Draft Environmental Impact Statement

Volume II of II - Appendices

PROPOSED OHANA KAI VILLAGE AFFORDABLE HOUSING PROJECT AND RELATED IMPROVEMENTS AT TMK (2) 3-6-001:018, TMK (2) 3-6-004:003(por.), and 008(por.), MAALAEA, MAUI, HAWAII

Prepared for:

MVI, LLC

Accepting Authority:

County of Maui,
Department of Housing and Human Concerns

December 2009

MUNEKIYO HIRAGA, INC.

LIST OF APPENDICES

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APPENDIX A.

Market Study Report

PREPARED FOR: **MR. JESSE SPENCER**
MVI LLC
P.O. Box 97
Kihei, Hawaii 96753

EFFECTIVE DATE: **May 20, 2009**

A MARKET STUDY OF THE OHANA KAI VILLAGE SUBDIVISION, WAILUKU, ISLAND OF MAUI, HAWAII

ACM CONSULTANTS, INC.

ACM CONSULTANTS, INC.
A Real Estate Appraisal, Research & Advisory Group

September 23, 2009

09-9037

MR. JESSE SPENCER
MVI LLC
P.O. Box 97
Kihei, Hawaii 96753

Re: Market Analysis for the proposed Ohana Kai Village Subdivision in Wailuku, Island and County of Maui

Dear Mr. Spencer:

In accordance with your request, we have inspected the above-referenced property in order to provide a defined scope market study of the proposed Ohana Kai Village Subdivision in Ma'alaea, District of Wailuku, Island and County of Maui. This *counseling report*, and the conclusions herein, are based on the on-site inspection of the property, a study of current political and economic conditions, and a historical review of the real estate market in the Central Maui and South Maui regions and on Maui overall.

The subject consists of approximately 257 acres of land and is currently zoned Agricultural District. The project, which is still in its preliminary planning stage, is identified as the Ohana Kai Village Subdivision and will be located mauka of the Honoapiilani Highway. It will possess views of the ocean and off-shore islands.

The focus of this assignment essentially has three parts: (1) to define and delineate the market area; (2) to identify and analyze the current supply and demand conditions specific to the subject's market; and (3) identify, measure and forecast the effect of anticipated developments or other factors on future supply.

The following report presents a narrative review of the market study and our analysis of data along with other pertinent materials on which this report is predicated. It contains data and exhibits gathered in our investigations, and will include a description of the analytical process and our conclusions, as of May 20, 2009.

2073 Wells Street, Suite 100 ◆ Wailuku, Maui, HI 96793 ◆ Telephone: (808) 242-6481 ◆ Fax: (808) 242-1852

Thank you for allowing us the opportunity to work on this interesting assignment.

Respectfully submitted,
ACM Consultants, Inc.

Glenn K. Kunihisa, MAI, CRE
Certified General Appraiser,
State of Hawaii, CGA-039
Expiration: December 31, 2009

Sharie M. Fukuda
Certified General Appraiser,
State of Hawaii, CGA-810
Expiration: December 31, 2009

ACM CONSULTANTS, INC

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PART I – INTRODUCTION

A. EXECUTIVE SUMMARY

Background

The proposed Ohana Kai Village Subdivision is located on the mauka side of Honoapiilani Highway in Maʻalaea, District of Wailuku, Island and County of Maui. The subject is currently zoned Agricultural District and consists of approximately 257 acres of land. The project, which is still in its planning stage, will consist of approximately 1,100 single family residential units, a village town center, a charter school site, park areas, and an on-site wastewater treatment facility. Potable and non-potable water for the project will be provided by three water wells and associated infrastructure. According to the Developer, the proposed land use is as follows:

Proposed Land Use	Acreage
Single-Family Homes	197 acres
Village Town Center (Commercial)	7 acres
Wastewater Treatment Facility	7 acres
Retention/Open Space Areas	20 acres
Public/Quasi-Public Uses	16 acres
Major Roads	10 acres
Total:	± 257 acres

Preliminary plans called for three-bedroom homes with an average living area of 1,584 square feet, in addition to four-bedroom homes averaging 1,811 square feet. Early indications were for 60 percent of the units to be provided within the affordable housing price range, with the Developer stating he will strive to also offer the remaining 40 percent as affordable units. The Developer has estimated an 8-year build out for Ohana Kai Village.

Study Objectives

ACM Consultants, Inc. has been retained by Mr. Jesse Spencer of MVI LLC to analyze the residential real estate market as it relates to this proposed project. In particular, we studied economic trends and demographics, and supply and demand factors for residential property which includes single family house lots, and residences, as well as condominium units. In the process, we have gathered as much information as possible on real estate sales on Maui while focusing on the Central Maui market.

The objectives of the market analysis were as follows: (1) to define and delineate the market area; (2) to identify and analyze the current supply and demand conditions specific to the subject's market; and (3) identify, measure and forecast the effect of anticipated developments or other factors on future supply.

Conclusion

Maui in general has seen growth in its population, tourism and economy over the past two decades. Similar to many real estate

markets on the mainland, Maui's real estate market saw significant increases up to mid-2006. Since then; however, median prices and sales volume have declined, while marketing times have increased. Whereas many projects were sold out in weeks, or even days in some cases, developers of market priced housing units now have to carry inventory for longer periods of time.

There are several ongoing residential projects that will provide the immediate supply in the market. Of all the ongoing projects on Maui, there are approximately 1,893 units that are available. In addition to the projects currently under construction or in their financing phase, there are more projects on Maui that may add inventory to the market in coming years but are still in the process of gaining governmental approvals. Beside the subject, the Consultant has identified twelve (12) large developments that could potentially bring between 14,500 and 16,300 units to the Maui real estate market. In Central Maui, these include Puʻunani Subdivision and Hale Mua Subdivision in Wailuku, and A&B Properties' Waiale project.

Historically, many potential projects have been met with governmental or community resistance, leading to long delays. Meanwhile, others were never completed for various reasons. Passage of the Workforce Housing Ordinance and the Water Availability Ordinance are considered by many residential developers as being the most difficult barriers to entry. In this light, it is difficult to determine which future projects will actually be brought to the market.

A survey of projects developed on Maui within the past 10 years indicated that a total of 6,042 new units have been absorbed within this period. This includes single family residences, condominium units, residential house lots as well as agricultural lots. The average number of units sold was approximately 604 units per year over the past 10 years. It should be noted that this period also included years in which the real estate market was weak. Based on this historical absorption rate, the current short term supply of 1,893 new units (**Page 26**) will last approximately 3 years.

The economic downturn being witnessed across the nation has significantly affected Maui, through a drop in visitor counts and the drastic slowdown of construction. These industries are two of the primary employment forces on the island and their decline has had an adverse impact on the local economy. Unemployment has been on the rise, with many that are still employed stating that job security is a concern. Meanwhile, the heavy losses witnessed in the financial sector since the fourth quarter of 2008 have surely diminished the investment capital for other potential buyers. Combined with a more stringent lending environment, it has become increasingly difficult to purchase real estate, regardless of current market conditions.

At the height of the market, the primary obstacle for buyers was the high asking prices for residential products. Many buyers who did not own a home found it difficult to even come up with enough money for a down payment. Meanwhile, homeowners saw their property values increase to a point where they were able to use their equity appreciation to upgrade to larger, more elaborate accommodations. For many, this option is no longer possible, as the retreat of home prices has caused a significant loss of equity.

Currently, the ability of qualified buyers to purchase affordable housing may be more difficult than a few years ago; however, it is fairly safe to assume that as economic conditions improve, housing units within this market segment will continue to be the most sought after. Economists have varied opinions as to the timing of the economic recovery, but many have pointed to 2011 for this turnaround.

Had Ohana Kai Village come on-line today, it would have likely been facing the same types of sales difficulties that other ongoing projects are witnessing. However, the subject will still need to go through entitlement, design and construction processes before sales can occur. As such, release of the subject's 1,100 single-family homes may be very well timed with the economic recovery. If so, significant demand can be expected for this project.

The Developer has stated that he still has over 4,000 names remaining on the waiting list from Waikapu Gardens, his most recent subdivision. The addition of Ohana Kai Village will supply Central Maui with 660 more affordable single-family homes, with the Developer striving to keep the remaining 440 units within affordable guidelines. He is an experienced home builder, with a proven track record of providing single-family residences at price points geared toward the workforce market segment. A preliminary land use map indicated that Ohana Kai Village will have a charter school site and park areas. In addition, the Developer is planning a commercial mixed use area to serve the subdivision, as well as the greater Maalaea community.

Once market conditions improve, the project can expect to see heightened demand, due to its Central Maui location and affordable/workforce price points. Statistical evidence has clearly shown that regardless of conditions, this market segment has the most demand. Although the pricing of the project units have not been determined, this development will give entry level market participants an opportunity for home ownership. After consideration of current economic and real estate market conditions, in addition to forecasts by Hawaii economists, it is our opinion that Ohana Kai Village should be well positioned to capitalize on the expected market recovery.

B. PURPOSE OF THE REPORT

The purpose of this report, as of May 20, 2009, is to generate a market analysis with respect to the proposed Ohana Kai Village Subdivision.

C. INTENDED USE OF THE REPORT

The intended use or function of this report is to provide real property information and real estate market data upon which internal decision making by our client may be based.

D. SCOPE OF THE REPORT

The Consultant has agreed to provide a current market analysis of this project by (1) defining and delineating the market area; (2) identifying and analyzing the current supply and demand conditions that make up the specific real estate market; and (3) identifying, measuring and forecasting the effect of anticipated developments or other changes on future supply. The market analysis will be developed and prepared in conformity with, and subject to, the requirements of the Code of Professional Ethics and the Standards of Appraisal Practice of the Appraisal Institute, and the Uniform Standards of Professional Appraisal Practice.

E. STATEMENT OF COMPETENCY

ACM Consultants, Inc. (formerly ACM Real Estate Appraisers, Inc.) has been actively involved in the real estate appraisal and consulting business since 1982. Our business emphasis has focused mainly on the research, consultation and valuation of residential and commercial properties located within the State of Hawaii. The company considers itself competent to conduct a market analysis for a proposed residential project in Wailuku, Island and County of Maui.

F. EXTRAORDINARY ASSUMPTIONS AND HYPOTHETICAL CONDITIONS

As of May 2009, the subject was still in the preliminary stages of planning. A land use map from the Developer provided a visual indication of the proposed layout of the project district. The Consultant is not liable for any changes in the project plan past this date, nor for information that has not been released or communicated to the Consultant.

The Consultant has no control over economic conditions and other international events that could have an affect upon Hawaii's economy and the Maui real estate market. As a result, this report has not made any assumptions regarding potential conflicts with other nations, or global external factors affecting economic conditions on Maui.

The counseling report is also subject to standard "Limiting and Contingent Conditions" located in the pages following.

G. CONFIDENTIALITY PROVISION

The contents of this market study are confidential. Release of this counseling report by ACM Consultants, Inc. is limited to you and for your preparation and submission of an Environmental Impact Statement for the proposed Ohana Kai Village Subdivision. The intended users of this report include MVI LLC, Munekiyo and Hiraga, Inc. and the appropriate government agencies to which this report will be submitted. Any further release of this report, or portions herein, is strictly prohibited and you shall accept the risk and liability for any such release without the previous written consent of ACM Consultants, Inc. Further, you shall indemnify and defend ACM Consultants, Inc., and its individual consultants/appraisers, from any claims arising out of any such unauthorized disclosure.

H. CERTIFICATION

The undersigned does hereby certify that except as other-wise noted in this appraisal report:

1. The Consultant's compensation is not contingent upon the reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value estimate, the attainment of a stipulated result, or the occurrence of a subsequent event.

2. The Consultant has no present or prospective interest in the property that is the subject of this report, and no personal interest or bias with respect to the parties involved. Any "Estimate(s) of Market Value" in the consulting report is not based in whole or in part upon the race, color, or national origin of the prospective owners or occupants of the properties in the vicinity of the property appraised.

3. The Consultant has personally inspected the property, and is a signatory of this Certification.

4. To the best of the Consultants' knowledge and belief, all statements of fact and information in this report are true and correct, and the Consultant(s) have not knowingly withheld any significant information.

5. No other person provided significant professional assistance to the person(s) signing this report.

6. The reported analyses, opinions and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal unbiased professional analyses, opinions and conclusions.

7. All analyses, opinions and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Appraisal Practice.

8. This counseling report is subject to and in conformance with the Code of Professional Ethics and Standards of Professional Conduct of the Appraisal Institute. The analyses, opinions and conclusions of this counseling report have been made in conformity with, and is subject to, the requirements of Title XI of the Federal Financial Institutions Reform, Recovery, and Enforcement Act of 1989.

9. This counseling report is to be used only in its entirety and no part is to be used without the whole report. All conclusions and opinions concerning the real estate are set forth in the counseling report were prepared by the Consultant(s) whose signature(s) appears on the counseling report. No change of any item in the counseling report shall be made by anyone other than the Consultant, and the Consultant shall have no responsibility for any such unauthorized change.

10. The Appraisal Institute, of which this Consultant is a member, has a legal right to review this report.

11. The qualifications of this Consultant, including completed educational requirements of his/her candidacy are located in the Addendum to this report. Any member signing the report has completed the requirements of the Appraisal Institute's continuing education program.

ACM Consultants, Inc.

Glenn K. Kunihisa, MAI, CRE
Certified General Appraiser,
State of Hawaii, CGA-039
Expiration: December 31, 2009

Shane M. Fukuda
Certified General Appraiser,
State of Hawaii, CGA-810
Expiration: December 31, 2009

I. LIMITING AND CONTINGENT CONDITIONS

1) This is a Counseling Report which is intended to comply with the reporting requirements set forth under Standards Rule 5 of the Uniform Standards of Professional Appraisal Practice for a Counseling Report. The information contained in this report is specific to the needs of the client and for the intended use stated in this report. The Consultant is not responsible for unauthorized use of this report.

   This report has not been prepared for federally-related mortgage financing purposes, and has not been prepared in compliance with the requirements of Title XI of the Federal Financial Institutions Reform, Recovery, and Enforcement Act of 1989.

2) No responsibility is assumed for legal or title considerations. Title to the property is assumed to be good and marketable unless otherwise stated in this report.

3) The property analyzed is free and clear of any or all lines and encumbrances unless otherwise stated in this report.

4) Responsible ownership and competent property management are assumed unless otherwise stated in this report.

5) The information furnished by others is believed to be reliable. However, no warranty is given for its accuracy.

6) All engineering is assumed to be correct. Any plot plans and illustrative material in this report are included only to assist the reader in visualizing the property.

7) It is assumed that there are no hidden or unapparent conditions of the property, subsoil, or structures that render it more or less valuable. No responsibility is assumed for such conditions or for arranging for engineering studies that may be required to discover them.

8) It is assumed that there is full compliance with all applicable federal, state, and local environmental regulations and laws unless otherwise stated in this report.

9) It is assumed that all applicable zoning and use regulations and restrictions have been complied with, unless a nonconformity has been stated, defined, and considered in this counseling report.

10) It is assumed that all required licenses, certificates of occupancy or other legislative or administrative authority from any local, state, or national governmental or private entity or organization have been or can be obtained or renewed for any use on which the value estimates contained in this report are based.

11) Any sketch in this report may show approximate dimensions and is included to assist the reader in visualizing the property. Maps and exhibits found in this report are provided for reader reference purposes only. No guarantee as to accuracy is expressed or implied unless otherwise stated in this report. No survey has been made for the purpose of this report.

12) It is assumed that the utilization of the land and improvements is within the boundaries or property lines of the property described and that there is no encroachment or trespass unless otherwise stated in this report.

13) The Consultant is not qualified to detect hazardous waste and/or toxic materials. Any comment by the Consultant that might suggest the possibility of the presence of such substances should not be taken as confirmation of the presence of hazardous waste and/or toxic materials. Such determination would require investigation by a qualified expert in the field of environmental assessment. The presence of substances such as asbestos, urea-formaldehyde foam insulation, or other potentially hazardous materials may affect the value of the property. The Consultant's value estimate is predicated on the assumption that there is no such material on or in the property that would cause a loss in value unless otherwise stated in this report. No responsibility is assumed for any environmental conditions, or for any expertise or engineering knowledge required to discover them. The Consultant's descriptions and resulting comments are the result of the routine observations made during the analysis process.

14) Unless otherwise stated in this report, the subject property is evaluated without a specific compliance survey having been conducted to determine if the property is or is not in conformance with the requirements of the Americans with Disabilities Act. The presence of architectural and communications barriers that are structural in nature that would restrict access by disabled individuals may adversely affect the property's value, marketability, or utility.

15) Any proposed improvements are assumed to be completed in a good workmanlike manner in accordance with the submitted plans and specification.

16) The distribution, if any, of the total valuation in this report between land and improvements applies only under the stated program of utilization. The separate allocations for land and buildings must not be used in conjunction with any other appraisal and are invalid if so used.

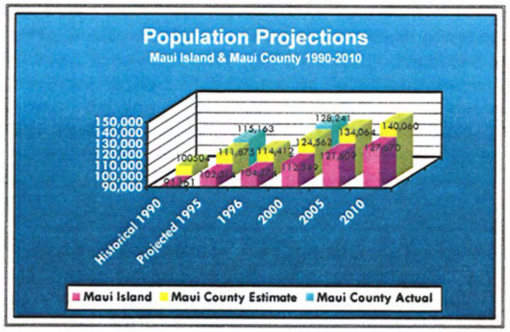
17) Possession of this report, or a copy thereof, does not carry with it the right of publication. It may not be used for any purpose by any person other than the party to whom it is addressed without the written consent of the consultant, and in any event, only with property written qualification and only in its entirety.

18) Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the Consultant, or the firm with which the Consultant is connected) shall be disseminated to the public through advertising, public relations, news sales, or other media without prior written consent and approval of the Consultant.

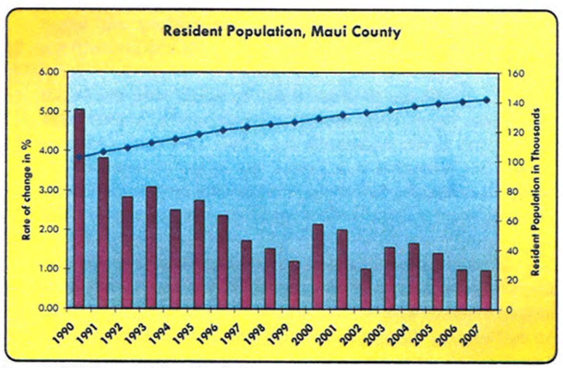
PART II – FACTUAL DATA

A. REGIONAL DATA - MAUI COUNTY

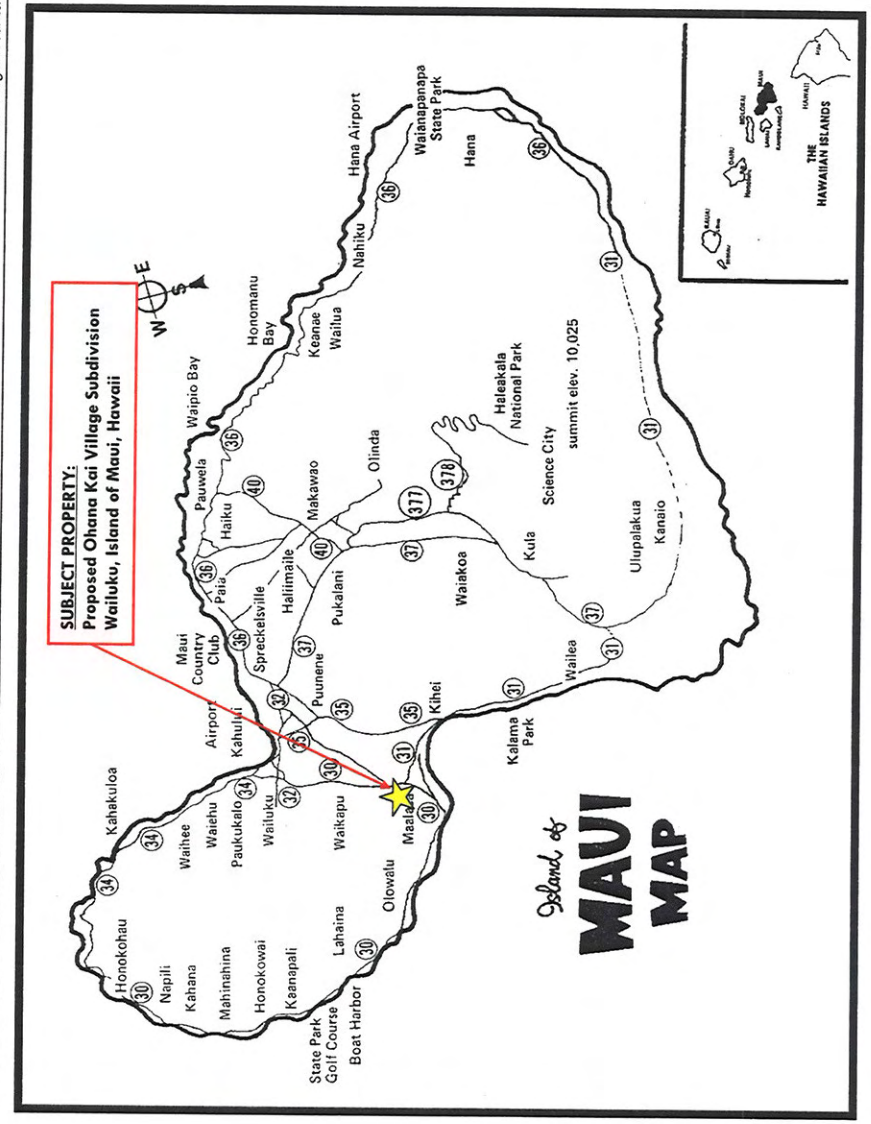
Maui County is the third most populous of the four counties of Hawaii, with a total resident population of 128,241 (2000 Census) and a change of 27.6 percent since 1990. Maui County consists of the islands of Maui, Molokai, Lanai, and Kahoolawe. Ninety percent (90%) of County residents live on Maui; the 2000 U.S. Census of Population reported 7,404 residents on Molokai and 3,193 on Lanai. The Island of Maui consists of a total of 734.5 square miles, or 470,080 acres. Population Projections for Maui County and the Island Maui are illustrated on the table below.



The following graph illustrates the resident population change in Maui County from 1990 through 2007. The graph indicates that although Maui's population has been steadily growing, it now appears to be rising at a decreasing rate.



Source: UHERO Economic Information Service



Like all the Hawaiian Islands, Maui, Molokai and Lanai are blessed by warm air temperatures year-round, and ocean waters that range from 72-77°F in winter to 77-81°F in summer. The islands' distance from other continents, the moderating effects of the surrounding water and the tropical location combine to create this pleasant climate. Hawaii's topography, particularly the mountains and valleys and location of each island, contributes to the great variety of microclimates within very small areas. On Maui, the West Maui Mountains and Haleakala are the primary geological features affecting the weather. Due in part to the above geographical factors, Maui, for thirteen out of the last fourteen years, was selected "Best Island in the World" by readers of Condé Nast Traveler magazine.

Visitor Industry

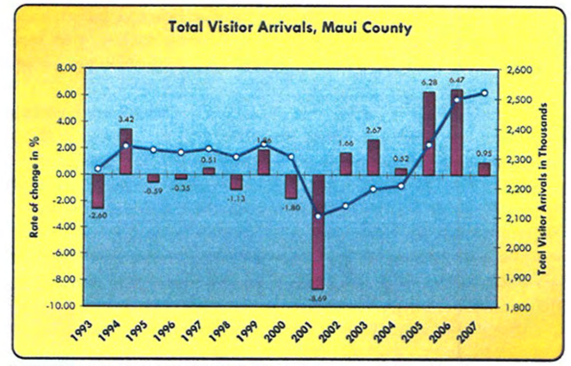
Historically, Maui hotel occupancies typically exceeded any area in the state with the exception of Waikiki. Its high rating is due to a number of factors. First, Maui receives the good fortune of location and climate. Second, Maui has the infrastructure in place to move tourists to a diverse variety of activities with a minimum of inconvenience and down time. The accommodations on Maui are another reason. Maui resort hotels have consistently ranked above other Hawaii resort destinations. In the same Conde Nast Traveler magazine, eight of the "Top 20 Hawaii Resorts" for 2008 were Maui County resorts. The Four Seasons Maui at Wailea topped the list, while other Maui County resorts garnering honors included: Four Seasons Lanai, The Lodge at Koele (3rd); Four Seasons Lanai at Manele Bay (4th); Hotel Hana Maui (6th), Fairmont Kea Lani (9th); Ritz-Carlton Kapalua (11th); Hyatt Regency Maui (14th); and Grand Wailea Resort Hotel & Spa (15th).

With the possible exception of Kauai, Maui is more dependent on tourism than any of Hawaii's four counties. That sector is not treating Maui very well today. For years, Maui has worked very hard at cultivating a worldwide image as a premier, upscale tropical island destination. In fact, it is the only county government in Hawaii that spends money to support tourism. In the wake of the current financial crisis, Maui's tourism counts and hotel occupancy have fallen significantly. Even the upscale and affluent markets, it appears, have curtailed their spending on trips to the Valley Island.

Tracking the tourism counts during this decade begins with the effects of the September 11, 2001 terrorist attacks on this country which had a drastic impact on the tourism industry. The final Maui visitor count for 2001 was 2,104,480. In 2002, the visitor count rebounded slightly to 2,139,427 as the visitors slowly returned during the mid to latter part of the year. Visitor totals for 2003 indicate an increase of 2.7 percent over 2002, 2004 total visitor arrivals increased by 0.52 percent over 2003, while 2005 visitor totals showed an increase of 6.28 percent, to 2,346,480. There was a rebound in 2006, with a

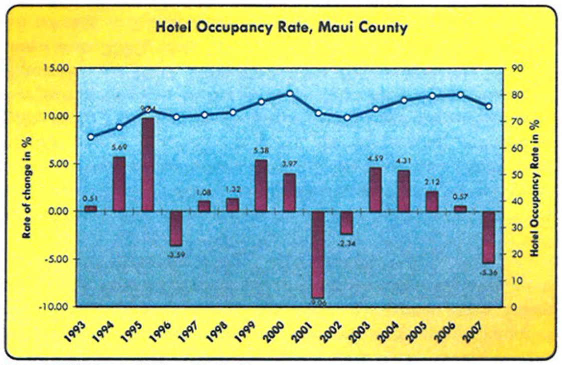
6.5 percent jump to 2,498,200, followed by another 1.0 percent gain in 2007 to 2,522,000. This year's numbers are predicted to be much lower. In fact, according to the November 2008 year-to-date figures, total visitor arrivals declined by 14.8 percent over the same period in 2007. Hawaii and many other visitor destinations worldwide continue to be severely impacted by the current national and global economic conditions.

According to the UHERO Quarterly Hawaii Forecast Update (November 21, 2008), 2008 visitor arrivals forecast for the State of Hawaii was cut from -9% to -10.8%, and an additional 6% decline is expected in 2009. According to the State of Hawaii DBEDT, total visitor count in 2008 through October dropped 14.3 percent from the same period in 2007.



Source: UHERO Economic Information Service

In addition, as of October 2008, Maui County had the lowest occupancy rate of all the Hawaii counties at just 63.3 percent. Compare this figure to the Big Island occupancy of 65.5 percent, Kauai occupancy of 67.5 percent and Oahu's occupancy of 73.4 percent.



Source: UHERO Economic Information Service

Visitor shopping opportunities have increased in recent years with the opening of The Maui Marketplace, a 275,000 square foot shopping complex, modeled after Oahu's successful Waikele Center. The Maui Marketplace is now home to such retail superstores like Lowe's Hardware, Pier One Imports, Borders Books and Music, Sports Authority, Starbucks Coffee, and Office Max, as well as many small local retailers and restaurants. Also opening in the same Kahului area were Home Depot, Wal-Mart, Big K and Costco. In addition, the Shops at Wailea opened in December 2000 and added approximately 150,000 square feet of high-end retail space in the Wailea Resort. At about the same time, the 150,000 square foot Piilani Shopping Center opened in Kihei with Safeway as its anchor tenant. The latest entry into the retail sector is the Lahaina Gateway, which opened in 2007. Dubbed a "lifestyle center", Lahaina Gateway, offers almost 137,000 square feet of gross leasable area.

Maui offers more than any other Neighbor Island in the way of proven vacation experiences. It has a larger tourism activities industry relative to the size of its economy than any other county. Such activities include ocean recreation, helicopter tours, biking down Haleakala, and golfing, among numerous other activities. Maui's well-developed ocean recreation industry ranges from windsurfing to snorkeling, scuba diving and sailing cruises which leave regularly from Lahaina and Ma'alaea Harbors.

Maui also has theme destinations, such as the Maui Tropical Plantation. But the premier theme destination on the island is the Maui Ocean Center. This center, featuring the marine environment of the Hawaiian Islands, is modeled after five other aquarium parks developed elsewhere in the world by Coral World International. This ocean center is located just behind the Maalaea Boat Harbor, and is easily

accessible from Kahului/Wailuku, and the resort areas of Lahaina/Kaanapali and Kihei/Wailea. The Maui Ocean Center anchors the 18-acre Maalaea Harbor Village, which also includes a retail strip shopping center, restaurants and other services.

When the United States and the world in general recover from the current economic crisis, it is hoped that Maui will continue to be a strongly favored destination for Mainland tourists. The island has a large share of condominiums available for families and groups on a budget. The California recovery in the early 2000's fueled higher demand for condominium rentals and this may possibly happen again in the next decade.

Hotels have not been adding much in the way of jobs, in fact, many hotel and other tourism-related industries have cut back their work force. Even when tourism numbers were growing steadily, job creation in the visitor industry was not matching that growth. Today, with tourism waning, the work force is noticeably decreasing. While tourism still dominates the labor force, the profitability problems of the large resorts have led managers to refine their operations.

Real Estate

Residential real estate can be divided into three broad categories (single-family homes, condominiums and residential lots) and four important geographic regions. As a result, there are eight subsections of the market that have proven capable of moving up and down with relatively little correlation with the others. Upcountry has virtually no condominium properties; and two other subsections, South Maui and Central Maui, have few leasehold condominiums. Only West Maui has all three types.

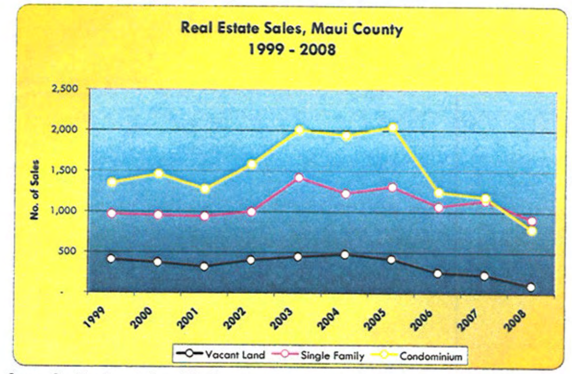
Of all the neighborhoods, several have virtually all luxury housing, such as Kapalua, Kaanapali, and Wailea. Kahului has no luxury housing and Wailuku only a little. All other areas have a mix.

Owner-occupied housing on Maui runs about 56 percent of all occupied housing units. The total housing stock has been growing at a rate of about 1,000 units a year in the 1980's. The total accelerated to 1,500-2,000 new units in the late 1980's, well short of demand. The Maui population has expanded tremendously for the past 10 to 12 years, but housing was not being built at the same pace as the 1980s. As a result, demand for housing during that period outpaced supply and homes prices and rents rose dramatically. The median single-family home price on Maui averaged $574,760 in 2008, which is a drop of 8.4 percent from 2007. Median sales price for a single family home was $627,137 in 2007, $697,450 in 2006, and $678,321 in 2005. These years were considered the height of the real estate market.

