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February 3, 2006

Ms. Genevieve Salmonson, Director
State of Hawai`i
Office of Environmental Quality Control
236 South Beretania Street, Suite 702
Honolulu, HI 96813

RE: South Hilo Sanitary Landfill Phase I Expansion
Final Environmental Assessment/FONSI

Dear Ms. Salmonson,

The Hawai'i County Department of Environmental Management has reviewed the comments received during the 30-day comment period which began on December 23, 2005. Our agency has determined that the project will not have significant environmental effects and has issued a FONSI. Please publish notice of this in the next available *Environmental Notice*. We have enclosed the following:

- Four copies of the Final EA
- A completed OEQC Environmental Notice Publication Form
- A distribution list for the Final EA
- A hard copy of the project summary (a version was e-mailed to your office on January 30, 2006)
- A sample "Dear Participant" letter

If you have any questions, please call me at 808-961-8083 or consultant Ron Terry at 808-982-5831.

Barbara Bell
DIRECTOR

cc: Michael Dworsky, SWD Chief

enclosures

1694

2006-02-23-HA-FEA SOUTH HILO SANITARY LANDFILL
PHASE I EXPANSION

SOUTH HILO SANITARY LANDFILL
PHASE I EXPANSION

WAIAKEA, SOUTH HILO, HAWAI'I

FINAL ENVIRONMENTAL ASSESSMENT

February 2006

Submitted Pursuant to the Hawai'i Environmental Policy Act (HEPA),
Chapter 343, Hawai'i Revised Statutes (HRS)

County of Hawai'i
Department of Environmental Management
25 Aupuni Street
Hilo, HI 96720

SOUTH HILO SANITARY LANDFILL
PHASE I EXPANSION

WAIAKEA, SOUTH HILO, HAWAI'I
TMK: 2-1-013:142, 152, 156 & 162

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Department of Environmental Management
25 Aupuni Street, Room 210
Hilo, HI 96720

The following person may be contacted for additional information concerning this document:

Barbara Bell
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(808) 961-8083

SUMMARY

The County of Hawai'i (County) is proposing to modify the slope profile of the South Hilo Sanitary Landfill (SHSL) to increase its overall capacity. The SHSL is the only permitted municipal solid waste (MSW) landfill in East Hawai'i and the County estimates that the SHSL will reach its currently permitted maximum capacity in 2006. The proposed project would steepen the perimeter slopes of the landfill, requiring a new final grading plan and a new State of Hawai'i Department of Health Solid Waste Management Permit. The SHSL's currently permitted maximum height and landfill footprint would not be increased as part of the Phase I Expansion. Normal daily operations at the landfill would not be affected, and the County does not propose to accept non-MSW or additional MSW beyond those quantities previously projected. This project would obviate the short-term need for municipal, commercial and residential transport of MSW to the West Hawai'i Sanitary Landfill at Pu'uanahulu in North Kona. No additional impacts to groundwater or surface water, air quality, noise, or odors would occur. The profile of the landfill would change almost imperceptibly and there would be negligible visual impact. Preliminary estimates indicate that the proposed Phase I Expansion could extend operation of the SHSL for an additional two to four years. It is anticipated that this additional capacity will provide the necessary time for the County to work toward other solid waste management solutions, including some combination of a vertical landfill expansion (Phase II), acquisition of a waste reduction technology facility, and increased strategies for waste reduction, recycling and re-use of certain MSW materials.

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ACRONYMS

AAQS	Ambient air quality standards
AMSL	(Elevation) above mean sea level
BMP	Best Management Practice
BOD	Biological oxygen demand
CO	Carbon monoxide
CFR	Code of Federal Regulations
DEM	County of Hawai'i, Department of Environmental Management
DHHL	State of Hawai'i, Department of Hawaiian Home Lands
DOH	State of Hawai'i, Department of Health
DPW	County of Hawai'i, Department of Public Works
DWS	County of Hawai'i, Department of Water Supply
EA	Environmental Assessment
EHRSS	East Hawai'i Regional Sort Station
EIS	Environmental Impact Statement
EISPN	Environmental Impact Statement Preparation Notice
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
GLA	GeoLogic Associates
HAR	Hawai'i Administrative Rules
HEPA	Hawai'i Environmental Policy Act
HRS	Hawai'i Revised Statutes
ISWMP	Hawai'i Integrated Solid Waste Management Plan
LCRS	Leachate collection and removal system
MCL	Maximum contaminant level
MSW	Municipal Solid Waste
NO_2	Nitrogen dioxide
NRCS	U.S. Natural Resources Conservation Service
O_3	Ozone
OEQC	Office of Environmental Quality Control
OSWM	State of Hawai'i, Department of Health Office of Solid Waste Mgmt.
RCRA	Resource Conservation and Recovery Act
SFHA	Special Flood Hazard Areas
SHSL	South Hilo Sanitary Landfill
SO_2	Sulfur dioxide
UH	University of Hawai'i
UIC	Underground Injection Control
USGS	U.S. Geological Survey
VOCs	Volatile organic compounds
WHSL	West Hawai'i Sanitary Landfill
WRTF	Waste Reduction Technology Facility

1 INTRODUCTION AND PURPOSE AND NEED FOR PROJECT

1.1 Project Location

Project Location

The South Hilo Sanitary Landfill (SHSL) is located at the eastern edge of Hilo on the Island of Hawai'i, approximately one mile east of Kanoelehua Avenue (State Highway 11), on TMKs 2-1-013: 142, 152, 156 and 162. Road access is via Leilani Street and an unnamed access road (see Figures 1-1 to 1-5). Nearby uses include:

- Keaukaha Military Reservation of the Air National Guard to the east and northeast, beyond which is the Hilo International Airport;
- Vacant land to the north;
- Green waste mulching site, a scrap metal salvage facility, and the County's Hilo Convenience Center to the northwest;
- Quarries and vacant land south, and the Panaewa Drag Strip 1.3 miles further south.
- Department of Hawaiian Home Lands Panaewa Farmlots to the west.

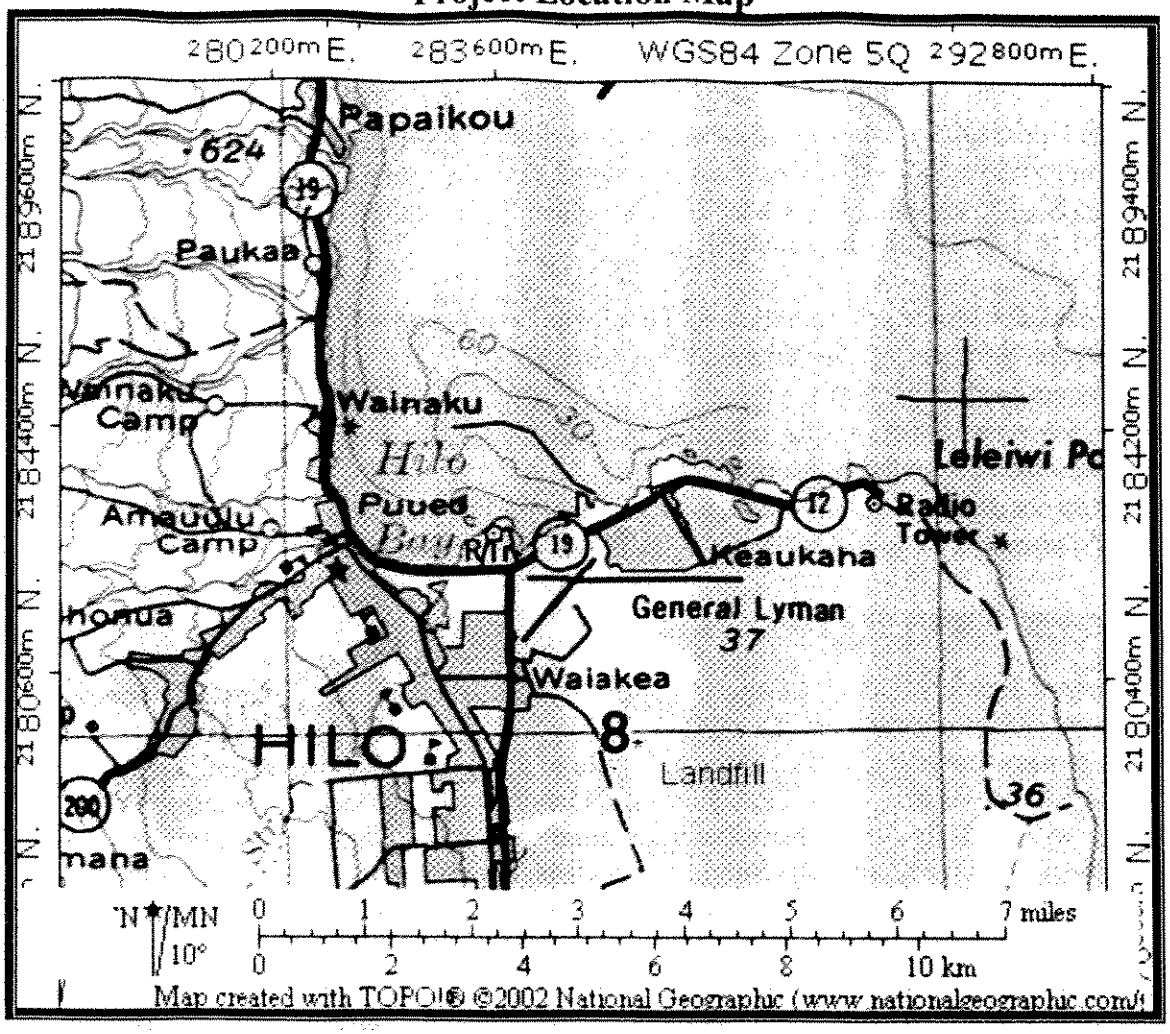
1.2 Project Purpose and Need

The County of Hawai'i (County) Department of Environmental Management (DEM) owns and operates two active landfill sites. One is the SHSL project site in Hilo, and the other is the West Hawai'i Sanitary Landfill (WHSL) at Pu'uanahulu in the district of North Kona. DEM estimates that the SHSL, an unlined (pre-RCRA Subtitle D) landfill that has been in operation since at least the 1960s, will reach its current permitted maximum capacity in 2006. Under current projections (DEM 2004), the WHSL, a RCRA Subtitle D landfill constructed in 1994 with a bottom liner and a leachate collection and removal system, is expected to reach capacity sometime between 2037 and 2049.

DEM's ultimate goal, in accordance with the *Update to the Integrated Solid Waste Management Plan for the County of Hawai'i*, (Hawai'i County DEM Harding ESE 2002), is to handle municipal solid waste (MSW) generated on the east side of the island in east side facilities to the extent feasible. This will reduce the need to transport MSW from Hilo to Pu'uanahulu, avoiding increases in illegal dumping and additional associated expenses related to added truck traffic on the island's highways. To this end, the County has actively implemented strategies to divert MSW from both landfills through programs developed to reduce/recycle/re-use materials that would traditionally be disposed of at a landfill. Another planned County facility, the East Hawai'i Regional Sort Station (EHRSS) (DEM 2004), when constructed, is anticipated to extend the life of the SHSL by helping to divert up to 45 percent of the volume of MSW currently being received at the adjacent Hilo Convenience Center as well as significant quantities of MSW currently received at the SHSL.

A further key task in the strategy to minimize the need to long-haul MSW is to develop a Waste Reduction Technology Facility (WRTF) for managing MSW generated throughout the County, especially on the east side of the island. Appropriate waste reduction technologies identified for

Figure 1-1
Project Location Map



the Big Island include waste to energy, anaerobic digestion, and thermal gasification. Waste reduction technologies offer possible solutions to divert or significantly reduce wastes from landfills while converting treated wastes into beneficial uses (i.e. electricity, building materials, or soil amendments). The County is currently investigating potentially feasible waste reduction technologies for implementation. It is preparing a request for proposals from WRTF vendors and is initiating an extensive public involvement process that will begin with an Environmental Impact Statement Preparation Notice (EISPN), scheduled for publication in early 2006. However, the timeframe for implementing such solutions extends beyond the currently projected operational life of the SHSL. Careful consideration must be taken to select a technology that is feasible for processing the quantity of waste generated within the selected service area by a technology service provider that has demonstrated the ability to commercially deliver, permit and maintain the selected technology.

Figure 1-2
Detailed Project Location Map

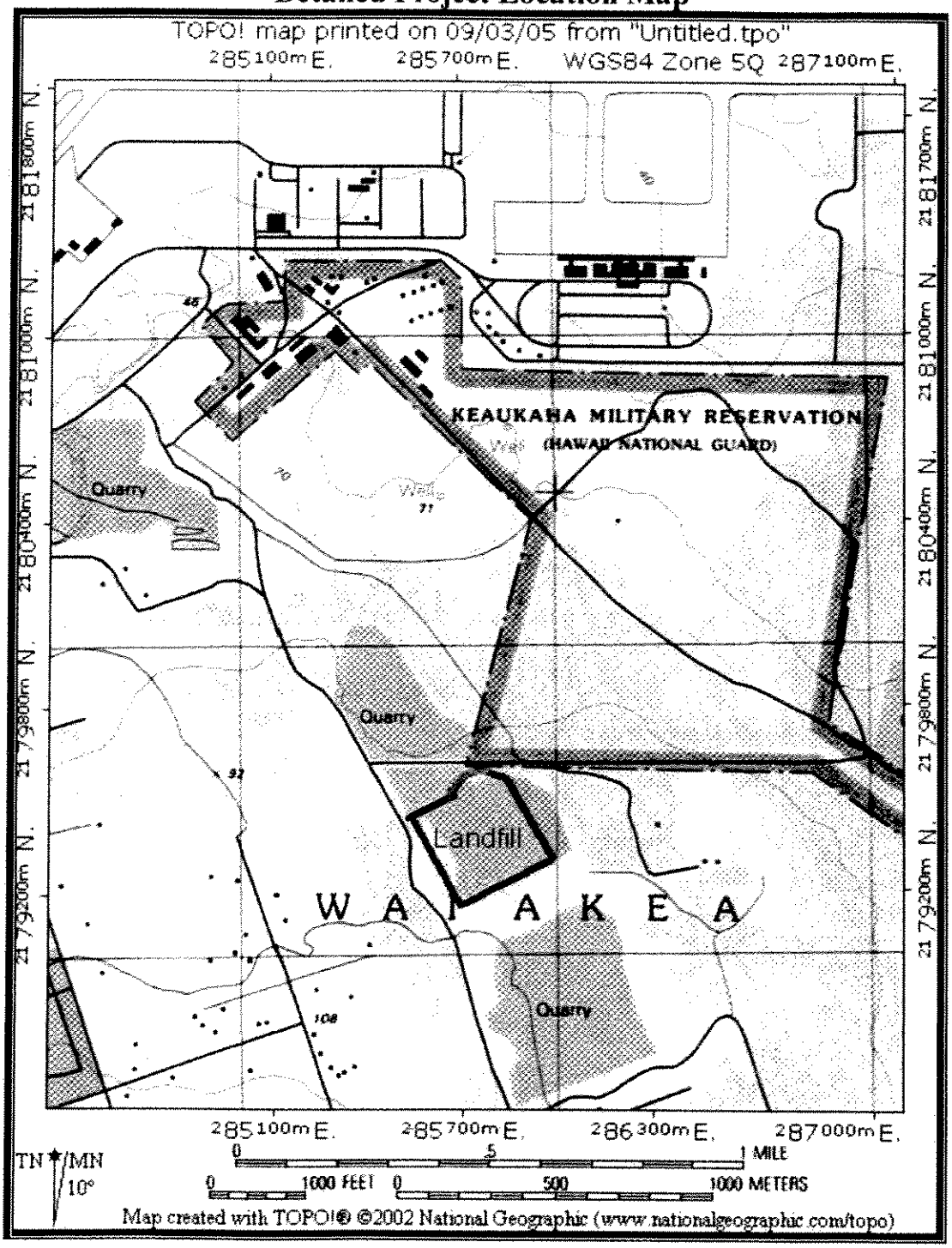


Figure 1-3
Real Property Tax Map

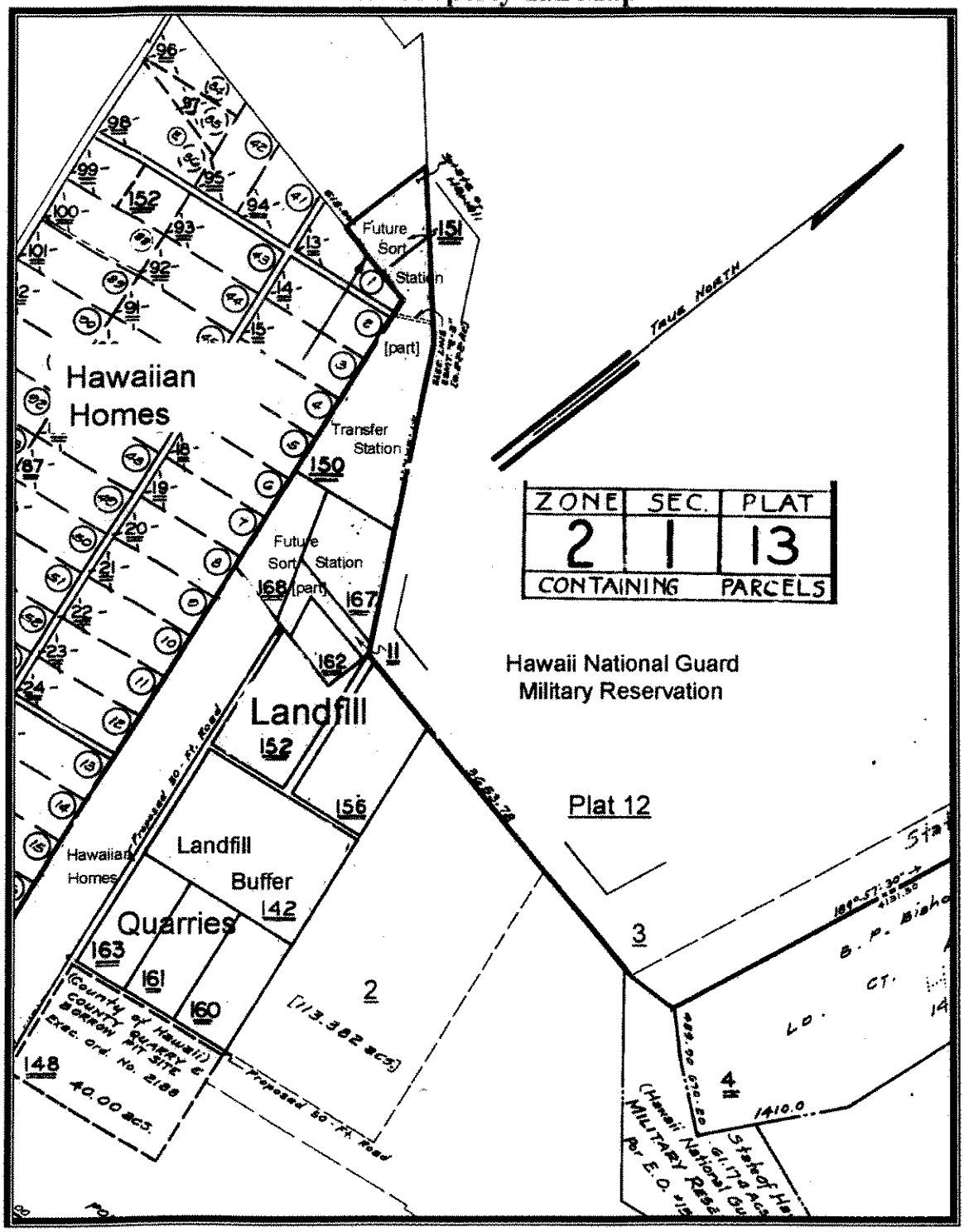
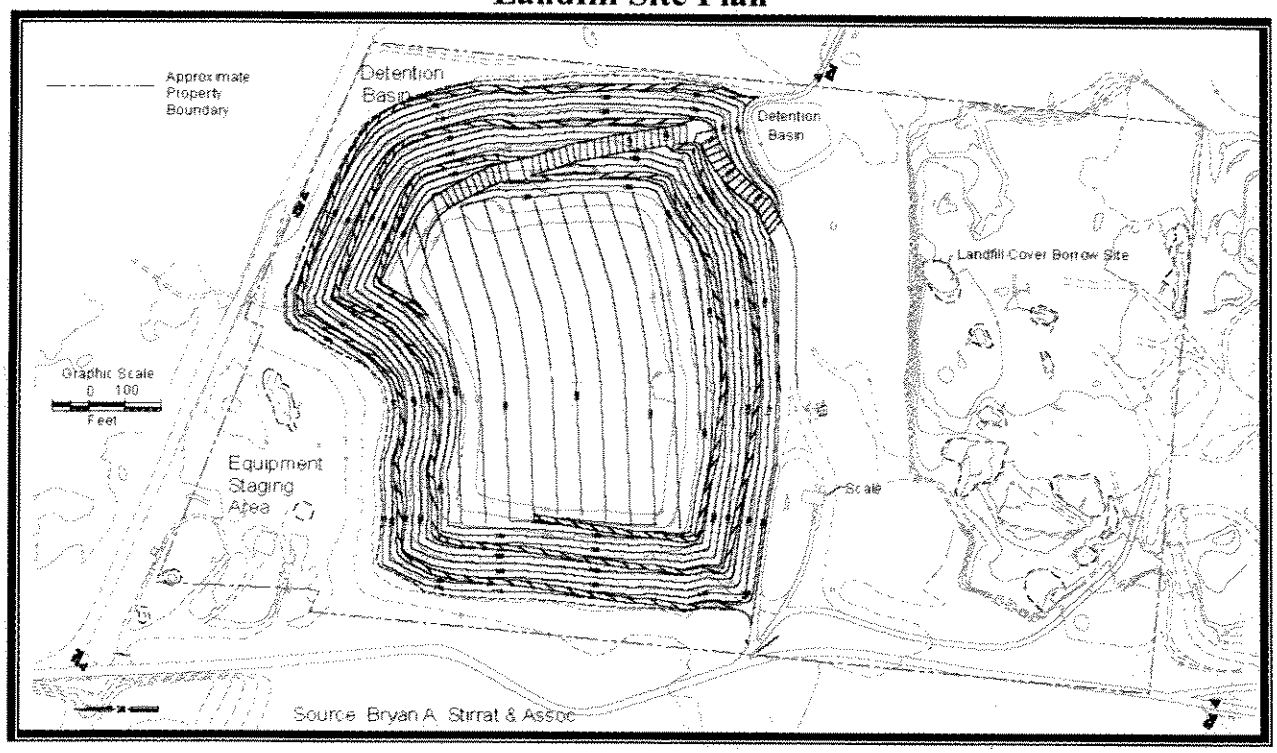