Since then, the real estate market has changed direction, with a less stable economy, increases in fuel and construction costs, and the evaporation of secondary lending sources. In 2008, interest rates averaged 6.03 percent, down from the previous year's average rate of 6.34 percent. The average interest rate is still slightly higher than 2003 to 2005 when average yearly rates fell between 5.83 and 5.87 percent. While the interest rates have remained relatively stable, the snowballing financial crisis has stifled Maui real estate significantly.

The following summarizes a sales volume history for Maui County from 1990 to 2008, which includes resales and new project sales.

Year	Vacant Land	Single Family	Condominium
1990	298	560	1,459
1991	116	430	593
1992	120	382	496
1993	121	361	461
1994	148	404	592
1995	118	331	495
1996	126	451	577
1997	182	507	812
1998	276	641	999
1999	408	965	1,348
2000	372	951	1,456
2001	318	938	1,274
2002	402	997	1,578
2003	447	1,420	2,001
2004	477	1,228	1,935
2005	421	1,311	2,041
2006	255	1,066	1,247
2007	226	1,138	1,179
2008	97	907	788

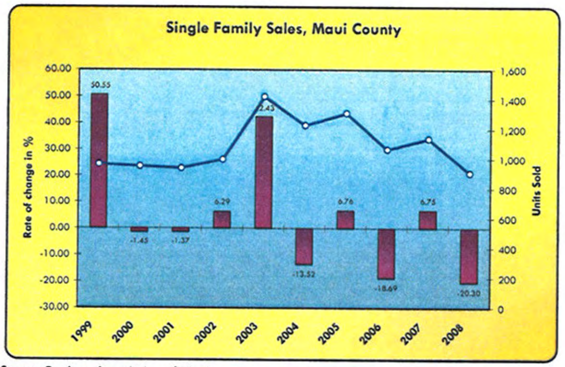


Source: Realtors Association of Maui

The real estate market increased significantly between 2002 and 2006. Single-family sales saw noteworthy increases in 2003, where the number of single-family sales leaped upwards of 37 percent. There was a 10 percent dip in 2004, followed by a rebound of almost 8 percent in 2005. For 2006, there was a decrease of 18 percent, with a subsequent upward bounce of almost 7 percent in 2007. Then, with the eroding economic conditions and financial crisis in 2008, Maui County experienced a 23 percent drop in sales from 2007 which is the biggest decline in sales since 1991 when sales of single-family homes dropped by 25 percent.

The increase in single-family sales volume and simultaneous drop in average median price in 2007 was partially attributed to the closing of numerous units in Waikapu Gardens. This affordable priced subdivision had over 14 percent of the island's single-family home closings in 2007, with 164 units, at an average sales price of $356,876.

The following graph further illustrates the single-family sales volume history for Maui County from 1999 to 2008.

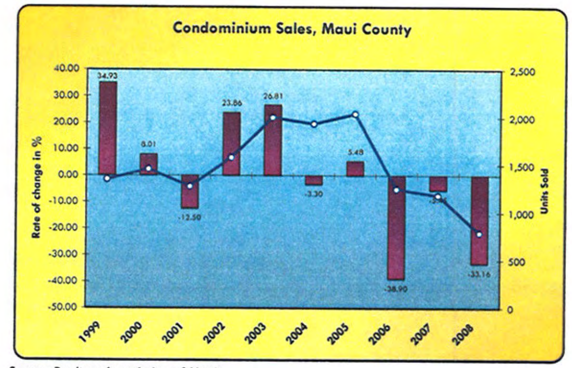


Source: Realtors Association of Maui

Similarly, condominium sales had experienced significant increases since 1999 in terms of units sold, achieving a new high in 2002 and a slight decrease in 2003. In 1999, 1,348 condominium units were sold, registering a 34 percent increase from the prior year. In 2001, the number of sales fell slightly, but rebounded significantly in 2002. In 2003, however, total condominium sales skyrocketed to 2,001, fell slightly to 1,935 units in 2004 and then jumped to 2,041 units in 2005. It appears that 2006 was the turning point for sales volume, as condominium sales plunged over 38 percent, followed by another 5 percent fall in 2007. It should be noted that since 2005, there has been little new condominium inventory, with the exception of the resort market.

Meanwhile the plummet of condominium sales volume in 2006 was deemed to be market stabilization from the spike in new inventory between 2003 and 2005. During this time period, Villas at Kenolio and Hale Kanani (Kihei), Villas at Kahana Ridge (Kahana), and Kehalani Gardens and Iliahi (Wailuku) closed on their units. Since then, there have been few non-resort condominium projects become available.

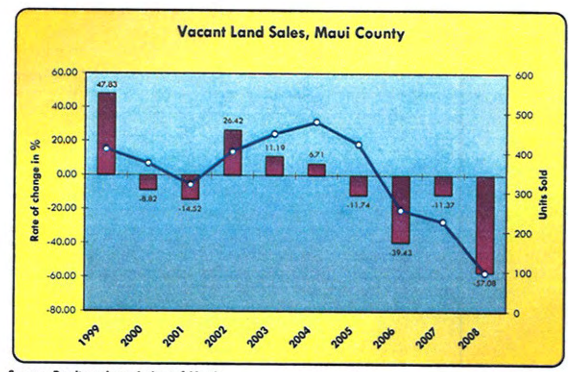
The following graph further illustrates the condominium sales volume history for Maui County from 1999 to 2008.



Source: Realtors Association of Maui

Land sales increased steadily between 2001 and 2004, but dropped 11 percent in 2005 with only 421 sales, then another 39 percent to 255 sales in 2006. This trend continued in 2007, with an 11 percent slide to 226 sales, surpassed by a huge 57 percent plunge in 2008. Many developers, realtors and lenders consider the passage of the Workforce Housing Ordinance (December 2006) and the Water Availability Ordinance (December 2007) to have had a significant contribution to the severe decline of sales of vacant land.

The following graph further illustrates the vacant land sales volume history for Maui County from 1999 to 2008.



Source: Realtors Association of Maui

Meanwhile, median prices rose continued to rise until 2006 for all categories of real estate. The average monthly median prices in 2006, for land parcels, single-family homes and condominium units, increased 29 percent, 2 percent and 33 percent, respectively. In 2007, average monthly median prices for land and single-family property decreased 19 percent and 10 percent, respectively, while the average median price for a condominium increased 5 percent. For 2008, the average monthly median prices for single-family homes and condominium units retreated by approximately 8 and 5 percent, respectively. Vacant land saw a slight gain of 6 percent over 2007.

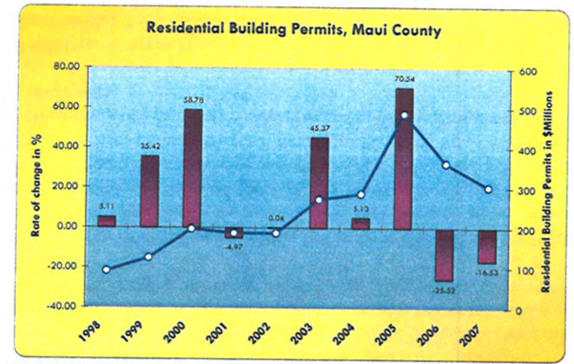
Construction and Development

The construction industry, in the mid part of this decade, benefitted from a robust economy and building climate.

Three new commercial centers were built in 2000. The Wailea Shopping Village had been demolished and was replaced with The Shops at Wailea, which includes 150,000 square feet of upscale retail and restaurant space. Also, the 150,000 square foot Piilani Village shopping center was built at the same time and is anchored by a 55,000 square foot Safeway store, one of the largest Safeway in the state. The Maʻalaea Harbor Village shopping complex, where the premier Maui Ocean Center presently stands, was also built during the same period; however, since then, no other project has been attempted and the majority of the lots in this commercial subdivision sit vacant. As previously discussed, the Lahaina Gateway was completed in 2008 and injected an additional 137,000 square feet of retail space.

Construction of single-family residential properties has fallen significantly, as developers have curtailed building to meet their anticipated sales levels. As mentioned earlier, the single-family and condominium real estate markets have softened, with sales volume and median prices generally decreasing, while marketing days have increased.

The following graph illustrates the trend of residential building permits (in dollars) in Maui County from 1998 through 2007. As shown below, residential permits peaked in 2005 at the height of the real estate market. As previously discussed, many feel that the passage of County ordinances relating to development in 2006 and 2007, coupled with increased construction costs, have severely lessened the ability to feasibly create new housing projects.



Source: UHERO Economic Information Service.

In Central Maui, the majority of the residential construction is within the Kehalani and Maui Lani project districts, which are being developed with several new subdivisions and condominium projects. Situated in the Kehalani district are Koa, which offers both house lots and single-family homes; Akolea and Cottages, both consisting of house and lot packages; Villas and Milo Court, which are townhouse condominium developments. Presently, there are five ongoing projects at Maui Lani. They include Na Hoku and Traditions (single-family homes), Sand Hills Estates and Fairways (house lots), and Parkways (both house lots and single-family homes).

The demand for housing in the Central Maui area had been extremely strong up to mid-2006, with projects usually sold out prior to completion of construction. Due to the more recent downward trend of the economy and residential real estate market, developers are now finding themselves holding inventory and most new construction has ceased.

Meanwhile, Spencer Homes has just completed construction of a 410-unit affordable project, called Waikapu Gardens. Approximately half of the houses met County affordable housing pricing requirements. This project was welcomed by the community as "affordable" prices were stated to be below $300,000. This project gained approval by the Maui Nui Affordable Housing Taskforce which was set up in response to the growing need for affordable housing on Maui.

Up to 2006, Kihei had also seen an upswing in residential development brought upon by ongoing residential projects including Ke Aliʻi Ocean Villas (townhouse condominiums) and Moana Estates (single-family homes) by Towne Development, Kamaliʻi Alayna (single-family homes) by Betsill Brothers, Inc., and Signature Homes' Hokulani Golf Villas (residential condominiums). Other current South Maui projects are Kilohana Waena (house lots) and Kai Ani (townhouse condominiums). Similar to Central Maui, the developers of ongoing projects have slowed construction while continuing to market their units; whereas, previous Kihei developments were often sold out prior to construction completion.

In Wailea, the Shops at Wailea and Wailea Town Center are the only commercial developments. Both centers target the high-end residents of this resort community and Wailea's upscale visitors. Phase I of Wailea Town Center was completed in 2006 while Phase II was completed in 2007. It contains neighborhood services which include retail and office owner-occupants. The second phase included more commercial condominium units and residential units on the second floor. Current condo owners in this project include Coldwell Banker and First Hawaiian Bank. This development was met with high demand as all of the units have already sold and some have even resold.

Retailing

In retail, the most significant addition to Maui is the Lahaina Gateway situated along Honoapiilani Highway across from the Lahaina Cannery Mall. It was dubbed as a "lifestyle center" with specialty retail shops, services and restaurants. Opened in late 2007, this 137,000 square foot center includes anchor tenants such as Office Max, Barnes & Noble, Outback Steakhouse, The Melting Pot, and Lahaina Farms, a supermarket owned by Foodland's Sullivan family. Prior to Lahaina Gateway, Maui Marketplace on Dairy Road was the last large retail development to be built, at 275,000 square feet. This center contains the likes of Lowe's Hardware, Office Max, Sports Authority, Borders Books & Music, Pier One Imports, Burger King and Starbucks Coffee.

Wal-Mart and Home Depot are also located on Dairy Road, immediately west of the Maui Marketplace. These outlets joined earlier arrivals Costco and Kmart, as well as Alexander & Baldwin's neighboring Triangle Square, in carving up the Maui retail pie. However, the local malls are answering the challenge with more food and entertainment, and retailers that can compete in their niche. Maui's largest mall, Maui Land & Pine's Queen Kaahumanu Center in Kahului, has been challenged by the presence of these large box retailers and vacancies are very noticeable. The most recent and highly publicized closure was that of JC Penney in January 2003.

In Kaanapali, Whalers Village has taken a turn toward the luxury market popular with the Japanese. After completing a $3 million renovation and a change in its tenant mix, this oceanfront center now aims for both westbound and eastbound visitors. Japanese visitors

are targeted with Duty Free Shoppers, Louis Vuitton, Prada, Loewe and other high-end shops.

The 150,000-square foot Shops at Wailea opened in 2000, offering upscale shopping in its high-end retail shops. Tenants include Louis Vuitton, Coach, Bally, Fendi, Tiffany & Co., Banana Republic, and Georgiou. Restaurants in this mall include Ruth Chris Steak House, Tommy Bahama Café and Emporium, and Longhi's. Other retailers include Crazy Shirts, Hot Topix, Gap, Wolf Camera, and Whalers General Store.

Agriculture

Agriculture on Maui is dominated by larger operations like Maui Land and Pine and Alexander & Baldwin's Hawaii Commercial and Sugar (HC&S).

Pineapple now confronts more foreign competition from places like Thailand. In 2007, the company shut down the canning portion of its operation to rely solely on the more profitable fresh fruit segment. Downsizing of the plantation occurred in 2008, which resulted in a reduction of over 200 employees. However, there have been some recent changes in top management of Maui Land and Pine as the company seeks profitability.

HC&S survives as one of Hawaii's few remaining sugar operations because of its economies of scale, its shape (a compact area in the isthmus of the Valley isle rather than being strung out along some coastline, which facilitates cane hauling), and its decisions over the years to reinvest and upgrade plant and equipment.

Maui's most recent casualty among sugar operations, Pioneer Mill in West Maui, is missed visibly. For years, proponents of maintaining and sustaining Hawaii's sugar industry argued that growing sugarcane imparted to this economy an important, if underestimated, non-pecuniary benefit; sugar kept the land green and attractive, for tourists and locals alike, even if it lost money. Economists call this situation an "externality," an activity that affects others for better or worse, without those others paying or being compensated for activity.

Anyone who doubts that logic now has only to drive the West Maui coast from Olowalu to Kaanapali and look mauka, at an entire mountain side of dry brush and unused fields. As with many cases where sugar plantations have shut down, most diversified agriculture crops are just not land intensive enough to utilize all the vacant land. Coffee and seed corn operations are possibilities, but they make only a small dent.

In addition to sugar and pineapple cultivation, Maui also offers rich opportunities for agricultural diversification by small farmers and large agribusinesses. Top among new agricultural products are: papaya, cut flowers, coffee, Kula onions and strawberries, and Chinese cabbage from Kula. Molokai offers its sweet potatoes, Molokai lettuce and alfalfa, as well as taro.

High-Tech

Maui's contribution to Hawaii's fledgling high-tech industry remains pre-eminent in the state. It also represents genuine diversification of the economy. The Maui Research and Technology Park in Kihei has all of it's infrastructure in place, and has completed three major building projects. Most important, it houses one of the country's most powerful supercomputers. The park now hosts over 30 companies and over 300 employees on 415 acres.

With access to one of the most powerful supercomputers in the world, funded by the U.S. Air Force, the Maui Research and Technology Park is continuing its efforts to diversify the Maui economy into something fundamentally different from what exists in the county or anywhere else in the state.

An office building was developed by the Maui Economic Development Board in 2006, and contains approximately 31,500 square feet of rentable area on a 2.8-acre site. Another completed project is Park Plaza, a 15-unit commercial office condominium building developed by Goodfellow Brothers and Betsill Brothers. Both Goodfellow and Betsill plan to occupy just over half of the entire building. Since its completion in 2008, sales have been very sluggish.

The park is sticking to its long-run strategic plan to capitalize on its location at the center of the Pacific Basin. Its extensive fiber-optic network to the U.S. Mainland makes it one of the most fiber-rich environments in the world, greater than many facilities actually located on the Mainland.

County Government

Maui County is unique in having several inhabited islands in its jurisdiction: Maui, Molokai, as well as Lanai, and the uninhabited island of Kahoolawe.

Maui County has an elected Mayor and County Council, and the Board of Water Supply and Liquor Control Commission are semi-autonomous with appointed directors. Although all courts are conducted by the State, the County is responsible for prosecution and the Mayor appoints the prosecutor. The council has nine members, each residing in one of nine districts; however, voters cast ballots for all nine seats.

Unlike other states, Hawaii has only two layers of government: State and County. The State is responsible for many functions that elsewhere come under the jurisdiction of municipalities, such as schools,

hospitals, and airports. Also, unlike other states, Hawaii has statewide zoning carried out by the State Land Use Commission. The County has zoning authority within the boundaries established by the commission.

The County of Maui is encountering a lack of affordable housing. Maui is one of the most expensive counties for single-family home buyers. A record high median price of $780,000 was set in July 2006 for a single-family home. Since then, the median single-family price has slowly fallen with an average monthly median sales price of $574,760 in 2008, down from $627,137 in 2007. According to the latest State of Hawaii Data Book, 8 percent of the houses are overcrowded on Maui and 41.4 percent of the households pay more than the recommended limit of 30 percent of their income on housing. In fact, 27.1 percent pay more than 40 percent on housing. The County administration has made the creation of affordable housing its priority and several new projects are either underway or in-process.

This heightened effort by the County resulted in the passage of Ordinance 3418 on December 5, 2006, under which all proposed developments are subject to review if they are to contain five or more units or lots. Under this ordinance, if the average sales price is projected to be less than $600,000, 40 percent of the total units must be priced to meet the various affordable categories. If the average sales price in the project is $600,000 or more, then 50 percent of the units must be affordably priced. An alternative to providing the affordable units is to pay an in-lieu fee equal to 30 percent of the average projected sales price of the market rate units multiplied by the number of affordable units required in the development. Or, the owner may elect to provide land which is equal in value to the in-lieu fee.

This ordinance has had a profound effect on the development industry since it has been passed. The developers, in conjunction with the County, have been thoroughly examining the ordinance to derive a clearer understanding of the process and the requirements.

The water availability ordinance is another recently passed law that has made an impact on the development community. On December 14, 2007, the County of Maui passed into law Ordinance 3502. As a result, the Department of Water Supply (DWS) is presently restricting the issuance of meters for all uses in the central and south Maui service areas and this bill restricts issuance of any building permits until the DWS can issue a meter consistent with the provisions of the bill. In order to do so, the DWS director needs to provide verifiable, long-term supply of water to the property. Landowners and professionals in the development community have been openly critical of the ordinance, some calling it a de facto moratorium on housing. Not surprisingly, sales of vacant development lands have been very scarce.

B. NEIGHBORHOOD DESCRIPTION

Since real estate is fixed in location, its marketability and rentability are strongly influenced by economic and social trends in its immediate environment. The continuing attractiveness of this neighborhood environment to potential users and tenants, and its competitive relation to those of substitute properties, must therefore be evaluated and forecast by the consultant. In particular, perceived neighborhood trends affect both the quality and quantity of the revenues the subject property can reasonably be expected to generate.

A neighborhood of income-producing properties is a geographic area characterized by similarity of uses and/or users, within which any change has a direct and immediate effect on the subject property and its value.

According to State of Hawaii Tax Maps, the subject is classified as being within the Wailuku District. However, long-term land use for Maalaea on the County level is determined by the Kihei-Makena Community Plan. The following neighborhood description has been excerpted from the Kihei-Makena Community Plan.

The geographic area surrounding the subject property is defined by physical and man-made boundaries, and encompasses an area known as Kihei-Makena. This area extends along the western shoreline of east Maui at the foot of Haleakala.

The boundaries of the Kihei-Makena planning region begin at the shore where Kapuni Gulch enters the ocean. Starting at this point, the boundary travels mauka to the Kahikinui forest reserve, then in the westerly direction along the unimproved Piilani Highway to the Kula Highway at Ulupalakua, then along the highway to the jeep trail running through the center of the Kamaole Ahupua'a, then makai along the jeep trail to the unimproved portion of Waiakoa Road, then in a northerly direction along the unimproved improved portions of Waiakoa Road to its intersection with Spanish Road north of Pulehu Gulch. The boundary then extends along Spanish and Waikapu Roads which traverse the length of the island's isthmus to a point just east of Waikapu at Waikapu Stream, then in a southwesterly direction to Honoapiilani Highway, and finally along the highway to Pohakea Gulch. The boundary then goes mauka along the centerline of the gulch to the ridgeline, and then makai along the centerline of Manawainui Gulch to the shoreline.

The region is comprised of four communities: Maalaea, Kihei, Wailea, and Makena. Community form in the planning region consists of a small shoreline-oriented community at Maalaea and a linear pattern of urbanization extending from the south end of Kealia Pond to

Makena. This consists of Kihei proper, extending from Kilohana Drive, and the planned resort destination areas at Wailea and Makena.

Kihei is the central residential and commercial area of south Maui. Included in the Kihei area are single family subdivisions, residential and resort condominiums, shopping centers, schools, and recreational and religious facilities. Kihei also provides the bulk of residential oceanfront properties available for private ownership. Access to Kihei is provided by two major thoroughfares: the Mokuleie Highway which services traffic from Kahului to Kihei and the North Kihei Road which services traffic from Wailuku Town and Lahaina to Kihei. Both thoroughfares are two-lane asphalt paved roads. The newer Piilani Highway connects with both highways and is considered the "express thoroughfare" while the older South Kihei Road provides access to the majority of properties via numerous secondary and tertiary roads.

All public utilities including electricity, water, sewer, and telephone service are available to the greater Kihei area. Due to increasing demands for domestic water in the south Maui area, a water assessment fee is presently in force and applied to all new large scale residential and commercial developments. Police, fire and ambulatory services are provided by stations directly in Kihei or in nearby Wailuku or Kahului.

A major factor in the growth and development of the Kihei region is tourism. This area of Maui has a sunny climate and possesses beautiful white-sand beaches, and, there, is a popular tourist destination. As a result, hotels have been successfully developed in the area.

Kihei in general experienced rapid and perhaps uncontrolled growth in the 1970's. This growth stabilized during the early 1980's and made a strong return in the latter half of the decade. There are numerous residential subdivisions in Kihei, making it one of Maui's larger suburban areas. Additionally, numerous residential and resort condominiums occupy nearly 20 percent of Kihei proper. The steady growth of Kihei and the south Maui area has also encouraged the development of new shopping complexes and other support facilities serving the resident and visitor population. The Wailea resort area with its luxury hotels, exclusive residential lots, condominiums, and recreational facilities is located on the outskirts of Kihei, and the Makena and Seibu resort areas are also located on the southern outskirts of Kihei.

The expansion of the Wailea Resort, along with other developments indicate a boom in the region as dramatic as the one that transpired in West Maui in the 1970's that triggered a rise of traffic, housing and environmental concerns as Maui attempted to cope with an

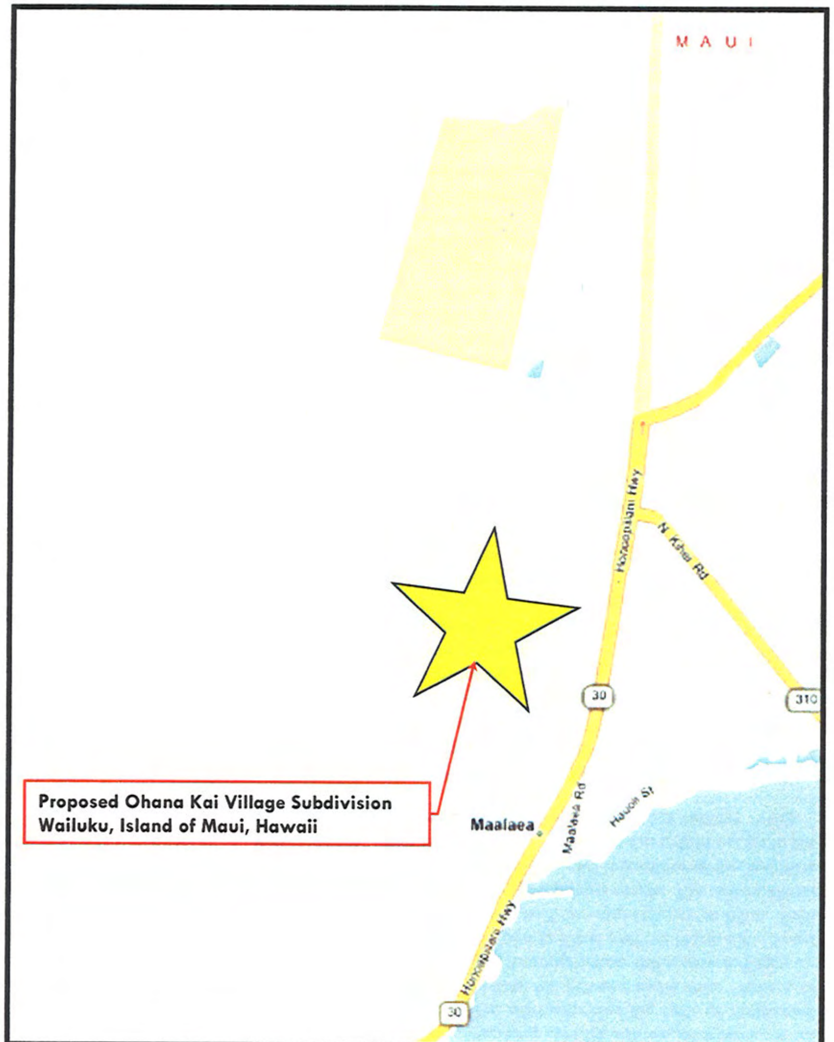
inadequate infrastructure and a rate of growth second only to Oahu. Currently, there is a very high level of interest by mainland investors in the resort projects of Wailea and Makena. A particularly high level of activity is observed in oceanfront properties and in subdivisions along the golf courses.

The Kihei region within the past ten years has experienced rapid growth in residential population and further growth is projected for this community. Population in this region had grown by about 50 percent between 1990 and 2000, resulting in an increasing demand for residential housing. Recently developed subdivisions have sold briskly and prices have been rising at a rapid rate.

With the growth in tourism and resident population, Kihei's commercial activity has expanded, especially along busy South Kihei Road which runs in a general north-south direction through the entire town of Kihei. It provides the more scenic ocean drive through the town and allows for easy access to all parts of the community. For this reason, this roadway is highly traveled by tourist and resident alike.

Evidence of the commercial growth of this community may be seen in the recent developments along South Kihei Road. In the past, shopping facilities in Kihei were relatively isolated; however, the recent commercial expansion has seen the development of a number of small shopping centers along South Kihei Road.

The continued growth of the south Maui region as a large urban area as well as the continued growth of the Wailea and Makena areas into major resort destinations is anticipated to be a catalyst for further long-term growth in residential, commercial, and various support facilities in the Kihei and Kihei town areas.



Not to Scale!

NEIGHBORHOOD MAP

C. PROJECT DATA

Environs

The subject is located on the mauka (mountain) side of Honoapiilani Highway in Maʻalaea, Island and County of Maui. Honoapiilani Highway runs in a general north-south direction, in the vicinity of the subject, and connects Wailuku and Waikapu to the Maʻalaea neighborhood. It then continues westward to the communities lying within the West Maui region.

The community of Maʻalaea is situated along Maui's southern coastline. Central to this neighborhood is the small boat harbor, which is home to a number of fishing and sightseeing charter boats, as well as private recreational vessels. The U.S. Coast Guard also has a small office and a dock for its ships. Included within this community are a small number of older oceanfront residences, and 10 oceanfront condominium projects. The condominium developments account for approximately 560 residential apartment units, the majority of which are rented on a short-term hotel basis. The Maʻalaea Triangle Subdivision is home to the Maʻalaea Harbor Shops, a small amusement park, and the Maui Ocean Center aquarium. The area does not have any schools, public recreational facilities (other than the harbor), or residential subdivisions. The nearest employment centers, shopping centers and schools are located in Kihei and Wailuku, both a 10-minute drive from Maʻalaea. Access to Maʻalaea is provided by one major thoroughfare, the Honoapiilani Highway, which also provides the only access to West Maui, one of the island's premier visitor destinations.

Besides the subject, two other major projects are currently being planned in the Maʻalaea community. A 110-unit condominium project is in the planning stages for a lot within the Maʻalaea Triangle Subdivision. Preliminary development details indicated the units would range from 550 to 1,400 square feet and may include two-bedroom residential units, two-bedroom live/work units, and one-bedroom workforce housing units. Also, the U.S. Army Corps of Engineers, in cooperation with the State Harbors Division, has proposed expanding the harbor at Maʻalaea. The environmental impact statement includes 5 proposed designs which will expand the slip count in the harbor to approximately 220.

It was announced in 2008 that the harbor will undergo a $30 million renovation. This project is not a part of the harbor expansion and will focus on reconstructing piers, roadways and the ferry terminal building; construction of sewage pump out stations; electrical upgrades, with a new meter building, power lines and outlets along the piers; renovating the loading docks and public boat launch; and new restrooms, walkways, parking spaces and upgraded drainage.

Description of the Proposed Project

The proposed Ohana Kai Village Subdivision will be located west of and bordering, Honoapiilani Highway in Maʻalaea. The subject consists of approximately 257 acres of land and is currently zoned Agricultural District but is designated as Project District 12 within the Kihei-Makena Community Plan. The project, which is still in its preliminary planning stage, will possess views of Mt. Haleakala, the West Maui Mountains, the ocean and the islands offshore.

The Consultant has gleaned project information from a preliminary land use map, as well as through discussions with the Developer. Ohana Kai Village will consist of approximately 1,100 single family residential units, a commercial mixed use area, a charter school site, park areas, and an on-site sewer treatment facility. Potable and non-potable water for the project will be provided by three water wells and associated infrastructure. According to the Developer, the proposed land use is as follows:

Proposed Land Use	Acreage
Single-Family Homes	197 acres
Village Town Center (Commercial)	7 acres
Wastewater Treatment Facility	7 acres
Retention/Open Space Areas	20 acres
Public/Quasi-Public Uses	16 acres
Major Roads	10 acres
Total:	± 257 acres

Preliminary plans called for three-bedroom homes with an average living area of 1,584 square feet, in addition to four-bedroom homes averaging 1,811 square feet. Early indications were for 60 percent of the units to be provided within the affordable housing price range, with the Developer stating he will strive to also offer the remaining 40 percent as affordable units. The Developer has estimated an 8-year build out for Ohana Kai Village.

PART III – ANALYSIS AND CONCLUSIONS

A. MARKET ANALYSIS

For the purpose of estimating the market response to this project, a market study was conducted to determine how current supply and demand for residential homes might be affected by the development of the subject's 1,100 units. The extent of our survey encompassed new, ongoing and proposed residential developments on Maui to give the reader the best perspective of the overall market.

OVERVIEW

One of the more difficult factors in determining the success of a proposed project is estimating future absorption rates. There are two components to this: First, is the design and pricing of the proposed project. This, of course, is well within the developer's control but has not yet been determined for the subject. Second, is the overall market environment at the time of pre-sale and project completion. This is, obviously, more difficult to define because it involves forecasting such variables as interest rates, overall market conditions, and general and specific sector real estate market conditions.

The added complication with most projects is the time frames and time lags involved. Since most subdivisions or condominium projects take several years between conception and completion, market and interest rate conditions can change significantly. Thus, a project may commence in a favorable environment and be completed in an unfavorable one (or vice versa). Furthermore, real estate is a cyclical industry and sales activity tends to move in spurts. It is not unusual for a new project to sell half its units in the first year of marketing and require 2 to 3 years (or longer) to sell the remaining half. Of course, these time periods could expand or contract depending upon market conditions. Thus, the notion of a linear sales rate may be deemed unrealistic for practical purposes, but is a useful and convenient tool for planning.

RESIDENTIAL SUPPLY CHARACTERISTICS

The Ohana Kai Village Subdivision is centrally located and has relatively uniform travel times to each of the major population centers on Maui. It follows that the subject's primary market area is the Central Maui and South Maui regions, while West Maui is expected to be a secondary market. Central Maui is home to the County and State government offices and is the industrial center of the island with convenient access to the major transportation facilities. South Maui has become a visitor destination with its expansive beaches and retail establishments targeted towards the tourist industry. West Maui is also a major tourist destination and is home to the famous Front Street retail corridor which allows for pedestrian access to numerous retail establishments within Old Lahaina Town. Further north of Lahaina are the Kaanapali and Kapalua master planned resorts. Clearly, the subject's Ma'alaea location is highly convenient with respect to all of the major population centers.