Figure 1-4
Landfill Site Plan



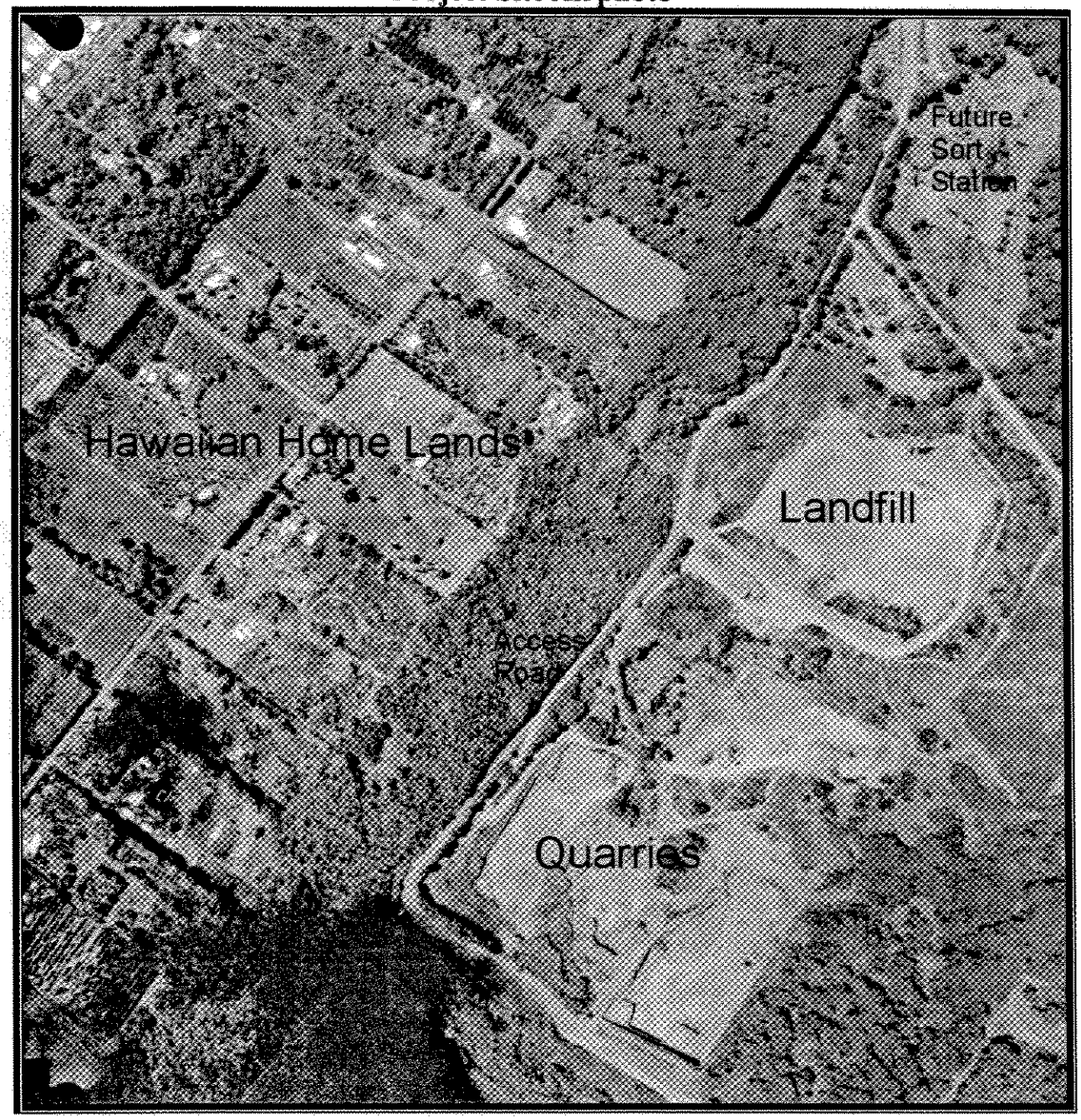
Any affordable waste reduction technology will still require an operating landfill for disposal of residuals and wastes that cannot be recycled or treated. Because of this fact, management of residuals and wastes (including liquid wastes and potential hazardous wastes) will need to be incorporated into the County's integrated waste management plans, as it is unlikely that an affordable technology will be capable of providing off-island management of residual wastes.

Unless more capacity at the SHSL is achieved, in accordance with County, State and federal regulations governing the management of MSW, the County will have no other viable option except to transport MSW to the WHSL sometime in 2006 during the interim period necessary to implement waste reduction and diversion plans.[1]

For the longer term, the County will study the feasibility of a vertical expansion (Phase II) of the SHSL that would provide additional landfill capacity. Currently, the County is not contemplating a lateral expansion of the SHSL nor any new landfills in East Hawai'i.

[1] As of late 2005 DEM is in the initial stages of investigating the feasibility of transporting MSW to mainland landfills via barges.

Figure 1-5
Project Site Airphoto



1.3 Current Facilities and Operations

The SHSL footprint is comprised of a single contiguous refuse fill area that encompasses an area of approximately 40 acres. The landfill has historically accepted MSW from commercial and residential haulers, as well as County trailers that collect MSW from County convenience centers. The convenience centers allow local residents to self-haul household refuse to a nearby location for temporary collection. An average of 82 commercial vehicles enter the SHSL each day. The County hauls more than ten convenience center trailers to the SHSL for disposal each day. Approximately 1,500 residents transport household refuse to the Hilo Convenience Center located adjacent to the SHSL each day, which is permitted to accept up to 40 tons of household refuse per day. In the most recent waste composition study (June 2001) approximately 67,000 tons per year of MSW was disposed in the SHSL. This represented approximately 43% of the total MSW disposed within the County annually. The origin of MSW disposed in the SHSL is:

- 48% of the total is from rural convenience centers,
- 38% of the total is from commercial waste haulers,
- 14% of the total is from residential self-haulers.

The estimated composition of the waste is as follows:

- Paper makes up 23.5%
- Glass makes up 3.0%
- Metal makes up 8.0%
- Plastic makes up 8.8%
- Organics (food, yard waste, textiles, etc.) make up 30.4%
- Construction and demotion waste make up 18.1%
- Household hazardous waste (paint, oil, etc.) makes up 0.3%
- Special waste (ash, sewage sludge, treated medical, bulky items, etc.) makes up 1.3%
- Other waste makes up 1.3%

Daily operations consist of personnel spreading 4-foot layers of waste up a slope to a height of approximately 6 to 8 feet, maintaining a maximum working face of approximately 50 to 100 feet. Next the layers are compacted to a minimum of approximately 1,200 pounds per cubic yard. In accordance with State and federal regulations governing solid waste management, and to minimize exposure of the working face to the elements and mitigate odors, vectors, and windblown trash, the waste is covered with approximately 6 to 12 inches of granular soil. Compliance with Hawai'i Administrative Rules (HAR) §11-58.1 requires that groundwater and landfill gas monitoring be conducted as part of normal landfill operations. Groundwater samples are collected on a quarterly basis from four wells and analyzed to determine if there are any landfill-related contaminants (see section 3.1.2.3 for details). Six permanent landfill gas probes sited adjacent to the SHSL footprint are used to monitor concentrations of methane and other landfill gases on a quarterly basis. To date, no environmental releases in exceedance of State and federal regulations associated with solid waste management have been detected at the SHSL.

County-wide recycling programs currently divert about 20 percent of the MSW generated within the County. The highest rates of diversion are achieved with greenwaste, metal, glass and paper. A steady increase in diversion has occurred over the last five years, and it is anticipated that as much as 45 percent will be diverted by the year 2020 through low-tech strategies, including improvements to the convenience centers to promote convenient and cost effective recycling, increased public education programs to demonstrate the benefits associated with recycling, disposal restrictions on certain commodities, development of commercial organic waste composting, and increased financial incentives for recycling and waste diversion.

1.4 Project Description

The County plans to steepen the perimeter slopes of the SHSL in order to expand the landfill's capacity. The current profile of the landfill is illustrated by the green line on Figure 1-6, which is a typical cross-section of the landfill, showing what it would look like from the side if it were cut in half. The current estimated in-place refuse volume at the SHSL is approximately 3.5 million cubic yards (cy). The current maximum size of the landfill is regulated by State of Hawai'i Department of Health (DOH) Solid Waste Management Permit No. SW-311286, which specifies the current (as of 2004 topography) fill volume plus the area shown in the light blue shading, which is the total remaining permitted airspace volume, approximately 194,000 cy. The proposed 2:1 horizontal Phase I Expansion, shown in dark blue shading, adds approximately 1.3 million cy of airspace to the existing permitted airspace. The total estimated remaining airspace including the permitted and proposed area is approximately 1.5 million cy.

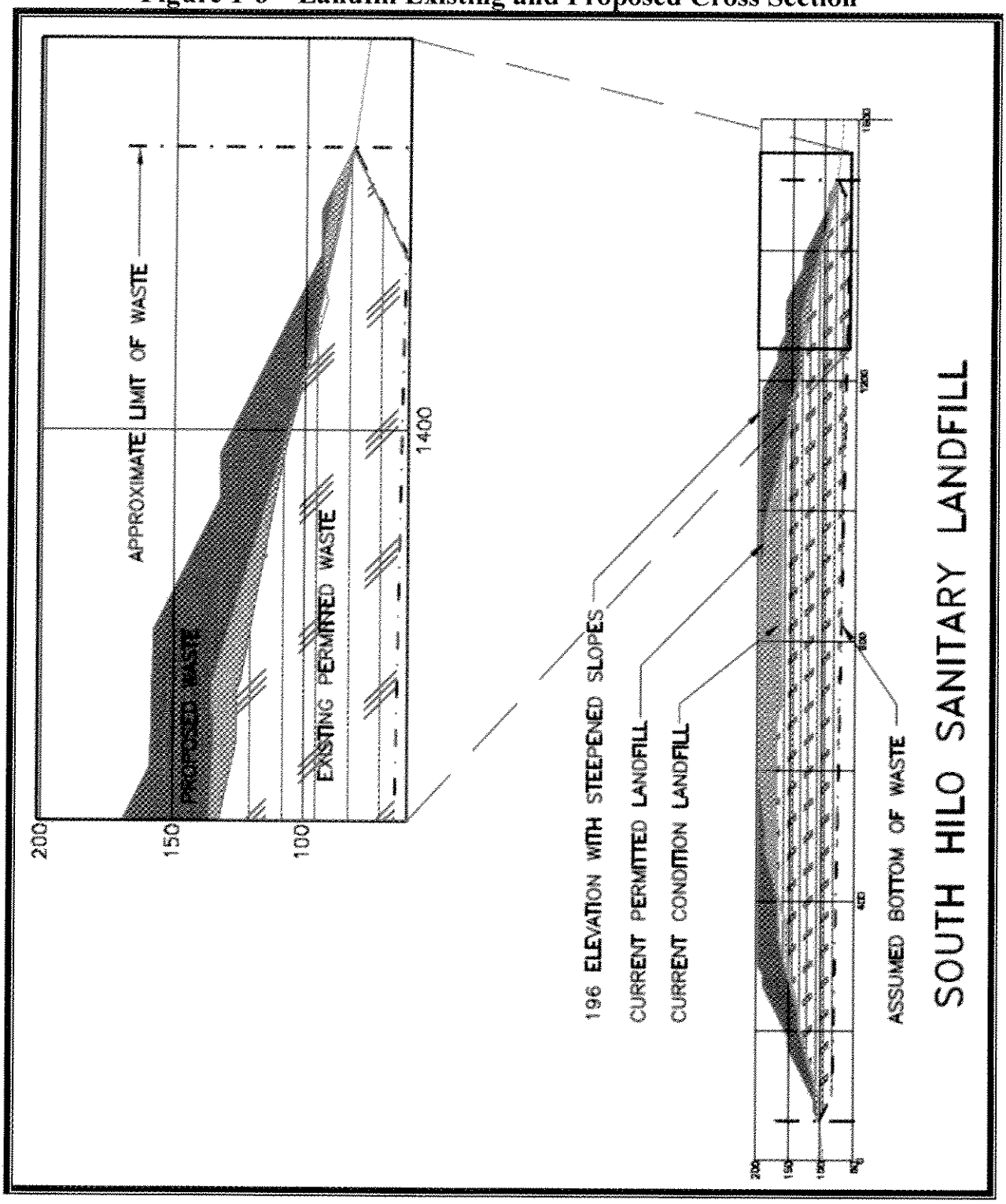
The proposed modification is depicted by the dark blue shading in Figure 1-6, and includes the following main features:

- Modifying the SHSL maximum sideslope gradient from 3.5:1 to 2:1 (horizontal:vertical);
- Addition of about 1.3 million cubic yards of landfill airspace capacity;
- Incorporating the use of an alternative final cover for closure of the SHSL; and
- Improvements to groundwater and landfill gas monitoring

The proposed project requires a new final grading plan and a new DOH solid waste management permit. The current permitted maximum height and MSW footprint of the landfill would not be increased, and normal operations at the landfill would remain essentially the same. The project would begin implementation as soon as the FONSI is declared and the DOH permit is granted.

This project would avoid the short-term need to transport MSW to the WHSL in Pu'uanahulu. Preliminary estimates indicate that the proposed project could extend operation of the SHSL for an additional 2 to 4 years; with the right circumstances and certain operational procedures, a longer landfill life might be gained. Depending on several factors – the rate at which the landfill achieves capacity after implementation of the proposed Phase I Expansion, the success of County-wide waste reduction, recycling and reuse programs, whether and when MSW is able to be disposed of off-island, and the successful acquisition of a Waste Reduction Technology Facility – a Phase II Expansion may be proposed at a later date. As currently envisioned, a Phase

Figure 1-6 Landfill Existing and Proposed Cross Section



II Expansion would raise the permitted maximum height of the landfill, which is now limited to 196 feet above mean sea level (AMSL), to a final proposed elevation of up to 260 feet AMSL.

It is anticipated that the proposed additional capacity achieved through the implementation of the Phase I Expansion will provide the time necessary for the County to work toward other solid waste management solutions, including permitting, design and construction of the WRTF, an increased recycling and re-use program, and construction of the EHRSS.

This strategy is consistent with the update to the Hawai'i County *Integrated Solid Waste Management Plan* (ISWMP – Hawai'i County DEM 2002). The ISWMP was adopted by the Hawai'i County Council in November 2002 and approved by DOH in April 2003. The ISWMP recognized that the two most urgent needs in the County are to identify a strategy to manage the waste produced in East Hawai'i after closure of the SHSL; and to increase island-wide waste diversion to preserve airspace at landfills. The proposed action is a direct action toward implementation of the ISWMP, in that it will provide additional time necessary to fully develop waste reduction, reuse, recycling and bioconversion efforts prior to closure of the SHSL.

Further details on the history of the landfill, the background and rationale for the project, capacity modeling, and the technical characteristics of the project are contained in Appendix 2, *Capacity Alternative Analysis – South Hilo Sanitary Landfill.*

1.5 State and Federal Regulatory Requirements

Chapter 343, HRS

Solid waste management has significant effects on the health, aesthetics, and land use characteristics of a community, and various regulatory conditions must be met to construct or expand MSW landfills. Because the proposed action involves expenditure of County funds on State land for the expansion of a public facility, it is subject to the Hawai'i Environmental Policy Act (HEPA) requirements under Chapter 343, Hawai'i Revised Statutes (HRS), and will also require a new solid waste management permit from DOH.

DEM is serving as the proposing/approving agency in the preparation of this Environmental Assessment (EA). This EA is meant to comply with HEPA, and it will also be submitted to DOH as an attachment to the County's SHSL solid waste management permit application. HAR 11-58.1-04, "Solid Waste Management Control," states that it shall be unlawful for any person to establish, modify, or operate any solid waste management facility or a part thereof or any extension or addition thereto without a permit issued by DOH.

HEPA was enacted by the State of Hawai'i to require State and County agencies to consider the environmental impacts of their actions as part of the decision-making process. The State Office of Environmental Quality Control (OEQC) is mandated with implementing Chapter 343 HRS, and has developed guidelines that specify how State and County agencies must carry out the requirements of HEPA. These regulations require State and County agencies to prepare an EA that investigates alternatives, discloses impacts and develops measures that mitigate adverse impacts. An important part of the process is the evaluation of the significance of impacts

according to thirteen specific criteria. Part 6 of this EA lists these criteria and the findings of the proposing agency. These findings have been finalized in consideration of comments received on the Draft EA, and this Final EA contains the determination by DEM that there are no significant impacts. DEM has thus issued a Finding of No Significant Impact (FONSI), and therefore an Environmental Impact Statement (EIS) is not warranted.

Laws and Regulations Governing Solid Waste

The federal government regulates solid wastes in the United States under Title 40 of the Code of Federal Regulations Subchapter I (40 CFR Parts 239 to 299). MSW landfills are subject to the regulations in 40 CFR Parts 257 to 258 (also known as RCRA Subtitle D). The Hawai'i State Department of Health, Environmental Management Division, Office of Solid Waste Management (OSWM), is responsible for implementing RCRA and State solid waste management rules and regulations within the State of Hawai'i. Hawai'i Administrative Rules, Title 11 Chapter 58.1 (HAR 11-58.1) regulates landfills, composting facilities, recycling operations, used oil transporters and salvage yards. The SHSL is currently permitted to accept MSW through DOH Solid Waste Management Permit No. SW-311286. This document is part of the permitting process to obtain a new DOH solid waste management permit for modification of the SHSL.

2 ALTERNATIVES

2.1 Proposed Alternative

The alternative proposed for implementation in this EA involves modifying the slopes of the SHSL in conformance with the plan described in Section 1.4, above. No lateral expansion or increase in the landfill's current permitted maximum height is proposed as part of this proposed alternative.

2.2 Alternatives Evaluated and Dismissed

Several other alternatives were considered during project formulation. Aside from minor sub-alternatives involving different slopes and benches, these consist of basically two options:

- Raising the maximum permitted elevation of the landfill; and
- Building another landfill in a nearby location.

Raising the maximum permitted elevation of the landfill would substantially increase the landfill's capacity without the need to expand the landfill laterally. A lateral expansion (or development of a new landfill) would require the County to incur substantial costs due to regulations governing management and treatment of leachate. Further extension of the landfill's current permitted maximum elevation would require consultation with State transportation and Federal Aviation Administration officials and would likely result in modifications to the landfill's operations and post-closure options. The alternative of constructing a nearby landfill was considered in depth as part of the East Hawai'i Regional Sort Station EIS (County DEM 2004), a discussion that is summarized below.

Federal and State regulations have been strengthened in the past decade in response to growing concern over the effect of landfills on water quality and other health and safety aspects of waste disposal. All new landfills and lateral expansions must have a low-permeability bottom liner and leachate management system that minimize the effect of landfills on water quality. In addition, the siting and operating criteria for new landfills are much more complex and include considerable monitoring and maintenance during operation of the landfill and for at least thirty years (30) after its closure.

All these factors have substantially increased the cost and lengthened the permitting procedures for establishing a new landfill or enlarging an existing landfill's footprint. Any new landfill would require a large initial capital outlay, an extensive period to design, permit and construct, and a significant financial commitments to accommodate closure and post-closure activities and associated risks relative to landfill ownership.

Specific landfill siting considerations for the Hilo area are availability of land; the proximity of major roads for access and egress, electricity, and water; landfill cover material; and rainfall and the cost of managing leachate. The first three factors are favorable for Hilo, as there are a number of depleted quarries in the area of the current landfill that could provide a potential location as well as quarries for providing fill; roads are present and utilities are all readily

available for expansion into the adjacent quarry area. However, because Hilo receives over 125 inches of average annual rainfall, both the cost of leachate management and potential adverse impacts on the municipal sewage system over the life of the landfill and its post-closure monitoring and maintenance periods led DEM to reject building a new landfill in or near Hilo as an alternative for the EHRSS. These same considerations are still valid, and it would be imprudent to construct a new landfill or expand the current one laterally using current permitted operating methods.

Future permitting of bioreactor landfills by DOH could substantially reduce the cost of laterally expanding the SHSL or constructing a new landfill in Hilo. Bioreactor landfills are steadily gaining acceptance as an appropriate technology for accelerating the decomposition of solid waste. One of the objectives of most landfills designed and operated in accordance with Federal RCRA Subtitle D regulations is to exclude moisture and remove leachate to minimize potential adverse impacts to underlying groundwater. Normal landfills are highly compacted and covered to exclude moisture. This creates an anaerobic environment where decomposition takes place in the absence of oxygen. Aerobic decomposition (with oxygen) is considerably faster. Bioreactor landfills are managed in a moist condition to create an aerobic environment in the waste that promotes rapid decomposition. Usually leachate is collected and re-circulated through the waste and, at some facilities in arid climates, moisture is added when necessary. In Hilo, however, rainfall would provide more than adequate quantities of moisture to operate a bioreactor landfill; and in fact, there would likely be surplus leachate that would require treatment and disposal. In addition to managing the moisture content of the waste, some bioreactor landfills capture landfill gas from which methane can be separated and used for fuel. The waste in bioreactor landfills is typically covered with an impermeable membrane and piping systems are incorporated into the waste cells to efficiently collect the useable landfill gases for use as fuel.

Besides fuel production, the benefits of accelerated decomposition include reduction of the waste mass and therefore increased capacity, reduction in the release of greenhouse gases because landfill gases are captured for reuse, long-term reduction in the biochemical oxygen demand (BOD) content of leachate, and earlier stabilization of the landfill after closure that facilitates post-closure maintenance and monitoring. Landfill waste volume reduction may be as much as 30 to 40 per cent.

In the past few years, bioreactor landfills have been constructed and operated in Virginia, California, and North Carolina. All are demonstration projects and all required regulatory approval to proceed. As liquids are prohibited from MSW landfills, regulatory approval was required to add moisture in the landfill in California. The East Coast landfills have liner systems that are not strictly in compliance with RCRA Subtitle D regulatory standards (although they are alternative systems approved by State regulations as allowed in the federal regulations).

Although a conventional lateral landfill expansion or new landfill is feasible, and bioreactor landfills may eventually be viable in Hawai'i, because both permitting time and costs are uncertain and would likely be high, neither is a prudent alternative for the problem at hand.

2.3 No Action Alternative

The No Action Alternative considered in this document would precipitate closing of the SHSL sometime in 2006. This is the default condition if the proposed action or alternatives are not implemented before the SHSL reaches capacity and ceases to accept waste. Residential haulers would continue to use the Hilo Convenience Center as it now exists; however, in the absence of the EHRSS and upon closure of the SHSL, the waste haulers that currently use the SHSL, including County convenience center refuse transport trailers, local residents, governmental agencies, and all the restaurants, hotels and other local businesses that self-haul waste to the SHSL would be required to transport MSW to the WHSL in North Kona. DEM considers this action undesirable primarily due to its excessive cost. DEM also recognizes the impact on island roads due to the increased cross-island traffic comprised of MSW-hauling vehicles, which would number 10-12 County convenience center refuse transport trailers per day if the EHRSS were in operation, or about 90 vehicles (County convenience center refuse transport trailers, commercial and private trucks) if the EHRSS is not built.

The No Action Alternative is inconsistent with the County's ISWMP. The County believes that it would create unacceptable impacts to essential services that maintain the standard and quality of life now enjoyed by County residents, local businesses and visitors. The No Action Alternative may promote illegal dumping because of the sudden disappearance of a convenient method of disposing of solid waste. Finally the No Action Alternative may promote inappropriate use of the Big Island's "Saddle Road" (Route 200) by commercial vehicles and illegal dumpers.

There is no initial construction cost for the No Action Alternative. However, a substantial extra operating cost for solid waste management would be distributed among government and commercial waste haulers. Commercial haulers operating in East Hawai'i would accrue additional costs, because instead of disposing of waste within approximately 10 miles of its collection point they would be hauling it about 85 miles. The increased distance would force these companies to increase staff and equipment to accommodate the approximately four-hour round trip to North Kona. Commercial haulers would pass the increased cost along to local businesses and other customers, who would in-turn pass the cost along to consumers. No effort has been made to quantify the increased cost to the public or commercial haulers; however, the cost of operation for East Hawai'i business is likely to rise perceptibly.

The County would incur additional cost from hauling waste from East Hawai'i convenience centers to the WHSL. A comprehensive cost estimate for the County is being developed as a contingency plan. The County's estimated cost for managing waste collected at the East Hawai'i convenience centers is in the vicinity of $77.00 per ton.

In summary, the No Action Alternative has significant disadvantages in terms of cost, traffic, and environmental quality.

3 ENVIRONMENTAL SETTING AND IMPACTS

This section describes the existing social, economic, cultural, physical and environmental conditions surrounding the proposed project, along with the probable impacts of the proposed action and mitigation measures designed to reduce or eliminate adverse environmental impacts. For most categories of impact, the No Action Alternative would result in no impacts. Therefore, unless explicitly mentioned, discussion of impacts and mitigation relates to the proposed Phase I Expansion Alternative only.

Basic Environmental Setting

The island of Hawai'i, home to approximately 148,677 residents in 2000 (U.S. Census of Population 2000), is largely rural. Major divisions include West Hawai'i and East Hawai'i. West Hawai'i's dry climate and calm ocean waters support a major tourism industry in the Kona and Kohala districts. East Hawai'i has an economy based on agriculture and the business and government functions headquartered in Hilo, the largest town on the island, with a population of about 41,000. The project area is within East Hawai'i in Hilo (Fig. 1-1), an urban area of about 25 square miles. Aside from Hilo, the other major populated area in East Hawai'i is the Puna District, with a population that is currently estimated to exceed 30,000. Settlement in the Puna District is scattered among dozens of sprawling rural subdivisions.

It is important to note that the proposed project would utilize the existing landfill footprint and would involve no lateral expansion nor any essentially different use of the landfill. The principal differences would be the profile of the perimter side slopes and the 2 to 4 year extension in the projected date of landfill closure. The on-ground area of most direct concern is within about 500 feet of the landfill and its service roads, where the existing landfill operations have the most potential to produce noise, odor, traffic, and occasional runoff. Traffic from self-hauling residents as well as County and commercial trucks also impacts Leilani Street and its intersections with Railroad and Kanoelehua Avenues.

Few sensitive uses are present within 2,000 feet of the SHSL and none within 1,000 feet. Several residences are located at distances from about 1,000 to 2,000 feet from the SHSL (see Figs. 1-2, 1-3 and 1-5), near the intersection of Auwae Road and Kahaopea Street, on agriculturally-zoned parcels. No public facilities, schools, churches or other noise-sensitive uses are located within 2,000 feet of the SHSL. DEM has not historically received complaints concerning the landfill from neighbors about noise, odor, dust, traffic, runoff or any other nuisance condition.

As for hydrological effects, there is a wider area of interest, comprising the basal aquifer under the landfill, the Kanoelehua and Port Industrial Areas, the Hilo International Airport, and the Keaukaha neighborhood.

3.1 Physical Environment

3.1.1 Geology, Hazards, and Soils

Existing Environment

The island of Hawai'i, youngest and largest of the Hawaiian chain, formed from the coalescence of five volcanoes during the last million years. The surface of the South Hilo District is composed of volcanic material from two volcanoes, generally separated by the Wailuku River. North of the Wailuku are Mauna Kea terrains, and south are Mauna Loa terrains. At the specific project site, the lava flows are from Mauna Loa and date from 750 to 1,500 years before the present (Wolfe and Morris 1996).

The soils in the project area are classified in the Papai series (rPAE), described as extremely stony muck, with 3 to 25 percent slopes. This series consists of well-drained, thin, extremely stony organic soils over fragmented 'a'a lava. They are found at elevations ranging from sea level to 1,000 feet and receive between 90 to 150 inches of annual rainfall. Areas with Papai soils are mostly covered in woodland, with some small areas used for pasture, orchards, and truck crops. These soils are slightly acid and are generally about 8 inches deep. Permeability for these soils is rapid, runoff is slow, and the erosion hazard is slight. Papai series soils are given capability subclass VII, meaning they have severe limitations that makes them largely unsuitable for cultivation, limiting their usefulness to pastureland or woodland. Additionally, Papai series soils are of limited use for road fill, as locations for highways, and foundations, due to the fragmental nature of the underlying 'a'a lava (U.S. Soil Conservation Service 1973).

This project would be subject to volcanic hazard, particularly lava inundation. According to the USGS hazard classifications, the entire project area is contained in Lava Flow Hazard Zone 3, on a scale of ascending risk 9 to 1. Zone 3 areas have had 15-75% of their surface covered by lava in the last 750 years, and 1-5% of their surface covered by lava since 1800, but are considered less hazardous than Zone 2, which designates areas directly adjacent to and downslope of active rift zones (Heliker 1990:23).

In terms of seismic risk, the entire island of Hawai'i is rated Zone 4 Seismic Probability Rating (Uniform Building Code, Appendix Chapter 25, Section 2518). Zone 4 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built. Partly owing to the lack of unconsolidated sediments in the local substrate, none of the several earthquakes of Richter magnitude 6.0 or greater that have occurred on the island since 1950 has caused substantial damage to well-engineered roads, bridges or other roadway structures.

Impacts and Proposed Mitigation Measures

Any solid waste facility in this part of Hilo is subject to the hazard of lava flows. There are no practical measures to avoid this impact, as areas of less volcanic hazard across the Wailuku River have soils, slopes and drainage characteristics that make them unsuitable for landfills.

As the landfill is already in place, no existing soil will be disturbed aside from the mixture of soil and rock obtained from adjacent permitted quarries and used for landfill cover, and there are no other considerations related to soil.

Although there have been no slope failures at the current landfill, the stability of the landfill is an important consideration. Placement of solid waste on slopes that are too steep to be supported by the shear strength of the material may become unstable, creating a safety hazard and preventing the SHSL from complying with permitted conditions. In order to assess the potential for slope instabilities of the placed MSW, GeoLogic Associates (GLA) performed a slope stability analysis for various proposed SHSL final grading options (GLA 2005). This report is included as an appendix to the SHSL Operations Manual and is available for review at DEM by appointment. In summary, the conditions for slope instability considered the maximum possible earthquake that could affect the area (producing a maximum horizontal acceleration of 0.8g), the properties of MSW, depth to ground water, and various slope geometries. The study concluded that all proposed slope configurations, including that included in the Phase I Expansion, would be stable, and that the landfill would not be subject to slope instabilities and mass wasting.

3.1.2 Hydrology and Water Quality

3.1.2.1 Floodplains

Existing Environment

Floodplain status for the project area has been determined by the Federal Emergency Management Agency (FEMA), which has mapped the area as part of the National Flood Insurance Program's Flood Insurance Rate Maps (FIRM). A summary of applicable Special Flood Hazard Areas (SFHA) designations in the Hilo area is as follows:

- Zone A: SFHAs subject to inundation by the 100-year flood. Because detailed hydraulic analyses have not been performed, no base flood elevation or depths are shown. Zone AE: SFHAs subject to inundation by the 100-year flood determined in a Flood Insurance Study by detailed methods. Base flood elevations are shown within these zones.
- Zone AH: SFHAs subject to inundation by 100-year shallow flooding (usually areas of ponding where average depths are between 1 and 3 feet. Base flood elevations derived from detailed hydraulic analyses are shown in this zone.
- Zone VE: the 100-year coastal, high hazard floodplain, incorporating storm surges. Base flood elevations derived from detailed hydraulic analyses are shown in this zone.
- Zone X: Areas identified in the community flood insurance study as areas of moderate or minimal hazard from the principal source of flood in the area.

The project site is within Flood Zone X, or areas subject to moderate or minimal flood hazard.

Impacts and Mitigation Measures

There will be no impact to floodplains, as no floodplains are present in the project area.

3.1.2.2 Surface Water

Existing Environment

There are no surface water features, such as streams, ponds, coastal waters, or wetlands, in the immediate vicinity of the landfill. Old quarries located about a mile to the northwest contain ponds, and a rarely flowing drainage ditch that collects water from streams and ditches in the southeastern part of Hilo, discharging into vacant, low-lying land about a half-mile south of the landfill.

During and immediately after heavy rainstorms, water runoff sheet-flows off certain portions of the landfill face and slopes. Part of this water may percolate within the upper layers of the landfill and re-emerge on the landfill face before flowing down. Because such water may have contacted solid waste, it is referred to as leachate. All surface water is captured within the facility boundary, and concentrated flows are diverted into onsite detention basins (see Figs. 1-4 and 1-5) where water percolates into the ground.

Landfills constructed after the adoption of the RCRA Subtitle D regulations (40 CFR Parts 257 and 258) in 1993 have been required to have bottom liners and a leachate collection and removal system (LCRS). Landfills equipped with an LCRS are required to sample the collected liquid to determine potential impacts to groundwater and to include all relevant leachate constituents in the groundwater monitoring parameters. The SHSL predates Subtitle D, and in keeping with contemporary practice, was built without a bottom liner or LCRS.

The SHSL is exempt from coverage under the National Pollutant Discharge Elimination System (NPDES) general permit for storm water associated with industrial activity and therefore does not conduct surface water sampling and analyses as part of a mandated NPDES program. There are no surface water bodies (ponds, streams, lagoons, etc.) at the SHSL that receive surface water run-off from the site. Normal landfill surface water monitoring includes visual inspections of onsite detention basins and drainage ditches to ensure that adequate capacities are maintained to prevent run-on to the waste prism, minimize stormwater ponding within areas accessible to the public, and to contain run-off within the facility boundary.

Impacts

No surface water features are present in the vicinity of the landfill, and none are affected by current operations or would be affected by the proposed Phase I expansion. Stormwater from the facility is captured in onsite detention basins where it percolates through soil and rock down into the groundwater.

Mitigation Measures

The County will continue to maintain the SHSL stormwater management system to ensure that run-on to the landfill is minimized and that all run-off is confined within the facility boundary, in conformance with Chapter 27 ("Flood Control") of the Hawai'i County Code, and applicable flood control policies.

In addition, the County is planning to initiate a limited voluntary investigation of landfill-affected stormwater, as the chemistry of this liquid may be similar to that of the leachate that percolates through the waste, and may thus provide valuable information for the groundwater monitoring program (see Section 3.1.2.3, below). Although this sampling and analysis will not produce the same level of information on leachate chemistry that a Subtitle-D LCRS would be able to provide, it may help refine monitoring of groundwater quality.

3.1.2.3 Groundwater Quality

Existing Environment

The SHSL is situated on a series of basalts that flowed from Mauna Loa in late Pleistocene to Holocene time (or between 250,000 and 500 years before present). The uppermost groundwater aquifer beneath the landfill is typically encountered just above sea level, or about 70 to 90 feet below the ground surface at the site. As defined by the State of Hawai'i, groundwater beneath the site is part of the North East Mauna Loa aquifer sector of the Hilo aquifer system. The SHSL lies above the segment of this aquifer that is seaward (makai) of the Underground Injection Control (UIC) line, which is found a minimum of one mile inland (mauka) of the SHSL. According to the State of Hawai'i Department of Health (DOH), groundwater that is makai of the UIC is not considered a drinking water source, while groundwater that is mauka of the UIC is considered a drinking water source. Thus, the portion of the North East Mauna Loa aquifer below the SHSL extending downgradient towards the Pacific Ocean is not considered a suitable drinking water source.

Environmental monitoring of the SHSL is regulated by DOH requirements contained in HAR 11-58.1 and 40 CFR 257-258. These regulations require a landfill to have a groundwater monitoring system that includes monitoring wells that extend into the uppermost aquifer beneath the landfill. Wells must be constructed upgradient of the landfill to monitor background water quality, as well as downgradient of the landfill to monitor groundwater that could be affected by a release from the landfill. The regulations require use of a sufficient number of wells to account for naturally-occurring variations in groundwater flow directions and groundwater chemistry.

Groundwater beneath the SHSL is monitored by four monitoring wells, including one upgradient (background) monitoring well, and three downgradient (compliance) wells. Each of these wells provides for adequate sample collection of groundwater from the uppermost aquifer below the SHSL. Groundwater sampling began in 1995 and has been conducted quarterly since that time. Historical groundwater elevation measurements indicate that groundwater flow conditions remain very consistent over time. Groundwater flows in a northeasterly direction passing beneath the landfill to the downgradient monitoring wells. The consistency in the groundwater flow direction and gradient means that groundwater flows in the same direction and at the same rate over time. Based on the groundwater flow direction and velocity, the monitoring wells are appropriately located and monitored to detect an environmental release from the SHSL.

Groundwater monitoring has been conducted quarterly since 1995, resulting in 29 discrete sampling events. Groundwater samples are analyzed for general chemistry parameters, heavy metals, and volatile organic compounds (VOCs). General chemistry parameters include nitrate

as ammonia, alkalinity, total organic carbon, and total dissolved solids. These parameters are used as a general assessment of aquifer chemistry. Elevated concentrations of these parameters may indicate a release from the landfill, other human activities (such as a leaking septic tank or storm drain), seawater intrusion into the aquifer, or naturally occurring variations in the aquifer chemistry. Groundwater samples are also analyzed for fifteen different heavy metals, such as copper, lead, and chromium. If present in landfill wastes, metals can be released when the wastes become acidic. Heavy metals may also be present naturally in the aquifer bedrock and soils. Volatile organic compounds are man-made chemicals or are chemicals created by bacteriological breakdown of man-made substances. Examples of VOCs include benzene and toluene, which are components of gasoline and other fuels, and tetrachloroethene and trichloroethene, which are solvents with diverse industrial uses. Groundwater samples are analyzed for VOCs, and the presence of these compounds in groundwater is definitive of contamination by man-made sources. VOCs can enter groundwater from a fuel spill, landfill leachate percolation, or industrial discharge.

Groundwater samples are collected by qualified field personnel and are analyzed by an analytical laboratory using test methods prescribed by the U.S. Environmental Protection Agency (EPA). Groundwater samples are accompanied by chain-of-custody documents that list all persons who have handled the sample, and by a series of duplicate and blank samples that are used to assess the quality of the laboratory's analytical abilities.

To determine whether the landfill has affected water quality, groundwater sample data are analyzed using statistical and non-statistical methods. Statistical methods compare groundwater chemistry data collected from the upgradient (background) well with data collected from the wells that are downgradient of the landfill. Statistical methods also look for changes in groundwater chemistry that occur over time in each well. Statistical anomalies are concluded when the downgradient groundwater chemistry data are found to be significantly different than the upgradient (background) monitoring data, or when a current analyte concentration is statistically different than values measured historically. A calculated statistical anomaly may indicate that a release from the landfill has occurred. Non-statistical data analyses methods include comparing water quality data with established water quality goals, such as drinking water standards or the U.S. EPA's maximum contaminant levels (MCLs).

If a release from the landfill is identified, then DOH rules require the landfill owner/operator to take the necessary measures to evaluate the nature and extent of the release, and then upon confirmation of the release, to evaluate and if necessary mitigate the release to minimize its impact on human health and the environment.

To date, the SHSL has been sampled 29 times, twice the number of sampling events that are required by DOH for the period of time that the monitoring wells have been in place. Data collected during that time indicate that groundwater downgradient of the landfill has a slightly different chemical signature than the groundwater upgradient of the landfill, and this difference appears to be related to natural tidal influences on groundwater chemistry. No statistical or non-statistical evidence of a release to groundwater has been identified. An independent assessment of the landfill groundwater monitoring system found the number, depth, and placement of monitoring wells was adequate and appropriate to detect a release from the landfill (GLA 2004).

Impacts and Mitigation Measures

No adverse impacts to groundwater quality have been detected from the current operation of the landfill, and steepening the perimeter side slopes and extending the lifetime 2-8 more years is not expected to alter this. It should be noted that in an effort to continue the high quality of groundwater quality observation and protection, DEM proposes to maintain a semi-annual sampling frequency incorporating a minimum of two additional groundwater monitoring wells and has recently included additional laboratory analyses to look for additional VOCs in the collected samples. Furthermore, groundwater monitoring parameters may likely to be refined as a result of the planned analysis of stormwater "leachate" discussed in Section 3.1.2, above.

3.1.3 Climate and Air Quality

Existing Environment

The climate of Hilo can be described as moderately wet and tropical. Average high temperatures vary from approximately 80° Fahrenheit (F) in the winter to 84° F in the summer. Temperature lows average approximately 64° F in the winter and 69° F in the summer. Mean annual rainfall in the project area is about 125 inches. Wind is important for its effect on dispersion or concentration of pollutants. The SHSL typically experiences east to southeast trade winds with speeds of 10-20 miles per hour. In winter, these are often replaced by kona winds, from the south or southeast. These winds are generally light, and seldom exceed an average daily speed of 10 miles per hour (UH-Hilo Dept. of Geography 1998).

Regional and local climate along with the type and amount of human activity generally dictate the air quality of a given location. Federal and state air quality standards limit ambient concentrations of pollutants produced by motor vehicles. These include particulate matter, sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and lead. These ambient air quality standards (AAQS) are specified in Section 40, Part 50 of the Code of Federal Regulations (CFR) and Chapter 11-59 of the Hawai'i Administrative Rules. Each regulated air pollutant has the potential to create or exacerbate some form of adverse health effect or to produce environmental degradation when present in sufficiently high concentration for a prolonged period of time. The state and federal governments periodically monitor air quality to determine whether it meets AAQ standards. Areas that do not meet standards are termed non-attainment areas and are subject to Conformity Rules. The entire State of Hawai'i is considered to have acceptable air quality and is thus an attainment area not subject to Conformity Rules.

Air quality on Hawai'i Island is affected by emissions from industrial sources, vehicles, and natural sources. The major industrial source for the island is oil-fired power plants, which emit SO_2, nitrogen oxides, and particulate matter. Motor vehicles emit CO, nitrogen oxides and hydrocarbons (an ozone precursor), as well as smaller amounts of other pollutants including particulates. Also emitting SO_2 is one geothermal power plant in the area, Puna Geothermal Venture, which supplies about 10-20% of the island's electricity. Volcanic emissions of sulfur dioxide convert into particulate sulfate, which causes a volcanic haze (vog) to blanket the area during occasional episodes of southerly kona winds.

The State of Hawai'i operates a network of air quality monitoring stations around the state. Currently there are five air quality monitoring stations on Hawai'i Island, one in Hilo, three in Puna, and one at Konawaena High School in Kealakekua (as well as three monitoring stations measuring hydrogen sulfide [H_2S] emissions near Puna Geothermal Venture power plant). Data from all stations indicate that concentrations are well within State air quality standards (no federal standards exist for H_2S), with no measurements exceeding State standards during the period of 2001-2004. In fact, no single measurement from any of the Hawai'i Island air quality monitoring stations was above any applicable State or federal standards during this period.

The general area near the landfill includes other uses that affect air quality, including quarries, industrial operations and HELCO's principal fossil fuel-fired electricity generating plant, but there is no recognized impairment of air quality in the area.

The principal air quality issues associated with landfills are dust, engine exhaust from trucks and and heavy equipment, landfill gases (primarily methane and carbon dioxide – see discussion below) that result from decomposition of refuse, and odors. Some landfills (such as the old Kailua and Waimea Landfills) also experience subsurface fires.

Currently, the isolation of the site from sensitive uses and the implementation of Best Management Practices (BMPs) and daily cover minimizes the problems of dust, odor, and engine exhaust. Historically, no landfill fires have occurred at the SHSL.

Landfill Gases

When organic wastes are buried in the ground, micro-organisms in the wastes and surrounding soil feed on the wastes, causing them to decompose over time. The decomposition of wastes by aerobic and anaerobic processes creates heat and gas as byproducts. All landfills with a sufficient quantity of organic wastes and moisture will decompose in this manner. Gas produced by decomposition of wastes is referred to as landfill gas. Once this gas migrates into the fractures or pores of the surrounding soil or rock, it is referred to as soil-pore gas.

The earth's atmosphere typically contains about 78 percent nitrogen and 21 percent oxygen, and the remaining 1 percent includes argon, carbon dioxide, and traces of other gases. The primary components of landfill gas include methane, carbon dioxide, carbon monoxide, hydrogen sulfide, and traces of numerous VOCs. The concentrations of landfill gas components vary based on the composition, moisture content, age of the waste, and the porosity of the soils in the landfill. A "typical" landfill gas may contain more than 20 percent carbon dioxide, a very low percentage of oxygen, and 40 to 60 percent methane. VOCs typically make up less than 1 percent of landfill gas. Because landfill gas composition is significantly different than the earth's atmosphere, exposure to these gases may pose a risk to human health or the environment. For example, an oxygen content of less than 19 percent may lead to oxygen deprivation, while methane concentrations greater than 5 percent by volume may pose an explosion risk.

The State of Hawai'i and U.S. Environmental Protection Agency require landfill owners and operators to monitor their sites for explosive gases and ensure that methane concentrations at the

property boundary and in on-site structures do not exceed 25 percent of the lower explosive limit (or 1.25 percent by volume). In accordance with these requirements, the SHSL is equipped with six soil-pore gas monitoring probes that have been constructed around the perimeter of the landfill. The probes extend more than 30 feet into the ground and are designed to intercept landfill gas that might migrate into the adjacent soil and rock. Each probe is monitored four times each year to measure methane concentrations, using calibrated field instruments that provide immediate information. To date, measurable concentrations of methane have not been identified in the soil-pore gas monitoring probes. In addition to monitoring of the perimeter soil-pore gas probes, structure monitoring is conducted quarterly at each on-site structure, using the same instrument and protocol employed for perimeter gas monitoring. To date, methane has not been detected in any of the on-site structures. An independent assessment of the landfill gas monitoring system found the number, depth, and placement of landfill gas monitoring probes was adequate and appropriate to detect a release from the landfill (GLA 2004).

Impacts and Mitigation Measures

The proposed Phase I Expansion will essentially continue operations at the site, with similar volumes of municipal solid waste, and is not anticipated to cause additional impacts in terms of dust, exhaust, landfill gas, odor, or fire potential. As there are currently no substantial ongoing problems with these issues, no significant impacts are expected to occur.

3.1.4 Noise

Existing Environment

The area presently has a fairly high existing noise levels resulting from the combined effects of truck traffic servicing the SHSL, the adjacent Hilo International Airport, nearby quarries and industrial sites, and the occasional use of the Panaewa Drag Strip. However, the nearest sensitive uses – residences near the intersection of Auwae Road and Kahaopea Street – are 1,000 feet or more distant, where landfill noise is perceptible but not a nuisance, and is blended in with airport, industrial, agricultural, and naturally occurring sounds. Existing noise impacts from the SHSL on sensitive receptors are thus modest.

Impacts and Mitigation Measures

The proposed slope modification would not noticeably increase noise, but it would prolong the period during which noise from the landfill was produced. Due to the rural nature of the project area, the noise-producing nature of surrounding uses, and because no sensitive receptors exist in the project area, the project is not expected to produce noise impacts.

No Action Alternative Impacts

Even with landfill closure, it is likely that greenwaste mulching, scrap metal salvage processing, proposed Sort Station activities, and nearby quarrying would continue to produce noise of nearly the same level on the site.

3.1.5 Scenic Values

Existing Environment

The Hawai'i County General Plan lists a number of sites of natural beauty in the Hilo area in the (Hawai'i County Planning Department 2005) (Table 3-1).