Available New Project Residential Supply

Research was conducted in order to determine the number of housing units in new developments that are currently available in the market. According to this survey, there are 1,893 housing units, which are currently for sale on the Maui market within recent, on-going projects and those developments which will be constructed within the next one to two years. Based solely on historical annual absorption rates of other new projects (604 units per year), the short-term market supply would be expected to last approximately 3 years. Of course, a multitude of other factors can influence the capture rate. For instance, the larger percentage of affordable units in the future supply points to a faster-than-normal absorption. Also, the number of buyers from the U.S. mainland and from foreign countries can fluctuate from year to year, and their presence in the market is not as predictable as the demand from local residents.

Shown in the table on **Page 26** is the list of projects representing the short-term housing supply for the Island of Maui. Those that have not begun construction are undergoing their financing processes and are expecting to commence construction in the short-term future. Included in this list are both single-family and condominium units from the island's four major population centers: Central Maui (Wailuku-Kahului); South Maui (Kihei-Wailea); Upcountry (Pukalani-Makawao-Kula) and West Maui (Lahaina to Kapalua).

Of the projects named in the following table, Koa, Sandhills Estates, Na Mala O Waihee, Waiolani Mauka, Na Hoku, Akolea, Cottages at Kehalani, Villas, Kai Malu, Kilohana Waena, Hoolei, Ke Alii Ocean Villas, Kamali'i Alayna, Papali, Moana Estates, Hokulani Golf Villas, E Paepae Puko'a, Omaopio Ridge, Cottages at Kulamalu, Lanikeha, Kaanapali Coffee Estates and Opukea have already begun closing sales of their units.

The number of units indicated in the table reflects the number of remaining units that have not closed, but may be under contract.

Table 1 – Available Supply in Ongoing Projects on Maui

Maui Projects 2009

Name	Location	Number of Units Total	Number of Units Remaining	Type of Development
CENTRAL MAUI				
Koa at Kehalani	Kehalani Proj Dist	72	4	Residential House Lots & SF Homes
Sandhills Estates	Maui Lani Proj Dist	108	10	Residential House Lots
Na Mala O Waihee	Waihee	7	3	Agricultural Lots
Waiolani Elua	Waikapu	25	1	Residential House Lots
Waiolani Mauka	Waikapu	105	1	Residential House Lots
Na Hoku	Maui Lani Proj Dist	162	79	SF Homes
Akolea at Kehalani	Kehalani Proj Dist	97	19	SF Homes
Cottages at Kehalani	Kehalani Proj Dist	114	42	SF Homes
Villas at Kehalani	Kehalani Proj Dist	103	101	Townhouse Condominiums
Fairways at Kehalani	Maui Lani Proj Dist	50	50	Residential House Lots
Traditions at Maui Lani	Maui Lani Proj Dist	153	153	SF Homes
Parkways at Maui Lani	Maui Lani Proj Dist	210	210	Residential House Lots & SF Homes
Milo Court at Kehalani	Kehalani Proj Dist	94	94	Residential Duplexes
Aina O Kane	Kahului	103	103	Lowrise Condominiums
SOUTH MAUI				
Kai Malu	Wailea	150	16	Luxury Condominiums
Kilohana Waena	South Kihei	31	22	Residential House Lots
Hoolei	Wailea	120	23	Luxury Condominiums
Ke Alii Ocean Villas	South Kihei	144	62	Lowrise Condominiums
Kamalii Alayna	North Kihei	92	24	SF Homes
Papali	Wailea	24	9	Luxury Residential Condominiums
Moana Estates	South Kihei	90	11	SF Homes
Hokulani Golf Villas	Central Kihei	152	123	Luxury Residential Condominiums
Kai Ani Village	South Kihei	99	99	Lowrise and Live/Work Condos
Nu'u Aina Estates	Central Kihei	68	68	Luxury Lowrise & Res Condominiums
Liloa Village	South Kihei	65	65	SF Homes
Cove Beach Villas	South Kihei	32	32	Lowrise Condominiums
UPCOUNTRY/EAST MAUI				
E Paepae Ka Puko'a	Spreckelsville	16	4	1/2 to 1-acre Residential Lots
Omaopio Ridge	Kula	18	10	Agricultural Lots
Piiholo South	Olinda	11	10	Agricultural Lots
Cottages at Kulamalu	Pukalani	40	31	Residential Duplexes & SF Homes
Makani O Kula	Kula	10	10	Agricultural Lots
Omaopio Estates	Kula	20	20	Agricultural Lots
Kula 'I'o	Kula	35	35	Agricultural Lots
Keaweamahi	Kula	11	11	1/2 to 1-acre Residential Lots
Kualono	Pukalani	49	49	1/2 acre Residential Lots.
WEST MAUI				
Lanikeha	Kaanapali	104	34	Residential House Lots
Kaanapali Coffee Estates	Kaanapali	6	16	Agricultural Lots
Opukea	Lahaina	7	107	Lowrise Condominiums
West Maui Breakers	Honokowai	0	114	MF Condos
Kaanapali 10-H	Kaanapali	17	18	Residential House Lots
	Total Short Term Supply Units		1,893	

Maui's Potential Residential Projects

It is also important to discuss the developments on Maui that could be brought to the market over the next 5 to 20 years. As mentioned earlier, many external factors, such as economic or social factors, could affect the supply and demand for real estate in the future. These factors cannot be controlled by developers who must constantly assess market conditions for their prospective construction and sales periods. Many of these projects are still in the initial planning phases and must still complete governmental requirements before bringing their products to the market. Combine these factors with "internal" events that could affect a developer and predicting which developments will actually make it to market becomes more difficult. This list also includes long term projects that are under way such as the Kehalani and Maui Lani Project Districts.

Nevertheless, the paragraphs below name the projects that are in their preliminary stages of development, but are considered to be potential sources of additional supply to Maui's housing market.

Central Maui

Maui Lani consists of approximately 1,012 acres of land in the Central Maui plains. Completed phases include the Greens, Grand Fairways North, Grand Fairways, Sandhills Estates, The Island and The Bluffs, and The Legends. Presently, projects under construction include Na Hoku, Fairways, Parkways and Traditions. To date, there have been approximately 1,200 units constructed in this project district. Based on the maximum density allowed, there are almost 2,500 units remaining.

Kehalani is situated at the base of the West Maui mountain range in Wailuku and consists of approximately 550 acres of developable land area. Currently, there are numerous ongoing residential developments such as Koa at Kehalani, The Cottages at Kehalani, Akolea and Villas at Kehalani. Projects on the horizon include Milo Court. In addition, future development includes a school, commercial center, and the potential of approximately 1,000 more residential units remaining within this project district.

Pu'unani is a proposed 754-unit, project district located west of, and bordering, Honoapiilani Highway in Wailuku. The site consists of approximately 208.06 acres of land and is currently zoned Agricultural District by the County of Maui. The project, which is still in its preliminary planning stage, will be located mauka of the Honoapiilani Highway and will possess views of the ocean as well as the West Maui Mountains and Haleakala. According to a Conceptual Land Use Plan, the subject will contain rural zoned lots, residential zoned lots, and multi-family units.

A&B Waiale Project is a proposed 826-acre development that will be located off of Kuihelani Highway and Honoapiilani Highway just south of the existing Maui Lani Project District. It will also surround the existing industrial lands along East Waiko Road, which was recently developed with the Waiko Baseyard Subdivision and the Consolidated Baseyard Subdivision. Community meetings have been held to seek input into designing this area to best serve the island population. This proposed project district could potentially add approximately 1,900 to 3,700 housing units.

Hale Mua is a 466-unit subdivision, set upon approximately 238 acres. Preliminary plans for this project call for 238 affordable house and lot packages ranging in size from 5,001 to 11,292 square feet; 209 market lots ranging from 10,000 to 16,693 square feet in size. In addition, there will also be a total of 19 large lots ranging from 2.02 to 21.40 acres in size. The large lots will be designated as Urban by the State Land Use Commission. As such these lots will not have the ability to be further subdivided and improvements will be limited to a main and accessory dwelling. As of May 2009, the developer was still in the entitlement process.

Ohana Kai Village (subject), formerly known as Ma'alaea Mauka, was still in the planning and approval phase, as of May 2009, and may add approximately 1,100 single-family residential units to the Maalaea neighborhood of Central Maui. Located on the mauka, or mountain, side of Honoapiilani Highway, this development is expected to have 60 percent of its units fall within the affordable price guidelines, with the developer stating he will strive to have the remaining 40 percent of the homes within the guidelines as well. The subdivision will feature a charter school site, park areas, a commercial mixed use, and an on-site sewage treatment facility. Although, the property already is designated as a project district, a district boundary amendment and change in zoning at the County level is still needed before development can begin.

West Maui

Kapalua Mauka has announced plans to expand into the pineapple fields on the slopes above the existing West Maui destination. Their plan calls for development of about 690 units on more than 925 acres. Kapalua Mauka would be built around the Village Course, one of three championship courses there. It would also be expanded from 18 holes to 27 holes and given another clubhouse. Although the resort is zoned for an additional hotel, there are no plans to add one at this point in time. As part of the project, Kapalua will develop a 35-acre park, and pineapple cultivation north of Napili is expected to end.

Kaanapali 2020, on about 4,300 acres in Kaanapali, is currently in the planning stage. In 2002, the planning had already taken three years and the permit process was expected to take another four years. Construction was expected to begin in 2008, however has not yet commenced. The project is proposed to include a mix of products needed by both the community and Amfac. It was reported that the developer is dedicating approximately 60 to 70 percent to open space. This project will also include cluster housing, single-family residential, multi-family residential, commercial, schools, churches, medical facilities, a cultural center, golf course and transportation center. Preliminary plans call for a total of 2,810 housing units to be built out over the next 20 to 30 years.

Pu'ukoli'i Village is a former plantation camp and is also part of the Kaanapali 2020 plan and is expected to be the first section of the plan that will be developed. It contains 260 acres of what was formerly a plantation camp and 940 of the 2,810 housing units in Kaanapali 2020 are proposed for Pu'ukoli'i Village. The developer, Kaanapali Land Management Corp., is in the process of revising the original Pu'ukoli'i approvals to allow for development before the construction of the Lahaina by-pass road. A revision to the affordable housing requirements is also in the works.

Waine'e will be located on the mauka side of Honoapiilani Highway. Situated along the eastern boundary of the Lahaina Aquatic Center and Recreation Center, this development will consist of approximately 240 acres of land once a plantation camp. It is currently undergoing the planning and entitlement process. The development will contain approximately 1,100 housing units with approximately half being set aside as affordable housing for the residents of West Maui.

Pulelehua will be developed by Maui Land and Pineapple Company and will be situated between Honoapiilani Highway and the Kapalua Airport on approximately 300 acres of land. This community will consist of single family and multi-family residential units, churches, schools, and other civic services. There will be a total of 882 residential units with approximately 50 percent being marked as affordable units targeted to buyers earning between 80 and 140 percent of the county's median income level. Preliminary designs of the community show that it will be "complete" and have a small town feel to it. Narrow roadways are expected to keep the development pedestrian oriented and naturally reduce traffic speeds within the neighborhood.

Hawaiian Homelands: The Department of Hawaiian Home Lands (DHHL) has approximately 700+ acres of land under its stewardship located between the proposed Pulelehua and Kaanapali 2020 projects mentioned above. Plans for this project are so preliminary that the owners do not know to what use, or to what extent, the proposed development will favor.

Villages of Lei'ali'i: The delay of this planned development is probably the most significant factor affecting the housing market in West Maui. This 1,120-acre, 4,813-unit community proposed by the State of Hawaii's Housing Finance and Development Corporation, was planned over a 15-year period. This project, however, was indefinitely shelved over a legal dispute over whether the State of Hawaii can sell ceded lands now held in trust for Native Hawaiians. The sale of the land from the State to the developer has not been completed due to litigation on behalf of native Hawaiian interests asserting claims and seeking to recover damages from the State. Conceptually, this project will develop 14 residential villages within 15 years. C. Brewer Homes, Inc. was marketing the housing in Village 1 known as Halelani in 1992 when the work was halted. Currently, only plans for Village 1A is in the works which will consist of 304 units.

South Maui

A&B Kihei Residential Project consists of approximately 94 acres of land, located mauka of the Piilani Highway and will possess views of the ocean, the West Maui Mountains and Haleakala. Preliminary plans called for 200 detached single family condominium units, 300 units within multi-family townhouse or stacked flat type buildings and 100 single family residential dwellings. Neighborhood commercial uses are also being planned. No pricing was available for any of the housing units as of May 2009, as this project was still in the preliminary design stage.

Wailea 670 (Honua'ula): This project first surfaced in the late-1980's and, in 1982 it received a Maui Planning Commission recommendation for approval of the developer's request to rezone the land from an agricultural district to residential and commercial districts. The land use measure, however, has yet to be heard by the Maui County Council. Initially, the developers planned to build approximately 2,600 units of housing and resort lodging, along with two golf courses. Today, renamed Honua'ula, the new scaled-down version features 1,400 single-family homes and multi-family units, which amounts to only 2.1 units per acre. There will be only one golf course and approximately 80,000 square feet of commercial space. The developers of Honua'ula say they will address their own infrastructure needs with the construction of a water well on site, a sewage system, roads, pedestrian paths and bikeways. These new changes were announced in March 2005, which arose in part from changes in market conditions and public comments on the project made more than a decade ago. The developer has indicated that about 20 percent of the units will be dedicated to affordable housing. At this point in time, the estimated price range of the affordable units is from $225,000 to $340,000. At least two-thirds of the units are planned for construction on the Honua'ula site, with the remaining one-third of the units built elsewhere.

Maluaka is an oceanfront development located along the 15th and 16th holes of the Makena South Golf Course. This project originally called for 71 luxury condominium units, but in early 2009, plans were scaled back to 13 home sites and two condominium units that will sit atop the project's recreation building. The developer stated a lack of lending sources and the economic downturn as being the primary causes for the downsizing. Home sites range from $4,000,000 to $7,000,000, while no prices were available for the two condominium units.

Upcountry
Hali'imaile has begun community meetings to discuss development and expansion of the existing town. The current land owners A&B Properties and Maui Land and Pineapple, are in the preliminary planning stages and it was rumored that 2,700 units are looking to be developed in this expansion.

Single-Family Residential Resale Active Listings

Besides the properties available in the projects, the number of resale listings on Maui is a good indication of real estate market conditions. This market evidence is generally viewed as a "counter-cyclical" indicator, which means that it is typically lower in strong markets and higher in weak ones. As previously indicated, the subject's primary markets were determined to be Central Maui and South Maui.

The Appraiser researched listings of single-family homes in these regions (See **Exhibit E** at the end of this report). The investigation of the Maui Multiple Listing Service revealed the following:

Central Maui
Of the 208 listings of Central Maui residential properties in the Multiple Listing Service, 188 were resale listings. This total was broken down as follows:

Range of Prices	No. of Listings	Average DOM
Under $400,000	32	209
$400,000 to under $600,000	84	163
$600,000 to under $800,000	39	206
$800,000 to under $1,000,000	15	129
$1,000,000 and Above	18	149

There were a total of 32 listings in the "Below $400,000" category. The lowest priced property was a two-bedroom/one-bath, 520 square foot home, built in 1936. This Wailuku Town property was listed at $200,000 and had a marketing time of 390 days. The high end of the range consisted of a 1,294 square foot, three-bedroom/two-bath home, built in 1998. This was a short sale

offering at $399,000, in The Greens subdivision in Maui Lani. The property had been on the market for 46 days.

It should be noted that during the most recent boom market, the homes in the "Below $400,000" category would typically consist of older properties in the Wailuku and Kahului neighborhoods. However, given the downward trend in the real estate market, properties in Waiehu Terrace subdivision, as well as short sale and bank owned properties from more recent projects, such as Wailuku Parkside, Kaimana (Kehalani), and The Greens (Maui Lani), are now becoming available.

From $400,000 to under $600,000, there were a total of eighty-four (84) listings with the lowest priced being $400,000 for a three-bedroom/one-bath dwelling along Kea Street in Kahului Town. The high end was represented by a 2,118 square foot, three-bedroom/two and one half-bath home in the Grand Fairways North. This home was listed for $599,000 and was built in 2001. Some of the subdivisions represented in this group of listings include Grand Fairways North, Legends, Ocean View Estates, Ohia, Wailuku Parkside, and Waiolani Elua.

This price range is generally considered to be the market segment that is affordable to Maui's workforce households. Many of the properties in this segment are priced around the median price range for residential properties on Maui. Thus, it is expected to be the most active segment of the market. It is noted that the monthly median price for a single family property in Maui averaged $574,760 in 2008, which is 8.4 percent lower than 2007, and 18 percent lower than in 2006. The average DOM in this category was 163 days. Of the listings within this range, 41 of the 84 have had their prices reduced from 2.4 to 39.6 percent.

From $600,000 to under $800,000, there are a total of thirty-nine (39) listings with an average "Days on Market" of 206 days. Prior to 2008, the median sales price for single-family homes on Maui fell within this price range. From 2005 to 2007, the luxury and second home markets were well represented by new projects. Sales of these high-end homes pushed real estate prices to new heights, and left the working class unable to afford to purchase homes. Of this group, 21 listings have had their prices reduced. The reductions ranged from 1.5 percent to 38.0 percent.

From $800,000 to under $1,000,000, there are a total of fifteen (15) listings with an average marketing time of 129 days. In the past, it was unheard of to find a non-oceanfront residential property in Central Maui selling for more than $800,000. Properties priced in this range were typically found in The Island, The Bluffs, Wailuku Heights, Wailuku Country Estates, Waiehu Heights, Sandhills, Sandhills

Estates, and even Kahului Town. Of this group, 5 listings have had their prices reduced. The reductions ranged from 2.1 percent to 21.0 percent.

At $1,000,000 and above, there were eighteen (18) listings with the highest being $7,500,000 for a two bedroom/two bath property off Kahekili Highway in Kahakuloa with 5,059 square feet of living area. This property contains approximately 51 acres of land area. The average marketing time in this category is 149 days.

South Maui

Of the 168 listings of residential properties in the Multiple Listing Service, 156 were resale listings. This total was broken down as follows:

Range of Prices	No. of Listings	Average DOM
Under $400,000	8	352
$400,000 to under $600,000	42	194
$600,000 to under $800,000	37	190
$800,000 to under $1,000,000	18	190
$1,000,000 and Above	51	188

There were a total of 8 listings in the "Below $400,000" category. The lowest priced property was a three-bedroom/one and one half-bath, 1,056 square foot home, built in 1975. This Kihei Kauhale Nani property was listed at $299,900 and had a marketing time of 315 days. The high end of the range consisted of a 1,024 square foot, three-bedroom/two-bath home, built in 1972. This was a short sale offering at $399,000, located on Hoonani Street. The property had been on the market for 333 days.

From $400,000 to under $600,000, there were a total of forty-two (42) listings with the lowest priced being $407,950 for a three-bedroom/two-bath dwelling along Eleu Place. This short sale property had a marketing time of 69 days. The high end was represented by a 960 square foot, three-bedroom/one and one half-bath house and one-bedroom/one-bath cottage situated on Koki Street. This short sale was listed for $599,000 and was built in 1978. Some of the subdivisions represented in this group of listings include Hale Piilani, Honu Alahele, Kaonoulu Estates, Meadowlands and Piilani Villages.

The average DOM in this category was 194 days. Of the listings within this range, 27 of the 42 have had their prices reduced from 0.5 to 54.1 percent.

From $600,000 to under $800,000, there are a total of thirty-seven (37) listings with an average "Days on Market" of 190 days. Prior to

2008, the median sales price for single-family homes on Maui fell within this price range. Of this group, 14 listings have had their prices reduced. The reductions ranged from 4.5 percent to 60.9 percent.

From $800,000 to under $1,000,000, there are a total of eighteen (18) listings with an average marketing time of 190 days. Properties priced in this range were typically found in Ke Alii Kai, Keawekapu Views, Keonekai Heights, and Maui Meadows. Of this group, 9 listings have had their prices reduced. The reductions ranged from 3.6 percent to 33.4 percent.

At $1,000,000 and above, there were fifty one (51) listings with the highest being $10,900,000 for a two-bedroom/two-bath property located on Keawekapu Beach with 2,144 square feet of living area. The average marketing time in this category is 188 days.

Residential House Lot Listings

The Appraiser also investigated the number of single-family house lots on the market in Central Maui and South Maui. Potential buyers in the market will look at the house lots on the market while considering the option of purchasing land and building a home versus buying a home already constructed.

The Appraiser searched for finished house lots within a range of 4,000 to 10,000 square feet. Although the home sites for Ohana Kai Village have not been determined, this range was based on the developer's previous affordable housing subdivision, Waikapu Gardens.

Research found a total of 28 listings with land areas between 5,576 and 9,670 square feet in Central Maui. The listings ranged in price from $190,000 for an 8,276 square foot parcel in Sandhills Estates to $499,000 for an 8,271 square foot parcel in Wailuku Heights. The majority of the listings were located in the Koa, Sandhills Estates and Waiolani Mauka subdivisions. Other developments with inventory included Waiolani Pikake, Wai'olu at Kehalani, and Wailuku Heights. It appeared that Akolea, which was previously offering strictly house and lot packages, is now selling house lots as well. There were price reductions seen for 10 of the listings, ranging from 1.9 to 49.5 percent. Average marketing time for these listings was 262 days.

In South Maui, there were a total of 27 listings with land areas between 7,500 and 9,762 square feet. The listings ranged in price from $245,000 for an 7,508 square foot parcel in Honu Alahele to $785,000 for an 8,668 square foot ocean view parcel in Kilohana Waena. The majority of the listings were located in the Kilohana Waena subdivision. Other developments with inventory included Alii Village, Kihei Village, Keawekapu Views, and Kilohana Hema. There were price reductions seen for three of the listings, at between 1.2 and 32.9 percent, while one had an increase of 17.7 percent. Average marketing time for these listings was 264 days.

New Construction

According to the Maui County Data Book 2007, new single-family construction, which fell from its high in 1988, appeared to recover somewhat in the 1990's and has remained stabile since 2004.

Table 2 – New Construction Island of Maui

Year	Number of New Single-Family Units	Five-Year Average
1980	803	
1981	398	
1982	530	
1983	547	
1984	638	
Subtotal	2,916	583
1985	984	
1986	911	
1987	1,119	
1988	1,453	
1989	1,136	
Subtotal	5,603	1,121
1990	1,068	
1991	694	
1992	810	
1993	660	
1994	673	
Subtotal	3,905	781
1995	473	
1996	601	
1997	532	
1998	574	
1999	647	
Subtotal	2,827	565
2000	904	
2001	778	
2002	787	
2003	877	
2004	1,104	
Subtotal	4,450	890
2005	967	
2006	1,008	

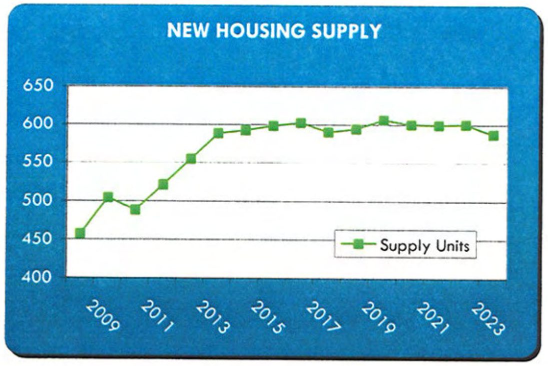
Source: Maui County Data Books 2002 through 2007

New single-family construction averaged 583 units during the five years between 1980 and 1984. During the next five years, 1985 to 1989, single-family housing starts increased significantly to an average of 1,121 per year. During 1990, house construction was also good at 1,068 units, but declined significantly following the Persian Gulf War and the economic slowdowns on the U.S. mainland and in Japan. Consequently, between 1990 and 1994, there was an average of 781 new single-family units built per year. From 1995 to 1999, construction of these units declined even more, with an average of only 565 units per year. In 2000, the number increased significantly to 904 units and then declined in 2001 to 778 units. The number of units remained nearly identical in 2002 with 787 units. In 2003 this number increased again to 877 units. Single family building permits in 2004 reached a total of 1,104, which is its highest level since the late 1980's, prior to declining to 967 in 2005. A small rebound to 1,008 was realized in 2006. (Refer to **Table 2**, starting on the preceding page). The average for the past 5 years is 948 units per year.

Without an adequate supply of new construction projects, the shortage of housing typically causes prices in general to move up. As a result, those at the bottom end of the income scale usually find it most difficult to purchase real estate. Historically, supply has lagged demand and is a significant limiting factor in the affordability of real estate in the Maui market.

Hawaii Housing Policy Study

In comparison, to the supply survey conducted by the Appraiser, the Hawaii Housing Policy Study 2003 indicated that approximately 2,524 housing units will be built over the next five years, from 2009 to 2013, an average of 504.8 units per year. This was calculated from the projected total housing units as indicted by the Hawaii Housing Inventory Report. It is also similar to the average number of units absorbed by the market over the past 10 years. This count will be explained later in this report. This inventory report is based on the standing inventory of housing units in 2002 and forward projections of housing units. Over the next 16 years to 2024, the total resident housing supply will total 9,080 units.



Maui County Workforce Housing Ordinance

In December 2006, the Maui County Council enacted the Residential Workforce Housing Ordinance. The purpose of the ordinance is to enhance the public welfare by ensuring that the housing needs of the County are addressed. The intent of the policy is to encourage the provision and maintenance of residential workforce housing units, for both purchase and rental, to meet the needs of income-qualified households for the workforce, students, and special housing target groups.

Essentially, all applicable residential development after the passage of this ordinance, including the subdivision of land and/or the construction of single-family dwelling units; two-family dwelling units; multifamily dwelling units; or hotels; shall be subject to the policy upon final subdivision or building permit approval. Applicable residential development includes, in part: five or more dwelling units, excluding farm labor dwellings or a second farm dwelling, not part of a condominium property regime; five or more new lots; a combination of dwelling units and new lots totaling five or more.

Prior to final subdivision approval or issuance of a building permit for a development, the developer is to enter into a residential workforce housing agreement that requires forty percent of the total number of units and/or lots shall be sold or rented to residents within established income-qualified groups, when more than fifty percent of the dwelling units and/or new lots in the development are offered for sale for less than $600,000. When fifty percent or more of the dwelling units and/or new lots in the development are offered for sale for $600,000 or more, fifty percent of the total number of units and/or lots shall be sold or rented to residents within established income-qualified groups.

Landowners who had already received entitlements, or were at least in the approval or permitting process, were granted an exemption from these requirements; and clearly have an advantage over those who began their entitlement process post passage. One of the primary concerns to developers is the reduction in sales revenue. Coupled with unprecedented increases in construction costs, potential projects could become financially unfeasible.

The Developer intends to offer 60 percent of his 1,100 single-family units at affordable prices. Although this would more than satisfy the requirements of the Workforce Housing Ordinance, the Developer stated that will strive to keep the prices of the remaining 40 percent to within the affordable guidelines.

Maui County Water Availability Ordinance

In December 2007, the Maui County Council enacted the "water availability policy", identified as Title 14 of the Maui County Code. The purpose of the ordinance is to acknowledge and affirm that water is a natural and cultural resource that must be protected, preserved and managed as a public trust, and requires verification of a long-term, reliable supply of water before subdivisions are approved. This policy applies to all new subdivisions with the exception of family subdivisions and subdivisions that will not be regulated by a public water system.

In essence, this policy requires developers who want to build a subdivision or condominiums to first prove to Maui County that they have a long-term source of water. The policy stipulates that no subdivision shall be approved, unless prior to submittal of subdivision construction plans, the director shall provide written verification of a long-term, reliable supply of water. Written verification by the County shall not constitute an assurance, covenant, or warranty by the County of water source from a private, non-County system.
Many developers on Maui have been outspoken critics of the ordinance, even calling it a de facto moratorium on housing. Developers have also complained that the ordinance will halt some much-needed new construction. However, proponents of the policy say that the ordinance is a significant step toward getting Maui's water shortfall under control. Furthermore, it closes a long-standing loophole for developers that held the County responsible for providing water service. For example, a developer could go through the entire process of planning, developing and selling the lots in a subdivision without guaranteeing the home buyers that they would receive a water meter from the County.

Ohana Kai Village will be serviced by three existing water wells. As such, it is not subject to the Water Availability Ordinance.

Affordable Price Analysis

Although the price points have not been set for the homes in Ohana Kai Village, the Developer intends to sell at least 60 percent of his units at affordable levels. Keeping this in mind, the Consultant considered it pertinent to research affordably priced available inventory. Since three-bedroom homes are the most common single-family residential housing type in Central Maui, this unit size was utilized in the analysis.

The 2009 Affordable sales Price Guidelines issued by the County of Maui Department of Housing and Human Concerns listed the maximum price for a three-bedroom home at \$529,500. This price was based on a prevailing annual interest rate of 6.00 percent, for households at the top of the "Gap Income" group. The Gap Income group consists of households earning 141 to 160 percent of the 2009 median income, \$75,400.

As of the effective date, there were 57 three-bedroom Central Maui resale listings at or below the \$529,500 price limit. These listings had an average living area of 1,278 square feet, with an average marketing time of 172 days. Over 40 percent of these listings were homes within older neighborhoods; however, there were also more units within more recently created subdivisions, such as Wailuku Parkside, Olena, and The Greens.

Meanwhile, Kihei had an additional 18 three-bedroom resale listings below the affordable price ceiling. The average marketing time for these listings, which averaged 1,277 square feet, was 210 days. The homes were from 6 to 65 years old, with the majority being built in the 1990's.

In Central Maui, there were 10 new project listings falling below the affordable maximum. All of these listings were three-bedroom homes from the Cottages (Kehalani), ranging from \$439,000 to \$526,500, with an average marketing time of 452 days. At their current asking price levels, the listings are within the "Above Moderate" (121 to 140 percent of median) and "Gap Income" (141 to 160 percent of median) categories. Price declines of between 11 and 27 percent were seen in nine of the properties, with the remaining listing being unchanged.

There were seven new project listings in Kihei's Kamali'i Alayna subdivision. All of the listings offered the same floor plan at either \$425,000 or \$429,000. This was down between 13 and 27 percent from their original list prices. The current listings fall within the "Above Moderate" affordable category.

The results of this study indicate that the decline in the residential real estate market has forced both private homeowners and developers to lower their asking price expectations. Price levels appear to have dropped to the point where developers' "market" homes are within the high end of the affordable price range.

However, real estate prices during a market uptrend tend to appreciate at a higher rate than increases to the affordable price range, which is set by median household income. As such, it is highly likely that once market conditions improve, new "market" units will return to price points above the affordable range.

RESIDENTIAL DEMAND CHARACTERISTICS

Demand is analyzed from two perspectives: The first is "demographic" demand, the number of units needed for a given market or employment base. Second is "effective" demand, the financial demand equation which involves looking at the number of buyers who would be qualified and interested in purchasing residential real estate.

Population

Population growth on Maui between 1980 and 1990 had been exceptionally high, and had outpaced the County's ability to provide adequate infrastructure and housing for this added number of people. Overall, population growth for the County of Maui during 1980 to 1990 was 41.67 percent. With this growth in population came a surge in real estate prices in the late-1980s. This increase, driven primarily by foreign and domestic investment and speculation, put the price of homes in Maui County well above the reach of many local residents, and affordable housing became a major concern to everyone.

The downturn in the economy between 1991 and 1997 led to the development of lower-priced housing as large land parcels became more affordable to developers. Zero-lot-line zoning was adopted by the County of Maui and the Meadowlands project in Kihei was among the first to be built. Three smaller zero-lot-line subdivisions were developed in West Maui between 1996 and 1998 and were highly successful. The only Zero Lot Line subdivisions in Central Maui were the Kaimana Subdivision in the Kehalani Project District and Luana Gardens in Kahului.

Meanwhile, the population of Maui County continued to grow during the 1990s. Between the 1990 and 2000 censuses the population increased by 28.5 percent, making Maui the fastest growing County in the State of Hawaii. According to Claritas Market Comparison Report (See **Exhibit A** at the end of this report), leading the growth on Maui was the South Maui region (Kihei-Wailea-Makena), which reflected growth of 49.3 percent increase over the 10-year period. The subject's Central Maui region (Wailuku-Kahului-Waikapu-Waiehu-Waihee) registered growth of 26.5 percent; while the West Maui region (Lahaina-Kaanapali-Honokowai-Napili-Kapalua) indicated a growth factor of 23.3 percent over the same 10-year period.

The growth trend has continued since the end of 2000. The 2009 population estimates have indicated a growth rate for Central Maui of approximately 12.8 percent over the population indicated in the 2000 census, while growth in South Maui was estimated at around 17.3 percent and West Maui in the 15.5 percent range.

The growth in the number of households in these regions paralleled the population pattern. Household numbers grew in the central, south, and west regions at the respective rates of 14.8, 21.3 and 16.1 percent.

According to the Population and Economic Projections for the State of Hawaii to 2030, the projected population of Maui County is expected to be 199,550 by the year 2030. This represents a 54.7 percent increase over the 2000 census numbers.

Employment and Household Income

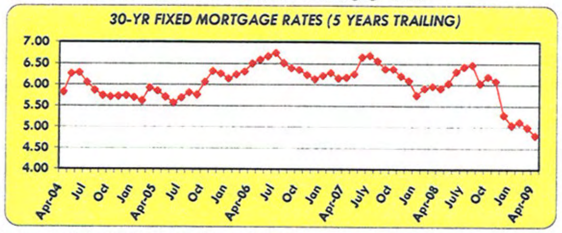
The unemployment rate on Maui had been on a decline since 1992 when unemployment was at 8.0 percent. In 2007, the unemployment rate was 2.8 percent. For 2008, this rate rose to 4.5 percent, after seeing month-over-month gains beginning May 2008. Unemployment rates of 7.9 and 9.0 percent were posted for February and March 2009, respectively. (*Source: DBEDT Quarterly Statistical & Economic Report*). The unemployment rate is expected to trend even higher, at least for the short-term, as the slowdown in the economy continues to unfold.

Household income figures have also been increasing. The estimated median household income for Maui County in 2009 is $64,228 (Source: Claritas), a rise of approximately 30 percent over the 1999 median household income of $49,489 (Source: US Census 2000) and a 66 percent increase over the 1989 figure of $38,771 (Source: US Census 1990). During the ten year period from 2000 to 2009, this represented an average increase of approximately 3 percent per year. The estimated median household income in Central Maui in 2009 is $62,838. (Source: Claritas)

Mortgage Interest Rates

From mid-1990 up until 2003, mortgage rates varied from 6.5 to 8.0 percent. In June 2003, the mortgage rate for a 30-year fixed rate mortgage averaged 5.21 percent, which was the lowest since Freddie Mac began tracking 30-year mortgage rates in 1971. Records that reach back earlier than Freddie Mac's indicate that this rate was the lowest since the early-1960s. However, due to continued cuts to the Federal Funds Rate in late 2008, interest rates in 2009 have fallen below even the June 2003 levels. In April 2009, the average mortgage rate dipped to 4.81 percent (See **Table 3** on the following page).

Table 3 – Historical Trend of 30 Year, Fixed Mortgage Rates



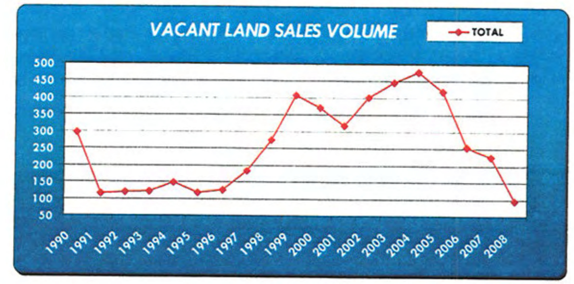
Source: Freddie Mac-Primary Mortgage Survey

Residential Sales Activity
Island of Maui

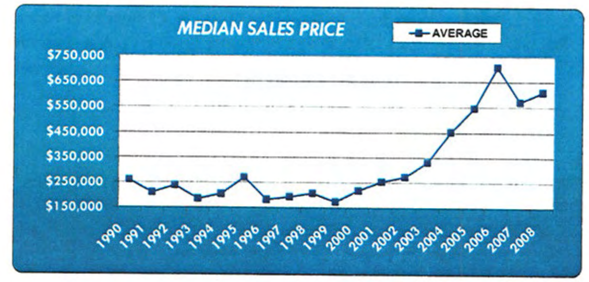
The number of units sold is the most basic indicator of market activity and is useful in helping estimate the number of new units which a specific market segment may be capable of absorbing. Zero-lot-line housing projects were popularized during this period as developers strived to make housing affordable to Maui residents. Since 1998, however, real estate began a strong recovery. As evidenced in the following section, prices and number of sales increased while marketing times decreased. The tables on the following pages illustrate the general market trends over the past 18 years on Maui.

Vacant Land

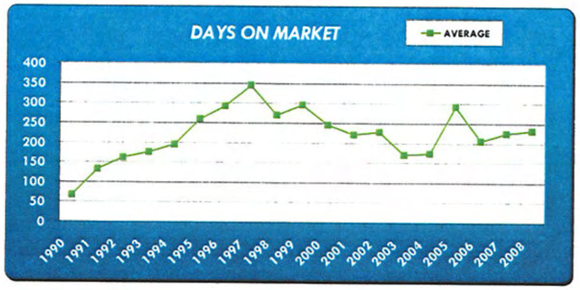
Sales of vacant land fell sharply after 1990 (298) to a level wavering around 100 to 150 sales for the next 6 years. Weakest sales, in terms of units sold, occurred in 1991 when only 116 properties were sold. In 1998, the number of land sales increased to 276 and in 1999, increased again to 408, reflecting a gain of 48 percent. Sales have fallen slightly since 1999 with 372 sales in the year 2000 and 318 sales in 2001; however, these figures rebounded in 2002, 2003 and 2004 to 402, 447 and 477, respectively. Vacant land sales for 2005 showed a slight decrease at 421 transactions, but dropped 39 percent in 2006, with only 255 sales. This trend continued in 2007, albeit with a more stabilized decrease of 11 percent, at 226 sales. However, in 2008, vacant land sales again decreased significantly by approximately 58 percent with only 96 sales.



Meanwhile, median prices slowly regained ground from a low of $173,458 in 1999 to $269,691 in 2002, and then sharply increased to $336,690 in 2003, $446,563 in 2004, and $546,081 in 2005. In 2006, the median price jumped approximately 30 percent to $709,000, but retreated by 19 percent in 2007, to $570,438. In 2008, the median sales price slightly increased to $609,846.

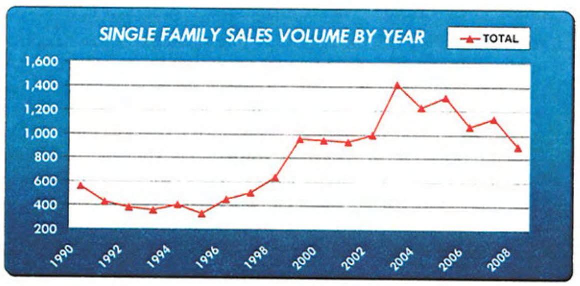


Median monthly days-on-market figures increased steadily from 67 in 1990 to 344 in 1997, but had fallen to 227 in 2002, to 170 days in 2003, increasing slightly to 173 days in 2004. This average escalated in 2005 to 291 days but dropped 29 percent to 204 days in 2006. In 2007, the average marketing time increased 9 percent to 224 days, followed by an increase of 3 percent in 2009 to 231 percent.



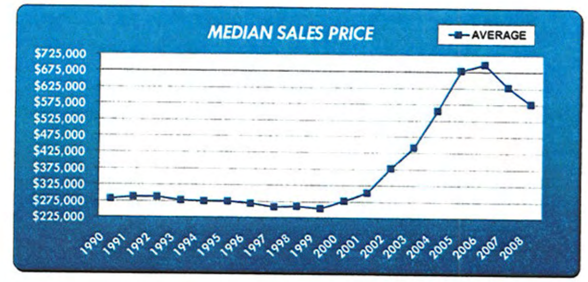
Single-Family

Sales of single-family properties exhibited a decrease after 1990 (560) to a level wavering around 350 to 450 sales for the next 6 years. Weakest sales, in terms of units sold, occurred in 1995 when only 331 properties were sold. In 1997, the number of single-family sales increased to 507 and in 1998, exceeded 1990 results with a figure of 641. The number of sales in 1999 (965 units) was 51 percent more than the number of sales in 1998 (641). Sales were slightly higher in 2000 at 951 units sold, but leveled off in 2001 at 938 units and 997 units in 2002. Sales sharply increased in 2003 to 1,420 transactions, and then decreased slightly in 2004 to 1,228, before climbing to 1,311 transactions in 2005. In 2006, the total sales dropped 18 percent, to 1,066 for the year. A 6 percent increased was realized in 2007, as sales volume totaled 1,138 units. In 2008, sales volume further decreased by 20 percent, to 906 units

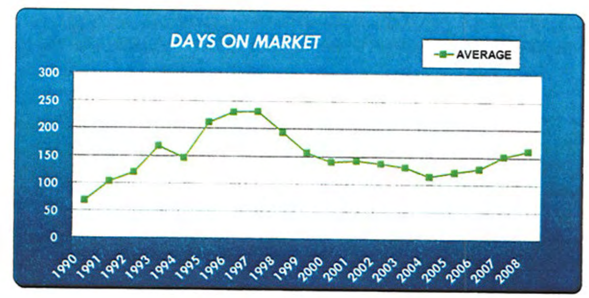


Median prices in 2001 showed a 9 percent increase from $275,958 in the year 2000, and reached a high for the past decade with a median of $301,886. In 2002, the median price increased even more to a level of $375,810, an enormous increase of 24 percent over 2001. Median prices for 2003 indicated an increase of about 17

percent to $441,062; then another large 25 percent increase to $553,167 in 2004. This trend continued in 2005, with a median sales price of $678,321, translating into a 22 percent increase. For 2006, prices continued their climb with a slight increase of 2 percent over the 2005 median. The median price for 2006 averaged approximately $697,450. A decline of 10 percent was seen in 2007, as the average median price was $627,137. The average price further declined in 2008 by 8 percent to $574,760.



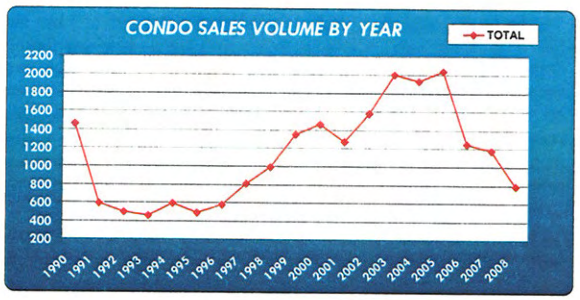
Average monthly days-on-market figures increased steadily from 67 in 1990 to 231 in 1997, but steadily fell to 137 in 2000. It has remained relatively level since that time, except in 2004 when that figure fell to 114 days, before rebounding to 121 days in 2005. The increase continued in 2006 climbing to 128 days, followed by a larger increase to 151 days in 2007, then by 161 days in 2008.



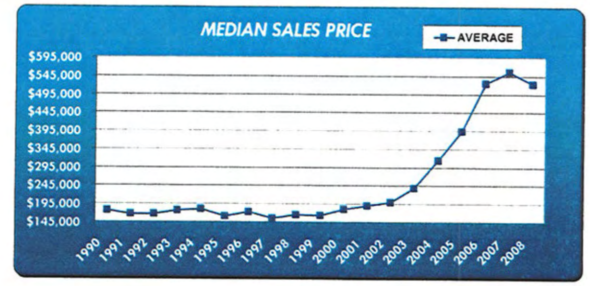
Condominiums

Sales of condominium units fell sharply after 1990 (1,459) to a level wavering between 400 to 600 sales for the next 6 years. Weakest sales, in terms of units sold, occurred in 1993 when only 461 properties were sold. In 1997, however, the number of sales increased to 812 and up to 2,001 units in 2003. 2004 showed a drop in sales, to 1,933 units. This was followed by a record setting year in 2005, with 2,041 units sold. However, sales volume dropped approximately 38 percent to 1,247 units in 2006, followed by a more stabilized decline of 5 percent in 2007, to 1,179 units. In 2008, sales volume continued its decline by another 33 percent to 788 units.

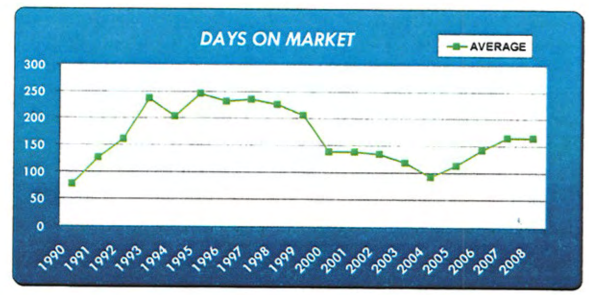
It should be noted that the spike in sales volume between 2003 and 2005 coincides with a flooding of new inventory. During this period, new condominium projects such as Villas at Kenolio and Hale Kanani (Kihei), Villas at Kahana Ridge (Kahana), and Kehalani Gardens and Iliahi (Wailuku) closed on their units.



Median prices remained in a range from $154,296 to $180,392 between 1990 and 2000. However, since then, the average monthly median price increased 5 percent to $189,946 in 2001, 5 percent to $200,020 in 2002, and 19 percent in 2003 to $238,755. 2004 indicated a sharp increase of 31 percent, with an average median price of $314,448, followed by a 24 percent gain in 2005, to $392,314. Despite a drop in sales volume in 2006, the median price increased to $524,758, an approximate 33 percent increase over 2005. This was followed by a more stabilized gain of 5 percent in 2007, to $556,151. In 2008, median sale price decreased for the first time in 10 years.



Average monthly days-on-market figures increased steadily from 77 days in 1990 to 230 days in 1996, but had decreased considerably to 133 days by the end of 2002. This figure fell to 118 days in 2003, then to 92 days in 2004, before rebounding to 113 days in 2005. It rose further in 2006, to 142 days, followed by another increase to 165 days in 2007. Days on market remained the same in 2008.



Historical Project Absorption

In addition to the absorption rates of the individual projects, research was also conducted to give a historical look at the total residential inventory absorbed on a year to year basis. This survey included large projects that are typically put on the open market. These projects included single family residential homes, residential house lots, condominium projects, as well as agricultural subdivisions. It is also known that individual property owners occasionally subdivide tracts of land and sell off the lots to relatives or to a private list of purchasers. These types of projects are difficult to track and have not been included in the survey. The intent of this survey was to provide an indication of the capacity that the real estate market has to absorb new inventory on an annual basis.

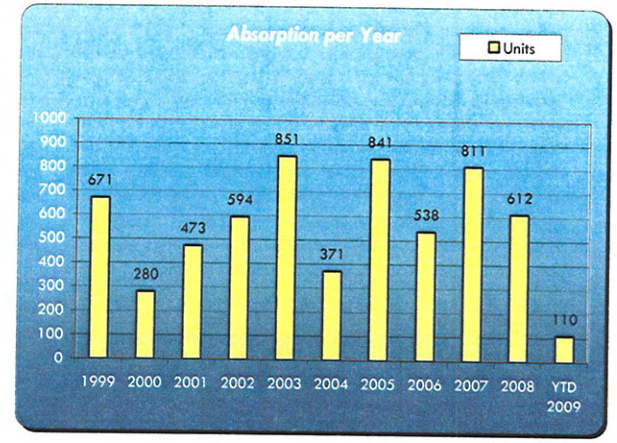
From 1995 to mid-2006, the real estate market showed an overall upward trend, in terms of sales volume as well as sales prices. In 1999, 671 new units were purchased. This number dropped to 280 in 2000 and has been on a steady climb up to 2003. In 2003 year, the real estate market absorbed a total of 849 new housing units. In 2004, this number dropped again to 370 units. However, this drop proved to be temporary as numerous projects in Central and South Maui were completed and a total of 839 units closed. These projects included Ohia, Maunaleo, Iliahi, and Kehalani Gardens within the Kehalani Project District as well as the Sand Hills Estates and Legends in the Maui Lani Project District. In addition, Hale Kanani and Wailea Beach Villas were completed in South Maui. There were a few projects in West Maui that were completed in 2005 and included Mahanalua Nui Phase IV, Honolua Ridge and the Villas at Kahana Ridge. Lanikeha in Kaanapali closed two-thirds of their lots in 2005 and 2006. For 2006 overall, the number of units dropped significantly to 538 units. In 2007, the Central and South Maui regions saw another large injection of new inventory, which catapulted sales upwards to 813 units. Leading the way was the Waikapu Gardens subdivision, featuring affordably priced units. Over 20 percent of the total closings for 2007 were from this single-family subdivision. In 2008, project sales were primarily from the same subdivisions that started in 2007. Total units absorbed amounted to 598. Again leading the way was Waikapu Gardens with 30 percent of all project sales. This survey only included the original sales of units within new projects.

During the ten year period between 1999 and 2008, there has been an average of approximately 604 units sold each year. By dividing the supply available in the market by this average, an estimate of the remaining years of current supply can be determined. Due to the recent stabilization of the real estate market, it should be expected that sales may not be as brisk as in the past. As previously noted, during the peak of the real estate market, projects were often sold out prior to construction completion. Since mid-2006, however, the market has downshifted and developers now have to hold on to completed inventory.

In Central Maui, there are still developer units available in ongoing Kehalani projects such as Koa, Akolea, Cottages, and Villas. Na Hoku and Sandhills Estates in Maui Lani also have developer inventory available for sale.

In South Maui, the majority of the ongoing projects are in the Wailea and Makena resort areas. Kamali'i Alayna is the exception to this, and this Central Kihei project continues to have developer units for sale.

Table 4 – Total New Project Absorption 1999 to YTD 2009



A breakdown of the absorption of single family, condominium and residential vacant land is included on the following pages.

Table 5 – Units Absorbed Per Year (Central Maui)

	Type	Units	Year 1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	YTD 2009
KAIMANA	S	179	11	1	1				2				
GREENS	L	217	104	8									
IAO PARKSIDE IV-B	C	52	14	5	6	1	1						
IAO PARKSIDE IV-C	C	52	1	3	5	41							
NANEA	S	90	70										
GRAND FAIRWAYS	L	36	31	5									
IAO PARKSIDE IV-A	C	13	4	7	2								
GRAND FAIRWAYS NORTH	L	79		57	22								
WAILUKU PARKSIDE	S	119		31	87	1							
THE ISLAND SCHULER PHASE I	S	55		1	24	30							
THE ISLANDMAUI LANI PHASE I	L	44		10	23	10	1						
OLENA	S	31			7	24							
THE ISLAND MAUI LANI PH II	L	35				35							
THE ISLAND SCHULER PH II	S	53				9	44						
WAILUKU COUNTRY EST	L	184					177	7					
WAIOLANI ELUA	L	25					22	2					
BLUFFS - Maui Lani	L	15					6	9					
- Schuler	S	21						7	14				
OLENA II	S	32						32					
LEGENDS	S	143						47	90	3	2		
OHIA AT KEHALANI	S	140							135	5			
MAUNALEO AT KEHALANI	S	82							55	27			
OHIA AT KEHALANI PH II	S	44								44			
ILIAHI AT KEHALANI	C	92							61	31			
KEHALANI GARDENS	C	132							83	49			
LEGENDS PHASE II	S	134								33	99	2	
WAIOLANI PIKAKE	L/S	36										36	
KOA AT KEHALANI	L/S	72							16	32	15	5	
SAND HILLS ESTATES	L	108							76	16	6		
NA MALA O WAIHEE	L	7									4		
WAIKAPU GARDENS	S	410								62	162	178	4
WAIOLANI MAUKA	L	105									104		
AKOLEA AT KEHALANI	S	97									25	43	10
NA HOKU	S	162									22	53	8
COTTAGES AT KEHALANI	S	114									6	50	16
VILLAS AT KEHALANI	C	103										1	1
Total			235	128	177	151	251	104	532	302	445	368	39

Table 6 – Units Absorbed Per Year (West Maui)

	Type	Units	Year 1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	YTD 2009
KAHANANUI	S	26											
VILLAGE AT MAHINAHINA	S	26											
KAHANA RIDGE	L	228	195			1							
KAUHALE MAHINAHINA	S	19	19										
MAHANALUA NUI (I to III)	L	104	33	10	19		41	1					
VINTAGE	C	73		3	70								
KE ALII SUB'D III	L	12		7	1	4							
PINEAPPLE HILL II	L	30		12	8	9	1						
MAKILA I	L	19				19							
OLOWALU MAKAI	L	5			1	4							
OLOWALU MAUKA	L	14				8	6						
COCONUT GROVE AT KAPALUA	C	36			36								
PUUNOA SUBDIVISION	L	14			14								
KAHANA NUI SUB'D (HUA NUI)	L	17			16	1							
PINNACLE	C	33			5	8	8	12					
SUMMIT													
Phase I	C	18			5	11	2						
Phase II (Pulled off Market)	C	17						17					
Phase III	C	19					19						
NAPILI VILLAS PH I	C	100				100							
NAPILI VILLAS PH II	C	44				44							
KE ALII SUB'D I	L	15				12	3						
KAPUA VILLAGE	L	45				10	35						
NAPILI VILLAS PHIII	C	40					40						
MAKILA II	L	24						24					
HONOLUA RIDGE	L	25						17	8				
VILLAS AT KAHANA RIDGE	MF	117							83	34			
MAHANALUA NUI IV	L	36					1		31	4			
LANIKEHA	L	138							59	40	2	2	1
KAANAPALI COFFEE ESTATES	L	22									3	3	
OPUKEA	MF	114											7
HONUA KAI	MF	700										1	29
WEST MAUI BREAKERS	MF	114											
Total			247	32	175	231	156	71	181	78	5	6	37

Table 7 – Units Absorbed Per Year (South Maui)

	Type	Units	Year 1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	YTD 2009
PIILANI VILLAGE PHASE I	S	100											
MEADOWLANDS	L	32											
MAKENA PLACE	C	10	2	2	2	2	1						
KAMAOLE HEIGHTS	L	40	40										
MEADOWLANDS II	L	88	63	25									
WAILEA FAIRWAY VILLAS	C	118	56	62									
PIILANI VILLAGE PHASE II	S	114			113	1							
MALUHIA AT WAILEA	C	14			5		1	3	2	2			
KE ALII KAI	S	96				61	35						
KENOLIO (KAONOULU) ESTATES	S	51				45	6						
NA HALE O MAKENA	C	40				13	24	3					
KEAHOU AT MAKENA	L	7				6		1					
PIILANI VILLAGE III	S	117					117						
HONU ALAHELE	L	64					64						
KILOHANA RIDGE	S	73					69	4					
KILOHANA HEMA	L	29					28	1					
VILLAS AT KENOLIO	C	140					61	78	1				
ONE PALAUEA	L	17					1	8	8				
ALII VILLAGE	L	27						27					
KENOLIO MAUKA		12						12					
HALE KANANI	C	72							70	2			
WAILEA BEACH VILLAS	C	98							34	63		1	
WALAKA MAUI (112 WALAKA)	C	18								18			
KIHEI KAUHALE	L	23								23			
KAI MAKANI	C	112									96	16	
KANANI WAILEA	C	38								9	25		
KAI MALU	C	150								22	86	26	
KILOHANA WAENA	L	31									6	3	
HOOLEI	C	120									22	69	6
KE ALII OCEAN VILLAS	C	144									37	35	10
KAMALI'I ALAYNA	S	92									44	19	5
PAPALI	C	24										15	
MOANA ESTATES	S	90								18	39	21	1
Total			185	117	120	128	407	137	115	157	355	228	28

Table 8 – Units Absorbed Per Year (Upcountry/East Maui)

	Type	Units	Year 1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	YTD 2009
HAIKU MAKAI	L	27	4	3									
MAUNAOLU PLANTATIONS	L	39				27	12						
RESIDENCES AT KULAMALU	L	57				56	1						
NORTH SHORE VILLAGE	S	23					22	1					
RIDGE AT KULAMANU	L	57						57					
KULAMALU HILLTOP (DOWLING)	L	11							11				
E PAEPAE PUKOA	L	16									6	6	
OMAOPIO RIDGE	L	18			1	1	2	1	2	1			
PIIHOLO SOUTH	L	11										1	
COTTAGES AT KULAMALU	C	40										3	6
MAKANI O KULA	L	10											
OMAOPIO ESTATES	L	20											
Total			4	3	1	84	37	59	13	1	6	10	6
GRAND TOTAL			671	280	473	594	851	371	841	538	811	612	110

Historical Resale Activity (Past 12 Months)

Vacant Land

Over the past year, there were five sales of residential zoned house lots between 4,000 and 10,000 square feet in Central Maui, with an average land area of 7,040 square feet. Neighborhoods with house lots sales included Waikapu Gardens, Waiolani Elua, Sandhills Estates, Waiolani Mauka and Wailuku Heights. Excluding the two Waikapu Gardens conveyances that were not market sales; the median price was shown to be $250,000.

Kihei showed three sales within the same size range, at an average of 8,225 square feet. The median price of the three lots was $290,050 and all were from the Alii Village subdivision. Average marketing time was 135 days.

Single Family

Research revealed a total of 379 single-family residential sales in Central Maui; however, only 131 of these were resales, with the remainder being developer sales from the Waikapu Gardens, Koa, Akolea, Cottages, and Na Hoku subdivisions.

The low end of the resale range was $240,000 for a two-bedroom/one-bath house on Kaohu Street, built in 1937. This Wailuku home had 800 square feet of living area. The high end, at $965,000, was for a four-bedroom/three-bath home with 3,128 square feet of living area, built in 2005, in Sandhills Estates.

The median sales price was $490,000 with an average living area of approximately 1,528 square feet. The average room count was about 3.2 bedrooms with an average of 2.1 baths. The average "Days on Market" for the 131 resales was 159 days.

Subdivisions with notable activity included Wailuku Parkside; The Greens, Legends Phase I, The Island, Maunaleo, Kaimana, Waiehu Terrace, Wailuku Town and Kahului Town.

Kihei added 135 single-family residential sales, with 85 being resales. Developer sales were determined to be from Kamali'i Alayna, Moana Estates and Hokulani Golf Villas.

The low end of the resale range was $165,000 for a 500 square foot, one-bedroom/one-bath house built on Auhana Street in 1976. Meanwhile, the high end was a three-bedroom/two and one half-bath home on Kuaua Place that sold for $2,800,000. This home was built in 2002 and has 3,287 square feet of living area.

Subdivisions with notable activity included Ka Ono Ulu Estates, Keonekai Heights, Maui Meadows, and Piilani Village.

Project Sales in Central Maui

The success of projects can be attributed to its location with respect to governmental agencies, transportation facilities, and commercial and professional services. New developments like the proposed subject often create excitement in the market, especially when the product is perceived to offer a particular value to the buyer. Project sales on Maui, at all price levels, had met good demand from the market up to mid-2006. As shown on the following page, absorption rates were rapid during that time period. In many subdivisions, especially the lower-priced homes, the residences were immediately reserved and waiting lists are as long as the reservation list. Ohia and Maunaleo, both located in the Kehalani Project District, had waiting lists of approximately 300 names each and closing rates were 9.42 and 6.69 homes per month, respectively.

Another example that stands out is Spencer Homes' affordable single-family subdivision in Waikapu. This project completed the last of its 410 single-family homes in late 2008. More than 50 percent of these homes were affordably priced; available to households earning up to 120 percent of the median household income. The developer had approximately 5,000 families on his waiting list. As expected, this subdivision sold out quickly, with about 4,000 potential buyers said to still be on the list.

The long waits in line to secure a spot on the reservation list and lottery systems are well-documented for Maui housing projects. During that period, absorption rates were reflective of the time needed to close the sold units. Since 2007, however, developers have to carry inventory and market their new units.

Within the past couple of months, sales activity in some of the projects has picked up, as buyers are being lured by substantial price cuts and attractive incentive packages. Furthermore, the recent drop in mortgage interest rates, which began in December 2008, has increased the purchasing power of potential buyers.

Schedules of absorption rates of new subdivisions and condominium projects in Central Maui and South Maui appear on the following pages.