The SHSL is visible from at least one of the viewplanes mentioned in the *General Plan* (Halai Hill), as well as a limited number of other locations in Hilo such as the Puainako Street Extension and the UH Research and Technology Park (Figs. 3-1a-d). Even from these perched vantages, the bulky base of the SHSL is hidden behind vegetation and occupies only a small segment of the horizon, and is therefore unobtrusive and inconspicuous relative to other features of urban Hilo. These views also include much of the urban Hilo area, including the Port of Hilo and the Hilo International Airport.

By contrast, in the land surrounding the SHSL, line-of-sight views of the landfill are generally obstructed because of the relatively flat terrain and the dense, tall forest that acts as a visual barrier. Some residences are present in the DHHL agricultural lands adjacent to the SHSL, which front Auwae Street and are accessed via Railroad Avenue and Kahaopea Street. Viewplanes of the SHSL from these residences are generally obstructed by tall foliage, in places including tall albizzia trees (*Paraserianthes falcataria*). These trees are mainly found on TMK 2-1-13:158, a 95.392-acre property owned by the Hawai'i State Department of Hawaiian Home Lands (DHHL).

As noted elsewhere, other than the DHHL agricultural lots, land uses surrounding the SHSL are generally industrial, including the Hilo International Airport and industrial areas to the north, and are thus less sensitive in terms of visual impacts. Regardless, the views towards the landfill from these areas are also obstructed by trees.

Impacts and Mitigation Measures

The proposed slope modification would only marginally change the size and appearance of the landfill (see Fig. 1-6 for comparison of current and proposed profile). The SHSL is presently visible only from areas that are a significant distance (2-10 miles) away on the upper slopes of suburban Hilo. From these mauka areas the increase in the apparent size of the SHSL due to the proposed action will be negligible.

Upon final closure, the landfill will be surfaced with vegetation as described in the SHSL Operations Manual. The landfill will have the appearance of a low, linear vegetated hill, distinguishable from but not disharmonious with adjacent landscapes. If the presence of dense forest on TMK 2-1-13:158 is maintained, the landfill will continue to be obscured from any nearby properties with sensitive views. If for some reason this forest cover is removed, and the landfill becomes a visually intrusive presence on nearby properties, the County may wish to consider planting trees on the western boundary of the landfill properties to act as a visual screen.

Table 3-1
Areas of Natural Beauty in Hawai'i County General Plan

Scenic Resource	TMK	Location
Banyan Drive Scenic Area	2-1-01, 03, 05	Waiakea
Liliuokalani Gardens	2-1-03:2	Waiakea
Viewpoint of Hilo Bay area with Mauna Kea in Background	2-1-03:2	Waiakea
Viewpoint of Hilo Bay with Mauna Kea in Background	2-1-03:17	Waiakea
Coconut Isle (Mokuola)	2-1-03:19	Waiakea
Reeds Bay (Shoreline)	2-1-05:1	Waiakea
Ice Pond	2-1-06:10	Waiakea
Viewpoint-Shoreline (Leleiwi Point)	2-1-11:5	Waiakea
Lehia Park (undeveloped)	2-1-13:5	Waiakea
Viewpoint-Shoreline (Keokea Point)	2-1-14:13	Waiakea
Lihikai (Onekahakaha) Beach Park shoreline	2-1-14:13	Waiakea
Waiahole Fish Pond	2-1-15:1	Waiakea
Haleolono Fish Pond	2-1-15:42	Waiakea
Leleiwi Park shoreline	2-1-16-19	Waiakea
Lokoaka Pond, Akahi Pond, and Kionakapahu Pond	2-1-16:1	Waiakea
Viewpoint-Shoreline (Waiuli Point)	2-1-19:9	Waiakea
Wailoa River Area: --Hoakimau Fish Pond; --Mohouli Fish Pond; --Waiakea Fish Pond	 2-2-13:3; 2-2-29:27; 2-2-31:1	Waiakea
Puu Halai (Halai Hill)	2-3-22	Ponahawai
Rainbow Falls and Area (Wailuku River Park)	2-3-27:1, 2	Pi'ihonua
Kaimukanaka Falls and Area	2-3-27:3, 5	Pi'ihonua
Boiling Pots and Area	2-3-29:12	Pi'ihonua
Viewpoint on hilltop looking over Hilo Bay	2-3-37	Ponahawai
Wai'ole Falls and Area	2-5-9:4	Pi'ihonua
Pe'epe'e Falls and Area	2-5-10:1	Pi'ihonua
Viewpoint from lower Wailuku Bridge looking makai	2-6-02	Pi'ihonua
Viewpoint from lower Wailuku Bridge looking mauka	2-6-03	Wailua
Alealea Point looking towards Hilo Bay	2-6-15:1	Wailua

Figure 3-1a

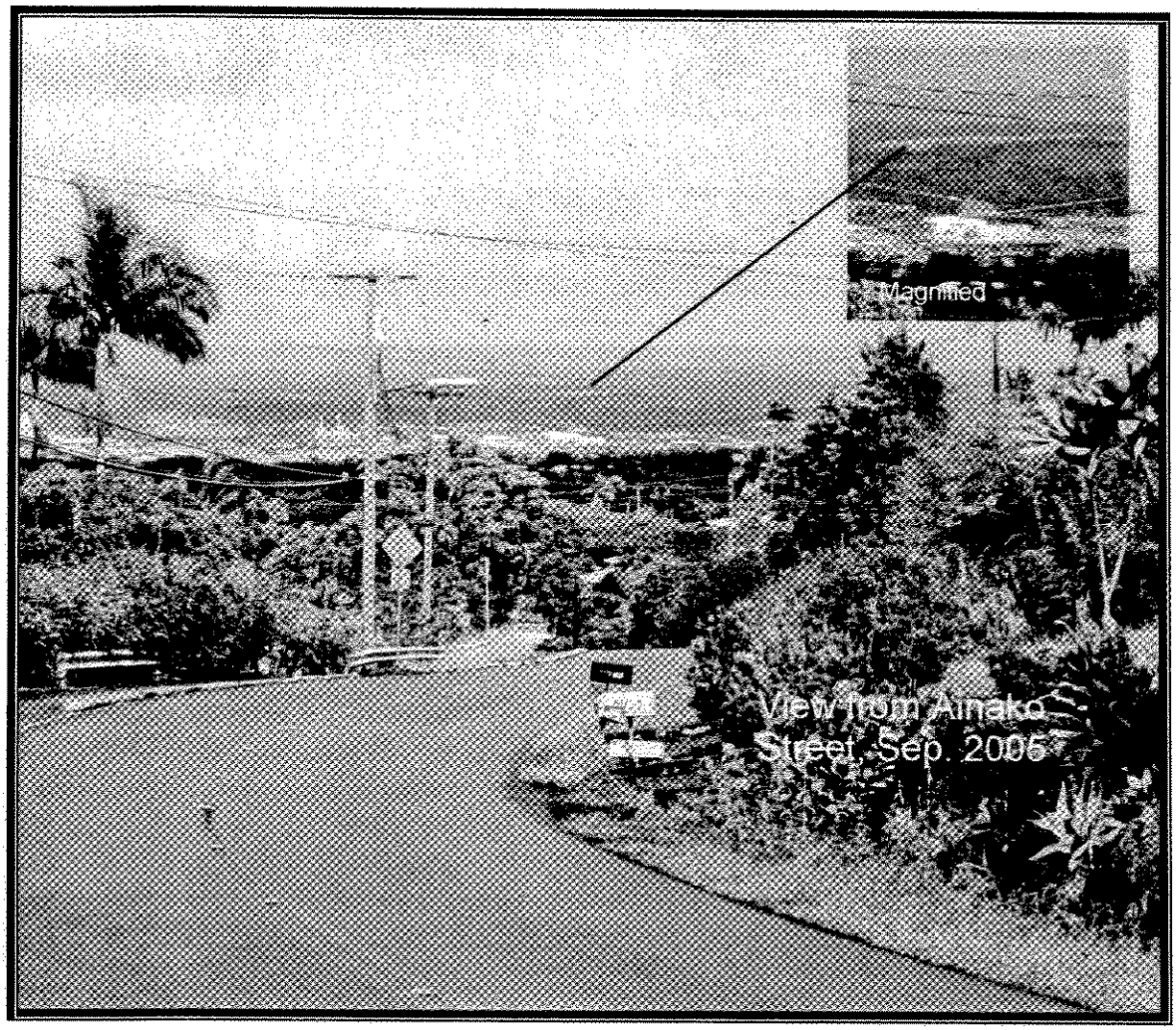


Figure 3-1b

Figure 3-1c

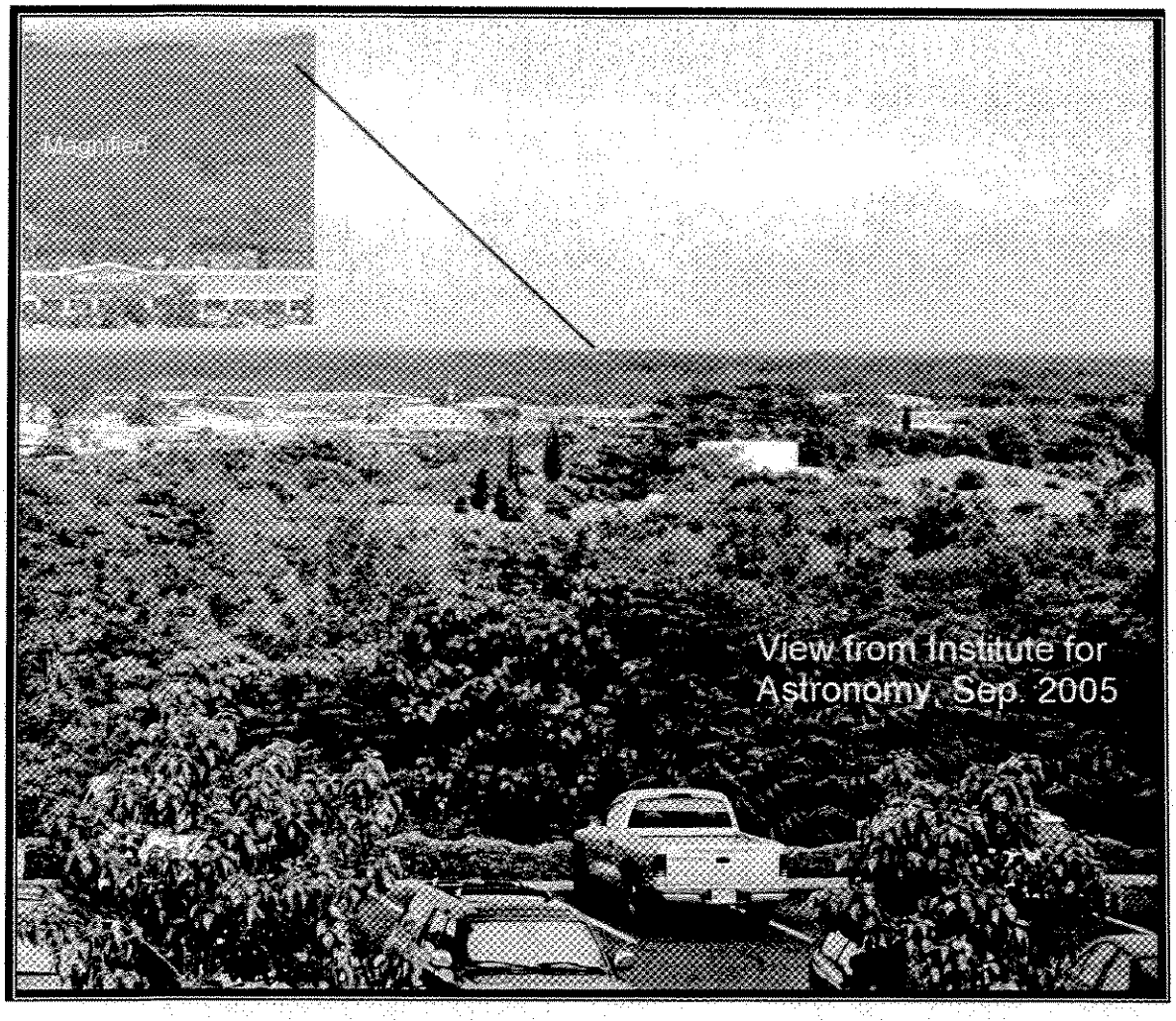
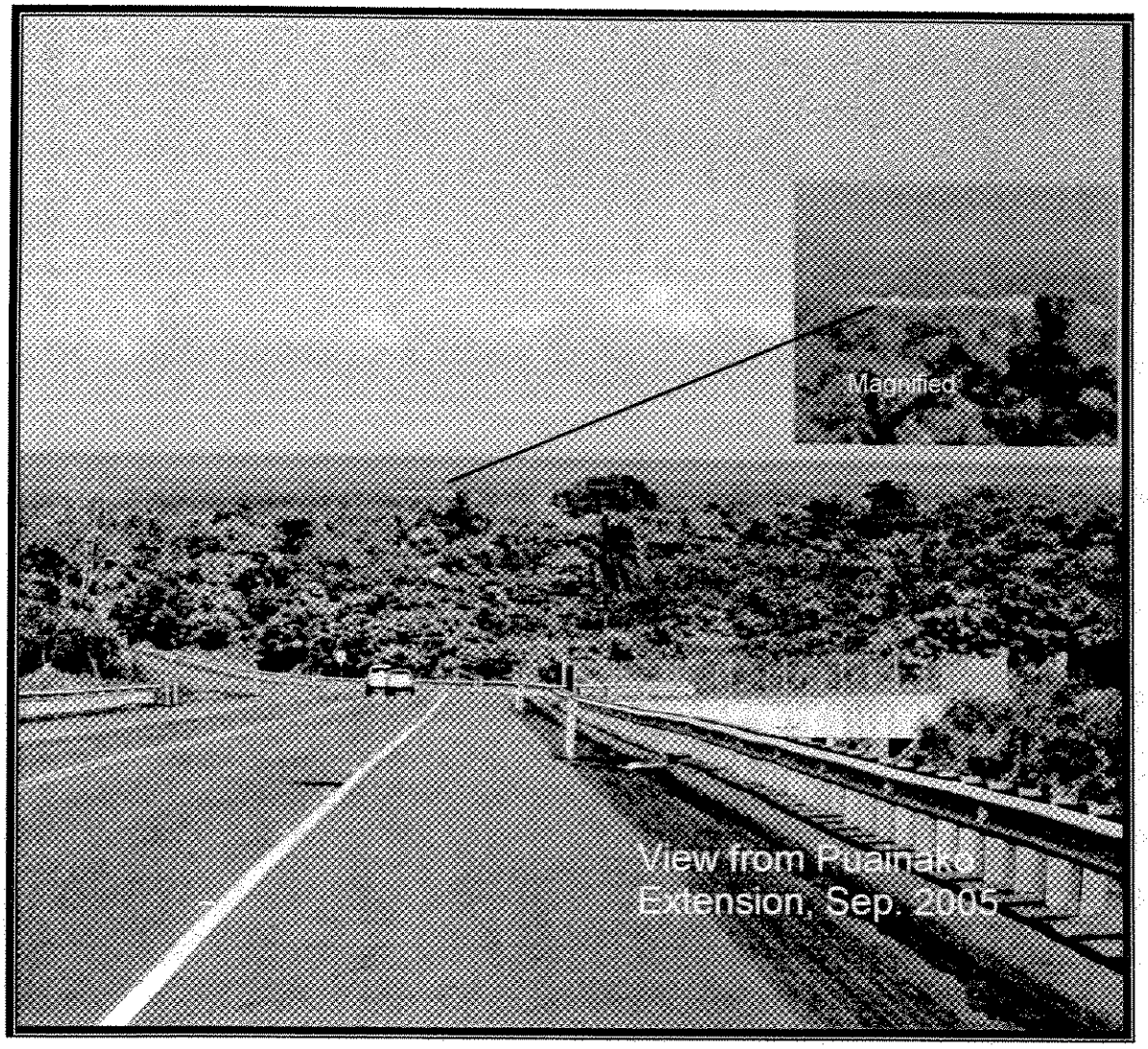


Figure 3-1d



3.2 Biological Environment

3.2.1 Terrestrial Flora

Existing Environment

The vegetation of this part of the South Hilo District can be described as a mixture of post-agricultural fallow vegetation (mixed alien shrubland and grassland and alien-dominated forest with relatively few native plants) with remnant lowland 'ohi'a forest (Gagne and Cuddihy 1990). Areas directly adjacent to the SHSL are generally highly disturbed.

As a result of its history of use for quarrying and landfill purposes, the area around the landfill currently has four vegetation types on the property. The first two are common and widely distributed, while the last is extremely limited in area.

The first consists of vegetation on the landfill itself, which is scattered weeds that sprout up quickly but are subject to destruction as the face of the landfill is reworked. This community has no conservation value.

The second consists of various early successional weed communities, in which alien herbs, vines and grasses dominate. This is found on the outskirts of the landfill and on access roads. An extremely wide variety of weeds are present, but in various locations, Napier grass (*Pennisetum purpureum*), *Crotalaria* spp. (rattlepod), *Desmodium* spp. (Spanish clover), sensitive plant (*Mimosa pudica*) and various sedges and grasses are dominant. The reason these communities are labeled "early" is that they are periodically disturbed through mowing, stockpiling, herbicide spraying, etc. This community has little if any conservation value.

The third community is late successional forest, which is dominated by alien trees, including *Albizia moluccana*, gunpowder tree (*Trema orientalis*), trumpet tree (*Cecropia obtusifolia*), strawberry guava (*Psidium cattleianum*), *Melastoma candidum*, and bingabing tree (*Macaranga mappa*). Even in such disturbed areas there are occasional natives, including mini-groves of low-stature hala (*Pandanus tectorius*) resting on old bulldozer pushpiles, and a few 'ohi'a (*Metrosideros polymorpha*) and lama (*Diospyros sandwicensis*) trees. This is found in just outside of the landfill properties' boundaries. As with the first vegetation type, this secondary forest has little conservation value for either the plant species it contains or as animal habitat, although Hawaiian Hawks may be able to forage there for rats.

The fourth community is native 'ohi'a-lama-hala forest, heavily invaded by aliens (especially *Melastoma candidum* and strawberry guava). Remnants of this native vegetation type are present surrounding at various distances from the landfill on various sides. It appears to take up not more (and possibly much less) than one-half acre directly opposite the entrance to the existing landfill, on TMK 2-1-13:142, as well as the DHHL property adjacent.

Some relatively intact and higher quality pockets of this forest type are found on the 500 acres of the Hawai'i Army National Guard's Keaukaha Military Reserve, located to the east of the landfill area. This site contains a number of native plants that are relatively uncommon in the

lowlands of Hilo and that are not present on the Sort Station site. These include kolea (*Myrsine* spp.), kopiko (*Psychotria* spp.), mamaki (*Pipturus albidus*), and 'ie'ie (*Freycinetia arborea*). A joint University of Hawai'i at Hilo-National Guard project is experimenting with restoration of the native forest at the site (Dewar 2002).

Impacts and Mitigation Measures

Because the proposed project will not utilize any vegetated area, the simple act of slope modification will affect only areas currently utilized as a landfill and will have no effects on vegetation. Landfills can be vectors for viable seeds and cuttings from alien species that may invade adjacent land, and they may also harbor viral, bacterial, invertebrate and vertebrate pest species that may harm native vegetation. However, the area directly around the landfill is mostly non-sensitive and would not be substantially threatened by the continuation of use. It is recommended that DEM liaison with the Big Island Invasive Species Council to monitor for the presence of any new and potentially virulent alien species that might appear.

3.2.2 Terrestrial Fauna

Existing Environment

The South Hilo area supports a variety of common alien mammals, birds, reptiles and amphibians. More importantly, several species of native birds forage or fly over the site, including the Hawaiian hawk or *'io* (*Buteo solitarius*), an endangered species. Foraging habitat for Hawai'i's only land mammal, the endangered *Lasiurus cinereus semotus* (the *'ope'ape'a* or Hawaiian hoary bat), may also be present in the forested areas surrounding the SHSL.

Bird species attracted to the SHSL have the ongoing potential to impact aircraft using Hilo International Airport. Expanded landfill operations have at least some potential to attract greater quantities of birds and thus pose a greater potential hazard to Hilo International Airport operations. Landfill hazards to airports, including the potential impacts at Hilo International Airport, are addressed as part of the Code of Federal Regulations (CFR), Part 258, otherwise known as RCRA Subtitle D, Location Restrictions, which states that "*Owners or operators of new MSWLF [municipal solid waste landfill] units, existing MSWLF units, and lateral expansions that are located within 10,000 feet (3,048 meters) of any airport runway end used by turbojet aircraft, or within 5,000 feet (1,524 meters) of any airport runway end used by only piston-type aircraft must demonstrate that the units are designed and operated so that the MSWLF unit does not pose a bird hazard to aircraft.*" The SHSL fits these criteria because it lies within the regulated distance to the Hilo International Airport runway ends.

At the request of the Hawai'i County Department of Public Works, A-Mehr, Inc. performed a study of the SHSL to determine whether the landfill posed a bird hazard to aircraft. The results of this study were detailed in the "*South Hilo Sanitary Landfill Airport Safety Demonstration Report*" (A-Mehr 1998). A-Mehr concluded that, because of waste management techniques observed being practiced at the SHSL, scavenger birds commonly involved in bird/aircraft collisions were not present at the SHSL, and therefore do not present a significant hazard to the Hilo International Airport operations.

Impacts and Proposed Mitigation Measures

The proposed project would utilize the existing landfill, which is not suitable habitat for the Hawaiian hawk or the Hawaiian Hoary bat. The project would not have an adverse impacts on these endangered species, or any other native fauna.

Observations have shown that bird species responsible for aircraft/bird collision are not present in the area, therefore no adverse impact to Hilo International Airport operations are anticipated. Landfill operations previously observed and documented by A-Mehr will be maintained throughout the operation of the SHSL.

3.2.3 Wetlands and Aquatic Habitat

Existing Environment, Impacts and Mitigation Measures

No wetlands or aquatic habitat are found in or near the project area, and no impacts to these occur currently or would be expected to occur in the future as a result of continued use.

3.3 Socioeconomic

3.3.1 Land Use

Existing Land Use and Impacts

Land use on adjacent or nearby properties, as shown on Figure 1-3, includes the following:

- *Industrial*: quarries on TMKs 2-1-13:160, 161 and 163;
- *Solid waste related*: scrap metal salvage facility, green waste mulching facility, Hilo Convenience Center, planned EHRSS and buffers on TMKs 2-1-13: 142, 150, 151, 162, 167, and 168;
- *Military*: Hawai'i National Guard site, TMK 2-1-12:3;
- *Open space*: likely industrial expansion, TMK 2-1-13:2 and DHHL property at TMK 2-1-13:158; and
- *Agricultural*: DHHL Panaewa lots in TMK 2-1-25 (plat).
- *Recreational*: skeet-shooting range located about a half-mile east on TMK 2-1-13:2, and the Panaewa Drag Strip, 1.5 miles south, access from Ammunition Dump Rd.

The proposed continued use of the property as a landfill is consistent with existing use of the subject property and compatible with adjacent uses, several of which are directly or indirectly related to solid waste collection and processing.

3.3.2 Planning Designations

Existing Designations

Planning responsibility for the County rests with the County Planning Department, the County Planning Commission and the State Land Use Commission.

Hawai'i County General Plan

The General Plan for the County, adopted by ordinance in 2005, is a policy document expressing the broad goals and policies for the long-range development of the island of Hawai'i.