Table 9 – Central Maui Project Absorption

No.	Project Name / Location (CENTRAL MAUI)	No. of Units	Project Type	Lot Size	Living Area of Dwellings	Price Range	Closing Time in Months	Units Sold	Units Sold Per Month
1	Cottages at Kehalani Wailuku, Maui, Hawaii Stanford Carr Dev	114 House and Lot Packages	Single Family	4,432 to 18,133 sf	1,253 to 1,876 SF	$523,000 to $837,800	19 (10/07-05/09)	72	3.79
2	Na Hoku Kahului, Maui, Hawaii Schuler Homes	160 House and Lot Packages	Single Family	4,183 to 12,163 sf	1,500 to 2,403 SF	$500,000+	21 (8/07-05/09)	83	3.95
3	Akolea at Kehalani Wailuku, Maui, Hawaii Towne Dev of Hawaii	97 House and Lot Packages	Single Family	7,037 to 16,606 sf	1,703 to 2,404 SF	$605,000 to $842,000	19 (10/07-05/09)	78	4.11
4	Waikapu Gardens Waikapu, Maui, Hawaii Spencer Homes	410 House and Lot Packages	Single Family	3,213 to 10,486 sf	973 to 1,658 sf	$225,000 to $597,200	30 (11/06-12/08)	406	13.53
5	Waiolani Mauka Waikapu, Maui, Hawaii Waikapu 28 Invstmnt LLC	105 House Lots	Single Family	7,512 to 12,242 sf	N/A	$162,300 to $456,000	10 (2/07-12/07)	104	10.40
6	Koa at Kehalani Wailuku, Maui, Hawaii Towne Dev of Hawaii	72 Lots and House and Lot Packages	Single Family	7,900 to 21,675 sf	N/A	$390,000 to $484,000	36 (10/05-10/08)	68	1.89
7	Sand Hills Estates Wailuku, Maui, Hawaii Maui Lani	108 House Lots	Single Family	7,561 to 16,999 sf	N/A	$294,000 to $495,000	20 (9/05-5/07)	98	4.90
8	Waiolani Pikake Waikapu, Maui, Hawaii M&W2 LLC	36 House Lots	Single Family	6,140 to 9,574 sf	N/A	$135,100 to $349,900	11 (1/07-12/07)	36	3.27
9	Maui Lani The Legend Phase II Schuler Homes	134 House and Lot Packages	Single Family	3,433 to 8,874 SF	1,297 to 1,873 SF	$497,800 to $693,800	16 (10/06-2/08)	134	8.38
10	Ohia at Kehalani Ph II Wailuku, Maui, Hawaii Towne Dev of Hawaii	44 House and Lot Packages	Single Family	6,527 to 10,555 SF	1,302 to 2,137 sf	$450,000 to $700,000	2 (10/06-12/06)	44	22.00
11	Kehalani Gardens Wailuku, Maui, Hawaii Stanford Carr Dev	132 Condominiums	Lowrise Condos	N/A	935 to 1,133 sf	$190,600 to $470,000	12 (5/05-5/06)	132	11.00
12	Ohia at Kehalani Wailuku, Maui, Hawaii Towne Dev of Hawaii	140 House and Lot Packages	Single Family	3,759 to 12,534 SF	1,308 to 1,860 sf	$350,000 to $775,000	13 (3/05-4/06)	140	10.77
13	Maunaleo at Kehalani Wailuku, Maui, Hawaii Stanford Carr Dev	82 House and Lot Packages	Single Family	6,301 to 16,082 SF	1,408 to 2,152 sf	$435,900 to $839,000	10 (6/05-4/06)	82	8.20
14	Iliahi at Kehalani Wailuku, Maui, Hawaii Towne Dev of Hawaii	92 Condominiums	Lowrise Condos	N/A	1,242 to 1,258 sf	$292,200 to $433,795	6 (8/05-2/06)	92	15.33
15	Maui Lani The Legend Schuler Homes	143 House and Lot Packages	Single Family	3,050 to 7,023 SF	1,297 to 1,873 SF	$321,000 to $633,000	37 (9/04-10/07)	142	3.84

Table 10 – South Maui Project Absorption

No.	Project Name / Location (SOUTH MAUI)	No. of Units	Project Type	Lot Size	Living Area of Dwellings	Price Range	Closing Period in Months	Units Sold	Units Sold Per Month
1	Kai Ani Village Kihei, Maui, Hawaii Victory Development	99 Condominiums (incl. 20 live/work)	Condo	N/A	886 to 1,901 sf	$459,900 to $899,900	No Closings Under Contract	8	N/A
2	Hokulani Kihei, Maui, Hawaii Signature Homes	120 Luxury Detached Condominiums	Condo	N/A	1,898 to 2,516 sf	$1.13mil to $1.48mil	11 7/08 to 5/09	29	2.64
3	Hoolei Wailea, Maui, Hawaii CMI Group Hawaii	120 Luxury Condominiums	Condo	N/A	2,500 to 3,300 sf	$1.6mil to $3.995mil	22 7/07 to 5/09	97	4.41
4	Papali Wailea, Maui, Hawaii Popkin/Weinstein	24 Luxury Detached Condominiums	Condo	N/A	3,000 sf	$2.35mil to $3.5mil	16 2/08 to 5/09	15	0.94
5	Kai Malu Wailea, Kihei, Maui A&B Prop/Armstrong	150 Luxury Duplex Condominiums	Condo	N/A	1,796 to 1,852 sf	$1.0mil to $1.8mil	32 10/06 to 5/09	135	4.22
6	Kanani Wailea Wailea, Kihei, Maui Pac. Land and Homes, LLC	38 Luxury Condominiums	Condo	N/A	2,000 to 2,300 sf	$1.2mil to $1.7mil	6 12/06 to 5/07 Remaining Units Withheld	34	5.67
7	Kamalii Aloyna Kihei, Maui, Hawaii Betsill/Clearly Maui	92 House and Lot Packages	Single Family	4,500 to 10,000 sf	1,000 to 2,200 sf	$675,000 to $850,000	25 4/07 to 12/08	68	2.72
8	Moana Estates Kihei, Maui, Hawaii Towne Development	90 House and Lot Packages	Single Family	7,525 to 16,989 sf	1,668 to 2,534 sf	$700,000's to $1.29mil	31 11/06 to 5/09	79	2.55
9	Ke Alii Ocean Villas Kihei, Maui, Hawaii Towne Development	145 Condominiums	Condos	N/A	1,233 to 1,906 sf	starting at $650,000	25 5/07 to 5/09	82	3.28
10	Wailea Beach Villas Wailea, Kihei, Maui Lai Honua LLC	98 Luxury Condominiums	Condo	N/A	1,900 to 2,900 sf	$677,740 to $7.13mil	15 10/05 to 11/06	98	6.53

Price Appreciation/ Depreciation

The Appraiser analyzed recently completed developments on Maui to illustrate the rate of price appreciation. We specifically focused on single-family subdivisions, condominium projects, and residential house lot subdivisions in the Central Maui neighborhood to give an indication of the demand for housing and its affect on prices within these projects. These developments were selected knowing that these products represent moderately priced market developments.

Within Central Maui, single-family subdivisions that were analyzed included Maunaleo, Ohia, Legends, and Koa; while Kehalani Gardens and Iliahi were two condominium developments that were checked for resales.

Since the first closing in April of 2005, there have been 39 resales within the Maunaleo at Kehalani subdivision. Nineteen appear to be sales by speculators, as there were subsequent transactions occurring within six months of the developer sale. The other resales indicated gross **appreciation rates ranging from 5 to 49 percent,** while eight had price **decreases of between 4 and 38 percent.**

To-date, there have been nine resales in the Ohia at Kehalani subdivision; however, only one fulfilled the project's three year owner-occupancy requirement. This resale occurred in July 2008, at an **appreciation rate of 22 percent.**

There have been 41 resales in Phase I of the Legends at Maui Lani subdivision since developer closings began in September 2004. These resales had **appreciation rates ranging from 0.3 to 80 percent,** as well as two bank owned (REO) sales at **depreciation rates of 4 and 16 percent.** In Legends Phase II, there were two resales since the project's first closings in 2006; both of which occurred in 2008. One sale indicated a **6 percent appreciation,** and the other was an REO sale, which showed **11 percent depreciation.**

Within the Koa at Kehalani subdivision, there have been nine resales. This subdivision featured 72 finished house lots, sixteen of which were sold as a house and lot package. All of the resales were of house lots, with the exception of one single-family home sale. The lot resales in 2006 and 2007 indicated price **appreciation from 7 to 18 percent,** while the 2008 and 2009 lot sales showed **depreciation between 11 and 19 percent, with one foreclosure sale at 29 percent.** The single-family home resale occurred in 2009 and showed **21 percent depreciation** from its 2006 developer sale.

Research revealed 30 resales within the Kehalani Gardens townhouse project; however, only 17 appeared to have fulfilled the two year owner-occupancy requirement. The 17 resales indicated gross increases of between **10 to 71 percent.** Original sales in this multi-family project were between $190,600 and $460,000, with a median of $283,138. All but 18 of the 132 units were originally offered as affordably priced condominium, which explains the large gross appreciation.

To date, there have been 22 resales at the Iliahi at Kehalani townhouse project, which showed gross increases of between **6 to 48 percent** between 2006 and 2008. In 2009, there has only been a foreclosure sale at **depreciation of 6 percent,** with a subsequent REO sale showing **depreciation of 9 percent.**

EFFECTIVE DEMAND

Effective demand considers the ability of market participants to purchase a home. Statistical information from the Hawaii Housing Policy Study 2006 by SMS Research & Marketing Services, Inc. provided information relative to the effective demand for housing in Maui County. Effective demand was determined by those who wanted to move to a new home, but excluding those who will move out-of-state. For Maui County, this figure was shown to be 39.6

percent in 2006, which was up from 35.8 percent in 2003, but lower than the 1997 estimate of 42.5 percent.

The survey indicated that approximately 49.9 percent of the current homeowners who wanted to buy another unit have adequate equity to do so. Approximately 69.2 percent of the households revealed that they have at least $5,000 in family savings or investments. At the same time, however, only 37.6 percent estimated that they would be able to gather $60,000 as a down payment.

Approximately 34.0 percent of the respondents have a household income of over 140 percent of the County median, yet 14.1 percent felt their current debt situation would hamper their ability to secure mortgage financing.

Obtaining mortgage financing was shown to be more difficult than being able to make mortgage payments, as at least 52.0 percent revealed they could afford to pay $2,000 or more per month. Around 60.0 percent of the current homeowners are paying more than $1,700 per month in mortgage and utility payments.

The 2006 survey indicated that, at the time, affordability was the lowest it has been in 25 years. Since then, home prices have dropped considerably; however, external forces are still making it difficult for potential homebuyers to obtain a home. The global financial crisis which emerged in late-2008 had a significant impact on national and local economies. Increased unemployment and a lack of job security have stopped many otherwise qualified households from considering the purchase a new housing unit. Furthermore, the evaporation of secondary lending sources has made it more difficult for those who are marginally qualified to secure financing.

In addition, lower property values diminished the equity appreciation many homeowners were relying on for the down payment on their next purchase. Based on the aforementioned circumstances, it is safe to assume that the desire for housing in Maui County remains; however, at present time it is being suffocated by unfavorable economic conditions.

MIXED USE MARKET ANALYSIS

The Developer intends to have a seven-acre acre commercial area, with a village town center design. Mixed-use residential projects are not readily seen on Maui; however, live/work architecture is often found in older towns, such as Wailuku, Paia, Lahaina and Makawao, where business owners would often reside above their shops. This design concept is currently experiencing a renaissance on the mainland, in the form of mixed-use residential projects.

Research revealed that many of the projects on the mainland involved renovation of existing structures in industrial or commercial areas, while others were new developments stationed near mass transit centers. The underlying theme behind their construction was to reduce urban sprawl and lessen the need for vehicular commuting. By having goods and services providers within proximity of residential units, these mixed-use projects enable people to live and work within the same neighborhood.

Proposed Mixed-Use Projects

As previously discussed, this type of architecture can be found in older towns; however, is largely untested for new development. There are three upcoming projects that intend to incorporate this type of design. The projects are discussed in the following paragraphs.

'Aina O Kane Condominiums is a 103 unit mixed-use development that will be built along Kane and Vevau Streets, in Kahului. There will be five (5) four-story buildings, four of which will offer commercial retail/office space on the ground floor. The residential units will have either two or three bedrooms, ranging in size from 723 to 1,033 square feet. The project's price points are currently in the mid-$300,000 to mid-$400,000 range. 'Aina O Kane is intended to provide housing for Maui residents and priority will be given to owner-occupants. Although there will be commercial spaces built below the residential units, there will not be any consolidated live/work product in this mixed-use project.

Kai Ani Village, in Kihei, will feature 99 low-rise condominium units, of which, 20 units will be live/work models. The 79 residential condominiums will range in size from 904 to 1,509 square feet, with the live/work models between 1,919 and 1,959 square feet. Prices for the residential condominiums were between $459,900 and $689,900. The live/work models ranged in price from $849,900 to $899,900. Initial marketing of Phases I and II commenced in August 2007. Phase I will include Buildings 1, 2, and 3, and Phase II consists of Buildings 4 through 15.

Another mixed-use project, which has not begun public marketing efforts, is **Kahului Town Center.** This will be a large scale development, involving four city blocks in Kahului. The nucleus of this venture will be the redevelopment of the Kahului Shopping Center, which was substantially damaged by fire in 2005. Kahului Shopping Center is generally bound by Kaahumanu Avenue, Puunene Avenue, Kamehameha Avenue and Lono Avenue. Early design plans indicate a combination of multi-family residential, commercial retail/office and mixed-use structures. At full build out, which was estimated to take over 10 years, the project will provide 442 multi-family residential units, 140,000 square feet of retail space and 156,000 square feet

of office space. A commercial leasing agent indicated that the first phase of the project may take several years to construct and would focus on the commercial retail/office element.

In addition to these proposed mixed use projects, **Maui Lani Village Center** is in the process of taking reservations. This development is located within the Maui Lani Project District, in an area designated Village Mixed Use (VMX). Although original plans involved some live/work condominium units, the project has morphed into more of a business park. The developers of this center are offering lots of between 9,267 square feet and 7.54 acres, with the majority being within the 10,000 to 20,000 square foot range. Initial pricing for the lots was said to be between $40 and $60 per square foot. Maui Lani Village Center will also include the "Professional Row", a group of 14 medical/professional office buildings, to be built on eight lots. The developer intends to sell these buildings in loft condition, allowing the buyers to finish the interiors to suit their individual businesses.

As previously indicated, Ohana Kai Village was in the early design stage and there were no site plans for the village mixed use area. The Developer stated he would like to have a supermarket and gas station as anchor businesses. Such uses would support both the subdivision, as well as the overall Ma'alaea community. This would also enable the project to be less auto-centric and reduce commuter traffic into Wailuku, Kahului and Kihei.

CONCLUSION

Over the past decade, Maui has seen significant growth in virtually all aspects (e.g., population, visitor arrivals, economy) of the community. One of the most important issues facing Maui has been the need for affordable housing. Increasing population and the low interest rate environment has increased the demand for homes. This demand has led to record prices and sales volume for real estate. Many single family subdivisions and condominium projects have been sold out prior to the completion of construction. In recent years, a strong emphasis has been placed on the construction of affordable homes as housing prices have outpaced increases in household incomes. The current County administration has set its sights on providing relief for island residents in this strong real estate market.

The following points summarize the supply of real estate in Maui at this time.

- As of May 2009, there are approximately 3,150 active listings in the Realtors Association of Maui Multiple Listing Service for all types of residential properties (single-family, multi-family, and residential house lots) on Maui.

- There are approximately 1,893 new housing units currently available in the market. This was determined to be the short term supply of new housing units or vacant lots available for purchase in the market. Of this total, approximately 870 units are located in Central Maui while South Maui has a total of 538 units. West Maui has only 289 of the total short term supply while Upcountry Maui has 131 units.

- Based on historical annual absorption rates of the real estate markets, the current short term supply of units is expected to last approximately 3 years (1,893 units of supply ÷ 604 units of average absorption over 10 years).

- According to the Hawaii Housing Policy Study 2003, there will be a total of 9,080 resident housing units (RHU) available from 2009 to 2024. This does not include vacant units as well as units set aside for non-resident occupancy.

The following points summarize the demand for real estate in Maui at this time.

- Population on Maui between 1990 and 2000 grew by 28.5 percent. Population is expected to increase by 54.7 percent from 2000 to 2025. From 1990 to 2000, Central Maui had a growth rate of 26.5 percent increase in population.

- Mortgage rates remain at historical lows. As of April 2009, the average interest rate on 30-year, fixed-rate mortgages was at 4.81 percent. These lower rates typically mean that real estate becomes more affordable to a larger segment of the population. At the same time, however, current economic conditions are impeding many potential buyers from purchasing real property.

- Real estate sales activity in vacant land, single-family, and condominium properties has been on a downward trend in terms of sales and median sales price since their peaks in mid-2005. The 2008 median sales price for residential properties averaged 8 percent less than 2007. Prior to that, there was a 10 percent reduction in median sales price from 2006 to 2007. Average marketing times or days-on-market for all property types increased between 2006 and 2008.

- Overall sales activity has dropped dramatically since the peak of the market in 2006. Central Maui remains the most active region on the island. This is a testament to the area's desirability and proximity to the primary financial, business, civic, transportation and shipping areas of Maui. From 1999

to 2008, there has been an average of 251 new housing units absorbed in Central Maui per year. In 2008, there were 368 new housing unit sales; this was the highest of all areas on Maui.

During the same period, 1999 to 2008, the South Maui region has absorbed an average of 195 new housing units annually. The 228 new housing unit sales in 2008 was second to only Central Maui, and more than West Maui and Upcountry combined.

- The Hawaii Housing Policy Study Update 2006 shows that there will be a demand for 4,224 new resident housing units (RHU) from 2007 to 2011.

On a long-term basis, from 5 to 20 years, it is difficult to reliably estimate the number of projects that will be actually brought to the market. As mentioned before, many projects have been delayed or have met with resistance from the community for various reasons. Some face the lengthy and uncertain tasks of rezoning and Community Plan Amendments by the County, as well as District Boundary Amendments by the State of Hawaii. This would seem to indicate that of all the potential projects that have been identified, a significant number may never be realized.

Many developers feel that the most difficult barriers to entry, with regard to residential projects, are the Workforce Housing Ordinance and Water Availability Ordinance. In their opinion, these County laws have increased an already time consuming and costly entitlement process, to the point where feasibility becomes questionable. Faced with this higher risk in the entitlement process, it is highly likely that they will put their money elsewhere, instead of constructing homes for Maui's residents. As such, in the next upswing in the market, the number of housing units that will become available is expected to be suppressed.

There is currently an imbalance between the supply and demand for residential real estate on Maui. Prices had increased significantly during the early 2000's and made home ownership extremely difficult for residents of Maui, especially for those near the median income levels. The decline of the market has done little to resolve this affordability issue. Most of the development focus, both current and past, has been on market level, upper income brackets or the luxury resort market. There is a strong need for development to serve the general population and ultimately rebalance the supply and demand factors for residential properties.

The demand for housing still exists, although it is currently being stifled by unfavorable market conditions. The residential real estate market is presently reacting to the economic slowdown, both on the mainland and in Hawaii, and the recent financial crisis. This in turn has an adverse effect on tourism and construction, two significant drivers of the local economy. As such, even though some property values have fallen to a level that is within the affordable price guidelines, many potential homebuyers are reluctant to purchase property, due to unemployment or a lack of job security. Many who are willing to buy are having trouble obtaining financing.

While being cognizant of the cyclical nature of the real estate market, many feel that there will be a continued decrease in prices on the horizon, with a subsequent rebound and increase. At that point in time, it is assumed that economic conditions will have improved and potential buyers will find themselves in more opportune financial circumstances.

However, if history holds true, property appreciation may once again outpace household income and prevent many from being able to afford a home. By offering housing at affordable and entry level price points, Ohana Kai Village would provide much relief from this situation.

Ohana Kai Village is conveniently located within easy driving distance of Central Maui and South Maui. It also provides a shorter trip to West Maui, than from Wailuku, Kahului, or Kihei. Release of more supply into the market, such as those offered by the subject, should be adequately received based on historical information. Of the 1,100 single-family residences planned, at least 60 percent will qualify as affordable priced housing units, which should see even greater interest. Furthermore, the available competition in the market may have a secondary effect of stabilization or even lowering of prices in the region. This in turn will help make housing more affordable to Maui's residents.

Currently, the ability of qualified buyers to purchase affordable housing may be more difficult than a few years ago; however, it is fairly safe to assume that as economic conditions improve, housing units within this market segment will continue to be the most sought after. Economists have varied opinions as to the timing of the economic recovery, but many have pointed to 2011 for this turnaround.

Had Ohana Kai Village come online today, it would have likely been facing the same types of sales difficulties that other ongoing projects are witnessing. However, the subject will still need to go through entitlement, design and construction processes before sales can occur.

As such, release of the subject's 1,100 single-family homes may be very well timed with the economic recovery. If so, significant demand can be expected for this project.

The Developer has stated that he still has over 4,000 names remaining on the waiting list from Waikapu Gardens, his most recent subdivision. The addition of Ohana Kai Village will supply Central Maui with 660 more affordable single-family homes, with the Developer striving to keep the remaining 440 units within affordable guidelines. He is an experienced home builder, with a proven track record of providing single-family residences at price points geared toward the workforce market segment. A preliminary land use map indicated that Ohana Kai Village will have a charter school site and park areas. In addition, the Developer is planning a commercial mixed use to serve the subdivision, as well as the greater Maalaea community.

Once market conditions improve, the project can expect to see heightened demand, due to its Central Maui location and affordable/workforce price points. Statistical evidence has clearly shown that under all market conditions, this segment has the most demand. Although the exact count and pricing of the project units have not been determined, this development will give entry level market participants an opportunity for home ownership. After consideration of current economic and real estate market conditions, in addition to forecasts by Hawaii economists, it is our opinion that Ohana Kai Village should be well positioned to capitalize on the expected market recovery.

EXHIBITS

EXHIBIT A

Claritas Demographic Data

Maui County

Pop-Facts: Demographic Snapshot Comparison Report

County, (see appendix for geographies), aggregate

Description	Total County	%
Population		
2014 Projection	152,970	
2009 Estimate	144,146	
2000 Census	128,094	
1990 Census	100,374	
Growth 2009-2014	6.12%	
Growth 2000-2009	12.53%	
Growth 1990-2000	27.62%	
2009 Est. Population by Single Race Classification	144,146	
White Alone	53,135	36.86
Black or African American Alone	1,219	0.85
American Indian and Alaska Native Alone	663	0.46
Asian Alone	41,294	28.65
Native Hawaiian and Other Pacific Islander Alone	14,122	9.80
Some Other Race Alone	2,259	1.57
Two or More Races	31,454	21.82
2009 Est. Population Hispanic or Latino by Origin*	144,146	
Not Hispanic or Latino	130,873	90.79
Hispanic or Latino:	13,273	9.21
Mexican	3,910	29.46
Puerto Rican	4,279	32.24
Cuban	80	0.60
All Other Hispanic or Latino	5,004	37.70
2009 Est. Hispanic or Latino by Single Race Class.	13,273	
White Alone	3,306	24.91
Black or African American Alone	36	0.27
American Indian and Alaska Native Alone	169	1.27
Asian Alone	1,222	9.21
Native Hawaiian and Other Pacific Islander Alone	737	5.55
Some Other Race Alone	2,030	15.29
Two or More Races	5,773	43.49

Description	Total County	%
2009 Est. Pop. Asian Alone Race by Category*	41,294	
Chinese, except Taiwanese	1,233	2.99
Filipino	22,990	55.67
Japanese	13,089	31.70
Asian Indian	105	0.25
Korean	845	2.05
Vietnamese	337	0.82
Cambodian	11	0.03
Hmong	0	0.00
Laotian	49	0.12
Thai	80	0.19
Other Asian	300	0.73
Two or more Asian categories	2,255	5.46
2009 Est. Population by Ancestry	144,146	
Pop, Arab	218	0.15
Pop, Czech	185	0.13
Pop, Danish	341	0.24
Pop, Dutch	791	0.55
Pop, English	4,895	3.40
Pop, French (except Basque)	1,564	1.09
Pop, French Canadian	351	0.24
Pop, German	6,959	4.83
Pop, Greek	228	0.16
Pop, Hungarian	188	0.13
Pop, Irish	4,650	3.23
Pop, Italian	2,548	1.77
Pop, Lithuanian	124	0.09
Pop, United States or American	1,998	1.39
Pop, Norwegian	1,074	0.75
Pop, Polish	1,093	0.76
Pop, Portuguese	5,617	3.90
Pop, Russian	609	0.42
Pop, Scottish	1,192	0.83
Pop, Scotch-Irish	961	0.67
Pop, Slovak	13	0.01
Pop, Subsaharan African	109	0.08
Pop, Swedish	922	0.64
Pop, Swiss	218	0.15
Pop, Ukrainian	212	0.15
Pop, Welsh	219	0.15
Pop, West Indian (exc Hisp groups)	75	0.05

Description	Total County	%
2009 Est. Population by Ancestry		
Pop, Other ancestries	87,913	60.99
Pop, Ancestry Unclassified	18,879	13.10
2009 Est. Pop Age 5+ by Language Spoken At Home	134,833	
Speak Only English at Home	102,552	76.06
Speak Asian/Pacific Islander Language at Home	26,891	19.94
Speak IndoEuropean Language at Home	2,264	1.68
Speak Spanish at Home	2,923	2.17
Speak Other Language at Home	203	0.15
2009 Est. Population by Sex	144,146	
Male	73,006	50.65
Female	71,140	49.35
Male/Female Ratio	1.03	
2009 Est. Population by Age	144,146	
Age 0 - 4	9,313	6.46
Age 5 - 9	8,544	5.93
Age 10 - 14	8,793	6.10
Age 15 - 17	5,689	3.95
Age 18 - 20	4,622	3.21
Age 21 - 24	6,496	4.51
Age 25 - 34	20,334	14.11
Age 35 - 44	21,316	14.79
Age 45 - 49	11,455	7.95
Age 50 - 54	11,360	7.88
Age 55 - 59	10,338	7.17
Age 60 - 64	8,122	5.63
Age 65 - 74	9,489	6.58
Age 75 - 84	5,633	3.91
Age 85 and over	2,642	1.83
Age 16 and over	115,644	80.23
Age 18 and over	111,807	77.57
Age 21 and over	107,185	74.36
Age 65 and over	17,764	12.32
2009 Est. Median Age	38.89	
2009 Est. Average Age	38.72	

County, (see appendix for geographies), aggregate

Description	Total County	%
2009 Est. Male Population by Age	73,006	
Age 0 - 4	4,804	6.58
Age 5 - 9	4,347	5.95
Age 10 - 14	4,451	6.10
Age 15 - 17	2,894	3.96
Age 18 - 20	2,406	3.30
Age 21 - 24	3,394	4.65
Age 25 - 34	10,831	14.84
Age 35 - 44	11,188	15.32
Age 45 - 49	5,664	7.76
Age 50 - 54	5,651	7.74
Age 55 - 59	5,266	7.21
Age 60 - 64	4,069	5.57
Age 65 - 74	4,550	6.23
Age 75 - 84	2,468	3.38
Age 85 and over	1,023	1.40
2009 Est. Median Age, Male	38.02	
2009 Est. Average Age, Male	37.97	
2009 Est. Female Population by Age	71,140	
Age 0 - 4	4,509	6.34
Age 5 - 9	4,197	5.90
Age 10 - 14	4,342	6.10
Age 15 - 17	2,795	3.93
Age 18 - 20	2,216	3.11
Age 21 - 24	3,102	4.36
Age 25 - 34	9,503	13.36
Age 35 - 44	10,128	14.24
Age 45 - 49	5,791	8.14
Age 50 - 54	5,709	8.03
Age 55 - 59	5,072	7.13
Age 60 - 64	4,053	5.70
Age 65 - 74	4,939	6.94
Age 75 - 84	3,165	4.45
Age 85 and over	1,619	2.28
2009 Est. Median Age, Female	39.84	
2009 Est. Average Age, Female	39.49	

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County, (see appendix for geographies), aggregate

Description	Total County	%
2009 Est. Population Age 15+ by Marital Status*	117,496	
Total, Never Married	34,898	29.70
Married, Spouse present	57,003	48.51
Married, Spouse absent	6,165	5.25
Widowed	6,580	5.60
Divorced	12,850	10.94
Males, Never Married	20,035	17.05
Previously Married	7,274	6.19
Females, Never Married	14,863	12.65
Previously Married	12,156	10.35
2009 Est. Pop. Age 25+ by Educational Attainment*	100,689	
Less than 9th grade	7,466	7.41
Some High School, no diploma	9,096	9.03
High School Graduate (or GED)	29,571	29.37
Some College, no degree	23,927	23.76
Associate Degree	7,885	7.83
Bachelor's Degree	15,913	15.80
Master's Degree	4,207	4.18
Professional School Degree	2,059	2.04
Doctorate Degree	565	0.56
Households		
2014 Projection	53,669	
2009 Estimate	50,150	
2000 Census	43,507	
1990 Census	33,145	
Growth 2009-2014	7.02%	
Growth 2000-2009	15.27%	
Growth 1990-2000	31.26%	
2009 Est. Households by Household Type	50,150	
Family Households	34,464	68.72
Nonfamily Households	15,686	31.28
2009 Est. Group Quarters Population	1,552	
2009 Households by Ethnicity, Hispanic/Latino	3,281	6.54

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County, (see appendix for geographies), aggregate

Description	Total County	%
2009 Est. Households by Household Income	50,150	
Income Less than $15,000	4,516	9.00
Income $15,000 - $24,999	3,968	7.91
Income $25,000 - $34,999	4,318	8.61
Income $35,000 - $49,999	6,634	13.23
Income $50,000 - $74,999	9,908	19.76
Income $75,000 - $99,999	7,790	15.53
Income $100,000 - $149,999	7,532	15.02
Income $150,000 - $249,999	3,874	7.72
Income $250,000 - $499,999	1,168	2.33
Income $500,000 and more	442	0.88
2009 Est. Average Household Income	$82,694	
2009 Est. Median Household Income	$64,228	
2009 Est. Per Capita Income	$29,003	
2009 Est. Household Type, Presence Own Children*	50,150	
Single Male Householder	5,783	11.53
Single Female Householder	5,760	11.49
Married-Couple Family, own children	11,796	23.52
Married-Couple Family, no own children	13,800	27.52
Male Householder, own children	1,527	3.04
Male Householder, no own children	1,396	2.78
Female Householder, own children	3,313	6.61
Female Householder, no own children	2,632	5.25
Nonfamily, Male Householder	2,540	5.06
Nonfamily, Female Householder	1,603	3.20
2009 Est. Households by Household Size*	50,150	
1-person household	11,543	23.02
2-person household	15,611	31.13
3-person household	8,598	17.14
4-person household	6,836	13.63
5-person household	3,679	7.34
6-person household	1,964	3.92
7 or more person household	1,919	3.83
2009 Est. Average Household Size	2.84	

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County, (see appendix for geographies), aggregate

Description	Total County	%
2009 Est. Households by Presence of People*	50,150	
Households with 1 or more People under Age 18:		
Married-Couple Family	13,231	26.38
Other Family, Male Householder	1,856	3.70
Other Family, Female Householder	4,108	8.19
Nonfamily, Male Householder	183	0.36
Nonfamily, Female Householder	75	0.15
Households no People under Age 18:		
Married-Couple Family	12,365	24.66
Other Family, Male Householder	1,067	2.13
Other Family, Female Householder	1,837	3.66
Nonfamily, Male Householder	8,140	16.23
Nonfamily, Female Householder	7,288	14.53
2009 Est. Households by Number of Vehicles*	50,150	
No Vehicles	3,076	6.13
1 Vehicle	18,054	36.00
2 Vehicles	19,587	39.06
3 Vehicles	6,368	12.70
4 Vehicles	1,968	3.92
5 or more Vehicles	1,097	2.19
2009 Est. Average Number of Vehicles*	1.81	
Family Households		
2014 Projection	36,883	
2009 Estimate	34,464	
2000 Census	29,899	
1990 Census	23,537	
Growth 2009-2014	7.02%	
Growth 2000-2009	15.27%	
Growth 1990-2000	27.03%	

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County, (see appendix for geographies), aggregate

Description	Total County	%
2009 Est. Family Households by Household Income	34,464	
Income Less than $15,000	1,844	5.35
Income $15,000 - $24,999	2,035	5.90
Income $25,000 - $34,999	2,231	6.47
Income $35,000 - $49,999	4,056	11.77
Income $50,000 - $74,999	7,252	21.04
Income $75,000 - $99,999	6,168	17.90
Income $100,000 - $149,999	6,432	18.66
Income $150,000 - $249,999	3,156	9.16
Income $250,000 - $499,999	940	2.73
Income $500,000 and more	350	1.02
2009 Est. Average Family Household Income	$93,048	
2009 Est. Median Family Household Income	$74,357	
2009 Est. Families by Poverty Status*	34,464	
Income At or Above Poverty Level:		
Married-Couple Family, own children	12,389	35.95
Married-Couple Family, no own children	12,035	34.92
Male Householder, own children	1,584	4.60
Male Householder, no own children	866	2.51
Female Householder, own children	2,867	8.32
Female Householder, no own children	1,888	5.48
Income Below Poverty Level:		
Married-Couple Family, own children	737	2.14
Married-Couple Family, no own children	435	1.26
Male Householder, own children	373	1.08
Male Householder, no own children	100	0.29
Female Householder, own children	1,066	3.09
Female Householder, no own children	124	0.36
2009 Est. Pop Age 16+ by Employment Status*	115,644	
In Armed Forces	108	0.09
Civilian - Employed	73,481	63.54
Civilian - Unemployed	3,841	3.32
Not in Labor Force	38,214	33.04

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County, (see appendix for geographies), aggregate

Description	Total County	%
2009 Est. Civ Employed Pop 16+ Class of Worker*	73,481	
For-Profit Private Workers	50,975	69.37
Non-Profit Private Workers	3,939	5.36
Local Government Workers	2,959	4.03
State Government Workers	6,593	8.97
Federal Government Workers	1,095	1.49
Self-Emp Workers	7,626	10.38
Unpaid Family Workers	294	0.40
2009 Est. Civ Employed Pop 16+ by Occupation*	73,481	
Management, Business, and Financial Operations	8,148	11.09
Professional and Related Occupations	11,337	15.43
Service	19,300	26.27
Sales and Office	19,257	26.21
Farming, Fishing, and Forestry	1,491	2.03
Construction, Extraction and Maintenance	7,071	9.62
Production, Transportation and Material Moving	6,877	9.36
2009 Est. Pop 16+ by Occupation Classification*	73,481	
Blue Collar	13,948	18.98
White Collar	37,999	51.71
Service and Farm	21,534	29.31
2009 Est. Workers Age 16+, Transportation To Work*	71,530	
Drove Alone	50,987	71.28
Car Pooled	12,218	17.08
Public Transportation	553	0.77
Walked	1,988	2.78
Motorcycle	451	0.63
Bicycle	841	1.18
Other Means	975	1.36
Worked at Home	3,517	4.92
2009 Est. Workers Age 16+ by Travel Time to Work*	68,013	
Less than 15 Minutes	25,880	38.05
15 - 29 Minutes	21,895	32.19
30 - 44 Minutes	11,699	17.20
45 - 59 Minutes	5,241	7.71
60 or more Minutes	3,298	4.85
2009 Est. Average Travel Time to Work in Minutes*	24.22	

Pop-Facts: Demographic Snapshot Comparison Report

County, (see appendix for geographies), aggregate

Description	Total County	%
2009 Est. Tenure of Occupied Housing Units	50,150	
Owner Occupied	28,964	57.75
Renter Occupied	21,186	42.25
2009 Occ Housing Units, Avg Length of Residence	8	
2009 Est. All Owner-Occupied Housing Values	28,964	
Value Less than $20,000	61	0.21
Value $20,000 - $39,999	46	0.16
Value $40,000 - $59,999	132	0.46
Value $60,000 - $79,999	56	0.19
Value $80,000 - $99,999	70	0.24
Value $100,000 - $149,999	260	0.90
Value $150,000 - $199,999	455	1.57
Value $200,000 - $299,999	2,505	8.65
Value $300,000 - $399,999	3,441	11.88
Value $400,000 - $499,999	4,160	14.36
Value $500,000 - $749,999	9,336	32.23
Value $750,000 - $999,999	3,924	13.55
Value $1,000,000 or more	4,518	15.60
2009 Est. Median All Owner-Occupied Housing Value	$588,264	
2009 Est. Housing Units by Units in Structure*	65,870	
1 Unit Attached	3,964	6.02
1 Unit Detached	36,456	55.35
2 Units	1,198	1.82
3 to 19 Units	10,841	16.46
20 to 49 Units	3,333	5.06
50 or More Units	9,912	15.05
Mobile Home or Trailer	121	0.18
Boat, RV, Van, etc.	45	0.07

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County, (see appendix for geographies), aggregate

Description	Total County	%
2009 Est. Housing Units by Year Structure Built	65,870	
Housing Units Built 1999 to 2009	11,832	17.96
Housing Unit Built 1995 to 1998	4,204	6.38
Housing Unit Built 1990 to 1994	7,758	11.78
Housing Unit Built 1980 to 1989	13,951	21.18
Housing Unit Built 1970 to 1979	16,223	24.63
Housing Unit Built 1960 to 1969	5,447	8.27
Housing Unit Built 1950 to 1959	2,657	4.03
Housing Unit Built 1940 to 1949	1,586	2.41
Housing Unit Built 1939 or Earlier	2,212	3.36
2009 Est. Median Year Structure Built **	1983	

*In contrast to Claritas Demographic Estimates, "smoothed" data items are Census 2000 tables made consistent with current year estimated and 5 year projected base counts.

**1939 will appear when at least half of the Housing Units in this reports area were built in 1939 or earlier.

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Appendix: Area Listing

Area Name:

Type: List - County   Reporting Detail: Aggregate   Reporting Level: County

Geography Code	Geography Name	Geography Code	Geography Name
15009	Maui County, HI		

Project Information:

Site: 1

Order Number: 967705083

Central Maui

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
Population		
2014 Projection	48,947	
2009 Estimate	46,089	
2000 Census	40,867	
1990 Census	32,310	
Growth 2009-2014	6.20%	
Growth 2000-2009	12.78%	
Growth 1990-2000	26.48%	
2009 Est. Population by Single Race Classification	46,089	
White Alone	7,354	15.96
Black or African American Alone	214	0.46
American Indian and Alaska Native Alone	184	0.40
Asian Alone	20,702	44.92
Native Hawaiian and Other Pacific Islander Alone	4,881	10.59
Some Other Race Alone	688	1.49
Two or More Races	12,066	26.18
2009 Est. Population Hispanic or Latino by Origin*	46,089	
Not Hispanic or Latino	41,032	89.03
Hispanic or Latino:	5,057	10.97
Mexican	992	19.62
Puerto Rican	2,099	41.51
Cuban	11	0.22
All Other Hispanic or Latino	1,955	38.66
2009 Est. Hispanic or Latino by Single Race Class.	5,057	
White Alone	870	17.20
Black or African American Alone	8	0.16
American Indian and Alaska Native Alone	65	1.29
Asian Alone	573	11.33
Native Hawaiian and Other Pacific Islander Alone	297	5.87
Some Other Race Alone	629	12.44
Two or More Races	2,615	51.71

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Place, (see appendix for geographies), aggregate

Description	Total Place	%
2009 Est. Pop. Asian Alone Race by Category*	20,702	
Chinese, except Taiwanese	485	2.34
Filipino	10,995	53.11
Japanese	7,387	35.68
Asian Indian	23	0.11
Korean	468	2.26
Vietnamese	130	0.63
Cambodian	2	0.01
Hmong	0	0.00
Laotian	24	0.12
Thai	22	0.11
Other Asian	125	0.60
Two or more Asian categories	1,041	5.03
2009 Est. Population by Ancestry	46,089	
Pop, Arab	56	0.12
Pop, Czech	24	0.05
Pop, Danish	7	0.02
Pop, Dutch	53	0.11
Pop, English	542	1.18
Pop, French (except Basque)	204	0.44
Pop, French Canadian	80	0.17
Pop, German	820	1.78
Pop, Greek	0	0.00
Pop, Hungarian	20	0.04
Pop, Irish	560	1.22
Pop, Italian	277	0.60
Pop, Lithuanian	8	0.02
Pop, United States or American	256	0.56
Pop, Norwegian	137	0.30
Pop, Polish	103	0.22
Pop, Portuguese	1,818	3.94
Pop, Russian	34	0.07
Pop, Scottish	106	0.23
Pop, Scotch-Irish	100	0.22
Pop, Slovak	0	0.00
Pop, Subsaharan African	22	0.05
Pop, Swedish	111	0.24
Pop, Swiss	4	0.01
Pop, Ukrainian	0	0.00
Pop, Welsh	19	0.04
Pop, West Indian (exc Hisp groups)	16	0.03

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Place, (see appendix for geographies), aggregate

Description	Total Place	%
2009 Est. Population by Ancestry		
Pop, Other ancestries	35,162	76.29
Pop, Ancestry Unclassified	5,550	12.04
2009 Est. Pop Age 5+ by Language Spoken At Home	42,871	
Speak Only English at Home	29,815	69.55
Speak Asian/Pacific Islander Language at Home	11,977	27.94
Speak IndoEuropean Language at Home	304	0.71
Speak Spanish at Home	728	1.70
Speak Other Language at Home	47	0.11
2009 Est. Population by Sex	46,089	
Male	23,135	50.20
Female	22,954	49.80
Male/Female Ratio	1.01	
2009 Est. Population by Age	46,089	
Age 0 - 4	3,218	6.98
Age 5 - 9	2,823	6.13
Age 10 - 14	2,965	6.43
Age 15 - 17	1,846	4.01
Age 18 - 20	1,566	3.40
Age 21 - 24	2,140	4.64
Age 25 - 34	6,858	14.88
Age 35 - 44	6,496	14.09
Age 45 - 49	3,182	6.90
Age 50 - 54	3,101	6.73
Age 55 - 59	2,898	6.29
Age 60 - 64	2,412	5.23
Age 65 - 74	3,089	6.70
Age 75 - 84	2,377	5.16
Age 85 and over	1,118	2.43
Age 16 and over	36,479	79.15
Age 18 and over	35,237	76.45
Age 21 and over	33,671	73.06
Age 65 and over	6,584	14.29
2009 Est. Median Age	37.51	
2009 Est. Average Age	38.59	

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Place, (see appendix for geographies), aggregate

Description	Total Place	%
2009 Est. Male Population by Age	23,135	
Age 0 - 4	1,665	7.20
Age 5 - 9	1,441	6.23
Age 10 - 14	1,508	6.52
Age 15 - 17	938	4.05
Age 18 - 20	866	3.74
Age 21 - 24	1,117	4.83
Age 25 - 34	3,651	15.78
Age 35 - 44	3,412	14.75
Age 45 - 49	1,607	6.95
Age 50 - 54	1,510	6.53
Age 55 - 59	1,449	6.26
Age 60 - 64	1,172	5.07
Age 65 - 74	1,387	6.00
Age 75 - 84	1,003	4.34
Age 85 and over	409	1.77
2009 Est. Median Age, Male	36.12	
2009 Est. Average Age, Male	37.31	
2009 Est. Female Population by Age	22,954	
Age 0 - 4	1,553	6.77
Age 5 - 9	1,382	6.02
Age 10 - 14	1,457	6.35
Age 15 - 17	908	3.96
Age 18 - 20	700	3.05
Age 21 - 24	1,023	4.46
Age 25 - 34	3,207	13.97
Age 35 - 44	3,084	13.44
Age 45 - 49	1,575	6.86
Age 50 - 54	1,591	6.93
Age 55 - 59	1,449	6.31
Age 60 - 64	1,240	5.40
Age 65 - 74	1,702	7.41
Age 75 - 84	1,374	5.99
Age 85 and over	709	3.09
2009 Est. Median Age, Female	39.04	
2009 Est. Average Age, Female	39.87	

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Place, (see appendix for geographies), aggregate

Description	Total Place	%
2009 Est. Population Age 15+ by Marital Status*	37,083	
Total, Never Married	11,214	30.24
Married, Spouse present	17,690	47.70
Married, Spouse absent	2,371	6.39
Widowed	2,605	7.02
Divorced	3,203	8.64
Males, Never Married	6,379	17.20
Previously Married	1,972	5.32
Females, Never Married	4,835	13.04
Previously Married	3,836	10.34
2009 Est. Pop. Age 25+ by Educational Attainment*	31,531	
Less than 9th grade	3,788	12.01
Some High School, no diploma	3,539	11.22
High School Graduate (or GED)	10,046	31.86
Some College, no degree	6,292	19.95
Associate Degree	2,386	7.57
Bachelor's Degree	4,094	12.98
Master's Degree	890	2.82
Professional School Degree	465	1.47
Doctorate Degree	31	0.10
Households		
2014 Projection	15,484	
2009 Estimate	14,495	
2000 Census	12,626	
1990 Census	9,953	
Growth 2009-2014	6.82%	
Growth 2000-2009	14.80%	
Growth 1990-2000	26.86%	
2009 Est. Households by Household Type	14,495	
Family Households	10,741	74.10
Nonfamily Households	3,754	25.90
2009 Est. Group Quarters Population	906	
2009 Households by Ethnicity, Hispanic/Latino	1,184	8.17

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Place, (see appendix for geographies), aggregate

Description	Total Place	%
2009 Est. Households by Household Income	14,495	
Income Less than $15,000	1,404	9.69
Income $15,000 - $24,999	1,284	8.86
Income $25,000 - $34,999	1,194	8.24
Income $35,000 - $49,999	1,845	12.73
Income $50,000 - $74,999	2,961	20.43
Income $75,000 - $99,999	2,214	15.27
Income $100,000 - $149,999	2,261	15.60
Income $150,000 - $249,999	1,005	6.93
Income $250,000 - $499,999	258	1.78
Income $500,000 and more	69	0.48
2009 Est. Average Household Income	$77,752	
2009 Est. Median Household Income	$62,838	
2009 Est. Per Capita Income	$24,723	
2009 Est. Household Type, Presence Own Children*	14,495	
Single Male Householder	1,373	9.47
Single Female Householder	1,653	11.40
Married-Couple Family, own children	3,778	26.06
Married-Couple Family, no own children	3,971	27.40
Male Householder, own children	407	2.81
Male Householder, no own children	473	3.26
Female Householder, own children	1,070	7.38
Female Householder, no own children	1,042	7.19
Nonfamily, Male Householder	416	2.87
Nonfamily, Female Householder	312	2.15
2009 Est. Households by Household Size*	14,495	
1-person household	3,026	20.88
2-person household	3,834	26.45
3-person household	2,563	17.68
4-person household	2,220	15.32
5-person household	1,327	9.15
6-person household	710	4.90
7 or more person household	815	5.62
2009 Est. Average Household Size	3.12	

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Place, (see appendix for geographies), aggregate

Description	Total Place	%
2009 Est. Households by Presence of People*	14,495	
Households with 1 or more People under Age 18:		
Married-Couple Family	4,314	29.76
Other Family, Male Householder	516	3.56
Other Family, Female Householder	1,390	9.59
Nonfamily, Male Householder	32	0.22
Nonfamily, Female Householder	18	0.12
Households no People under Age 18:		
Married-Couple Family	3,435	23.70
Other Family, Male Householder	364	2.51
Other Family, Female Householder	722	4.98
Nonfamily, Male Householder	1,757	12.12
Nonfamily, Female Householder	1,947	13.43
2009 Est. Households by Number of Vehicles*	14,495	
No Vehicles	1,187	8.19
1 Vehicle	5,021	34.64
2 Vehicles	5,290	36.50
3 Vehicles	1,987	13.71
4 Vehicles	647	4.46
5 or more Vehicles	363	2.50
2009 Est. Average Number of Vehicles*	1.82	
Family Households		
2014 Projection	11,494	
2009 Estimate	10,741	
2000 Census	9,312	
1990 Census	7,549	
Growth 2009-2014	7.01%	
Growth 2000-2009	15.35%	
Growth 1990-2000	23.35%	

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Place, (see appendix for geographies), aggregate

Description	Total Place	%
2009 Est. Family Households by Household Income	10,741	
Income Less than $15,000	595	5.54
Income $15,000 - $24,999	661	6.15
Income $25,000 - $34,999	645	6.01
Income $35,000 - $49,999	1,293	12.04
Income $50,000 - $74,999	2,443	22.74
Income $75,000 - $99,999	1,923	17.90
Income $100,000 - $149,999	2,032	18.92
Income $150,000 - $249,999	862	8.03
Income $250,000 - $499,999	222	2.07
Income $500,000 and more	65	0.61
2009 Est. Average Family Household Income	$87,482	
2009 Est. Median Family Household Income	$72,269	
2009 Est. Families by Poverty Status*	10,741	
Income At or Above Poverty Level:		
Married-Couple Family, own children	4,039	37.60
Married-Couple Family, no own children	3,392	31.58
Male Householder, own children	473	4.40
Male Householder, no own children	296	2.76
Female Householder, own children	827	7.70
Female Householder, no own children	758	7.06
Income Below Poverty Level:		
Married-Couple Family, own children	210	1.96
Married-Couple Family, no own children	108	1.01
Male Householder, own children	106	0.99
Male Householder, no own children	5	0.05
Female Householder, own children	461	4.29
Female Householder, no own children	66	0.61
2009 Est. Pop Age 16+ by Employment Status*	36,479	
In Armed Forces	37	0.10
Civilian - Employed	21,365	58.57
Civilian - Unemployed	1,222	3.35
Not in Labor Force	13,855	37.98

Prepared For:
Prepared By:

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2009 Est. Civ Employed Pop 16+ Class of Worker*	21,365	
For-Profit Private Workers	15,254	71.40
Non-Profit Private Workers	1,180	5.52
Local Government Workers	1,209	5.66
State Government Workers	2,237	10.47
Federal Government Workers	313	1.47
Self-Emp Workers	1,099	5.14
Unpaid Family Workers	73	0.34
2009 Est. Civ Employed Pop 16+ by Occupation*	21,365	
Management, Business, and Financial Operations	1,850	8.66
Professional and Related Occupations	2,871	13.44
Service	5,203	24.35
Sales and Office	6,377	29.85
Farming, Fishing, and Forestry	520	2.43
Construction, Extraction and Maintenance	2,090	9.78
Production, Transportation and Material Moving	2,454	11.49
2009 Est. Pop 16+ by Occupation Classification*	21,365	
Blue Collar	4,544	21.27
White Collar	11,026	51.61
Service and Farm	5,795	27.12
2009 Est. Workers Age 16+, Transportation To Work*	20,906	
Drove Alone	15,024	71.86
Car Pooled	4,271	20.43
Public Transportation	158	0.76
Walked	404	1.93
Motorcycle	60	0.29
Bicycle	107	0.51
Other Means	389	1.86
Worked at Home	493	2.36
2009 Est. Workers Age 16+ by Travel Time to Work*	20,413	
Less than 15 Minutes	8,918	43.69
15 - 29 Minutes	5,254	25.74
30 - 44 Minutes	3,416	16.73
45 - 59 Minutes	1,928	9.44
60 or more Minutes	897	4.39
2009 Est. Average Travel Time to Work in Minutes*	23.85	

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2009 Est. Tenure of Occupied Housing Units	14,495	
Owner Occupied	8,870	61.19
Renter Occupied	5,625	38.81
2009 Occ Housing Units, Avg Length of Residence	10	
2009 Est. All Owner-Occupied Housing Values	8,870	
Value Less than $20,000	0	0.00
Value $20,000 - $39,999	22	0.25
Value $40,000 - $59,999	73	0.82
Value $60,000 - $79,999	32	0.36
Value $80,000 - $99,999	34	0.38
Value $100,000 - $149,999	61	0.69
Value $150,000 - $199,999	166	1.87
Value $200,000 - $299,999	745	8.40
Value $300,000 - $399,999	1,199	13.52
Value $400,000 - $499,999	1,763	19.88
Value $500,000 - $749,999	3,353	37.80
Value $750,000 - $999,999	960	10.82
Value $1,000,000 or more	462	5.21
2009 Est. Median All Owner-Occupied Housing Value	$525,380	
2009 Est. Housing Units by Units in Structure*	15,089	
1 Unit Attached	1,342	8.89
1 Unit Detached	10,089	66.86
2 Units	155	1.03
3 to 19 Units	2,439	16.16
20 to 49 Units	406	2.69
50 or More Units	606	4.02
Mobile Home or Trailer	52	0.34
Boat, RV, Van, etc.	0	0.00

Place, (see appendix for geographies), aggregate

Description	Total *Place*	%
2009 Est. Housing Units by Year Structure Built	15,089	
Housing Units Built 1999 to 2009	2,593	17.18
Housing Unit Built 1995 to 1998	1,330	8.81
Housing Unit Built 1990 to 1994	1,553	10.29
Housing Unit Built 1980 to 1989	2,348	15.56
Housing Unit Built 1970 to 1979	2,550	16.90
Housing Unit Built 1960 to 1969	2,267	15.02
Housing Unit Built 1950 to 1959	1,320	8.75
Housing Unit Built 1940 to 1949	477	3.16
Housing Unit Built 1939 or Earlier	651	4.31
2009 Est. Median Year Structure Built **	1981	

*In contrast to Claritas Demographic Estimates, "smoothed" data items are Census 2000 tables made consistent with current year estimated and 5 year projected base counts.

**1939 will appear when at least half of the Housing Units in this reports area were built in 1939 or earlier.

Pop-Facts: Demographic Snapshot Comparison Report

Appendix: Area Listing

Area Name:

Type: List - Place   Reporting Detail: Aggregate   Reporting Level: Place

Geography Code	Geography Name	Geography Code	Geography Name
1522700	Kahului CDP	1575510	Waihee-Waiehu CDP
1575950	Waikapu CDP	1577450	Wailuku CDP

Project Information:

Site: 1

Order Number: 967705106

South Maui

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
Population		
2013 Projection	20,002	
2008 Estimate	18,761	
2000 Census	16,749	
1990 Census	11,107	
Growth 2008-2013	6.61%	
Growth 2000-2008	12.01%	
Growth 1990-2000	50.80%	
2008 Est. Population by Single Race Classification	18,761	
White Alone	8,539	45.51
Black or African American Alone	278	1.48
American Indian and Alaska Native Alone	80	0.43
Asian Alone	4,976	26.52
Native Hawaiian and Other Pacific Islander Alone	1,493	7.96
Some Other Race Alone	311	1.66
Two or More Races	3,084	16.44
2008 Est. Population Hispanic or Latino by Origin*	18,761	
Not Hispanic or Latino	17,297	92.20
Hispanic or Latino:	1,464	7.80
Mexican	569	38.87
Puerto Rican	322	21.99
Cuban	18	1.23
All Other Hispanic or Latino	555	37.91
2008 Est. Hispanic or Latino by Single Race Class.	1,464	
White Alone	538	36.75
Black or African American Alone	2	0.14
American Indian and Alaska Native Alone	13	0.89
Asian Alone	161	11.00
Native Hawaiian and Other Pacific Islander Alone	47	3.21
Some Other Race Alone	258	17.62
Two or More Races	445	30.40

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Pop. Asian Alone Race by Category*	4,976	
Chinese, except Taiwanese	144	2.89
Filipino	3,509	70.52
Japanese	750	15.07
Asian Indian	22	0.44
Korean	107	2.15
Vietnamese	62	1.25
Cambodian	4	0.08
Hmong	0	0.00
Laotian	14	0.28
Thai	15	0.30
Other Asian	54	1.09
Two or more Asian categories	295	5.93
2008 Est. Population by Ancestry	18,761	
Pop, Arab	41	0.22
Pop, Czech	10	0.05
Pop, Danish	87	0.46
Pop, Dutch	157	0.84
Pop, English	834	4.45
Pop, French (except Basque)	258	1.38
Pop, French Canadian	42	0.22
Pop, German	1,429	7.62
Pop, Greek	40	0.21
Pop, Hungarian	28	0.15
Pop, Irish	1,155	6.16
Pop, Italian	611	3.26
Pop, Lithuanian	26	0.14
Pop, United States or American	298	1.59
Pop, Norwegian	257	1.37
Pop, Polish	196	1.04
Pop, Portuguese	485	2.59
Pop, Russian	70	0.37
Pop, Scottish	226	1.20
Pop, Scotch-Irish	189	1.01
Pop, Slovak	10	0.05
Pop, Subsaharan African	21	0.11
Pop, Swedish	146	0.78
Pop, Swiss	43	0.23
Pop, Ukrainian	64	0.34
Pop, Welsh	37	0.20
Pop, West Indian (exc Hisp groups)	9	0.05

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Population by Ancestry		
Pop, Other ancestries	9,282	49.47
Pop, Ancestry Unclassified	2,710	14.44
2008 Est. Pop Age 5+ by Language Spoken At Home	17,552	
Speak Only English at Home	13,102	74.65
Speak Asian/Pacific Islander Language at Home	3,507	19.98
Speak IndoEuropean Language at Home	316	1.80
Speak Spanish at Home	579	3.30
Speak Other Language at Home	48	0.27
2008 Est. Population by Sex	18,761	
Male	9,553	50.92
Female	9,208	49.08
Male/Female Ratio	1.04	
2008 Est. Population by Age	18,761	
Age 0 - 4	1,209	6.44
Age 5 - 9	1,197	6.38
Age 10 - 14	1,221	6.51
Age 15 - 17	731	3.90
Age 18 - 20	583	3.11
Age 21 - 24	850	4.53
Age 25 - 34	2,730	14.55
Age 35 - 44	3,238	17.26
Age 45 - 49	1,632	8.70
Age 50 - 54	1,540	8.21
Age 55 - 59	1,279	6.82
Age 60 - 64	947	5.05
Age 65 - 74	1,029	5.48
Age 75 - 84	421	2.24
Age 85 and over	154	0.82
Age 16 and over	14,877	79.30
Age 18 and over	14,403	76.77
Age 21 and over	13,820	73.66
Age 65 and over	1,604	8.55
2008 Est. Median Age	37.66	
2008 Est. Average Age	36.88	

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Male Population by Age	9,553	
Age 0 - 4	619	6.48
Age 5 - 9	607	6.35
Age 10 - 14	624	6.53
Age 15 - 17	374	3.92
Age 18 - 20	305	3.19
Age 21 - 24	431	4.51
Age 25 - 34	1,406	14.72
Age 35 - 44	1,701	17.81
Age 45 - 49	846	8.86
Age 50 - 54	762	7.98
Age 55 - 59	641	6.71
Age 60 - 64	500	5.23
Age 65 - 74	497	5.20
Age 75 - 84	179	1.87
Age 85 and over	61	0.64
2008 Est. Median Age, Male	37.41	
2008 Est. Average Age, Male	36.53	
2008 Est. Female Population by Age	9,208	
Age 0 - 4	590	6.41
Age 5 - 9	590	6.41
Age 10 - 14	597	6.48
Age 15 - 17	357	3.88
Age 18 - 20	278	3.02
Age 21 - 24	419	4.55
Age 25 - 34	1,324	14.38
Age 35 - 44	1,537	16.69
Age 45 - 49	786	8.54
Age 50 - 54	778	8.45
Age 55 - 59	638	6.93
Age 60 - 64	447	4.85
Age 65 - 74	532	5.78
Age 75 - 84	242	2.63
Age 85 and over	93	1.01
2008 Est. Median Age, Female	37.92	
2008 Est. Average Age, Female	37.25	

Claritas Tech Support: 1 800 866 6511

CLARITAS MARKETPLACE
Prepared For:
Prepared By:

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Population Age 15+ by Marital Status*	15,134	
Total, Never Married	4,461	29.48
Married, Spouse present	6,985	46.15
Married, Spouse absent	746	4.93
Widowed	653	4.31
Divorced	2,289	15.12
Males, Never Married	2,392	15.81
Previously Married	1,240	8.19
Females, Never Married	2,069	13.67
Previously Married	1,702	11.25
2008 Est. Pop. Age 25+ by Educational Attainment*	12,970	
Less than 9th grade	527	4.06
Some High School, no diploma	1,041	8.03
High School Graduate (or GED)	3,640	28.06
Some College, no degree	3,797	29.28
Associate Degree	1,171	9.03
Bachelor's Degree	2,078	16.02
Master's Degree	426	3.28
Professional School Degree	160	1.23
Doctorate Degree	130	1.00
Households		
2013 Projection	7,467	
2008 Estimate	6,962	
2000 Census	6,170	
1990 Census	4,133	
Growth 2008-2013	7.25%	
Growth 2000-2008	12.84%	
Growth 1990-2000	49.29%	
2008 Est. Households by Household Type	6,962	
Family Households	4,317	62.01
Nonfamily Households	2,645	37.99
2008 Est. Group Quarters Population	85	
2008 Households by Ethnicity, Hispanic/Latino	412	5.92

Claritas Tech Support: 1 800 866 6511

CLARITAS MARKETPLACE
Prepared For:
Prepared By:

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Households by Household Income	6,962	
Income Less than $15,000	640	9.19
Income $15,000 - $24,999	576	8.27
Income $25,000 - $34,999	772	11.09
Income $35,000 - $49,999	1,014	14.56
Income $50,000 - $74,999	1,463	21.01
Income $75,000 - $99,999	1,073	15.41
Income $100,000 - $149,999	868	12.47
Income $150,000 - $249,999	435	6.25
Income $250,000 - $499,999	94	1.35
Income $500,000 and more	27	0.39
2008 Est. Average Household Income	$72,394	
2008 Est. Median Household Income	$58,188	
2008 Est. Per Capita Income	$26,993	
2008 Est. Household Type, Presence Own Children*	6,962	
Single Male Householder	981	14.09
Single Female Householder	854	12.27
Married-Couple Family, own children	1,565	22.48
Married-Couple Family, no own children	1,631	23.43
Male Householder, own children	224	3.22
Male Householder, no own children	154	2.21
Female Householder, own children	468	6.72
Female Householder, no own children	275	3.95
Nonfamily, Male Householder	495	7.11
Nonfamily, Female Householder	315	4.52
2008 Est. Households by Household Size*	6,962	
1-person household	1,835	26.36
2-person household	2,256	32.40
3-person household	1,119	16.07
4-person household	852	12.24
5-person household	421	6.05
6-person household	233	3.35
7 or more person household	246	3.53
2008 Est. Average Household Size	2.68	

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Households by Presence of People*	6,962	
Households with 1 or more People under Age 18:		
Married-Couple Family	1,700	24.42
Other Family, Male Householder	251	3.61
Other Family, Female Householder	536	7.70
Nonfamily, Male Householder	35	0.50
Nonfamily, Female Householder	10	0.14
Households no People under Age 18:		
Married-Couple Family	1,496	21.49
Other Family, Male Householder	127	1.82
Other Family, Female Householder	207	2.97
Nonfamily, Male Householder	1,441	20.70
Nonfamily, Female Householder	1,159	16.65
2008 Est. Households by Number of Vehicles*	6,962	
No Vehicles	259	3.72
1 Vehicle	2,710	38.93
2 Vehicles	2,899	41.64
3 Vehicles	652	9.37
4 Vehicles	272	3.91
5 or more Vehicles	170	2.44
2008 Est. Average Number of Vehicles*	1.81	
Family Households		
2013 Projection	4,637	
2008 Estimate	4,317	
2000 Census	3,811	
1990 Census	2,587	
Growth 2008-2013	7.41%	
Growth 2000-2008	13.28%	
Growth 1990-2000	47.31%	

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Family Households by Household Income	4,317	
Income Less than $15,000	249	5.77
Income $15,000 - $24,999	290	6.72
Income $25,000 - $34,999	302	7.00
Income $35,000 - $49,999	574	13.30
Income $50,000 - $74,999	946	21.91
Income $75,000 - $99,999	789	18.28
Income $100,000 - $149,999	680	15.75
Income $150,000 - $249,999	385	8.92
Income $250,000 - $499,999	81	1.88
Income $500,000 and more	21	0.49
2008 Est. Average Family Household Income	$84,692	
2008 Est. Median Family Household Income	$69,641	
2008 Est. Families by Poverty Status*	4,317	
Income At or Above Poverty Level:		
Married-Couple Family, own children	1,549	35.88
Married-Couple Family, no own children	1,488	34.47
Male Householder, own children	210	4.86
Male Householder, no own children	127	2.94
Female Householder, own children	412	9.54
Female Householder, no own children	216	5.00
Income Below Poverty Level:		
Married-Couple Family, own children	58	1.34
Married-Couple Family, no own children	101	2.34
Male Householder, own children	26	0.60
Male Householder, no own children	15	0.35
Female Householder, own children	107	2.48
Female Householder, no own children	8	0.19
2008 Est. Pop Age 16+ by Employment Status*	14,877	
In Armed Forces	31	0.21
Civilian - Employed	10,293	69.19
Civilian - Unemployed	556	3.74
Not in Labor Force	3,997	26.87

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Civ Employed Pop 16+ Class of Worker*	10,293	
For-Profit Private Workers	7,665	74.47
Non-Profit Private Workers	399	3.88
Local Government Workers	294	2.86
State Government Workers	682	6.63
Federal Government Workers	141	1.37
Self-Emp Workers	1,087	10.56
Unpaid Family Workers	25	0.24
2008 Est. Civ Employed Pop 16+ by Occupation*	10,293	
Management, Business, and Financial Operations	1,094	10.63
Professional and Related Occupations	1,343	13.05
Service	3,131	30.42
Sales and Office	2,745	26.67
Farming, Fishing, and Forestry	79	0.77
Construction, Extraction and Maintenance	1,086	10.55
Production, Transportation and Material Moving	815	7.92
2008 Est. Pop 16+ by Occupation Classification*	10,293	
Blue Collar	1,901	18.47
White Collar	5,159	50.12
Service and Farm	3,233	31.41
2008 Est. Workers Age 16+, Transportation To Work*	9,996	
Drove Alone	7,618	76.21
Car Pooled	1,176	11.76
Public Transportation	47	0.47
Walked	328	3.28
Motorcycle	118	1.18
Bicycle	188	1.88
Other Means	83	0.83
Worked at Home	438	4.38
2008 Est. Workers Age 16+ by Travel Time to Work*	9,558	
Less than 15 Minutes	3,059	32.00
15 - 29 Minutes	4,107	42.97
30 - 44 Minutes	1,320	13.81
45 - 59 Minutes	706	7.39
60 or more Minutes	366	3.83
2008 Est. Average Travel Time to Work in Minutes*	23.74	

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Tenure of Occupied Housing Units	6,962	
Owner Occupied	3,414	49.04
Renter Occupied	3,548	50.96
2008 Occ Housing Units, Avg Length of Residence	6	
2008 Est. All Owner-Occupied Housing Values	3,414	
Value Less than $20,000	0	0.00
Value $20,000 - $39,999	4	0.12
Value $40,000 - $59,999	7	0.21
Value $60,000 - $79,999	0	0.00
Value $80,000 - $99,999	0	0.00
Value $100,000 - $149,999	31	0.91
Value $150,000 - $199,999	90	2.64
Value $200,000 - $299,999	732	21.44
Value $300,000 - $399,999	423	12.39
Value $400,000 - $499,999	493	14.44
Value $500,000 - $749,999	1,163	34.07
Value $750,000 - $999,999	333	9.75
Value $1,000,000 or more	138	4.04
2008 Est. Median All Owner-Occupied Housing Value	$485,121	
2008 Est. Housing Units by Units in Structure*	10,402	
1 Unit Attached	706	6.79
1 Unit Detached	3,300	31.72
2 Units	199	1.91
3 to 19 Units	2,127	20.45
20 to 49 Units	831	7.99
50 or More Units	3,239	31.14
Mobile Home or Trailer	0	0.00
Boat, RV, Van, etc.	0	0.00

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Housing Units by Year Structure Built	10,402	
Housing Units Built 1999 to 2008	1,483	14.26
Housing Unit Built 1995 to 1998	505	4.85
Housing Unit Built 1990 to 1994	1,987	19.10
Housing Unit Built 1980 to 1989	2,401	23.08
Housing Unit Built 1970 to 1979	3,380	32.49
Housing Unit Built 1960 to 1969	384	3.69
Housing Unit Built 1950 to 1959	116	1.12
Housing Unit Built 1940 to 1949	107	1.03
Housing Unit Built 1939 or Earlier	39	0.37
2008 Est. Median Year Structure Built **	1985	

*In contrast to Claritas Demographic Estimates, "smoothed" data items are Census 2000 tables made consistent with current year estimated and 5 year projected base counts.