The County General Plan calls for the following among its Environmental Quality Goals:

(a) Define the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable.
(b) Maintain and, if feasible, improve the existing environmental quality of the island.
(c) Control pollution.

Among its Environmental Quality Policies, the County General Plan calls for the following:

(a) Take positive action to further maintain the quality of the environment.

The proposed action serves to maintain environmental quality and control pollution through the responsible management of municipal solid waste.

Additionally, the County General Plan calls for the following among its Environmental Quality Standards:

(a) Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well being, through the enforcement of appropriate Federal, State and County standards.
(b) Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.
(c) Federal and State environmental regulations shall be adhered to.

The County General Plan calls for the following among its standards for public facilities (Section 10.5.3):

(a) Sanitary landfill sites for refuse disposal shall be established in accordance with the needs of communities and the State Department of Health and U.S. Environmental Protection Agency's rules and regulations.

General Plan LUPAG Map

The Land Use Pattern Allocation Guide (LUPAG) map is a graphic representation of the Plan's goals and policies. The project site appears to designated as Important Agricultural Lands, even though it is an existing landfill. However, according to a letter of January 26, 2006, from the Hawai'i County Planning Director (see App. 1C), because the existing use is industrial and LUPAG maps may be general and require interpretation, the proposed use is consistent.

County Zoning and State Land Use District

Parcels 152 and 162 are split-zoned General Industrial (MG-1) and Agricultural (A-20a) and also split between the State Land Use Urban and Agricultural Districts. Parcels 156 and 142 are zoned A-20a by the County and are within the State Land Use Agricultural District. The existing and planned use is a permitted use for areas within State Land Use Urban and County zoning Industrial. Special Permit No. 574, approved with conditions on January 31, 1985, allowed the extension of the landfill eastward onto 15 acres of Parcel 156. Condition C required the County to submit an application for a State Land Use District boundary amendment from the Agricultural to the Urban District for the subject property within five years from the date of approval, which never occurred. DEM intends to coordinate with the Planning Department to remedy the lack of compliance with Condition C as it continues to move forward on the permit modify the existing South Hilo Sanitary Landfill.

Impact of Project in Terms of Planning Designations

The proposed modification of slopes and continuation of use is consistent with all land use designations and land use policies. A landfill is an identified use with the State Land Use Urban District, and is a permitted use within the County MG-1 zone. The area is designated in the Land Use Pattern Allocation Guide Map for industrial uses, and the project fulfills relevant goals, policies, and objectives of the General Plan. No rezoning, or land use reclassification, is required for the project.

3.3.3 Demographics and Community Identity

Existing Environment

The U.S. Census Bureau collects detailed data for a region encompassing the urban area of Hilo (i.e., Hilo Census Designated Place - CDP) (Fig. 3-2; Table 3-2) and for the approximate project area, Census Tract 211, Block Group 2. The 2000 U.S. Census of Population provides the most recent demographic information. Table 3-3 presents demographic data for the census tract that contains the project area. The project area includes portions of Hawaiian Home Lands and thus has a higher percentage of native Hawaiians than other areas of Hilo and the County.

Impacts and Mitigation Measures

No relocation of residences, businesses, community organizations or farms would occur because of the project. The project only continues ongoing landfill activities. No effects on community identity or cohesion are expected.

Figure 3-2
Census Tract 206, Block Group 2

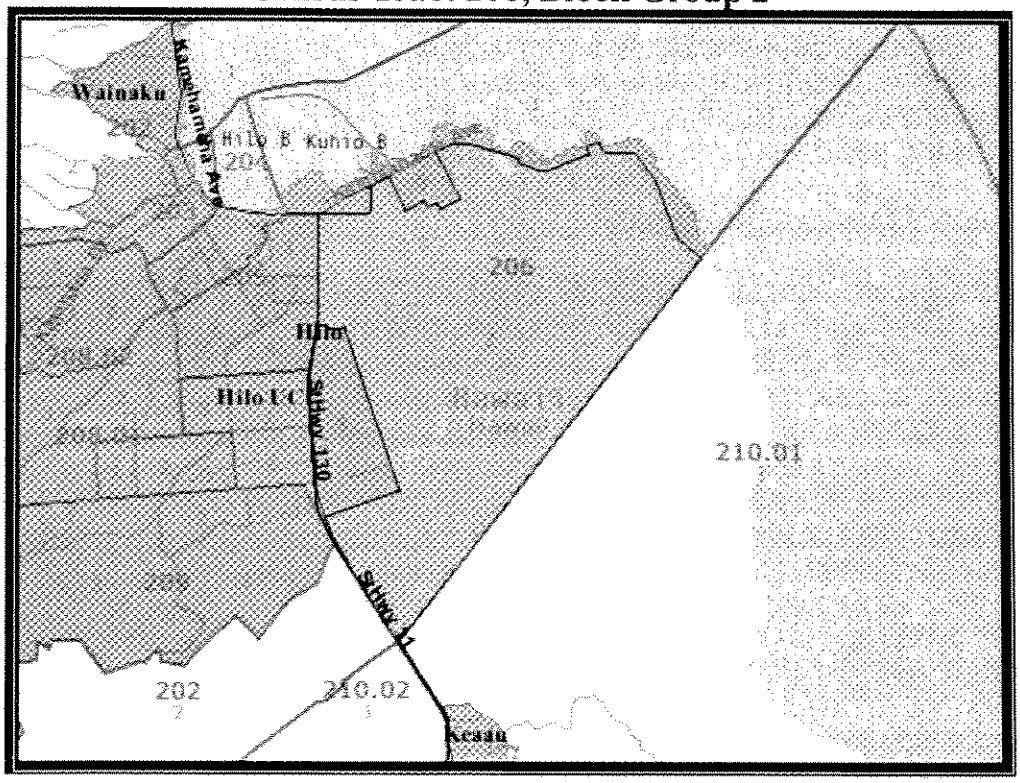


Table 3-2
Demographic Characteristics of Project Area Census Subdivisions

Demographic Area Description	Hawai'i County	Hilo (Census Designated Place)	Census Tract 206, Block Group 2
Total Population	148,677	40,759	1,187
Race	Asia/Pac 44.3 White 31.5 Other 24.2	Asia/Pac 51.4 White 17.1 Other 31.5	Asia/Pac 59.8 White 8.9 Other 31.3
% Hawaiian	11.2	13.1	39.8
Persons/Household	2.75	2.70	3.08
Median Household Income	39,805	39,139	34,338
Median Age	38.6	38.6	39.6
Median Home Value	$153,700	$153,800	$122,800
% Households Receiving Public Assistance Income	9.7	9.9	12.0

Sources: U.S. Bureau of the Census: "2000 Census of Population. General Population Characteristics," 2000 CP-1-13.

3.3.4 Public Services and Facilities

Existing Facilities and Services,

All existing utilities required by the SHSL are already in place. These include:

Water Service

Potable water is available from the County Department of Water Supply (DWS) distribution system. A 12-inch water main runs along Leilani Street and terminates near the entrance to the existing Hilo Convenience Center.

Electrical and Telephone Utilities

The SHSL currently has electrical and telephone service. Electric service is provided by two portable generators. Only one generator is necessary to support landfill operations. Telephone service is provided by a dedicated mobile phone that is maintained at the landfill's scale house.

Police, Fire and Emergency

Hilo is the headquarters for both the County Police and Fire Departments. The Police Department main station is located near downtown Hilo. Fire Stations are present near the Hilo International Airport, in downtown Hilo, and on Kawailani Street in Waiakea. Fire Department personnel include paramedics and they respond to medical as well as fire emergencies.

Impacts and Mitigation Measures

The proposed Phase I expansion will essentially continue operations at the site and will thus not cause additional impacts in terms of any public utilities or services.

3.3.5 Cultural Resources

Because the project does not involve utilization of any new lands, and takes place solely on an existing landfill, no cultural resources, including archaeological sites, cultural sites, or traditional cultural practices, will be affected in any way by the proposed action.

3.3.6 Agricultural Land

Because the project does not involve utilization of any new lands, no agricultural lands will be affected by the proposed action.

3.3.7 Hazardous Materials and Toxic Substances

Existing Environment, Impacts and Proposed Mitigation Measures

Hazardous materials are prohibited for disposal at the SHSL. A Special Waste Handling and Regulated Hazardous Waste Exclusion Plan is included in the SHSL Operations Manual and is implemented and maintained by landfill operations personnel at the SHSL. The proposed Phase I Expansion will essentially continue current operations at the site and will not cause additional impacts in terms of hazardous materials or toxic substances.

3.3.8 Traffic and Transportation

Existing Conditions

An average of more than 80 commercial vehicles enter the SHSL each day, with Monday's being the peak day. The County hauls more than eight transfer station trailers each day of household refuse to the SHSL from rural convenience centers. Additionally, nearly 1,500 residents drop household refuse off at the adjacent Hilo Convenience Center each day.

Impacts and Proposed Mitigation Measures

The proposed action would not produce any appreciable change in traffic conditions, as per-day volumes similar to those of the present are expected to continue over the next 2-3 years. The current transportation infrastructure and traffic patterns have evolved to accommodate this use and are expected to support anticipated growth.

No Action Alternative Impacts

The No Action Alternative would necessitate the closure of the SHSL in 2006, requiring the hauling of MSW to the WHSL at Pu'uanahulu in North Kona. The County considers this alternative to be undesirable for not only cost but also because of increased illegal dumping and potential adverse traffic reasons. According to the EIS for the EHRSS (County DEM 2004), one of two traffic scenarios would occur: 1) when the EHRSS is operational, there would be a maximum of about 12 daily round trips from the EHRSS to the WHSL by County refuse trailers; or 2) should the EHRSS not be constructed, there would be approximately 90 daily round-trips by municipal, commercial and residential haulers (including County refuse trailers). A Traffic Impact Analysis Report prepared for the EHRSS EIS gauged the worst-case peak-hour increase in traffic in Waimea under Scenario 1 as 0.8% versus 6.4% under Scenario 2.

Transport of MSW from South Hilo through Kohala to North Kona is an unpopular prospect for some local residents as well as various stakeholders with financial interests along the popular Kohala Coast. Should inter-island transport of MSW occur through these communities, the County anticipates that this action would be controversial.

3.3.9 Growth-Inducing, Cumulative and Secondary Impacts

Cumulative impacts result when implementation of several projects that individually have minor impacts combine to produce more severe impacts. It bears repetition that the proposed project would continue normal operations of the SHSL for 2 to 4 years. If the project did not occur, there would be some reduction of impacts in traffic, dust, noise and odor on the access road. However, this road is basically exclusively used by industrial traffic, most of it solid waste or quarry related, and such reductions would not have any substantial benefit in terms of reduction of cumulative impact, particularly considering the increase in traffic on roads between the SHSL and the WHSL that would result. All adverse impacts of the current project related to native species/habitat, wetlands, water quality, erosion, historic sites, and other areas of concern are either non-existent or extremely restricted in geographic scale, negligible, and capable of continuing mitigation through implementation of Best Management Practices, responsible landfill management and maintaining compliance with applicable local, State and federal regulations. Therefore, such adverse impacts would not tend to be cumulative in this context.

Construction projects sometimes have the potential to induce secondary physical and social impacts that are only indirectly related to the project. For example, construction of a new recreation facility can lead to changes in traffic patterns that produce impacts to noise and air quality for a previously unimpacted neighborhood. In this case, the proposed project's impacts are limited to continuation of direct impacts at the site itself, and there does not appear to be any potential for secondary impacts.

A method for convenient, accessible and reasonably priced sanitary disposal of waste is vital to protect public health and the environment, as well as to sustain the standards of living that are considered acceptable to most Americans. Without action, the SHSL would close in 2006 or shortly thereafter because the current landfill configuration would be maximized to the extent allowed in the County's current DOH solid waste management permit for the SHSL. The County has selected the method of maintaining service that meets the objectives of the ISWMP by providing a convenient, accessible and cost effective method for maintaining disposal services with the least impact to public health and safety, the environment and the quality of life enjoyed by local residents, businesses and tourists.

The proposed action will help maintain the current level of services for East Hawai'i residents and businesses and can be implemented for a practical cost. As with most developments, there is a commitment of resources and potential impacts to the quality of life.

The impacts associated with extended waste transport may be considered temporary if one or both of the County's expressed goals are implemented. The EHRSS is being developed simultaneously with improvements to the system of convenience centers, with the common goal of increasing recycling, and reuse of traditional recyclables and materials that would otherwise be disposed at County landfills. If the County can increase its island-wide waste diversion from 20% to 45% with these and other programs, the impact on County landfills may be significantly mitigated. If the County proceeds with procurement of one or more waste reduction technologies, the amount of waste being transported to County landfills will be substantially reduced. Depending on the technology, MSW generated throughout the County may be diverted

to a WRTF for processing in the new alternative. Examples may include hard to dispose of waste such as tires and medical waste; waste with some intrinsic value such as aluminum or glass; or specific waste needed by the selected technology. A waste reduction technology is estimated to be at least five years away if not more, and during this period the SHSL and the proposed EHRSS are planned to provide continuous, convenient and cost effective solid waste service to East Hawai'i.

The expense for solid waste management represents a burden to almost all municipalities in the U.S. including the County. The proposed alternative is the least expensive of all alternatives considered. The direct cost of solid waste operations and landfilling to the County was just over $9.69 million in 2002, or about $58/ton. The tipping fee at that time collected $45/ton from landfill customers. Net proceeds from the tipping fee amounted to $3.2 million, with another $270,000 derived from grants. The remaining cost of solid waste disposal ($6.2 million) was taken from the County's general operating budget. In 2002, the tip fee covered only one-third of the County's expense for solid waste management. In order to offset the additional cost of MSW management, the County has increased the tipping fee by $10 per ton and will continue to increase the fee annually up to $85 per ton in order to maintain an adequate level of revenue from tipping fees. Even with these tipping fee rate hikes the County will be required to provide an increasing portion of the general fund to cover the cost of its MSW management. The public funds committed to MSW management are an irretrievable commitment of resources that are necessary to protect public health and safety and the environment.

The proposed action will continue make use of the approximately 40 acres of public land currently dedicated for MSW disposal operations that have been historically utilized during the last four decades. This land is not currently proposed for any other land use.

Continued operation of the SHSL uses a considerable amount of energy during its period of operation. The primary form of energy is from fuel used to operate equipment, including landfill equipment and scale house generators. Should the SHSL close (and in the absence of an operational EHRSS) the County estimates that approximately 100,000 gallons of fuel per year may be required to transport MSW from East Hawai'i rural convenience centers to the WHSL in North Kona. The use of electrical and diesel power is an irretrievable commitment of resources.

3.4 Required Permits and Approvals

Discussions with DOH indicate that a new solid waste management permit is required to implement the Phase I Expansion project.

4 COMMENTS AND COORDINATION

4.1 Agencies, Organizations and Individuals Contacted

The following agencies and organizations received a letter inviting their participation in the preparation of the Environmental Assessment or were contacted during preparation of the EA:

- U.S. Natural Resources Conservation Service, RC&D
- Hawai'i State Department of Health - Noise, Radiation and IAQ Branch
- Hawai'i State Department of Health - Environmental Management Division
- Hawai'i State Department of Health - Solid and Hazardous Waste Branch
- Hawai'i State Department of Hawaiian Home Lands
- Office of Hawaiian Affairs
- Hawai'i State Department of Land and Natural Resources, Director
- Hawai'i County Department of Public Works
- Hawai'i County Council, Councilmember Stacy Higa
- Hawai'i County Planning Department.
- Hawai'i County Police Department
- Hawai'i County Fire Department
- Panaewa Hawaiian Homes Community Association
- Kanoelehua Industrial Area Association
- Hawai'i Island Chamber of Commerce
- Sierra Club
- Hilo Bay Watershed Advisory Group
- Hawai'i Leeward Planning Conference

A total of eight written comments were received on the Draft EA. These comments and the responses to them are contained in Appendix 1B. Various places in the EA have been modified to reflect in the comment letters; additional or modified text is denoted by double underlines, as in this paragraph.

DEM held a public meeting on the project on January 12, 2006. A summary of the meeting is presented in Appendix 1C.

5 LIST OF DOCUMENT PREPARERS

This Environmental Assessment was prepared under the supervision of the County of Hawai'i by Geometrician Associates, with the assistance of GeoLogic Associates and Bryan A. Stirrat & Associates. The following officials, companies and individuals were involved:

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6 STATE OF HAWAI'I ENVIRONMENTAL ASSESSMENT FINDINGS

Section 11-200-12 of the State Administrative Rules sets forth the criteria by which the significance of environmental impacts shall be evaluated. The following discussion paraphrases these criteria individually and evaluates the project's relation to each.

1. *The project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources.* No expansion of the landfill footprint will occur, and the action will take place completely within an existing permitted landfill. The State Historic Preservation Officer is expected to concur that no effect to any significant historic site would occur as a result of the continuation of the proposed action.

2. *The project will not curtail the range of beneficial uses of the environment.* No future beneficial use will be affected in any way by the proposed action, as the area for the proposed project is already occupied by a permitted landfill.

3. *The project will not conflict with the State's long-term environmental policies.* The State's long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. A number of specific guidelines support these goals. No aspect of the proposed project conflicts with these guidelines. The proposed action supports a number of guidelines, including responsible management of solid waste.

4. *The project will not substantially affect the economic or social welfare of the community or State.* The expansion will benefit the social and economic welfare of the County.

5. *The project does not substantially affect public health in any detrimental way.* No effects to public health are anticipated.

6. *The project will not involve substantial secondary impacts, such as population changes or effects on public facilities.* No adverse secondary effects are expected. The action will not enable development in any way.

7. *The project will not involve a substantial degradation of environmental quality.* The proposed action will enhance environmental quality by managing solid waste in an efficient and responsible manner.

8. *The project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* No endangered species of flora or fauna are expected to be affected. The action only involves a steepening of the landfill sides, so no new area will be utilized.

9. *The project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions.* The proposed action simply represents a continuation of present actions. These activities

provide a fundamental need required by socio-economic activity and, by their nature, cannot enhance the cumulative effects of other actions.

10. *The project will not detrimentally affect air or water quality or ambient noise levels.* The proposed action will continue current activities at the SHSL. Therefore ambient noise levels, air quality, and water quality will continue at their present approximate level. Landfill gases and water quality will continue to be monitored through the proposed active and post-closure periods. No water quality impacts have been identified to date, and no negative changes to water quality are anticipated as a result of the project.

11. *The project will not affect or will likely be damaged as a result of being located within an environmentally sensitive area such as flood plains, tsunami zones, erosion-prone areas, geologically hazardous lands, estuaries, fresh waters or coastal waters.* The proposed action will not affect environmentally sensitive area such as floodplains, tsunami zones, erosion-prone areas, geologically hazardous lands, estuaries, fresh waters or coastal waters. Although the proposed action is located in a zone exposed to some earthquake and volcanic hazards, there are no reasonable alternatives. The project has been evaluated and designed in full consideration of the seismic environment.

12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* No scenic vistas and viewplanes identified in County or State plans or studies are present in the area to be affected with existing visual buffers. Visual impacts on nearby residences may be mitigated through maintenance and preservation of existing visual buffers.

13. *The project will not require substantial energy consumption.* Although input of energy is required for transport, placement, compaction, and filling of material, the No Action Alternative would use a far greater quantity of energy, requiring transport of MSW a significant distance to the WHSL in North Kona.

For the reasons above, DEM anticipates that the proposed project will not have any significant effect in the context of Chapter 343, Hawai'i Revised Statues and section 11-200-12 of the Hawai'i Administrative Rules, and anticipates issuance of a Finding of No Significant Impact (FONSI).

REFERENCES

Dewar, H. 2002. "Forest Managers Seek to Stem the Tide of Loss with Recovery Projects Statewide." *Environment Hawai'i* 11(6):1, 5-11.

Gagne, W. and L. Cuddihy. 1990. "Vegetation," pp. 45-114 in Wagner, W.L. et al., eds. *Manual of the Flowering Plants of Hawai'i.* 2 vols. Honolulu: University of Hawai'i Press.

GeoLogic Associates. 2004. *"Review of Groundwater Monitoring and Reporting Program – South Hilo Sanitary Landfill, Hawaii", May 12, 2004.* Prep. for DEM. Hilo.

_____. 2004. *"Review of Landfill Gas Monitoring Requirements – South Hilo Sanitary Landfill, Hawaii", June 15, 2004.* Prep. for DEM, Solid Waste Division. Hilo.

Hawai'i County Department of Environmental Management (DEM). 2002. *Update to the Integrated Solid Waste Management Plan (ISWMP) for the County of Hawaii, December, 2002.* Prep by Harding ESE. Honolulu.

_____. 2004. *Final EIS, Construction and Operation of East Hawai`i Regional Sort Station.* Hilo.

Hawai'i County DEM, Solid Waste Division, BAS, GLA. 2005. *Operations Manual - South Hilo Sanitary Landfill, Hilo Hawai'i.* Hilo.

_____. 2005. *Capacity Alternative Analysis – South Hilo Sanitary Landfill.* Hilo.

_____. 2005 *Operations Manual for the South Hilo Sanitary Landfill, October, 2005.* Hilo.

Hawai'i County Planning Department. 2005. *Hawai'i County General Plan.* Hilo.

Hawai'i County Research and Development Department (R&D). 2001. *Hawai`i County Data Book.* Hilo: R&D. [http://www.hawaii-county.com/databook].

Heliker, C. 1990. *Volcanic and Seismic Hazards on the Island of Hawaii.* Washington: U.S. GPO.

Macdonald, G.A., A.T. Abbott, and F.L. Peterson. 1986. *Volcanoes in the Sea: The Geology of Hawaii.* 2nd ed. Honolulu: University of Hawai'i Press.

U.S. Bureau of the Census. 2001. American Fact Finder Web Page: http://factfinder.census.gov/.

U.S. Soil Conservation Service. 1973. *Soil Survey of Island of Hawaii, State of Hawaii.* Washington: U.S. GPO.

University of Hawai'i at Hilo, Dept. of Geography. 1998. *Atlas of Hawaii.* 3rd ed. Honolulu: University of Hawai'i Press.

Wolfe, E.W., and J. Morris. 1996. *Geologic Map of the Island of Hawai'i.* USGS Misc Investigations Series Map i-2524-A. Washington, D.C.: U.S. Geological Survey.

SOUTH HILO SANITARY LANDFILL
PHASE I EXPANSION

WAIAKEA, SOUTH HILO, HAWAI'I
TMK: 2-1-013:142, 152, 156 & 162

DRAFT ENVIRONMENTAL ASSESSMENT

APPENDIX 1

PUBLIC INVOLVEMENT AND AGENCY LETTERS

Part A

Comments in Response to Early Consultation Letters

Harry Kim
Mayor

Darryl J. Oliveira
Fire Chief

Desmond K. Wery
Deputy Fire Chief

County of Hawai'i
FIRE DEPARTMENT
25 Aupuni Street • Suite 103 • Hilo, Hawai'i 96720
(808) 961-8297 • Fax (808) 961-8296

8/25/2005

August 25, 2005

TO : RON TERRY
GEOMETRICIAN ASSOCIATES
HC 2 BOX 9575
KEA`AU, HAWAII 96749

FROM : DARRYL OLIVEIRA, FIRE CHIEF

SUBJECT: ENVIRONMENTAL ASSESSMENT
SOUTH HILO SANITARY LANDFILL SLOPE
TAX MAP KEY: (3) 2-1-13:152 & 156

We have no comments to offer at this time in reference to the above-mentioned Environmental Assessment for South Hilo Sanitary Landfill Slope.

DARRYL OLIVEIRA
Fire Chief

JCP:lpc

Harry Kim
Mayor

Lawrence K. Mahuna
Police Chief

Harry S. Kubojiri
Deputy Police Chief

County of Hawaii
POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-8869

August 31, 2005

Mr. Ron Terry
Principal
Geometrician Associates
HC 2 Box 9575
Keaau, Hawaii 96749

Dear Mr. Terry:

SUBJECT: ENVIRONMENTAL ASSESSMENT, SOUTH HILO SANITARY LANDFILL SLOPE; MODIFICATION TMK (3rd) 2-1-13:152 & 156

Upon review of the Environmental Assessment provided, the South Hilo Sanitary Landfill would not result in any impact to the Police Department. Therefore, we have no comments or concerns.

Thank you for the opportunity to comment.

Sincerely,

LAWRENCE K. MAHUNA
POLICE CHIEF

LW:lli

Harry Kim
Mayor

Christopher J. Yuen
Director

Roy R. Takemoto
Deputy Director

County of Hawaii
PLANNING DEPARTMENT
101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720-3043
(808) 961-8288 • Fax (808) 961-8742

September 23, 2005

Mr. Ron Terry
Geometrician Associates, LLC
HC 2, Box 9575
Keaau, Hawaii 96749

Dear Mr. Terry:

SUBJECT: Draft Environmental Assessment (DEA)
South Hilo Sanitary Landfill Slope Modification
Waiakea, South Hilo, Island of Hawaii
Tax Map Key: (3) 2-1-013:152 & 156

This is in response to your letter dated August 10, 2005 requesting our comments on the proposed project for which a Draft Environmental Assessment is being prepared by your firm on behalf of the Department of Environmental Management (DEM).

We understand that the DEM intends to increase the capacity of the South Hilo Sanitary Landfill by increasing the slope of the sides of the landfill without increasing its overall footprint, and that a Department of Health Solid Waste Management Permit and new grading plan will be required.

Parcel 152 is zoned General Industrial (MG-1a) and Agricultural (A-20a) by the County of Hawaii. The State Land Use (SLU) designations are Urban and Agricultural (A), respectively. Parcel 156 is zoned A-20a by the County of Hawaii and is in the SLU A district. The properties are not in the County of Hawaii's Special Management Area. The General Plan Land Use Pattern Allocation Guide map designates the subject area as "important agricultural lands." Our comments are based on the assumption that the proposed slope modification will be for the current landfill facility on Parcel 156 only.

Public dumps are permitted in the A district with the approval of a Special Permit when the site is also in the SLU Agricultural district. Special Permit No. 574 (SPP 574) was approved, with conditions, by the Planning Commission on January 31, 1985 to allow for the establishment of a sanitary landfill on 15 acres of Parcel 156. Condition C of SPP 574 required that the "petitioner,

its successors or assigns shall submit an application for a State Land Use boundary amendment from an Agricultural to Urban district for the subject property within five years from the date of approval of the Special Permit." This condition has not been satisfied.

The Planning Department acknowledges the difficult and sensitive issues involved with the County of Hawaii's current solid waste management crisis and the potential impacts it presents to all the residents of the County of Hawaii and its visitors. Therefore, we want to emphasize the importance of ensuring that this environmental assessment include an extensive and thorough analysis of the comparative short term and long range environmental impacts of the proposed project versus the viable alternatives, including, but not limited to, the temporary trucking of solid waste from East Hawaii communities to the West Hawaii Sanitary Landfill.

Thank you for the opportunity to provide comments on the proposed project prior to drafting the EA. Should you have questions, please feel welcome to contact Larry Brown or Esther Imamura of my staff at 961-8288.

Sincerely,

CHRISTOPHER J. YUEN
Planning Director

LMB: jnlb
P:\Wpwin60\Larry\EA-EIS Comments\Geometrician-DEM HiloLandfillSlope preDEA.doc

xc: DEM

SOUTH HILO SANITARY LANDFILL
PHASE I EXPANSION

WAIAKEA, SOUTH HILO, HAWAI'I
TMK: 2-1-013:142, 152, 156 & 162

DRAFT ENVIRONMENTAL ASSESSMENT

APPENDIX 1

PUBLIC INVOLVEMENT AND AGENCY LETTERS

Part B

Public Meeting Materials

Department of Environmental Management

ATTENDANCE SHEET
HILO LANDFILL EXPANSION ENVIRONMENTAL ASSESSMENT PUBLIC HEARING

DATE: January 12, 2006; TIME: 6:00 p.m.; PLACE: County Council Room

NAME (Print)	COMPANY / AFFILIATION (If any)	MAILING ADDRESS	PHONE NO.
J. WILLIAM SANBORN	EM COMMISSION	JWS@aloha.net	895-1102
MIKE DWORSKY	SOLID WASTE	108 RAILROAD AVE	961-8515
Steven Araujo	D&D Rubbish Service	P.O. Box 637 Kurtistown HI 96760	966-7215
Graham Knopp	Geometricia Assoc.	P.O. Box 10344	938-8583
Barbara Bell	DEM		961-8083
John Hower	Geologic Associates	12585W. Bernardo Dr San Diego CA 92127	858-451-1134
MICHAEL CULLINANE	BRYAN A STIRRAT & ASSOC	1360 VALLEY VISTA WAY DIAMOND BAR CA	909-860-7777
LEONARD Cooperband	Leo's Rubbish	271 Kekuanaoa St	935-5850
DIANA MILLER	EMC commission	P.O. Box 1255 Kurtistown 96760	982-7122
JON OLSON		13-631 Leilani 96778	443-1036
Ron Terry	geometrician		

Hilo Landfill Expansion Draft Environmental Assessment Public Meeting
January 12, 2005, 6:00 pm
Hawai'i County Councilroom

Team Members
BB: Barbara Bell, Director, Department of Environmental Management (DEM)
MD: Mike Dworsky, DEM Solid Waste Division Chief
MC: Mike Cullinane, Bryan A. Stirrat & Assoc.
JH: John Hower, GeoLogic
RT: Ron Terry, Geometrician Associates
GK: Graham P. Knopp, Geometrician Associates

Notes recorded by GK; all discussion paraphrased.

Question and answer session preceded by a PowerPoint presentation from RT, with assistance from MD and MC.

Question – You mentioned that cost would not be a negative factor, but if we bring in soil for a final cover – isn't this expensive?
Response – With the alternative cover we need 3' of final cover minimum.

Q – What is meant by soil here?
R – Engineered material, 2 1/2"' minus material.

Q – Is mulch acceptable for final cover?
R – No, but we can use it on top of the cover to support vegetation.

Q – There is not much water in the retention basin at the bottom of the landfill right now, so why will we need it?
R – The final membrane will be relatively impermeable, and the benches will guide water to the basin.

Q – Final cover after closure?
R – Yes, we want to release methane pressure.

Q – What comes after this project?
R –First this is Phase I, the slope increase with no height increase. If Phase II would include a height increase. Meanwhile we have requested Waste Reduction Technology (WRT) proposals, which are due 2/28/06. (Divergent discussion of diversion follows –BB states that we have 12 of 21 Transfer stations with glass recycling bins without HI5 redemption, and 9/21 have bins for mixed recyclables minus glass.) RT – And we have the WRT EISPN coming out soon. We'll have a February public meeting. BB: It looks like late February now.

Q – What potential DOH concerns are there?
R – RT: I am not aware of any. MD: DOH has seen the SHSL extended multiple times. Then subtitle D came into effect, and DOH may want us to close the SHSL. But, we have good engineering and records, so DOH may let us extend the SHSL lifetime, but impose a number of conditions to the permit including leachate treatment.

Q –Why would they allow us to extend without a real MSW management plan, a long-term solution? So, if we extend two more years, then what happens after that?
R – RT: It is likely that we will get more than two years out of this project.

Q- Can we get a new MSW management plan ready and in place in two years? I think the DOH will be skeptical of the County of Hawai'i's ability to solve this issue that quickly.
R – RT: Well, as a stopgap we can take MSW to the WHSL. BB: Yes, but the danger of buying more time is that nothing will happen. And the FAA would require a new permit for vertical expansion. This project is the more doable of Phase I and Phase II.

Q – The political issue right now is the public asking skeptically why we didn't do this earlier.
R – BB: We had a plan for the EHRSS with a tipping floor five years ago, and it has been difficult to implement as the waste situation evolves as seen from the perspective of many players.

Q – So this project includes a closure plan?
R – Yes. With an alternative final cover.

Q – Why does it have to take five years or more to have a WRT in place?
R – BB: Once we have bids we have to prepare an EIS taking 1-2 years, and air permit taking 2 years. RT: That's why we are starting the EIS now.

Q – Why not just build the WRT instead of the EHRSS? This would save the county money. If we could speed up the timeline for the WRT we may never need to truck to the WHSL.
R - RT: That is an ideal situation that may not occur. BB: The EHRSS can act as a front end for the WRT facility.

Q – But the WRT would be a distance from where the EHRSS will be constructed? It will cost too much to transport the waste from the EHRSS to the WRT. Why not put them next to each other?
R – BB: This isn't a problem. The sorted MSW can be moved via conveyor, for example.
Q – Well, now you're talking even more money.
R – RT: We have to be aware that the WRTF scenario might not happen for various reasons: bidder reluctance, financing, risk.

Q – What is Maui County doing (with MSW management)?
R – MD: Maui County is looking at WRT, and they have expressed interest in our combustible MSW.

Q – So all we need is a processing facility and we can sell our MSW to Maui County?
R – MD: We are considering this. RT: And we have offers to ship our MSW to the mainland.

Q – Are they going to landfill our MSW for future mining, if it goes to the mainland?
BB – No, it just goes to a conventional landfill.
Q – These contractors make it quite clear that once they purchase MSW it is their property.

Q – Is there Agricultural inspection for this shipped MSW?
R – MD: The County is looking at this, the indication from the DOA is that it is OK.
R – RT: The key issue Hawaii County has is that we have many solutions on the table, but central to every solution is some sort of Sort Station.
R – MD: DOH is concerned with what is going into our chutes at the transfer stations. With the tipping floor we can know what is going in.

Q – Can Hawai'i County cooperate with Maui County? Can we do this without a lot of paperwork?
R – BB: Yes and Yes.

Q – Why not build two sort stations? West Hawai'i needs one too.
R – MD: Cost becomes a factor with this.

Q – Would the County fully fund the WRT?
R – BB: We have funding choices. For example, the tipping fees for the EHRSS may go to pay off bonds.

Q – Will the WRT turn a profit on our MSW?
R – MD: They would have to pass this on to the County.

Q – Isn't it an issue that we are giving them our waste for free? Are they going to make money off of electricity production?
R – RT: A fairly modest amount of electricity is produced because plant operation and emissions controls demand much of what is produced.

Q – We have to look at our MSW as an asset. And maybe with the WRT we could use MSW from other counties. MSW is valuable.
Q - MSW is valuable because of the recycleables in it. This is why some large businesses are beginning to divert; Wal-Mart and other large stores value the packaging that products come in, and often return it to their distribution centers.

Q – The Council seems to think this will be a turnkey project. One problem is that with one vendor we will have no redundancy. We will be stuck with them. It's scary that MSW management won't be under the control of the County.
Q – Who will manage the SHSL when the WRT comes on line?
R – MD: We will maintain control of the SHSL.

Q – Who will be educating workers, for example with the steeper slopes of the SHSL??
R – MD: We will (i.e., DEM), with the help of consultants.

SOUTH HILO SANITARY LANDFILL
PHASE I EXPANSION

WAIAKEA, SOUTH HILO, HAWAI'I
TMK: 2-1-013:142, 152, 156 & 162

DRAFT ENVIRONMENTAL ASSESSMENT

APPENDIX 1

PUBLIC INVOLVEMENT AND AGENCY LETTERS

Part C

Comments to Draft EA and Responses

Extending landfill's life span

Thursday, December 29, 2005 10:54 AM HST

http://www.hawaiitribune-herald.com/articles/2005/12/29/local_news/local01.txt

Adding more trash to the slopes is the suggestion of study

by Bobby Command
Stephens Media Group

Adding more trash to the slopes of the South Hilo Sanitary Landfill would increase the life of the facility by two to four years and could eliminate the need to truck East Hawaii's trash to Puuanahulu.

That's the conclusion of a draft environmental assessment released Dec. 23 by Hawaii County. The phase one expansion would increase the capacity of the landfill, which would otherwise likely reach capacity sometime in 2006. The proposal would buy time for the county to implement alternative solutions, and do so without further impacts to the environment or regular operations at the South Hilo facility.

Furthermore, county officials believe some combination of vertical landfill expansion -- otherwise known as phase two -- along with newly implemented waste reduction technologies and increased recycling could further extend the life of the landfill even longer, if circumstances make it necessary.

"We've been talking about this for quite a while," said Barbara Bell, director of the county's Department of Environmental Management. "We're confident this will be part of the solution."

According to the draft EA, the landfill's currently permitted maximum 196-foot height and 40-acre footprint would not be increased as part of the first phase of expansion, and, because there would be an almost imperceptible change in the profile of the landfill, there would also be negligible visual impact.

In 2001, it was estimated the Hilo landfill accepted about 180 tons of trash daily -- 43 percent of what people throw away on the Big Island each day. Almost half of what entered the Hilo landfill in 2001 was hauled from rural transfer stations in East Hawaii. About 40 percent was trucked in by commercial haulers while about 1,500 residents visited each day to bring in the rest.

In its current state, the county estimates the Hilo Landfill has about six months of life left. The facility has already accepted 3.5 million cubic yards of trash, and if permitted, phase one expansion would add an additional 1.3 million cubic yards of space.

Given the proper circumstances, the life of the landfill could be extended even further, according to the EA. This would depend on the rate the landfill achieves capacity after implementation of phase one, the success of county-wide waste diversion, possible off-island disposal, and the fruition of the proposed Waste Reduction Technology Facility.

A phase two expansion could also be proposed at a later date. However, that would depend on the state Health Department's approval of raising the height of the landfill by 44 feet to an elevation of 260 feet above sea level. The Health Department will also have to issue a new solid waste management permit for the expansion to proceed.

Bell said she hopes the county won't need to consider that option, and additional space created by the first phase of expansion will provide the enough time for the county to work toward other ways to address the flow of solid waste.

Those options include development of the waste reduction facility, an increased recycling and re-use program, and construction of the sort station.

Bell said her department is working on the environmental impact statement preparation notice for the high-tech waste reduction facility. At the same time, the county will issue a request for proposals sometime next year.

"We're doing it with more feeling this time," Bell said.

As for the sort station, the Mayor Harry Kim's administration will seek an additional $3.1 million from the County Council to add to the $6.2 million already allotted by the lawmakers for construction of the facility. Bell said the sort station, which will cost more than the county anticipated, can be built once funding is in place.

According to the draft EA, a number of alternatives were not accepted for various reasons. It also states no action would create unacceptable impacts to essential services and quality of life enjoyed by residents, businesses and visitors. It could also promote illegal dumping and use of the Saddle Road by commercial vehicles and illegal dumpers.

The Hawaii County Department of Environmental Management (DEM) has released the Draft Environmental Assessment for the South Hilo Sanitary Landfill Phase I Expansion. The notice was published in the December 23, 2005, OEQC Environmental Notice. A public hearing will be held 6-8 p.m. Thursday, Jan. 12 in the Hawaii County Building's Council Room.

County officials and consultants who helped prepare the document will be on hand to explain the project and respond to questions. The Draft EA is available for review at the Hilo Public Library and at the Environmental Management office.

For more information, call Barbara Bell at 961-8083.

SOUTH HILO SANITARY LANDFILL
PHASE I EXPANSION

WAIAKEA, SOUTH HILO, HAWAI'I
TMK: 2-1-013:142, 152, 156 & 162

DRAFT ENVIRONMENTAL ASSESSMENT

APPENDIX 1

PUBLIC INVOLVEMENT AND AGENCY LETTERS

Part C

Comments to Draft EA and Responses

946-7593

LINDA LINGLE
GOVERNOR OF HAWAII

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

December 27, 2005

Barbara Bell
Department of Environmental Management
25 Aupuni Street #210
Hilo, Hawaii 96720

Subject: Draft Environmental Assessment, **South Hilo Landfill Expansion**

Dear Ms. Bell:

We have the following comments to offer:

Timeframe: What are the anticipated start and end dates of this project?

Noise: In Figure 1-5 Hawaiian Home Lands appear rather close. What is the scale for this figure? Will construction noise be a problem for HHL residents?

If you have any questions call Nancy Heinrich at 586-4185.

Sincerely,

Genevieve Salmonson

GENEVIEVE SALMONSON
Director

c: Ron Terry

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

January 30, 2006

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

Dear Ms. Salmonson:

Subject: **Comment Letter to Draft EA, South Hilo Sanitary Landfill Phase I Expansion, Waiakea, South Hilo, Hawai'i, TMK: 2-1-013:142, 152, 156 & 162**

Thank you for your comment letter dated December 27, 2005, on the Draft EA. On behalf of the proposing agency, the Hawai'i County Department of Environmental Management (DEM), I am providing the following responses to your specific comments:

1. *Timing.* The project is expected to be implemented as soon as the FONSI is published and the DOH permit granted, as there is an imminent need for more landfill airspace. The immediate timing of the action is now specified in Section 1.4 of the Final EA.
2. *Noise and proximity of Hawaiian Home Lands.* The distance between occupied Hawaiian Home Lands and the landfill is easiest to gauge in Figure 1-2. As stated at the beginning of Chapter 3 in the Draft EA, some of these residences are located at distances of 1,000 to 2,000 feet from the SHSL, near the intersection of Auwae Road and Kahaopea Street. It bears repetition that the proposed project would simply continue an existing use with the same intensity and characteristics as before. DEM has not historically received complaints from neighbors about noise, odor, dust, traffic, runoff or any other nuisance condition at the landfill, and it is hoped that the proposed action will not generate any additional nuisances. If DEM does receive complaints, it will act to address them through mitigation as feasible.

Again, thank you for your comment. If you have any questions about the EA, please contact me at 982-5831. For information or questions about the project, please contact Mike Dworsky of DEM at 961-8515.

Sincerely,

Ron Terry, Principal
Geometrician Associates

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

January 30, 2006

James M. Day
Assistant Police Chief
Area I Operations
Hawaii County Police Department
349 Kapiolani Street
Hilo HI 96720-3998

Dear Mr. Day:

Subject: **Comment Letter to Draft EA, South Hilo Sanitary Landfill Phase I Expansion, Waiakea, South Hilo, Hawai'i, TMK: 2-1-013:142, 152, 156 & 162**

Thank you for your comment letter dated January 4, 2006, on the Draft EA, in which you stated that you did not anticipate any significant impact to traffic or public safety concerns. The Hawai'i County Department of Environmental Management (DEM) appreciates your review of the document. If at any time you have any questions about the EA, please contact me at 982-5831. For information or questions about the project, please contact Mike Dworsky of DEM at 961-8515.

Sincerely,

Ron Terry, Principal
Geometrician Associates

Harry Kim
Mayor

Darryl J. Oliveira
Fire Chief

Desmond K. Wery
Deputy Fire Chief

County of Hawai'i
FIRE DEPARTMENT
25 Aupuni Street • Suite 103 • Hilo, Hawai'i 96720
(808) 961-8297 • Fax (808) 961-8296

January 6, 2006

GEOMETRICIAN ASSOCIATES
HC 2 Box 9575
Kea`au, HI 96749

SUBJECT: PRE-ENVIRONMENTAL ASSESSMENT CONSULTATION
Hawaii County Department of Environmental Management
South Hilo Landfill Phase I Expansion
TAX MAP KEY: (3rd): 3rd): 2-1-013:142,152,156 & 162

We have no comments to offer at this time in reference to the above-mentioned Pre-Environmental Assessment Consultation.

DARRYL OLIVEIRA
Fire Chief

DJO:lpc

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

January 30, 2006

Darryl Oliveira, Chief
Hawai'i County Fire Department
25 Aupuni Street
Hilo HI 96720

Dear Chief Oliveira:

Subject: **Comment Letter to Draft EA, South Hilo Sanitary Landfill Phase I Expansion, Waiakea, South Hilo, Hawai'i, TMK: 2-1-013:142, 152, 156 & 162**

Thank you for your comment letter dated January 6, 2006, on the Draft EA, in which you stated that you did not have any comments to offer at this time. The Hawai'i County Department of Environmental Management (DEM) appreciates your review of the document. If at any time you have any questions about the EA, please contact me at 982-5831. For information or questions about the project, please contact Mike Dworsky of DEM at 961-8515.

Sincerely,

Ron Terry, Principal
Geometrician Associates

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

in reply, please refer to:
EMD/SHWB

January 6, 2006 S0104LO

Mr. Ron Terry
Geometrician Associates
HC 2 Box 9575
Keaau, Hawaii 96749

Dear Mr. Terry:

SUBJECT: South Hilo Sanitary Landfill Phase I Expansion
Draft Environmental Assessment

Thank you for providing the Solid and Hazardous Waste Branch of the Department of Health with the opportunity to review and comment on the above cited document.

We acknowledge that the proposed action requires a Solid Waste Management Permit from the Department of Health. We will therefore address all of our comments through the permitting process.

Please contact Lane Otsu of the Office of Solid Waste Management at (808) 586-4226 with any questions regarding these comments.

Sincerely,

STEVEN Y.K. CHANG, P.E., CHIEF
Solid and Hazardous Waste Branch

c: Director, Office of Environmental Quality Control
Director, Department of Environmental Management, County of Hawaii

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

January 30, 2006

Mr. Stephen Y. K. Chang, P.E., Chief
Environmental Management Division
Solid and Hazardous Waste Branch
Hawai'i State Department of Health
P.O. Box 3378
Honolulu HI 96801-3378

Dear Mr. Chang:

Subject: **Comment Letter to Draft EA, South Hilo Sanitary Landfill Phase I Expansion, Waiakea, South Hilo, Hawai'i, TMK: 2-1-013:142, 152, 156 & 162**

Thank you for your comment letter dated January 6, 2006, in which you stated that you would address all your concerns through the permitting process. The Hawai'i County Department of Environmental Management (DEM) appreciates your review of the EA and permit documents. If at any time you have any questions about the EA, please contact me at 982-5831. For information or questions about the project, please contact Mike Dworsky of DEM at 961-8515.

Sincerely,

Ron Terry, Principal
Geometrician Associates

PHONE (808) 594-1888

FAX (808) 594-1865

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

HRD05/2180

January 10, 2006

Ron Terry
Geometrician Associates
HC 2 Box 9575
Keaau, HI 96749

RE: Draft Environmental Assessment for the Proposed South Hilo Sanitary Landfill Phase I Expansion, South Hilo, O'ahu, TMK (3) 2-1-013: 142, 152, 156 & 162.

Dear Mr. Terry,

The Office of Hawaiian Affairs (OHA) is in receipt of your December 23, 2005 request for comment on the above listed proposed project, TMK (3) 2-1-013: 142, 152, 156 & 162. OHA offers the following comments:

Our office has no comment specific to the above-listed proposed project at this time. Thank you for your continued correspondence.