**1939 will appear when at least half of the Housing Units in this reports area were built in 1939 or earlier.

Pop-Facts: Demographic Snapshot Comparison Report

Appendix: Area Listing

Area Name:

Type: List - Place   Reporting Detail: Aggregate   Reporting Level: Place

Geography Code	Geography Name	Geography Code	Geography Name
1536500	Kihei CDP		

Project Information:

Site: 1

Order Number: 967348896

EXHIBIT B
Maui County Zoning Ordinance
Agricultural District

Chapter 19.30A

AGRICULTURAL DISTRICT

Sections:

19.30A.010 Purpose and intent.

A. Purpose. The purpose of the agricultural district is to:

1. Implement chapter 205, Hawai'i Revised Statutes, and the goals and policies of the Maui County general plan and community plans;
2. Promote agricultural development;
3. Preserve and protect agricultural resources; and
4. Support the agricultural character and components of the County's economy and lifestyle.

B. Intent. It is the intent of this chapter to:

1. Reduce the land use conflicts arising from encroachment of nonagricultural uses into agricultural areas;
2. Mitigate rising property values of farm lands to make agricultural use more economically feasible;
3. Discourage developing or subdividing lands within the agricultural district for residential uses, thereby preserving agricultural lands and allowing proper planning of land use and infrastructure development;
4. Discourage establishment of nonagricultural subdivisions;
5. Ensure that the rezoning of land from the agricultural district shall be open for public debate and in the overall public interest, as evidenced by conformance with the Maui County general plan and community plan land use designations and policies, State land use law, this chapter and good planning practices; and
6. Notify the public that lands within the agricultural district are used for agricultural purposes. Owners, residents, and other users of such property or neighboring properties may be subjected to inconvenience, discomfort, and the possibility of injury to property and health arising from normal and accepted agricultural practices and operations. Such normal and accepted agricultural practices and operations include but are not limited to noise, odors, dust, smoke, the operation of machinery of any kind, including aircraft, and the storage and disposal of manure. Owners, occupants, and users of such property or neighboring properties shall be prepared to accept such inconveniences, discomfort, and possibility of injury from normal agricultural operations. (Ord. 2749 § 3 (part),1998)

19.30A.020 District criteria.

Agricultural lands that meet at least two of the following criteria should be given the highest priority for retention in the agricultural district:

A. Agricultural Lands of Importance to the State of Hawai'i (ALISH);

B. Lands not classified by the ALISH system whose agricultural land suitability, based on soil, topographic, and climatic conditions, supports the production of agricultural commodities, including but not limited to coffee, taro, watercress, ginger, orchard and flower crops and nonirrigated pineapple. In addition, these lands shall include lands used for intensive animal husbandry, and lands in agricultural cultivation in five of the ten years immediately preceding the date of approval of this chapter; and

C. Lands which have seventy-five percent or more of their boundaries contiguous to lands within the agricultural district. (Ord. 2749 § 3 (part), 1998)

19.30A.030 District standards.

Except as otherwise provided in this chapter, the following district standards shall apply for uses, facilities and structures in the agricultural district:

A. Minimum lot area: two acres;

B. Minimum lot width: two hundred feet;

C. Minimum yard setbacks: front yards, twenty-five feet; side and rear yards, fifteen feet;

D. Maximum developable area: ten percent of the total lot area. This restriction shall apply to farm dwellings, but shall not apply to any structure or portion thereof which is used to support agriculture, including but not limited to storage facilities, barns, silos, greenhouses, farm labor dwellings, and stables, and shall not apply to utility facilities as permitted by this chapter;

E. Maximum height limit: Unless otherwise provided for in this chapter, the maximum height of any dwelling shall be thirty feet, except that vent pipes, fans, chimneys, antennae and solar collectors on roofs shall not exceed forty feet. Any non-dwelling structure such as a barn or silo that is over thirty-five feet in height shall be set back one additional foot for each foot in structure height;

F. Maximum wall height: Walls shall not exceed four feet within the yard setback area as measured from the finished or existing grade, whichever is lower, to the top of the wall as defined herein. This does not preclude constructing fences on the top of the wall for safety purposes. The director of public works and waste management may permit greater heights of walls as needed to retain earth, water or both for health and safety purposes;

G. The maximum number of lots that may be created from a lot, or portion there of, that is in the agricultural district shall be based on the gross area of the subject lot, which for the purposes of this subsection shall be the tax map key parcel as certified by the real property tax division on March 1998, as follows:

Area of lot (in acres)	Maximum number of permitted lots: 2-acre minimum lot size	Maximum number of permitted lots: 15-acre minimum lot size	Maximum number of permitted lots: 25-acre minimum lot size	Maximum number of permitted lots: 40-acre minimum lot size
Area of lot (in acres)	7			
At least 31 but less than 61	7, plus one additional lot for each 10 acres above 31 acres			
At least 61 but less than 92	10, plus one additional lot for each 15 acres; plus	1		
92+	12, plus one additional lot for each 40 acres above 92 acres (not to exceed 14 lots); plus	2, plus one additional lot for each 60 acres above 92 acres; plus	1, plus one additional lot for each 100 acres above 92 acres; plus	one for each 160 acres above 92 acres

For the purposes of this subsection, any lot(s) or portions(s) thereof that is contained entirely within the subject lot, and that is owned by the same persons or related corporate entities as the subject lot, shall be considered a part of the subject lot and shall count towards the maximum number of permitted lots that may be created from the subject lot.

This subsection shall not apply to any lot which received preliminary subdivision approval prior to the effective date of the ordinance codified in this chapter and which receives final subdivision approval after the effective date of said ordinance. The subsequent lots resulting from such subdivision shall be subject to this subsection. (Ord. 2749 § 3 (part), 1998)

19.30A.040 Limitations on resubdivision.

A. Following the effective date of this the ordinance codified in this chapter:

1. At the time of subdivision, the director of public works and waste management shall determine the maximum number of lots that can be created based upon the provisions and standards set forth in section 19.30A.030;

2. The subdivider shall allocate the maximum number of lots that can be created between the original lot and any new lot created as a result of the subdivision;

3. The allocation of lots shall be recorded with the bureau of conveyances; and

4. No lot, or portion thereof, which is in the agricultural district shall be further subdivided beyond the maximum number of lots permitted pursuant to this chapter and as recorded with the bureau of conveyances, except as provided by subsection 19.30A.040.C.

B. The following subdivisions shall not reduce the gross "area of lot" nor the "maximum number of permitted lots" as provided by subsection 19.30A.030.G:

1. Any subdivision requested by a public agency or public utility company for a public purpose;

2. Any consolidation and resubdivision in which no additional developable lots, as defined by section 18.04.123, Maui County Code, are created, provided that this would not result in the potential to create any additional lots than could have been created prior to consolidation and resubdivision;

3. Any subdivision for purposes of providing an easement exclusively for the protection of sites of cultural and historic significance; greenways; protection of sensitive environmental areas such as wetlands, streams, and endangered species habitat; and easements for public access to shoreline and mountain areas; or

4. Any subdivision for purposes of providing a roadway easement or lot.

C. If the original lot has been subdivided into the maximum number of lots permitted pursuant to this chapter, additional lots may be created for family members as described in subsections 18.20.280.B.1 and 18.20.280.B.2, Maui County Code, whether or not a deferral of improvements is intended, with the approval of the council; the application for such additional lots shall be processed in the same manner as applications for conditional permits, as provided by chapter 19.40, Maui County Code.

D. No deed, lease, agreement of sale, mortgage or other instrument of conveyance shall contain any covenant or clause which restricts, directly or indirectly, the operation of agricultural activities on lands within the agricultural district. This subsection shall not apply to any covenant or clause existing prior to the effective date of the ordinance codified in this chapter. (Ord. 2749 § 3 (part), 1998)

19.30A.050 Permitted uses.

The following uses and structures shall be permitted in the agricultural district provided they also comply with all other applicable laws:

A. Principal Uses.

1. Agriculture;

2. Agricultural land conservation;

3. Agricultural parks, pursuant to chapter 171, Hawai'i Revised Statutes;

4. Animal and livestock raising, including animal feed lots and sales yards;

5. Private agricultural parks as defined herein;

6. Minor utility facilities as defined in section 19.04.040, Maui County Code; and

7. Retention, restoration, rehabilitation, or improvement of buildings, sites or cultural landscapes of historical or archaeological significance.

B. Accessory Uses. Uses which are incidental or subordinate to, or customarily used in conjunction with a permitted principal use, as follows:

1. Two farm dwellings per lot, one of which shall not exceed one thousand square feet of developable area;

2. One farm labor dwelling per five acres of lot area. On the island of Maui, the owner or lessee of the lot shall meet two of the following three criteria:

a. Provide proof of at least $35,000 of gross sales of agricultural product(s) per year, for the preceding two consecutive years, for each farm labor dwelling on the lot, as shown by State general excise tax forms and federal Schedule F forms;

b. Provide certification by the Maui board of water supply that agricultural water rates are being paid if the subject lot is served by the County water system; or

c. Provide a farm plan that demonstrates the feasibility of commercial agricultural production.

On the islands of Moloka'i and Lana'i, the owner or lessee of the lot shall meet both of the criteria provided by subsections 19.30A.050.B.2.a and 19.30A.050.B.2.b;

3. One agricultural products stand per lot, for the purpose of displaying and selling agricultural products grown and processed on the premises or grown in the County, provided that said stand shall not exceed three hundred square feet, shall be set back at least fifteen feet from roadways, shall have a wall area which is at least fifty percent open, and shall meet the off-street parking requirements for roadside stands provided by section 19.36.010, Maui County Code, except that paved parking shall not be required; stands which display or sell agricultural products which are not grown on the premises shall be required to obtain a special permit pursuant to chapter 205, Hawai'i Revised Statutes;

4. Farmer's markets, for the growers and producers of agricultural products to display and sell agricultural products grown and processed in the County; structures shall have a wall area which is at least fifty percent open; markets shall operate only during daylight hours and shall not operate on parcels less than ten acres; the director of public works and waste management may impose additional requirements if a building permit is required for any structures; markets which display or sell agricultural products which are not grown on the premises shall be required to obtain a special permit pursuant to chapter 205, Hawai'i Revised Statutes;

5. Storage, wholesale and distribution, including barns; greenhouses; storage facilities for agricultural supplies, products and irrigation water; farmer's cooperatives; and similar structures that are customarily associated with one or more of the permitted principal uses or, for the purpose of this section, are associated with agriculture in the County;

6. Processing of agricultural products, the majority of which are grown in the County; this includes the burning of bagasse as part of an agricultural operation;

7. Energy systems, small-scale;

8. Small-scale animal-keeping;

9. Animal hospitals and animal board facilities; if conducted on the island of Moloka'i,

such uses shall have been approved by the Moloka'i planning commission as conforming to the intent of this chapter;

10. Riding academies; if conducted on the island of Moloka'i, such uses shall have been approved by the Moloka'i planning commission as conforming to the intent of this chapter;

11. Open land recreation as follows: hiking; noncommercial camping; fishing; hunting; equestrian activities; rodeo arenas; arboretums; greenways; botanical gardens; guided tours which are accessory to principal uses, such as farm or plantation tours, petting zoos, and garden tours; hang gliding; paragliding; mountain biking; and accessory restroom facilities. If hiking, fishing, hunting, equestrian activities, rodeo arenas, hang gliding, paragliding or mountain biking and conducted for commercial purposes on the island of Moloka'i, such uses shall have been approved by the Moloka'i planning commission as conforming to the intent of this chapter. Open land recreation uses or structures not specifically permitted by this subsection or by subsection 19.30A.060.H shall be prohibited; certain open land recreation uses or structures may also be required to obtain a special permit pursuant to chapter 205, Hawai'i Revised Statutes;

12. Parks for public use, not including golf courses and not including commercial uses except when under the supervision of a government agency in charge of parks and playgrounds; and

13. Other uses which primarily support a permitted principal use; however, such uses shall be approved by the appropriate planning commission as conforming to the intent of this chapter. (Ord. 2749 § 3 (part), 1998)

19.30A.060 Special uses.

The following uses and structures shall be permitted in the agricultural district if a special use permit, pursuant to section 19.510.070, Maui County Code, has been obtained; except that if a use described in this section also requires a special permit pursuant to chapter 205, Hawai'i Revised Statutes, and if the land area of the subject parcel is fifteen acres or less, the State special permit shall fulfill the requirements of this section:

A. Additional farm dwellings beyond those permitted by subsection 19.30A.050.B.1;
B. Farm labor dwellings that do not meet the criteria of subsection 19.30A.050.B.2;
C. Agricultural products stands that do not meet the standards of subsection 19.30A.050.B.3;
D. Farmer's markets that do not meet the standards of subsection 19.30A.050.B.4;
E. Public and quasipublic institutions which are necessary for agricultural practices;
F. Major utility facilities as defined in section 19.04.040, Maui County Code;
G. Telecommunications and broadcasting antenna;
H. Open land recreation uses, structures or facilities which do not meet the criteria of subsection 19.30A.050.B. 11, including commercial camping; gun or firing ranges; archery ranges; skeet shooting; paint ball; bungee jumping; skateboarding; roller blading; playing fields; accessory buildings and structures. Certain open land recreation uses or structures may also be required to obtain a special permit pursuant to chapter 205, Hawai'i Revised Statutes. The following uses or structures shall be prohibited: airports, heliports, drive-in theaters, country clubs, drag strips; motor sports facilities; golf courses and golf driving ranges;
I. Cemeteries, crematories, and mausoleums;
J. Churches and religious institutions;
K. Mining and resource extraction; and
L. Landfills. (Ord. 2749 § 3 (part), 1998)

19.30A.070 Private agricultural parks.

Private agricultural parks provide for appropriately sized, functionally configured, and affordable agricultural parcels to support diversified agricultural development. Lots created for the purposes of establishing or expanding a private agricultural park shall not be counted in or as part of the number of lots permitted by subsection 19.30A.030.G. Except as otherwise provided in this chapter, the following requirements and standards shall apply for uses, facilities, and structures in areas designated as private agricultural parks;

A. Individual lot leases or deeds shall provide that the lots is restricted to agricultural purposes;
B. Lots within private agricultural parks shall be made available for lease or sale;
C. No permanent or temporary dwellings or farm dwellings, including trailers and campers, shall be permitted within a private agricultural park, unless the following requirements are met:

1. A special use permit, pursuant to section 19.510.070, Maui County Code, has been obtained;
2. The lot on which the dwelling is located is used principally for agriculture, and the occupant of the dwelling provides security or caretaker services for the private agricultural park;
3. A maximum of one dwelling per lot;
4. The private agricultural park shall be subject to a maximum density of one dwelling per twenty-five acres of private agricultural park area; and
5. The dwelling shall be subject to a maximum developable area of seven hundred square feet.

D. A restrictive covenant excluding dwellings that do not meet the criteria of subsection 19.30A.070.C shall be included in the deed of the lot and run with said lot as long as said lot is within the agricultural district. This restriction shall not prohibit the construction of storage sheds, equipment sheds or other structures appropriate to the agricultural activity carried on within the lot;
E. Agricultural parks shall not be less than twenty-five acres in size;
F. Minimum lot area: five acres;
G. Subdivision requirements, as set forth in the following provisions of Title 18, Maui County Code, shall not apply to private agricultural parks and the lots therein:

1. 18.16.010 to 18.16.180;
2. 18.16.270 to 18.16.310B;
3. 18.16.320;
4. 18.20 to 18.20.090;
5. 18.20.140; and
6. 18.28; and

H. All requirements set forth herein shall terminate if an area designated as an agricultural park is rezoned to a nonagricultural zoning district. (Ord. 2749 § 3 (part), 1998)

19.30A.080 Agricultural leases.

A. Any landowner may enter into an agricultural lease provided that the following conditions are met:

1. The principal use of the leased land is agriculture; and
2. No permanent or temporary dwellings or farm dwellings, including trailers and campers, are constructed on the leased area. This restriction shall not prohibit the construction of storage sheds, equipment sheds or other structures appropriate to the

agricultural activity carried on within the lot.

B. Subdivision requirements, as set forth in Title 18, Maui County Code, shall not apply to agricultural leases. (Ord. 2749 § 3 (part), 1998)

19.30A.090 Substandard agricultural lots.

Substandard agricultural lots existing prior to the enactment of the ordinance codified in this chapter shall be subject to the following standards:

A. Lots less than two acres but equal to or greater than one-half acre shall be subject to the yard and building height standards as set forth for lots of such area in section 19.29.020, Maui County Code, and shall be exempt from the maximum developable area restriction of subsection 19.30A.030.D; and

B. Lots less than one-half acre shall be subject to the yard and building height standards as set forth for lots of such area in sections 19.08.050 and 19.08.060, Maui County Code, and shall be exempt from the maximum developable area restriction of subsection 19.30A.030.D. (Ord. 2749 § 3 (part), 1998)

19.30A.100 Exemptions pursuant to state law.

A. If provided by Hawai'i Revised Statutes, for lands legally defined and recognized as kuleana or similar type of land ownership, such as land commission awards or royal patents, the district standards of section 19.30A.030, and the density restriction of subsection 19.30A.050.B.1, shall not apply.

B. Affordable housing projects as set forth in chapter 201E, Hawai'i Revised Statutes, shall be exempt from the requirements of this chapter. (Ord. 2749 § 3 (part), 1998)

19.30A.110 Permits issued prior to the enactment of this ordinance.

State or County special permits, special use permits, conditional permits and variances issued prior to the enactment of the ordinance codified in this chapter shall remain in full force and effect for their duration, and their renewal shall be subject to the provisions of this chapter. Any dwelling or structure that was constructed with a building permit that was approved prior to the enactment of said ordinance need not acquire a County special use permit, conditional permit or variance and may be reconstructed as permitted by the original building permit(s), and such dwellings or structures may be expanded or modified with a building permit, subject to the other provisions of this chapter and this title. (Ord. 2749 § 3 (part), 1998)

19.30A.120 Rule-making authority.

The planning director and the director of public works and waste management shall have the authority to adopt rules regarding the administration of this chapter. (Ord. 2749 § 3 (part), 1998)

ADDENDA

DEFINITIONS

The purpose of this Glossary is to assist the reader in understanding specific terminology used in this report.

Appraisal (noun) the act or process of developing an opinion of value; an opinion of value (adjective) of or pertaining to appraising and related functions such as appraisal practice or appraisal services.

Cash Equivalent A price expressed in terms of cash, as distinguished from a price expressed totally or partly in terms of the face amounts of notes or other securities that cannot be sold at their face amounts.

Counseling Providing competent, disinterested, and unbiased advice and guidance on diverse problems in the broad field of real estate; may involve any or all aspects of the business such as merchandising, leasing, management, acquisition/disposition planning, financing, development, cost-benefit studies, feasibility analysis, and similar services. Counseling services are often associated with evaluation, but they are beyond the scope of appraisal.

Discounting A procedure used to convert periodic incomes, cash flows, and reversions into present value; based on the assumption that benefits received in the future are worth less than the same benefits received now.

Extraordinary Assumption An assumption, directly related to a specific assignment, which, if found to be false, could alter the appraiser's opinions or conclusions. Extraordinary assumptions presume as fact otherwise uncertain information about physical, legal, or economic characteristics of the subject property; or about conditions external to the property such as market conditions or trends; or about the integrity of data used in an analysis. An extraordinary assumption may be used in an assignment only if:

- It is required to properly develop credible opinions and conclusions;
- The appraiser has a reasonable basis for the extraordinary assumption;
- Use of the extraordinary assumption results in a credible analysis; and
- The appraiser complies with the disclosure requirements set forth in USPAP for extraordinary assumptions.

Fair Value The cash price that might reasonably be anticipated in a current sale under all conditions requisite to a fair sale. A fair sale means that buyer and seller are each acting prudently, knowledgeably, and under no necessity to buy or sell-, i.e., other than in a forced or liquidation sale. The appraiser should estimate the cash price that might be received upon exposure to the open market for a reasonable time, considering the property type and local market conditions. ***When a current sale is unlikely-i.e., when it is unlikely that the sale can be completed within 12 months-the appraiser must discount all cash flows generated by the property to obtain the estimate of fair value.*** These cash flows include, but are not limited to, those arising from ownership, development, operating, and sale of the property. The discount applied shall reflect the appraiser's judgment of what a prudent, knowledgeable purchase under o necessity to buy would be willing to pay to purchase the property in a current sale.

Fee Simple Estate Absolute ownership encumbered by any other interest or estate, subject only to the limitations imposed by the governmental powers of taxation, eminent domain, police power, and escheat.

Hawaiian Terms The Hawaiian words "mauka" and "makai" are commonly used in the islands as indicators of direction. The word "mauka" means toward the mountain, and "makai" means toward the ocean.

Highest and Best Use The reasonably probable and legal use of vacant land or an improved property, which is physically possible, appropriately supported, financially feasible, and that results in the highest value. The four criteria the highest and best use must meet are legal permissibility, physical possibility, financial feasibility, and maximum profitability.

Highest and Best Use of Land or a Site as Though Vacant Among all reasonable, alternative uses, the use that yields the highest present land value, after payments are made for labor, capital, and coordination. The use of a property based on the assumption that the parcel of land is vacant or can be made vacant by demolishing any improvements.

Highest and Best Use of Property as Improved The use that should be made of a property as it exists. An existing improvement should be renovated or retained as is so long as it continues to contribute to the total market value of the property, or until the return from a new improvement would more than offset the cost of demolishing the existing building and constructing a new one.

Hypothetical Condition That which is contrary to what exists, but is supposed for the purpose of analysis. Hypothetical conditions assume conditions contrary to known facts about physical, legal, or economic characteristics of the subject property; or about conditions external to the property, such as market conditions or trends; or about the integrity of data used in an analysis. A hypothetical condition may be used in an assignment only if:

- Use of the hypothetical condition is clearly required for legal purposes, for purposes of reasonable analysis, or for purposes of comparison;
- Use of the hypothetical condition results in a credible analysis; and
- The appraiser complies with the disclosure requirements set forth in USPAP for hypothetical conditions

Leased Fee Interest An ownership interest held by a landlord with the rights of use and occupancy conveyed by lease to others. The rights of the lessor (the leased fee owner) and the lessee are specified by contract terms contained within the lease.

Leasehold Interest The interest held by the lessee (the tenant or renter) through a lease transferring the rights of use and occupancy for a stated term under certain conditions.

Market Rent The most probable rent that a property should bring in a competitive and open market reflecting all conditions and restrictions of the specified lease agreement including term, rental adjustment and revaluation, permitted uses, use restrictions, and expense obligations; the lessee and lessor each acting prudently and knowledgeably, and assuming consummation of a lease contract as of a specified date and the passing of the leasehold from lessor to lessee under conditions whereby:

- Lessee and lessor are typically motivated.
- Both parties are well informed or well advised, and acting in what they consider their best interests.
- A reasonable time is allowed for exposure in the open market.
- The rent payment is made in terms of cash in United States dollars, and is expressed as an amount per time period consistent with the payment schedule of the lease contract.
- The rental amount represents the normal consideration for the property leased unaffected by special fees or concessions granted by anyone associated with the transaction.

Market Value

The major focus of most real property appraisal assignments. Both economic and legal definitions of market value have been developed and refined. Continual refinement is essential to the growth of the appraisal profession.

The most widely accepted components of market value are incorporated in the following definition:

"The most probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms, for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to a fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress."

Market value is defined in the Uniform Standards of Professional Appraisal Practice (USPAP) as follows:

"A type of value, stated as an opinion, that presumes the transfer of a property (i.e., a right of ownership or a bundle of such rights), as of a certain date, under specific conditions set forth in the definition of the term identified by the appraiser as applicable in an appraisal."

The following definition of market value is used by agencies that regulate federally insured financial institutions in the United States:

"The most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:"

- Buyer and seller are typically motivated;
- Both parties are well informed or well advised, and acting in what they consider their best interests;
- A reasonable time is allowed for exposure in the open market;
- Payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and
- The price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.

Prospective Market Value Upon Completion of Construction

The prospective future value of a property on the date that construction is completed, based upon market conditions forecast to exist as of the completion date.

Prospective Value Opinion

A forecast of the value expected at a specified future date. A prospective value opinion is most frequently sought in connection with real estate projects that are proposed, under construction, or under conversion to a new use, or those that have not achieved sellout or a stabilized level of long-term occupancy at the time the appraisal report is written.

Report

Any communication, written or oral, of an appraisal, appraisal review, or appraisal consulting service that is transmitted to the client upon completion of an assignment. The types of written reports listed below apply to real property appraisals:

<u>Self-Contained Appraisal Report</u>: A written appraisal report prepared under Standards Rule 2-2(a) of the Uniform Standards of Professional Appraisal Practice. A self-contained appraisal report sets forth the data considered, the appraisal procedures followed, and the reasoning employed in the appraisal, addressing each item in the depth and detail required by its significance to the appraisal and providing sufficient information so that the client and the users of the report will understand the appraisal and not be misled or confused.

<u>Summary Appraisal Report</u>: A written report prepared under Standards Rule 2-2(b) or 8-2(b). A summary appraisal report contains a summary of all information significant to the solution of the appraisal problem. The essential difference between a self-contained appraisal report and a summary appraisal report is the level of detail of presentation.

<u>Restricted Appraisal Report</u>: A written report prepared under Standards Rule 2-2(c), 8-2(c), or 10-2(b). A restricted use appraisal report is for client use only. The restricted use appraisal report should contain a brief statement of information significant to the solution of the appraisal problem.

Uniform Standards of Professional Appraisal Practice

Current standards of the appraisal profession, developed for appraisers and the users of appraisal services by the Appraisal Standards Board of The Appraisal Foundation. The Uniform Standards set forth the procedures to be followed in developing an appraisal, analysis, or opinion and the manner in which an appraisal, analysis, or opinion is communicated. They are endorsed by the Appraisal Institute and by other professional appraisal organizations.

LIMITING AND CONTINGENT CONDITIONS
ACM Consultants, Inc.

1. The property is appraised as though free and clear of any or all liens and encumbrances unless otherwise stated in this report. The appraiser will not be responsible for matters of a legal nature that affect either the property being appraised or the title to it. The appraiser assumes that the title is good and marketable, and therefore, will not render any opinions about the title.

2. Legal descriptions referenced in the report were obtained from public documents from the State of Hawaii, Bureau of Conveyances, or were furnished by the client, and were assumed to be correct.

3. It is assumed that all applicable zoning and use regulations and restrictions have been complied with, unless a nonconformity has been stated, defined, and considered in this appraisal report.

4. It is assumed that all required licenses, certificates of occupancy or other legislative or administrative authority from any local, state, or national governmental or private entity or organization have been or can be obtained or renewed for any use on which the value estimates contained in this report are based.

5. It is assumed that the utilization of the land and improvements is within the boundaries or property lines of the property described and that there is no encroachment or trespass unless otherwise stated in this report. Responsible ownership and competent property management are assumed unless otherwise stated in this report.

6. The Appraiser has inspected as far as possible, by observation, the land and the improvements; however, it was not possible to personally observe conditions beneath the soil or hidden structurally or by other components. The appraisal assumes that there are no hidden, unapparent, or apparent conditions of the property site, subsoil, or structures or toxic material which would render it more or less valuable. The Appraiser and firm have no responsibility for any such conditions or for any expertise or engineering to discover them. All mechanical components are assumed to be in operable condition and status standard for properties of the subject type. Conditions of heating, cooling, ventilation, electrical and plumbing equipment is considered to be commensurate with the conditions of the balance of the improvements unless otherwise stated. No judgment may be made by us as to adequacy of insulation, type of insulation, or energy efficiency of the improvements or equipment, and no representations are made herein as to these matters unless specifically stated and considered in the report.

7. Information provided by third parties including government agencies, financial institutions, realtors, buyers, sellers, property owners and others and contained in this report were obtained from sources considered reliable and believed to be true and correct. However, no warranty is assumed for possible misinformation.

8. All engineering is assumed to be correct. Any plot plans and illustrative material in this report are included only to assist the reader in visualizing the property. Any sketch in this report may show approximate dimensions and is included to assist the reader in visualizing the property. Maps and exhibits found in this report are provided for reader reference purposes only. No guarantee as to accuracy is expressed or implied unless otherwise stated in this report. No survey has been made for the purpose of this report.

9. The appraiser is not qualified to detect hazardous waste and/or toxic materials. Any comment by the appraiser that might suggest the possibility of the presence of such substances should not be taken as confirmation of the presence of hazardous waste and/or toxic materials. Such determination would require investigation by a qualified expert in the field of environmental assessment. The presence of substances such as asbestos, urea-formaldehyde foam insulation, or other potentially hazardous materials may affect the value of the property. The appraiser's value estimate is predicated on the assumption that there is no such material on or in the property that would cause a loss in value unless otherwise stated in this report. No responsibility is assumed for any environmental conditions, or for any expertise or engineering knowledge required to discover them. The appraiser's descriptions and resulting comments are the result of the routine observations made during the appraisal process.

10. If analysis contained in this appraisal involves partial interests in real estate, the value of the fractional interest plus the value of all other fractional interests may or may not equal the value of the entire fee simple estate considered as a whole.

11. Unless otherwise stated in this report, the subject property is appraised without a specific compliance survey having been conducted to determine if the property is or is not in conformance with the requirements of the Americans with Disabilities Act. The presence of architectural and communications barriers that are structural in nature that would restrict access by disabled individuals may adversely affect the property's value, marketability, or utility.

12. Possession of this report, or a copy thereof, does not carry with it the right of publication. It may not be used for any purposed by any person other than the party to whom it is addressed without the written consent of the appraiser, and in any event, only with proper written qualification and only in its entirety.

13. The Appraiser(s) or those assisting in preparation of the report will not be asked or required to give testimony in court or hearing because of having made the appraisal, in full or in part, nor engage in post appraisal consultation with client or third parties except under separate and special arrangement and at additional fee. If testimony or deposition is required because of subpoena, the client shall be responsible for any additional time, fees, and charges regardless of issuing party.

14. Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the appraiser, or the firm with which the appraiser is connected) shall be disseminated to the public through advertising, public relations, news sales, or other media without prior written consent and approval of the appraiser.