OHA further requests your assurances that if the project goes forward, should iwi or Native Hawaiian cultural or traditional deposits be found during ground disturbance, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

Thank you for the opportunity to comment. If you have further questions or concerns, please contact Jesse Yorck at (808) 594-0239 or jessey@oha.org.

'O wau iho nō,

Clyde W. Nāmu'o
Administrator

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

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

January 30, 2006

Clyde W. Nāmuo, Administrator
Office of Hawaiian Affairs
711 Kapi'olani Street, Suite 500
Honolulu HI 96813

Dear Mr. Nāmuo:

Subject: **Comment Letter to Draft EA, South Hilo Sanitary Landfill Phase I Expansion, Waiakea, South Hilo, Hawai'i, TMK: 2-1-013:142, 152, 156 & 162**

Thank you for your comment letter dated January 10, 2006, on the Draft EA, in which you stated that you had no specific comments at this time, other than requesting assurances regarding inadvertent finds of *iwi* or Native Hawaiian cultural or traditional deposits. As the project would occur on an existing landfill, such findings are not anticipated; should they occur, be assured that Hawai'i County Department of Environmental Management (DEM) will act in accordance with all proper procedures, as you recommend.

Again, thank you for your comment. If you have any questions about the EA, please contact me at 982-5831. For information or questions about the project, please contact Mike Dworsky of DEM at 961-8515.

Sincerely,

Ron Terry, Principal
Geometrician Associates

Draft Environmental Assessment
South Hilo Sanitary Landfill (SHSL)

January 23, 2006

I would like to offer the following comments on the content of the Environmental Assessment (EA) and seek clarification and expand on the options considered.

1.2 PROJECT PURPOSE AND NEED

The County is considering expanding the existing landfill by 1.3 million cubic yards under Phase I. The volume might be increased by millions more under Phase II. Without regard to the issue of valid permits, this does raise a question. Why does the County deem it desirable to continue to deposit thousands of tons of Solid Municipal Waste (SMW) into a landfill without a liner or leachate collection system?

2.2 ALTERNATIVES EVALUATED AND DISMISSED

There are naturally risks and costs associated with any waste processing and disposal method. Why is SHSL the preferred repository instead of a new or existing RCRA compliant landfill that has a liner and leachate collection system?

2.3 NO ACTION ALTERNATIVE

Bulk Ocean transportation is the most economical freight transportation mode available. Compacting SMW in a controlled environment into manageable bundles lowers transportation costs and reduces insitu compaction costs at a sanitary landfill. Double bottom truck movements may be permitted from Kawaihae to Pu'uanahulu. Why did the County not consider shipping 30-ton containers to the Port of Hilo, barge to Kawaihae and trucked (2 double bottom moves per day) to WHSL?

Thank you for your consideration,

Robert Ward
77-6526 Ho'olaupa'i
Kailua Kona

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

January 30, 2006

Robert Ward
77-6526 Ho`olaupa`i St.
Kailua-Kona HI 96740-4430

Dear Mr. Ward:

Subject: **Comment Letter to Draft EA, South Hilo Sanitary Landfill Phase I Expansion, Waiakea, South Hilo, Hawai'i, TMK: 2-1-013:142, 152, 156 & 162**

Thank you for your comment letter dated January 23, 2006, on the Draft EA. On behalf of the proposing agency, the Hawai'i County Department of Environmental Management (DEM), I am providing the following responses to your specific comments. First, I would like to establish some background about the County solid waste policy. The Integrated Solid Waste Management Plan (ISWMP) Final Update of December 31, 2002 set forth the recommended alternatives as identified through the planning process. The Solid Waste Advisory Committee (SWAC) specified the following:

- Construct no new landfill in East Hawai`i
- Emphasize the recovery of recyclable materials at the future East Hawai`i Regional Sort Station
- Procure a waste reduction facility for the East Hawai`i waste stream, and
- Establish a county recycling program, to increase the waste division significantly.

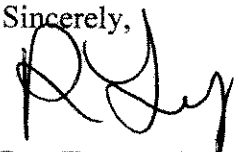
1. *Purpose and Need.* Without extending the life of this landfill, it will be necessary to ship all solid waste to the West Hawai`i Sanitary Landfill for an extended period of time, until a working waste reduction technology facility, alternate East Hawai`i landfill, or off-island waste shipping facility is in place. The expense and environmental impacts of this shipping exceed that of continuing to use available or easily acquirable space in the South Hilo Sanitary Landfill. The project would not change the environmental characteristics of the landfill; it would simply take advantage of the additional 1.3 million cubic yards of available airspace by adjusting the slope. The expansion of the existing landfill (which is unlined) does not exceed the current footprint nor raise the permitted height. The County continues to monitor the groundwater as required by the Department of Health permit. Currently this monitoring indicates that no environmental hazards that would require

remedial action are occurring. The project will help to avoid across-island hauling and will buy some time for the procurement of a waste reduction facility in combination with a strong recycling program.

2. *Dismissed Alternatives*. DEM's evaluation of what would be involved in building a new RCRA-compliant landfill in East Hawai`i indicates that it would be expensive, difficult to implement (requiring a new or substantially upgraded wastewater plant to treat leachate) and time-consuming to permit. This will be periodically re-examined in future ISWMP updates as they are required and the technology for treating leachate evolves.
3. *Bulk Ocean Transportation*. Bulk ocean transportation has been suggested in unsolicited proposals to the County Council. However, the requirements for a controlled environment (covered tipping floor), baling equipment, transportation and trucking arrangements were not in the short-term options that were considered. The SHSL Phase I expansion buys some time for the other options such as bulk ocean transportation to be considered by the County Council. This could take the form of either an interim solution until a waste reduction facility is procured and operational, or a long term solution if the County Council and Administration conclude that it is in the best interest of the County.

Again, thank you for your comment. If you have any questions about the EA, please contact me at 982-5831. For information or questions about the project, please contact Mike Dworsky of DEM at 961-8515.

Sincerely,



Ron Terry, Principal
Geometrician Associates

Harry Kim
Mayor

Bruce C. McClure
Director

Jiro A. Sumada
Deputy Director

County of Hawaii
DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 · Hilo, Hawaii 96720-4224
(808) 961-8321 · Fax (808) 961-8630

January 25, 2006

Mr. Ron Terry
Geometrician Associates
HC 2 Box 9575
Keaau, HI 96749

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
South Hilo Sanitary Landfill, Phase I Expansion
Tax Map Keys: 2-1-13:142, 152, 156, & 162

We have reviewed the subject assessment as described in your letter received December 27, 2005 and have no objection to the project.

Landfills are exempt from the grading ordinance, Chapter 10 of the Hawaii County Code.

The subject parcel is in an area designated as Zone X on the Flood Insurance Rate Map (FIRM) by the Federal Emergency Management Agency (FEMA). Zone X is an area determined to be outside the 500-year floodplain.

Questions may be referred to Mr. Kelly Gomes of the Engineering Division at 961-8327.

Kelly Gomes
for GALEN M. KUBA, Division Chief
Engineering Division

KG

c: Department of Environmental Management

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ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

January 30, 2006

Galen Kuba, Division Chief
Engineering Division
Hawaii County Department of Public Works
101 Pauahi Street, Suite 7
Hilo HI 96720

Dear Mr. Kuba:

Subject: **Comment Letter to Draft EA, South Hilo Sanitary Landfill Phase I Expansion, Waiakea, South Hilo, Hawai'i, TMK: 2-1-013:142, 152, 156 & 162**

Thank you for your comment letter dated January 25, 2006, on the Draft EA, in which you stated that the subject property was in Zone X on FIRM maps, as stated in the EA, and that landfills are exempt from Chapter 10 of the County Code. If you have any questions about the EA, please contact me at 982-5831. For information or questions about the project, please contact Mike Dworsky of DEM at 961-8515.

Sincerely,

Ron Terry, Principal
Geometrician Associates

Harry Kim
Mayor

Christopher J. Yuen
Director

Brad Kurokawa, ASLA, LEED™ AP
Deputy Director

County of Hawaii

PLANNING DEPARTMENT

Aupuni Center • 101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720
Phone (808) 961-8288 • Fax (808) 961-8742

January 26, 2006

Mr. Ron Terry
Geometrician Associates, LLC
HC 2, Box 9575
Keaau, Hawaii 96749

Dear Mr. Terry:

SUBJECT: Draft Environmental Assessment (DEA)
South Hilo Sanitary Landfill Slope Modification
Waiakea, South Hilo, Island of Hawaii
Tax Map Key: (3) 2-1-013:152 & 156

This is in response to your transmittal of the subject DEA, which we received on December 27, 2005. After reviewing the DEA we offer the following comments.

1. The affected TMK parcel(s) are not clearly identified in Project Location (Sec. 1.1) of the DEA. Figure 1-3 indicates that the actual landfill is situated over Parcels 152 and 156.
2. Section 1.4, paragraphs 1 and 2 refer to Figures 1-5 and 1-4 rather than Figure 1-6 as suggested by the relevant text.
3. Section 3.3.2 does not accurately reflect the applicable land use designations for the subject area and should be amended to reflect the following:
   a) The General Plan Land Use Pattern Allocation Guide map appears to show the subject area as "important agricultural lands" (IAL). However, the GP states (p. 14-8):

      "Because of the scale of the Land use Pattern Allocation Guide maps used to designate Important Agricultural Land, the location of these lands should be verified by more detailed mapping when considering specific land use decisions."

Therefore, since LUPAG map is meant to show a broad depiction of uses and is not necessarily parcel specific, the site is clearly within the vicinity of industrial designated lands, and given the historical use of the site, as recognized within the text of the GP (p. 10-23), the Planning Director considers this to be consistent with the industrial designation on the LUPAG map.

b) Parcel 152 is zoned General Industrial (MG-1a) and Agricultural (A-20a) by the County of Hawaii. The State Land Use (SLU) designations are Urban and Agricultural (A), respectively.

c) Parcel 156 is zoned A-20a by the County of Hawaii and is in the SLU A district.

4. We further note the absence of any reference to the Special Permit No. 574 (SPP 574), which was approved, with conditions, by the Planning Commission on January 31, 1985 to allow for the establishment of a sanitary landfill on 15 acres of Parcel 156. Condition C of SPP 574 required that the "petitioner, its successors or assigns shall submit an application for a State Land Use boundary amendment from an Agricultural to Urban district for the subject property within five years from the date of approval of the Special Permit." This condition has not been satisfied.

Thank you for the opportunity to provide comments on the DEA. Should you have questions, please feel welcome to contact Larry Brown or Esther Imamura of my staff at 961-8288.

Sincerely,

CHRISTOPHER J. YUEN
Planning Director

LMB:cd
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xc: DEM

Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

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ronterry@verizon.net

February 2, 2006

Christopher J. Yuen, Director
Hawaii County Planning Dept.
101 Pauahi Street, Suite 7
Hilo, HI 96720

Dear Mr. Yuen:

Subject: **Comment Letter to Draft EA, South Hilo Sanitary Landfill Phase I Expansion, Waiakea, South Hilo, Hawai'i, TMK: 2-1-013:142, 152, 156 & 162**

Thank you for your comment letter dated January 26, 2006, on the Draft EA. On behalf of the proposing agency, the Hawai'i County Department of Environmental Management (DEM), I apologize for the errors in the Draft EA and am providing the following responses to your comments:

1. *Unclear TMK Identification.* The Final EA lists all the subject TMKs in Section 1.1.
2. *Figure Numbers.* Thank you for noting the mistaken numbers, which have been corrected in the Final EA.
3. *LUPAG.* The Final EA now states that the mapped LUPAG designation is Important Agricultural Lands, but that the Planning Director has interpreted the context and considers the proposed action consistent with the LUPAG designation. Zoning and State Land Use Districts have been corrected or clarified.
4. *Special Permit No. 574.* Reference to the Special Permit has been added to Section 3.3.2. DEM intends to coordinate with the Planning Department to remedy the lack of compliance with Condition C, while it continues to move forward on the permit to modify the existing South Hilo Sanitary Landfill so that a critical public service can be maintained.

Again, thank you for your comment. If you have any questions about the EA, please contact me at 982-5831. For information or questions about the project, please contact Mike Dworsky of DEM at 961-8515.

Sincerely,

Ron Terry, Principal
Geometrician Associates

SOUTH HILO SANITARY LANDFILL
PHASE I EXPANSION

WAIAKEA, SOUTH HILO, HAWAI'I
TMK: 2-1-013:142, 152, 156 & 162

DRAFT ENVIRONMENTAL ASSESSMENT

APPENDIX 2

CAPACITY ALTERNATIVE ANALYSIS

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
SOLID WASTE DIVISION
COUNTY OF HAWAII – 108 RAILROAD AVENUE, HILO, HI 96720
HILO (808) 961-8339 WAIMEA (808) 887-3018 KONA (808) 327-3507

Capacity Alternative Analysis

South Hilo Sanitary Landfill

County of Hawai`i

November 2005

Prepared By:

County of Hawai`i
Department of Environmental Management
Solid Waste Division
108 Railroad Street, 2nd Floor
Hilo, Hawaii 96720

In Association With

Bryan A. Stirrat & Associates
1360 Valley Vista Drive
Diamond Bar, California 91765

GeoLogic Associates
16885 W. Bernardo Dr., Suite 305
San Diego, California 92127

1.0 INTRODUCTION

A. OBJECTIVE AND PURPOSE

This Capacity Alternative Analysis (CAA) was prepared by the County of Hawai`i (County) Department of Environmental Management (DEM) Solid Waste Division (SWD) in association with Bryan A. Stirrat & Associates and GeoLogic Associates (BAS/GLA Team) to examine the feasibility of performing a limited expansion of the South Hilo Sanitary Landfill (SHSL) located in Hilo on the Big Island of Hawai`i. Based on available information, the SWD has estimated that the SHSL will reach its currently permitted capacity in 2006.

In accordance with the "*Update to the Integrated Solid Waste Management Plan for the County of Hawai`i*" (ISWMP), prepared by Harding ESE and dated December 31, 2002, the County intends on acquiring a Waste Reduction Technology Facility (WRTF) to assist in managing the Big Island's municipal solid waste (MSW). Additionally, the County intends on constructing the proposed East Hawai`i Regional Sort Station (EHRSS) as a means of managing MSW generated in east Hawai`i and to minimize long distance transport of MSW to the West Hawai'i Sanitary Landfill (WHSL) during that period of time between the closure of the SHSL and the operation of a WRTF.

The County anticipates that the time necessary to procure, design, permit and construct a WRTF will exceed the time remaining until the SHSL will reach its current permitted capacity. The County's ISWMP recommends a plan to (among other things) provide enhanced recycling services and reuse activities at County solid waste transfer stations (or convenience centers) and construction and operation of a sort station to provide for diversion of recyclables from the landfill waste stream (thus extending the active life of both County landfills). The ISWMP also recommends that all MSW, which would otherwise be managed at the SHSL, be transported to the WHSL for legal disposal during that time that the SHSL ceases to accept MSW and a WRTF is in full operation. The EHRSS was designed to implement the recommendations of the ISWMP. Detailed information pertaining to the EHRSS is included in the "*Final Environmental Impact Statement – Construction and Operation of the East Hawai`i Regional Sort Station*" (EIS), prepared by DEM, and dated February 2004. The ISWMP was adopted by County Council on November 20, 2002 and was subsequently accepted by the State of Hawaii Department of Health.

The objectives of this CAA are to:

- Summarize existing conditions at the SHSL
- Analyze SHSL additional capacity alternatives
- Provide recommendations for extending the life of the SHSL

B. SCOPE

The scope of this project is summarized below:

General

- Volumetric Modeling in order to determine the existing landfill capacity.
- Capacity Analysis in order to determine additional capacity that may be obtained by re-designing the landfill's final grades.
- Alternative Final Cover Analysis.

C. GOVERNMENT REGULATIONS AND POLICIES

The Federal government regulates solid waste management in the United States under Title 40 of the Code of Federal Regulations Subchapter I (40 CFR 239 to 299). Under authority of the Resource Conservation and Recovery Act (RCRA), the United States Environmental Protection Agency (USEPA) administers Title 40 regulations and enforces Federal solid waste policies. MSW landfills are subject to the regulations in 40 CFR 258 (also known as RCRA Subtitle D) "Criteria for Municipal Solid Waste Landfills".

The State of Hawaii, Department of Health (DOH) through its Office of Solid Water Management (OSWM) is responsible for implementing solid waste management policies within the State of Hawaii. In 1993, USEPA approved the State of Hawaii's solid waste management program and, thereby, delegated the responsibility for permitting and regulating solid waste management facilities within the State of Hawaii to DOH. Hawaii Administrative Rules, Title 11 Chapter 58.1 (HAR 11-58.1) provides regulations for (among other things) landfills, composting facilities, recycling operations, used oil transporters and salvage yards. The SHSL is currently operating under an administrative extension through DOH Solid Waste Management Permit No. SW-311286. It is anticipated that DOH will require the County to prepare an application for a new (or modified) SHSL solid waste management permit prior to implementing a limited expansion through a revised final grading design.

County laws regarding solid waste management are codified in Chapter 20 of the Hawai'i County Code. Additionally, DEM implements and enforces Administrative Rules which establish minimum standards for (among other things) refuse operations, maintenance of solid waste disposal and transfer systems, and a fee structure for MSW disposal at County solid waste management facilities.

D. BACKGROUND

On September 28, 2003, an aerial survey of the SHSL was performed to update the topographical data previously prepared for the proposed EHRSS site and the SHSL. The resulting topographical data was then utilized to estimate the approximate remaining capacity at the SHSL. Preliminary calculations completed at that time indicated that approximately two (2) to three (3) years of refuse disposal capacity might be available. These preliminary calculations were based on comparisons of the updated topographic survey to the current final grading plan (dated 12/99) included in Appendix F of the *"Operations Manual – South Hilo Sanitary Landfill – Hilo, Hawaii"* (Operations Manual), prepared by Harding Lawson Associates, and dated January 25, 2000. Assumptions regarding projected annual waste/cover material quantities, in-place waste/cover material densities, and the final cover design for the landfill were utilized in developing the preliminary estimates. Secondary settlement of the existing waste was not included in the preliminary estimates in order to accommodate unanticipated fluctuations in the amounts and types of waste received prior to closure of the SHSL. Projected waste generation quantities were taken from the EIS. Other assumptions were based on a review of operations records and firsthand observations at the SHSL.

Based on available information, the following summary is provided in regards to previous County efforts to update the SHSL airspace capacity estimates:

Dec. 1998: County estimates remaining landfill capacity of 108,000 cubic yards with projected closure date of September 1999.

Feb. 2001: County submits to DOH a permit application for four-year extension with projected closure date of March 2005.

March 2001: County submits to DOH an updated Final Closure and Post-Closure Plan w/approximate 40-foot vertical extension (refer to Operations Manual).

April 2001: County estimates remaining landfill capacity of 590,000 cubic yards with projected closure date of October 2004.

Nov. 2002: County estimates remaining landfill capacity of 398,000 cubic yards with projected closure date of late 2004.

Oct. 2003: County estimates remaining landfill capacity of approximately 214,000 cubic yards with projected closure date of February 2006.

Feb. 2005: County estimates remaining landfill capacity of approximately 167,000 cubic yards with projected closure date of March 2006.

The items listed below likely affected the closure date projection estimates listed above:

Operational Modifications

Historical: A comparison of the September 2003 topographic survey with the SHSL Operations Manual final grading plan indicated that a substantial portion of the SHSL sideslopes and drainage benches had been over-built. It appears that most of the lower half of the landfill had been constructed in previous years above the design grades provided for in the Operations Manual; in some cases the landfill had been over-built by more than 10 to 20 feet. The SWD has estimated that approximately 25% of the fill previously placed at the SHSL exceeds the Operations Manual design final grades. Associated waste placed above design grades may not have been excluded from previous airspace estimates.

In April 2001, DOH staff inspected the SHSL and cited the County for violating HAR 11-58.1-15(b) and SW-311286 Permit Condition Part II, Special Conditions 6 relating to inadequate thicknesses of landfill cover materials (especially within inactive areas). As a result of this inspection (and other violations noted by DOH), the County entered into a "Consent Agreement" with DOH to perform corrective actions necessary to mitigate the identified deficiencies and to quantify the County's responsibility relating to payment of penalties and the implementation of supplemental environmental activities. Given that prior operation of the landfill had been documented as using significantly less daily and intermediate cover material than required by applicable regulations, it is possible that previous attempts to estimate the SHSL remaining airspace capacity excluded airspace that would have been consumed by mandated landfill cover materials.

Early 2001: County incorporates for the first time the use of a landfill compactor in placing waste/cover materials at the SHSL. Landfill compactors are specialized pieces of heavy equipment designed to efficiently spread and compact large volumes of incoming MSW. Landfill compactors typically increase waste density by up to 50%. The addition of the landfill compactor allowed the County to operate the landfill with two pieces of specialized heavy equipment (dozer and landfill compactor)

capable of efficiently managing incoming waste and maximizing waste density.

Early 2002: County reduces the size of landfill cover material from 6-inch minus to 2-1/2-inch minus. Reduction in the size of landfill cover material typically increases equipment operator control of cover layer thickness (minimizing wasted cover) and reduces the amount of air voids within the cover layer thus minimizing lost airspace or lost waste capacity.

September 2004: County increases site personnel at SHSL. One (1) additional full-time equipment operator and one (1) additional full-time landfill spotter are added to the landfill operation. These additional personnel provide for (among other things) increased management of incoming waste and improved MSW compactive effort.

October 2004: County hires full-time permanent Solid Waste Superintendent and Hilo District Supervisor. Permanent managerial staff provided for improved management of SHSL resources and standardization of operations. Managerial staff implemented upgrades to SWD equipment including landfill heavy equipment (dozers/landfill compactors).

March 2005: County implements alternative daily cover (ADC) pilot project. Clean processed green waste mulch is periodically applied to interior temporary refuse slopes as ADC. Green waste ADC is biodegradable thus airspace previously consumed by coarse soil daily cover is reused for future waste disposal. The success of this ADC pilot project has resulted in the SWD's inclusion of this ADC in accordance with HAR 11-58.1-15(b)(2) as an approved daily cover within the proposed 2005 DOH permit application.

Capacity Calculation Assumptions

Based on available information, previous airspace capacity estimates appear to have assumed an in-place waste density estimate of 1000 pounds per cubic foot. Recent preliminary estimates assume an in-place waste density of 1200 pounds per cubic foot. In-place waste densities between 1000 pounds per cubic foot and 1600 pounds per cubic foot can be achieved as a result of normal landfill operations observed at the SHSL. It is likely that waste densities in excess of 1000 pounds per cubic foot have been achieved at the SHSL. An informal waste density analysis recently performed at the SHSL yielded preliminary in-place waste densities exceeding 1500 pounds per cubic foot. The increase in waste density has resulted in an increase in landfill capacity.

Secondary settlement occurs when the waste mass is decreased through a combination of waste decomposition and static/dynamic compaction. Secondary settlement of the existing waste was not included in the preliminary capacity estimates in order to accommodate unanticipated fluctuations in the amounts and types of waste received at the landfill prior to closure. Secondary settlement can increase airspace capacity by up to 20 percent annually.

The February 2005 airspace capacity estimate utilized a calculated airspace consumption rate generated through a comparison of topographic surveys performed in September 2003 and December 2004. This airspace consumption rate was utilized to update the projected closure date based on the volume of remaining airspace calculated from the December 2004 topographic survey. It should be noted that both the 2003 and 2005 estimates accounted for the approximate landfill airspace consumed from the time each topographical survey had been performed.

Recycling/Diversion Efforts

The County's ISWMP outlines the County's strategy for achieving Federal and State waste reduction goals through increased recycling, reuse and source reduction. In recent years, the County has increased its diversion efforts to the extent that significant waste (which may have originally been included in past County waste generation estimates) is now being diverted from both County landfills. Continued success and support of these efforts in combination with an increase in the operational efficiency at County landfills and specific bans on disposal of recyclable wastes (i.e. green wastes, tires, construction and demolition debris) will extend both County landfill closure dates beyond those dates previously estimated. The current County diversion rate is approximately 19% with a goal to increase the diversion rate to 45% by the year 2008. As a point of reference, the Federal government established a diversion rate of 35% by 2005 and the State of Hawaii's diversion goal was set at 50% by 2001. In the absence of strong recycling, re-use and source reduction programs (including local mandates) and in light of the anticipated growth projected for the Big Island, both County landfills will likely reach their maximum permitted capacities prior to current estimates.

Waste Reduction Technology

Many municipalities are in the initial stages of investigating the use of testing alternative waste treatment or waste reduction technologies with varying degrees of success. As detailed in the ISWMP, appropriate waste reduction technologies identified for the Big Island include waste to energy, anaerobic digestion, and thermal gasification. Waste reduction technologies offer possible solutions to divert or significantly reduce wastes from landfills while converting treated wastes into beneficial uses

(i.e. electricity, building materials). Although the use of waste reduction technologies is generally viewed as being a significant component in the future of solid waste management, the majority of municipalities have determined that due to negative public perception, high operating and maintenance costs, vendor unreliability, financing issues, and the lack of a proven performance record – many technologies present an unacceptable risk to taxpayers.

The County is currently among those municipalities who are investigating potentially feasible waste reduction technologies for implementation. However, the timeframe for implementing such solutions extends beyond the currently projected operational life of the SHSL. Careful consideration must be taken to choose an appropriate technology service provider who has demonstrated the ability to commercially deliver and maintain the selected technology and to select a technology that is feasible for processing the quantity of waste generated in the area.

Any waste reduction technology will still require an operating landfill for disposal of residuals and wastes that cannot be recycled or treated. Because of this fact, management of residual wastes (including liquid wastes and potential hazardous wastes) will need to be incorporated into the County's integrated waste management plans, as it is unlikely that an affordable technology will include off-island management of residual wastes.

2.0 EXISTING CONDITIONS

BAS evaluated the existing conditions of the SHSL based on the September 2003 topographic survey against the SHSL's Operations Manual final grading plan. The September 2003 topographic survey is based on an aerial photogrammetric survey, which was flown on September 28, 2003 by Air Survey Hawaii, Inc. with ground survey control provided by Island Survey, Inc. Contour intervals applied to the resulting topographic drawing were provided every two feet over the entire site. The Operations Manual final grading plan was provided to BAS in digital format by the SWD in order to facilitate a digital comparison of the updated topography with the final grading plan. Additionally, the 2003 topographic survey was updated by Inaba Engineering, Inc., based on a ground survey they performed late December 2004. Likewise, BAS performed a digital comparison of the 2004 topographic survey with the final grading plan.

The SHSL's final grading plan primarily consists of 3:1 or flatter slopes with 12-foot wide benches at a minimum of every 40 vertical feet. The final grading plan provides for landfill drainage to be directed to five (5) collection systems which consists of three (3) slope drains and two (2) ditch drains. This drainage design provides for conveyance of stormwater to two (2) separate detention basins from the northwest corner in a northeasterly direction around the base of the landfill to the detention basin located on the northeasterly portion of the site and from the

northeast corner in a southeasterly direction around the base of the landfill to the other detention basin located on the southeasterly portion of the site. Due to the porous nature of the landfills cover materials and the surrounding strata, concentrated flow of stormwater occurs only sporadically during significant rain events. Historical observations have indicated that the majority of stormwater percolates downward through the landfill cover and adjacent strata.

The final grading plan indicates an ultimate height of the landfill at 196 feet above mean sea level (AMSL). This year's survey indicated that the landfill's top deck high point was at approximately 168 feet AMSL meaning that the landfill would reach its maximum design elevation with an additional twenty-eight (28) feet. The final grading plan indicates that as the height increases, the width of the landfill deck decreases (due to construction of the perimeter slopes).

In comparing the updated topography to the current final grading plan, BAS's 2003 analysis indicated that the slopes up to approximate elevation 160 feet AMSL showed areas of refuse overfill and underfill. In general, the as-built condition of the SHSL appears to be in generally substantial compliance with the final grading plan with the exception of the mid-slope drainage bench, which was not fully constructed, and the northerly side of the landfill and the southwesterly corner of the landfill. Within the northerly side and southwesterly corner, the overfill varied and in the steepest areas was between 16 feet and 21 feet respectively. The 2003 comparison yielded a fill of approximately 307,000 cubic yards and the analysis further indicated that the total useable airspace was approximately 258,000 cubic yards. For the purposes of this analysis, useable airspace is defined as that amount of landfill airspace available between the SHSL's active fill area (or active face) and the final grading plan's maximum elevations. The BAS/GLA Team assumed that a 4-foot cover section would be applied to close the landfill, of which one foot would be placed during landfill operations as interim cover, thus, the refuse grades are assumed to be three feet lower than the design elevations depicted in the final grading plan. This comparison resulted in a remaining capacity of approximately 214,000 cubic yards of landfill air space.

The 2005 analysis utilized the updated topography from the December 2004 survey. This updated topographical survey was compared against the September 2003 topographical survey. The amount of fill placed during the period between the two surveys was generated using a digital comparison and was estimated to be approximately 155,000 cubic yards. This volume was then divided by the amount of time between the two surveys to generate an airspace consumption rate of approximately 10,000 cubic yards per month. This monthly airspace consumption rate was then used to revise the estimated closure date to March 2006.

The remaining landfill capacity will be greater based on settlement effects of the landfill. Generally, the BAS/GLA Team has found that as the fills on this type of landfill get to the deepest point, increasing settlement occurs and, therefore, typically results in an increase to the landfill capacity. However, given available information, the BAS/GLA Team was not able to estimate this additional airspace and it should not be counted on for planning purposes. It is recommended that the County install settlement monuments within various inactive areas within the landfill's waste limit to further gauge the effects of settlement on landfill capacity. Survey data from these settlement monuments could be incorporated into future annual landfill capacity estimates.

Conversely, the remaining landfill life may be less due to increases in the quantities of landfilled waste. Natural disasters, large-scale demolition and construction projects, contaminated property remediation, and ongoing disposal of recyclable (or otherwise reusable) materials will consume available landfill airspace within a relatively short period of time.

3.0 PROPOSED ALTERNATIVES

A. LANDFILL EXPANSION ALTERNATIVES

The EIS identified specific issues relative to implementing a lateral expansion of the SHSL. As RCRA Subtitle D regulations now require that all new landfills (including existing landfills proposed for lateral expansion) be operated and closed utilizing the "dry cell" or "dry tomb" method, associated costs for expanding the SHSL or constructing a new Hilo landfill required detailed analysis. As shown in the EIS, the costs associated with managing a "dry cell" landfill in a local environment that receives significant rainfall, such as Hilo, was determined to exceed those costs estimated for other alternatives. In late 2003, the SWD investigated other options not previously contemplated by the County in an effort to identify realistic opportunities to extend the SHSL capacity. These options included (among other things) increasing the maximum SHSL elevation via a vertical expansion (i.e. extending the maximum elevation of the landfill), dynamic compaction of the SHSL utilizing mechanical methods, mining the SHSL for recyclables and other potential reuse items, and steepening the existing SHSL perimeter slopes.

The SWD recommended against pursuing the first option, as it was determined that additional consultation with the Federal Aviation Administration would be required in order to extend the maximum elevation of the SHSL. The SWD estimated that the additional resources necessary to complete the review/approval process for a vertical expansion at this time would be more efficiently utilized exploring other options that would likely yield greater volumes of available landfill airspace.

The use of specialized equipment and methods to dynamically compact existing waste within the SHSL was dismissed due to operational concerns (i.e. minimizing impact to landfill operations). Additionally, the amount of time necessary to produce significant airspace through dynamic compaction could not be accurately estimated and was believed by the SWD to exceed the amount of time available prior to closure of the SHSL. Furthermore, regulatory issues associated with the County's November 2002 "Consent Agreement" with DOH and the SHSL solid waste management permit dictated that this option was not feasible given the amount of time available.

Recovery of recyclables and other reuse items through traditional mining and material separation techniques was deemed by the SWD to be too costly and would pose similar concerns as the dynamic compaction option.

Construction of MSW landfills with final perimeter slopes steeper than 3:1 is a common landfill practice and has been utilized by experienced landfill operators throughout the United States. Construction of 2:1 slope fills constructed over 3:1 or 3.5:1 slopes (as is the case for the SHSL) has been safely and efficiently completed in California with similar resources as those currently available at the SHSL. Additionally, site-specific geotechnical analyses of 2:1 refuse fill slopes have demonstrated that these 2:1 fill slopes can be constructed and maintained with static and dynamic factors of safety exceeding those mandated by the Federal government.

The BAS/GLA Team evaluated two distinct alternatives for the final grading configuration of the SHSL. The first configuration that was evaluated was for a 3.5:1 gross slope gradient. This slope gradient produced intermediate slopes slightly steeper but generally consistent with the existing permitted slope steepness (i.e. Operations Manual final grading plan). The second alternative was a 2.5:1 gross slope gradient. These slope gradients would have a maximum of 3.1 and 2.1 intermediate slopes, respectively, between the landfill benches. These benches are required for controlling drainage and for providing safe access for maintenance activities. Each alternative required that all future development of the landfill perimeter slopes be confined within the existing waste footprint and that no lateral expansion of the SHSL would be required. As previously discussed, the SHSL is a pre-RCRA Subtitle D landfill, and therefore, was constructed without a bottom liner and leachate collection and removal system (LCRS). Lateral expansion of the landfill outside of the existing landfill waste limit (i.e. base of the landfill slopes) would require the installation of a low-permeability liner and the construction and operation of an LCRS (refer to the EIS for more details).

Each alternative was evaluated with a maximum elevation of 200 feet AMSL. This elevation is approximately consistent with the existing permitted top deck elevation (i.e. Operations Manual final grading plan). The 3.5:1 slope gradient alternative was expanded to an elevation of 216 feet AMSL (resulting in a reduced top deck area). The 216 feet AMSL elevation was determined to yield the hypothetical minimum area necessary (based on the final top deck area design provided in the Operations Manual) to maintain an efficient and safe operational deck for refuse placement, and was therefore, the maximum height feasible while constructing the proposed 3.5:1 gross slope gradient. The 2.5:1 gross slope gradient was extended to a maximum elevation of 260 feet AMSL. This was determined to be the maximum elevation, which would yield the hypothetical minimum area necessary (based on the current top deck area provided in the Operations Manual) to maintain an efficient and safe operational deck for refuse placement, and was therefore, the maximum height feasible while constructing the proposed 2.5:1 gross slope gradient.

At the request of the SWD, GLA performed a detailed geotechnical analysis of the proposed gross slope gradients. The "Slope Stability Analyses For Proposed Final Grading Designs – South Hilo Sanitary Landfill, Hawai`i", prepared by GLA, and dated October 21, 2005 indicated that both proposed slope gradients (including the 2.5:1 gross slope gradient with intermediate 2:1 slopes) would yield factors of safety that exceed the minimum requirements established by the Federal government.

The various impacts of the two proposed slope gradients to landfill operations, final closure, post-closure land use, and site life are summarized below.

Landfill Operations

Operationally, sliver fills may be challenging to initiate due to the nature of fill operations starting and ending at a daylight point and widening/deepening as the fill operations continue vertically. Normally, the initial tipping area platform (or active fill area) is constructed utilizing intermediate cover material until adequate width is developed to position refuse disposal vehicles within the active fill area. Most landfill operators develop an over-built cover material buffer along the landfill limit of waste (or RCRA Subtitle D line) in order to ensure that new waste is placed within the permitted waste footprint. Construction of an earthen material buffer along the RCRA Subtitle D line (base of the landfill) will also protect the waste from run-on from adjacent properties and will enhance stormwater conveyance to the detention ponds.

Access to sliver fill areas is typically developed using intermediate cover material to develop competent temporary access, that will be capable of adequately supporting refuse transport vehicles and provide sufficient area for these vehicles (and equipment support vehicles) to safely maneuver in and out of the vicinity of the active fill area. Although the sliver fill operation may require refuse transport vehicles to unload waste away from the active fill area, access would be developed to minimize the distance that landfill equipment must push waste to the active fill area and would allow for clear lines of sight for all individuals operating within the vicinity of the active fill area.

The proposed sliver fills would be keyed into the existing slopes and benches as a standard practice in preparing all new fills prior to placement of additional refuse in order to provide adequate slope stability and increase the size of the active fill area. A sufficient quantity of cover material would be stockpiled adjacent to each successive sliver fill in order to provide required thicknesses of daily cover and intermediate cover (required for all perimeter slopes constructed to final grades). All perimeter slopes would be constructed in a single-phase operation (i.e. placement of multiple sliver fills or "pancaking" successive daily refuse fills directly onto a given slope area would be avoided).

The two alternative fill plans analyzed by the BAS/GLA Team consisted of: 3.5:1 gross slopes (3:1 intermediate slopes between benches) and 2.5:1 gross slopes (2:1 intermediate slopes between benches). Grades are normally slightly easier to control with the 3.5:1 gross slope. The flatter slope gradient (3:1) makes it easier for equipment to operate up and down the slopes. Standard construction equipment has been proven and observed to operate safely on both slope gradients analyzed for this CAA. Any proposed final slope gradient would require additional grade controls (i.e. construction stakes and regular grade inspection) to ensure construction and maintenance of the final landfill design grades in order to satisfy specific design/permitting requirements. The steeper intermediate slope (2:1) allows for construction of an active fill area established at a much lower elevation than the 3:1 slope so as the fill progresses, the sideslope refuse fill deck area widens at a faster rate than the flatter 3:1 intermediate slope gradient.

The final perimeter slopes of the landfill require intermediate cover and will eventually require final cover as part of the proposed final closure (discussed in the next section). The intermediate cover placement on a 3.5:1 gross slope is slightly easier than the 2.5:1 gross slope. Both proposed slope gradients will require that landfill heavy equipment compact or "track walk" the intermediate cover material in-place to stabilize the material and prepare it for final cover. The daily cover operation is similar in both slope gradients with the steeper slope gradient

providing a larger sideslope refuse fill deck area (at a lower relative elevation), which will simplify daily cover operations at lower elevations near the base of the landfill.

Additional planning by SWD personnel will be required in order to minimize or eliminate potential negative impacts such as traffic delays and reduced equipment efficiency due to standby time resulting from poorly planned access. The SWD should consider operation of two (2) active fill areas during the initial development of the sliver fills until an adequately sized tipping area (sideslope refuse fill deck) and access has been constructed. Litter control will also likely require increased effort, as sliver fill operations will be performed along the perimeter of the landfill.

Final Closure

Use of geosynthetics on a 2.5:1 gross slope is not technically feasible in this proposed application. Alternative final covers, such as a monolithic soil covers have proven to be extremely effective in final cover applications and have been demonstrated to outperform prescriptive RCRA Subtitle D final covers. Additionally, alternative final covers can be designed to incorporate the use of native materials (soils and plants) to provide a final cover system, which will blend in naturally with adjacent vegetation and will be relatively simple to maintain. The proposed monolithic soil final cover is discussed in greater detail in Section 3.0.B.

Post-Closure Land Use

The County proposes that the post-closure land use of the site be non-irrigated open space. Non-irrigated open space means that the site will not be used for any further development and shall not be artificially irrigated (i.e. installation of permanent irrigation systems shall be prohibited). Regular maintenance and inspection of the landfill final cover shall be implemented and maintained by the County. Environmental monitoring shall also continue as required by the DOH solid waste management permit.

Site Life

As a result of the grading analyses performed by the BAS/GLA Team, the SWD determined that the 2.5:1 gross slope option provided the most feasible option available to the County to satisfy certain County Council member's objectives within the available timeframe. Furthermore, the SWD viewed this option as an opportunity to re-construct the slopes of the SHSL in a manner that would effectively remedy issues relative to stormwater management and long-term maintenance of the SHSL final cover.

A review of associated costs (operations/closure construction/post-closure maintenance) was originally proposed as part of this CAA. However, due resource and time restrictions associated with preparing the DOH permit application and certain Council member's directives to pursue the limited expansion expeditiously while concurrently pursuing waste reduction technologies, a cost analysis was not performed as part of this CAA. It is anticipated, however, that operations costs will increase substantially as construction of sliver fills is not an efficient method in constructing a landfill. Additionally, as identified previously, additional resources will be necessary in order to accommodate sliver fill construction.

The following table (Table 1) is a summary of the various gross slope gradients evaluated with corresponding comparisons of associated landfill airspace capacity yields (Gross Capacity):

[1]TABLE 1

Gross Slope Gradient (Horizontal:Vertical)	Maximum Elevation (ft. AMSL)	Gross Capacity[2] (cubic yards)
3.5:1	200	615,000
3.5:1	216	700,000
2.5:1	200	1,300,000
2.5:1	260	1,850,000

Notes: [1]Taken from 2003 Topography
[2]Gross Capacity includes all available airspace (including waste and cover materials).

B. FINAL COVER ALTERNATIVES

There are three primary advantages of monolithic soil final cover when compared to the prescriptive final cover design. The first is that the monolithic soil final cover typically provides a thicker section of soil that promotes the growth of vegetation that aids in moisture uptake and removal by transpiration, thereby minimizing the quantity of water that passes through to the refuse prism. The above ground plant structure also minimizes erosion by diffusing rainfall energy and runoff channeling, and by binding the final cover soils with the root system. As a result, a robust plant community not only enhances evapotranspiration (ET) but also the long-term stability of the final cover soils. A second advantage of the monolithic soil final cover system is that it utilizes materials that are readily available locally in the quantity and quality that are generally required to construct the final cover system. As a result, import of soils or extensive amendment of on-site soils is not required. Finally, monolithic ET soil final covers do not rely on the extended competency of a low-permeability layer to maintain performance integrity. Studies by USEPA's Alternative Cover Assessment Program have found that desiccation of the

low permeability infiltration layer will begin in as little as three weeks after the last application of moisture. Since historical climatic data for the Hilo International Airport indicate that it is not uncommon for South Hilo to experience three or more weeks without significant rainfall, desiccation (and subsequent reduced cover performance) of a conventional prescriptive final cover would be anticipated.

At the request of the SWD, GLA performed a detailed geotechnical analysis of proposed alternative final covers in comparison to the RCRA Subtitle D prescriptive final cover. The "Alternative Final Cover Analyses – South Hilo Sanitary Landfill, Hawai'i", prepared by GeoLogic Associates, and dated November 2005 indicates that an ET composite alternative final cover system including four (4) feet of select, processed soil placed on the landfills perimeter slope areas and a linear low density polyethylene geomembrane with overlying drainage and vegetative soils placed on the top deck, drainage benches, and haul roads will perform better than the prescriptive final cover system at the SHSL, and will satisfy the regulatory requirements for an alternative final cover as defined in HAR 11-58.1-17(2).

4.0 RECOMMENDATIONS

To maintain compliance with current County solid waste management permits, and to minimize transport costs and associated disposal fees at the WHSL, it is recommended that the County coordinate efforts with DOH to pursue a limited expansion of the SHSL. A limited expansion of the SHSL will require that operations at the site be modified in order to accommodate construction of sliver fills along the slopes of the landfill.

It is anticipated that the proposed limited expansion of the SHSL will remedy current stormwater and grading compliance issues at the site and will result in additional landfill airspace that will provide the County with a limited amount of time to pursue and implement waste diversion programs. As the additional landfill airspace anticipated to be gained through implementation of the proposed limited expansion is a short-term solution, it is recommended that the County investigate additional solutions to increase the active life of the SHSL. These additional solutions include (but are not limited to):

- Construct and operate EHRSS.
- Investigate viable waste reduction technologies.
- Increase recycling and reuse efforts to obtain higher landfill diversion.
- Increase incoming waste monitoring at all County transfer stations (i.e. mobilize full-time personnel at each transfer station in order to educate waste haulers on appropriate disposal and recycling habits

and to minimize disposal of recyclable materials and prohibited wastes).

- Pursue use of ADC (including green waste and tarps).
- Increase operations training for SWD managerial staff and landfill personnel.
- Acquire in-house equipment maintenance and emergency repair capabilities in order to maximize equipment use and landfill airspace.
- Increase public awareness of diversion needs through outreach education.
- Implement landfill bans or other restrictions on recyclable or otherwise reusable materials (i.e. construction and demolition waste, green waste, scrap metal, etc.)
- Implement County policies to increase source reduction (i.e. require all County agencies to reduce purchase of non-essential waste products, require County agency procurement of certain recycled content products in lieu of similar non-recycled content products, require County agencies to implement County developed environmental sustainability plan, etc.).
- Implement County policies to increase recycling and reuse (i.e. require County agencies to recycle office waste, require County agencies to reuse office supplies where appropriate, require County agencies to prohibit single-sided printing/photocopying, etc.).
- Implement County mandates to increase recycling and reuse.
- Investigate lateral expansion of SHSL as a bioreactor landfill within the adjacent quarry area.
- Pursue opportunities to increase recycling of construction and demolition wastes.
- Update disaster debris plans for emergency storage and processing of non-putrescible wastes. The plan should include proper procedures for sorting debris at the point of generation.
- Revise County Planning and Building Department permitting guidelines in order to increase diversion and enforce waste restrictions.

- Investigate vertical expansion (i.e. increase maximum vertical elevation) of the SHSL.

5.0 CONCLUSION

Based on the information available and associated analyses performed, it is concluded that the existing SHSL refuse capacity can be extended through a limited expansion that will not require any modification to the landfill's permitted maximum vertical and horizontal limits. The limited expansion will provide for reconstruction of the landfill slopes in a manner that will mitigate previous landfill construction and increase the protection of the surrounding environment. The limited expansion should be coordinated between DOH and County officials in order to ensure that appropriate planning is performed in support of landfill operations personnel and waste haulers. As the limited expansion is only a short-term solution for the management and disposal of solid waste at the SHSL, the County should implement other diversion plans immediately and continue implementation of long-term solid waste management strategies.

6.0 CLOSURE

This report has been prepared in accordance with generally accepted engineering and geotechnical practices and makes no other warranties, either express or implied, as to the professional advice or data included herein.

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7.0 REFERENCES

"Alternative Final Cover Analyses – South Hilo Sanitary Landfill, Hawai`i", prepared by GeoLogic Associates, and dated November 2005.

"Final Environmental Impact Statement – Construction and Operation of the East Hawai`i Regional Sort Station", prepared by the County of Hawai`i – Department of Environmental Management, and dated February 2004.

"Operations Manual – South Hilo Sanitary Landfill – Hilo, Hawaii", prepared by Harding Lawson Associates, and dated January 25, 2000.

"Slope Stability Analyses For Proposed Final Grading Designs – South Hilo Sanitary Landfill, Hawai`i", prepared by GeoLogic Associates, and dated October 21, 2005.

"Update to the Integrated Solid Waste Management Plan for the County of Hawai`i", prepared by Harding ESE, and dated December 31, 2002.