ACCEPTANCE OF, AND/OR USE OF THIS APPRAISAL REPORT BY CLIENT OR ANY THIRD PARTY CONSTITUTES ACCEPTANCE OF THE ACM CONSULTANTS, INC., CERTIFICATION, LIMITING AND CONTINGENT CONDITIONS. APPRAISER LIABILITY EXTENDS ONLY TO STATED CLIENT, NOT SUBSEQUENT PARTIES OR USERS OF ANY TYPE, and the total liability of Appraiser(s) and firm is limited to the amount of fee received by Appraiser.

PROFESSIONAL QUALIFICATIONS
Glenn K. Kunihisa, MAI, CRE

STATE LICENSING

State Certified General Appraiser,
State of Hawaii, License No. CGA 39, July 17, 1991
Expiration: December 31, 2009

PROFESSIONAL AFFILIATIONS

Member, Appraisal Institute, MAI Designation, Hawaii Chapter No. 67
Member, The Counselors of Real Estate, CRE Designation, Hawaii Chapter
Member, International Right of Way Association
Appraiser-Realtor, National Association of Realtors, Maui Board of Realtors

PROFESSIONAL INVOLVEMENT

President – Hawaii Chapter of the Appraisal Institute – 2009
Vice President – Hawaii Chapter of the Appraisal Institute - 2008
Education Chairperson – Hawaii Chapter of the Appraisal Institute – 2004 and 2005
Former Island of Maui Representative – Hawaii Chapter of the Appraisal Institute
Former Multiple Listing Service (MLS) Committee Member – Realtors Association of Maui

COMMUNITY AFFILIATIONS

St. Anthony Parish School Board
Board Member 1995 to Present
Board President 1997 and 1998
Alii Community Care, Inc. – A non-profit health care corporation
Board Member 2004 to 2006

EMPLOYMENT

President
ACM Consultants, Inc.
May, 1997 to present

Previously associated with the following:
ACM, Real Estate Appraisers, Inc. - 1986 to 1997
A&B Commercial Company; a division of Alexander & Baldwin, Inc. - 1979 to 1985
Bank of Hawaii - 1976 to 1979

GENERAL EDUCATION

University of Hawaii at Manoa
Master of Business Administration (MBA) - Executive MBA Program V, 1988
Bachelor of Business Administration (BBA), 1976
Iolani School, 1971

LEGAL & CONSULTING

Qualified as an expert witness in the Second Circuit Court of the State of Hawaii
Qualified as an expert in testimony to the State Land Use Commission
Experienced in real estate arbitration assignments in the State of Hawaii

APPRAISAL EDUCATION

Appraisal Institute
Seminar — Appraisal Challenges: Declining Markets and Sales Concessions
Cambria, California – October 2008

Course	*7-Hour National USPAP Update Course* Honolulu, Hawaii – September 2008
Course	*Online 7-Hour National USPAP Equivalent Course* Chicago, Illinois – October 2007
Course	*Valuation of Conservation Easements* Denver, Colorado – October 2007
Seminar	*Uniform Standards for Federal Land Acquisitions ("Yellow Book") Practical Applications for Fee Appraisers* Honolulu, Hawaii – December 2006
Seminar	*California Conservation Easements* Sacramento, California – November 2005
Course 400	*7-Hour National USPAP Update Course* Honolulu, Hawaii – October 2005
Seminar	*Case Studies in Limited Partnership and Partial Interest Valuation* Honolulu, Hawaii – May 2005
Seminar	*Appraisal Consulting: A Solutions Approach for Professionals* Honolulu, Hawaii – February 2005
Seminar	*Real Estate Finance, Value and Investment Performance* Honolulu, Hawaii – February 2005
Seminar	*Fannie Mae Residential Presentation* Honolulu, Hawaii - July 2004
Seminar	*Subdivision Analysis* Chicago, Illinois - August 2003
Seminar	*Supporting Capitalization Rates* Chicago, Illinois - August 2003
Seminar	*The Technology Assisted Appraiser* Chicago, Illinois - August 2003
Seminar	*Scope of Work: Expanding Your Range of Services* Chicago, Illinois - August 2003
Course 400	*National Uniform Standards of Professional Practice* Honolulu, Hawaii - May 2003
Course 420	*Business Practices and Ethics* Honolulu, Hawaii - May 2003
Seminar	*The Private Conservation Market* Honolulu, Hawaii - July 2002
Seminar	*Finance Reporting Valuations Parts I and II* Honolulu, Hawaii - July 2002
Seminar	*Future of Appraisal Profession from a Global Perspective* Honolulu, Hawaii - July 2002
Seminar	*Appraisal Office Management* Honolulu, Hawaii - July 2002
Course 540	*Report Writing* Denver, Colorado - December 2000
Seminar	*Partial Interests: Theory and Case Law* Las Vegas, Nevada - July 2000
Seminar	*Easement Valuation* Las Vegas, Nevada - July 2000
Seminar	*Bridging the Gap: Marketability Discounts for Real Estate Interests* Las Vegas, Nevada - July 2000

Course 430	*Standards of Professional Practice, Part C* Honolulu, Hawaii - September 1999
Seminar	*Litigation Skills for the Appraiser: An Overview* Honolulu, Hawaii - May 1998
Seminar	*Special Purpose Properties* Honolulu, Hawaii - September 1997
Seminar	*Highest and Best Use Applications* Honolulu, Hawaii - September 1997
Seminar	*Detrimental Conditions* Honolulu, Hawaii - July 1997
Seminar	*The Appraiser As Expert Witness* Honolulu, Hawaii - August, 1995
Seminar	*How to Appraise FHA-Insured Property* Los Angeles, California - January, 1995
Seminar	*Understanding Limited Appraisals and Reporting Options* Honolulu, Hawaii - August, 1994
Seminar	*Valuation of Leasehold Interests* Honolulu, Hawaii - May, 1993
Seminar	*Valuation of Leased Fee Interests* Honolulu, Hawaii - May, 1993
Seminar	*Valuation Considerations: Appraising Non-Profits* Boston, Massachusetts - July, 1992
Seminar	*Americans With Disabilities Act* Boston, Massachusetts - July, 1992
Seminar	*Valuation in Today's Capital and Financing Markets* Honolulu, Hawaii - June 1992
Seminar	*Arbitration Principles, Procedures and Pitfalls* Honolulu, Hawaii - June, 1992
Seminar	*Institutional Real Estate in the 1990's* Honolulu, Hawaii - June, 1992
Seminar	*FIRREA and its Impact on Appraisers* Honolulu, Hawaii - June, 1992
Course 410/420	*Standards of Professional Practice, Parts A & B* Honolulu, Hawaii - April, 1991

<u>The American Society of Farm Managers and Rural Appraisers, Inc.</u>

Seminar	*Agricultural Lease Valuation* Honolulu, Hawaii – March 2006

<u>Maui Coastal Land Trust</u>

Seminar	*Understanding the New Tax Incentives: Conservation Easements & Other Charitable Contributions* Wailuku, Hawaii – June 2007

<u>Society of Real Estate Appraisers</u>

Course 101	*Introduction to Appraising Real Property* Dallas, Texas - 1987
Course 102	*Applied Residential Property Valuation* Honolulu, Hawaii - July 1990

Course 201 — *Principles of Income Property Appraising*
Chicago, Illinois, 1987

Course 202 — *Applied Income Property Valuation*
San Diego, California - 1988

Seminar — *Professional Practice and the Society of Real Estate Appraisers*
Honolulu, Hawaii - 1988

Seminar — *Appraisal Standards Seminar - Federal Home Loan Bank Board Guidelines, Regulations and Policies*
Honolulu, Hawaii - April, 1988

Seminar — *Appraisal Standards Seminar - Federal Home Loan Bank Board Guidelines, Regulations and Policies*
Honolulu, Hawaii - April, 1988

American Institute of Real Estate Appraisers

Seminar — *Rates, Ratios and Reasonableness*
Honolulu, Hawaii - 1989

Seminar — *Discounted Cash Flow Analysis*
Honolulu, Hawaii - 1989

Seminar — *Highest and Best Use*
Honolulu, Hawaii - 1989

Seminar — *Capitalization Overview - Part A*
Honolulu, Hawaii - 1990

Seminar — *Capitalization Overview - Part B*
Honolulu, Hawaii – 1990

Seminar — *Accrued Depreciation*
Honolulu, Hawaii - 1990

International Right of Way Association

Course 101 — *Appraisal*
Las Vegas, Nevada - October, 1998

Course 101 — *Negotiation*
Las Vegas, Nevada - October 1998

National Business Institute, Inc.

Seminar — *Commercial Real Estate Leasing In Hawaii*
Honolulu, Hawaii - 1989

American Arbitration Association

Seminar — *Real Estate Dispute Resolution - Mediation and Arbitration*
Kahului, Maui, Hawaii - October, 1990

PROFESSIONAL QUALIFICATIONS

Shane M. Fukuda

STATE LICENSING

State Certified General Appraiser
State of Hawaii, License No. CGA-810, July 1, 2007
Expiration: December 31, 2009

PROFESSIONAL AFFILIATIONS

None

EMPLOYMENT

ACM Consultants, Inc.
July 1, 2007 to Present
Position: Staff Appraiser
October 2004 to July 2007
Positions held: Appraiser Assistant; Appraiser Trainee

Previously associated with the following:

Dollar Thrifty Automotive Group, Inc.
1994 to 2004
Positions held: Rental Agent; Lead Rental Agent; Station Manager; Senior Station Manager

GENERAL EDUCATION

Maui Community College, 1989-1990
Henry Perrine Baldwin High School, 1989

APPRAISAL EDUCATION

Appraisal Institute

Course 320 — *General Applications*
San Diego, California – July 2006

Course 310 — *Basic Income Capitalization*
San Diego, California – July 2006

Course 101 — *Basic Appraisal Procedures*
Denver, Colorado – April 2005

Course 100 — *Basic Appraisal Principles*
Denver, Colorado – April 2005

Lincoln Graduate Center

Course 405 — *Residential Sales Comparison & Income Approaches*
Honolulu, Hawaii – November 2006

Course 404 — *Residential Appraiser Site Valuation & Cost Approach*
Honolulu, Hawaii – November 2006

Course 403 — *Residential Market Analysis & Highest & Best Use*
Honolulu, Hawaii – November 2006

Course 772 — *National USPAP Course*
Honolulu, Hawaii – October 2006

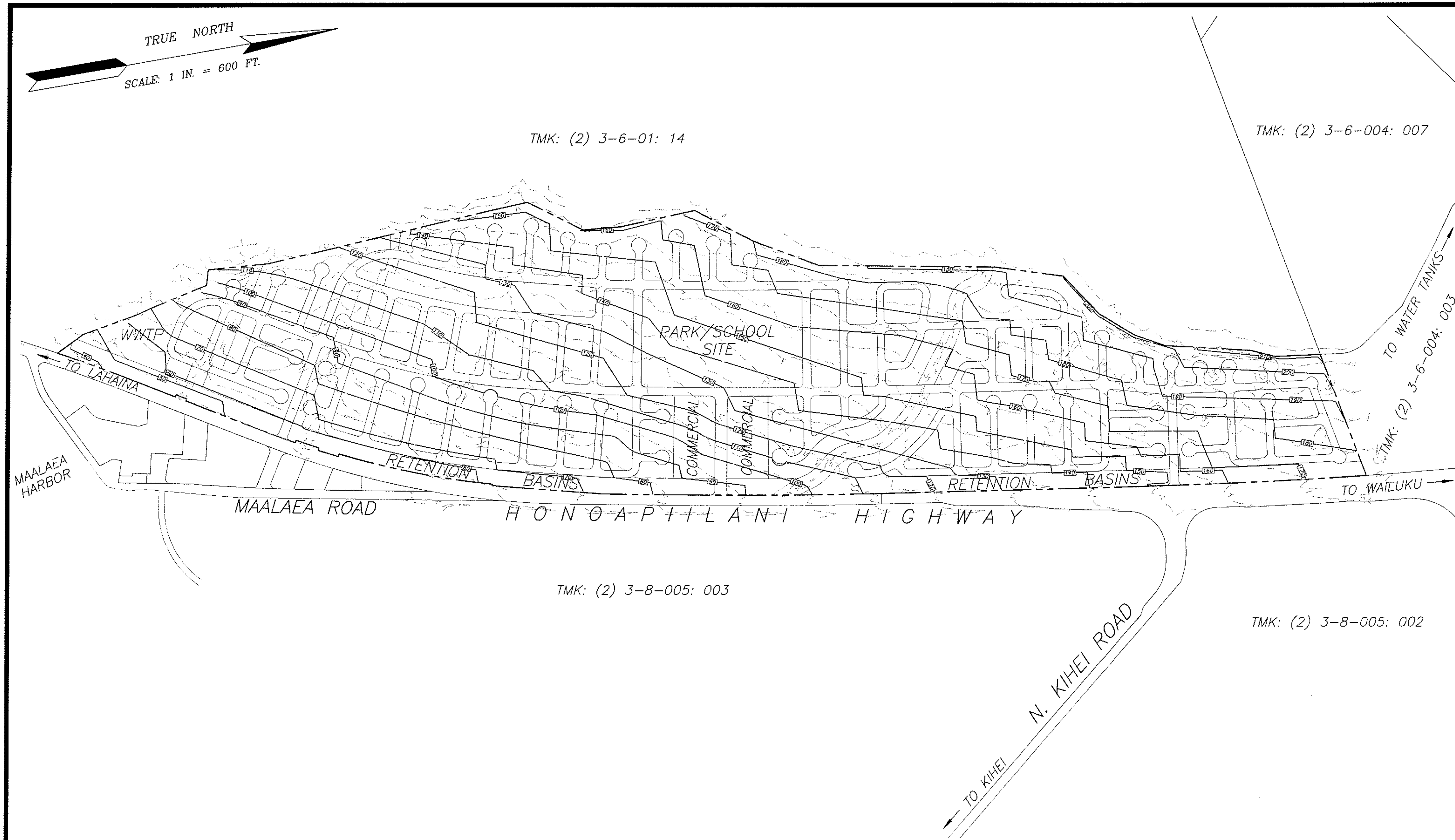
Course 772 — *National USPAP Course*
Honolulu, Hawaii – January 2005

MISCELLANEOUS EDUCATION

REALM Business Solutions — Argus 12.0
Honolulu, Hawaii – July 2005

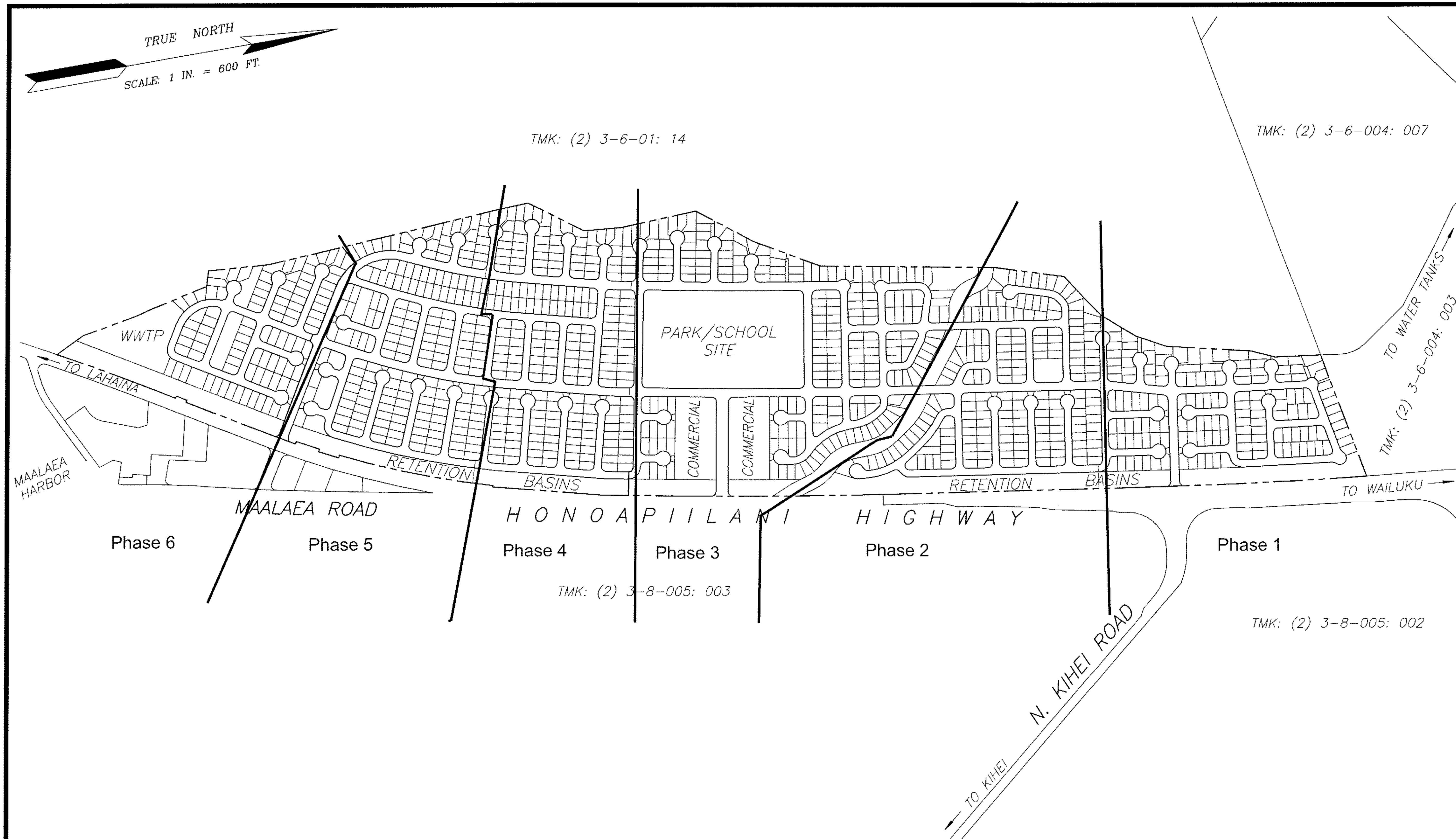
APPENDIX B.

Conceptual Mass Grading Plan and Construction Phasing Plan



CONCEPTUAL GRADING PLAN

SCALE: 1 IN. = 600 FT.



PRELIMINARY SITE PLAN

SCALE: 1 IN. = 600 FT.

APPENDIX C.

Agricultural Impact Assessment Report

Ma'alaea Mauka Residential Subdivision: Impact on Agriculture

Decision Analysts Hawai'i, Inc.

Ma'alaea Mauka Residential Subdivision: Impact on Agriculture

Prepared for:

Ma'alaea Properties, LLC

Prepared by:

Decision Analysts Hawai'i, Inc.

January 2007

CONTENTS

EXECUTIVE SUMMARY

1. PROPOSED DEVELOPMENT

Ma'alaea Properties, LLC proposes to develop Ma'alaea Mauka Residential Subdivision ("the Project"), a planned residential community on a 257-acre site located in the southeast corner of Central Maui. The Project will include about 949 market and affordable homes, a community center, a park, open space and buffer zones, a quasi-public facility, and interior roads. An additional 5 acres north of the Project will be used for a wastewater treatment plant. Some or all of the treated effluent will be dispersed on a nearby 85-acre site.

The Project is within the State Agricultural District, and the County of Maui zoning for the Project site is "Agricultural." However, the *Kihei-Makena Community Plan* designates the site as a residential Project District. Development of the Project will require (1) a State Land Use Boundary Amendment to change the districting from Agricultural to Urban, (2) Project District Approval pursuant to Chapter 19.45 of the Maui County Code, and (3) changes in zoning to conform with the *Kihei-Makena Community Plan.*

2. AGRICULTURAL CONDITIONS

About 240 ± 5 acres at the Project site and the 5 acres for the off-site wastewater treatment plant have favorable agronomic conditions for crop production as indicated by good soils (although they are stony in most areas), gently sloping terrain, high solar radiation, access to irrigation water, and good road access.

3. LOCATIONAL ADVANTAGES AND DISADVANTAGES FOR CROP PRODUCTION

In terms of location, farmers in Central Maui are well-located to supply the small Maui Island market. And compared to other farmers in Hawai'i, they can also compete reasonably well in supplying mainland markets, as long as their products have long shelf-lives and so can be shipped by surface vessel.

However, compared to farmers on O'ahu, Maui farmers are at a disadvantage in supplying the Honolulu market. Furthermore, they are at a disadvantage supplying mainland markets if their products have short shelf-lives and so must be shipped by air. Also, farmers in Central Maui are at a disadvantage in competing against the low-cost producers who supply mainland markets.

4. SURROUNDING LAND USES

Honoapi'ilani Highway borders the eastern edge of the Project site, beyond which lie sugarcane fields. South and southeast of the Project site are Ma'alaea Triangle commercial complex, the Ma'alaea Small Boat Harbor, and apartment buildings. To the west are the lower slopes of the West Maui Mountains. To the north are fallow agricultural lands, followed by the King Kamehameha Golf Courses and sugarcane fields.

Maui Pineapple Co. (Maui Pine) grew pineapple on abutting fields north of the Project site until they chose to return the land to the landowner in late 2006.

5. PAST AGRICULTURAL USES

The Project lands have been used for growing sugarcane (late 1800s to about 1988), pineapple (about 1992 to 1995) and, on less than half of the acreage, diversified crops (about 1988 to 2004).

6. IMPACT ON EXISTING AGRICULTURAL OPERATIONS

a. Grazing

Maui Cattle Co. leased the Project site in 2005 to graze cattle, but cattle were not placed on the land until 2006 after fencing and other improvements were installed. The lease is for a 3-year period, with an option to extend for an additional 4 years.

Development of the Project will remove about 257 acres of grazing lands from their inventory of about 60,000 acres. The company anticipates no significant impact from this small loss of land, including no significant impact on the size of their herd, production, revenues, employment or payroll.

In view of these findings, mitigation measures for this loss of grazing land are not recommended.

b. Nearby Farm Operations and Nuisance Issues

Hawaiian Commercial & Sugar Company (HC&S) fields are located east of the Project site across Honoapi'ilani Highway. These operations are not likely to cause significant nuisance problems to residents of the Project because the homes will be separated from the sugarcane fields by the highway and by a buffer along the eastern boundary of the Project site. Also, residents will not be downwind of farm areas during prevailing tradewinds since these winds blow across the isthmus roughly parallel to Honoapi'ilani Highway.

To the north, the upwind sugarcane operations are not likely to cause significant nuisance problems because of the distance: about 4,200 feet (0.8 mile) to the nearest homes in the Project.

Farming of the adjoining fallow fields to the north, which are owned by an affiliate of the Project developer, could place agricultural operations within about 1,000 feet of some of the homes in the Project. In order to avoid potential nuisance issues, both the landowner and one or more future agricultural tenants are likely to limit activities to ones that are compatible with nearby homes. Instead of short-term crops on this land, more compatible agricultural uses could include cattle grazing on an irrigated pasture that would allow high stocking densities, or one or more orchard crops.

Before new residents purchase homes and lots, they will be informed that they will be living near farming areas. This point will be highlighted in promotional brochures and will be spelled out in the sales contracts. Under these circumstances, buyers are more likely to accept that nearby farm operations are part of the ambiance and lifestyle of the area.

In any case, Hawai'i's Right-to-Farm Act gives farmers who were operating before neighboring properties were developed the right to farm even if they cause a nuisance, provided that the farm activity does not threaten public health or safety.

In view of the above, no additional measures are needed to mitigate potential nuisance problems.

7. GROWTH OF DIVERSIFIED CROP FARMING (CUMULATIVE IMPACT)

a. Potential Acreage Requirements for Diversified Crops

Crops to Replace Imports of Fruits and Vegetables

For low-elevation fruits and vegetables that have a history of profitable production in Hawai'i, potential land requirements in 2010 for 100% import substitution for the state and for Maui County are estimated at 12,700 acres and 1,700 acres, respectively, plus additional acreage for fallowing land between crop plantings. When allowing for competition from imports, these estimates drop to about half.

Export Crops

Hawai'i farmers are exploring various export crops on lands released from plantation agriculture. Over the next 20+ years, one or more of these crops may prove to be successful and may grow into a major export crop.

However, the history of agricultural efforts in Hawai'i reveals that the successful development of major new export crops requiring large amounts of land is infrequent. For example, over the past 50 years in Hawai'i, farmers have explored numerous possibilities for export crops, but they have developed overseas markets for just one diversified crop that requires more than 10,000 acres (macadamia nuts at 18,000 acres in 2004); one additional crop that requires more than 5,000 acres (coffee at 7,700 acres); and only five additional crops or crop categories that require more than 1,000 acres each.

Feed Crops

If feed crops could be grown in Hawai'i and priced competitively against mainland imports, they could replace some of the grains and hay that is now being imported to the state. Unfortunately, a number of commercial attempts in Hawai'i to grow grains and alfalfa have been unsuccessful.

Biofuel Crops

Crops can be grown to produce biomass to fuel a boiler, or as feedstock to produce fuels. In Hawai'i, the common practice is to produce biomass as a by-product of some principal crop. However, O'ahu Ethanol Corporation plans to build an ethanol plant at Campbell Industrial Park using conventional technology but, at least initially, using imported molasses as the feedstock. For the longer term, this company is exploring the economics of growing sweet sorghum to supply feedstock to its ethanol plant. Acreage requirements for a new sorghum biofuel plantation on O'ahu would range from about 6,000 acres for viability to 15,000 if it were to replace all imported molasses.

However, a number of substantial difficulties must be overcome in order to develop a biofuel plantation that supplies feedstock for ethanol production. For example, in many areas of the state, it will be difficult to lease the large amount of land required for a biofuel plantation at low lease rents for the 30 or so years required to capitalize the substantial investment in a new plantation. Also, emerging technology in the early stages of commercialization promises a more plentiful and cheaper source of feedstock for ethanol. Instead of producing ethanol using sugars from conventional sources, the sugar would come from "cellulosic" sources. This would include green waste for which there would be no land rent and no growing costs, but there could be a disposal fee paid to the processor. In the long term, this less expensive source of feedstock could result in an unprofitable biofuel plantation.

These and other difficulties and risks suggest that the probability of successfully developing and sustaining a sorghum biofuel plantation in Hawai'i is low.

Recent Trends in Crop Acreage

For all diversified crops—i.e., all crops other than sugarcane and pineapple, including crops to replace imports and crops for export—statewide land requirements grew by an average of 240 acres per year from 1984 through 2004, or about 2,400 acres per decade.

b. Statewide Availability of Land for Diversified Crops

Statewide, a vast amount of land has been released from plantation agriculture: about 249,900 acres between 1968 and 2004—an average decrease of over 6,940 acres per year over a 36-year period (see Figure 10). The 2006 closure of Del Monte's pineapple plantation on O'ahu increased this acreage by about 5,100 acres, resulting in a total release of at least 255,000 acres from plantation agriculture between 1968 and 2007.

Over this same period, the demand for land for diversified crops increased by about 26,500 acres, or an average of about 740 acres per year. Since 1984, the growth has slowed to an average of 240 acres per year, as previously mentioned.

As the above indicates, the release of land from plantation agriculture has far outpaced the demand for land for diversified crops. The net decrease in crop land between 1968 and 2004 amounted to 223,400 acres; this figure has increased to about 228,500 acres after adding the land fallowed by Del Monte. While some of the released land has been converted or is scheduled to be converted to urban uses and tree plantations, an estimated 160,000+ acres remain available for diversified crops.

Once the Superferry begins operating in 2007, cultivating crops on the Neighbor Islands for the Honolulu market, and vice versa, will become more economically feasible. This will increase the importance of the statewide availability of agricultural land vis-a-vis the island-wide availability.

The above indicates that ample land is available in Hawai'i to accommodate the growth of diversified crops, whether demand is based on potential or recent trends. In other words, the limiting factor to the growth of diversified crops is *not* the *land supply*, but rather the *size of the market* for crops that can be grown *profitably* in Hawai'i.

c. Maui Island Availability of Land for Diversified Crops

The above findings also apply to Maui. Since 1977, the contraction and eventual closure of Wailuku Sugar Co. and Pioneer Mill released about 11,200 acres from sugarcane production. In addition, the contraction of pineapple operations has released about 5,000 acres since 1993.

During the 1980s, about 4,700 acres of sugarcane land in Central Maui were made available for other uses. During the 1990s, the reduction in sugarcane acreage occurred in West Maui. Similarly, most of the recent reduction in pineapple acreage occurred in West Maui.

Some of this former plantation land was developed and some was converted to other crops, but most of it remains fallow or is used for grazing cattle.

In summary, considerable land remains available on Maui for diversified agriculture, although most of it is in West Maui.

d. Potential Loss of Agricultural Land on Maui to Development

If all of the committed, designated and proposed residential and resort projects on Maui Island were approved, built and sold, they would supply about 45,740 homes. At the projected demand of about 1,380 new homes per year, this potential supply of homes could be absorbed in about 33 years.

Development of all of these projects—including the 257-acre Ma'alaea Mauka Residential Subdivision—would result in about 11,800 acres that are now in the Agricultural District being lost to potential agricultural uses. This estimate includes prime agricultural land, low-quality land that is suitable for grazing but not farming, and gulch land. It represents less than 5% of the 244,600 acres on Maui Island that are in the State Agricultural District.

After a period in 33 years or so, this would leave about 232,800 acres on Maui Island available for agricultural uses.

e. Cumulative Impact on the Growth of Diversified Crop Farming

Including the wastewater treatment plant, the Project will commit 262 acres of agricultural land to a non-agricultural use. If this land were used to grow a typical vegetable or fruit crop, then it could support about 33 farm jobs (based on about 12.5 jobs per 100 acres).

More realistically, development on this agricultural land—combined with other developments in Hawai'i and on Maui Island—involves the loss of too little agricultural land to significantly affect (1) the availability of land to farmers in Hawai'i, (2) agricultural land rents, (3) the growth of diversified crops, or (4) potential agricultural employment. This conclusion is based on the finding that, as a result of the contraction of plantation agriculture, ample land is available for diversified crops, with the available supply far exceeding likely or potential demand.

However, in Central Maui, the Project might adversely affect the growth of diversified agriculture somewhat since the market for agricultural land is tighter there than it is in most other areas of the State.

f. Mitigating Measures

In view of the small impact of the Project on the growth of diversified agriculture, mitigation measures for the lost agricultural land are not recommended.

8. OFFSETTING BENEFITS

a. Non-agricultural Benefits

The loss of 262 acres of agricultural land will be offset by the following benefits of the Project:

- 949 homes for Maui residents including senior care housing and affordable housing, along with a community center, parks, open space, and supporting infrastructure;
- construction jobs and other jobs provided by the development activity;
- at full development of the Project, jobs generated by residents of the Project who purchase goods and services on Maui;
- tax revenues (excise taxes, personal income taxes, corporate income taxes, property taxes, etc.) generated by development activity; and
- tax revenues generated by the families who occupy homes in the Project.

b. Agricultural Benefits

Preservation of Prime Agricultural Land Supplied with Water

In addition to the above, the Project will provide agricultural benefits—namely, it will preserve the 85-acre wastewater disposal area for future agricultural use. This is high-quality agricultural land that will be supplied with 600,000 gallons per day of wastewater that will be treated to a high standard that will allow any method of irrigation of any crop. Agricultural uses that would be compatible with the Project would include orchard crops and cattle grazing.

Support for Affiliated Agricultural Operations

The Project developer is affiliated with other Hawai'i companies that are engaged in farming, including Maui Tropical Plantation, a Coffees of Hawai'i farm on Moloka'i, and a new Coffees of Hawai'i farm on Maui.

Many agricultural operations in Hawai'i are marginally profitable, including MTP and probably most coffee farms. The association of MTP and Coffees of Hawai'i with the Project may contribute to their economic health by having profits from development (1) cover losses from farming during lean years, and (2) contribute capital to improve or further expand the farms.

9. CONSISTENCY WITH STATE AND COUNTY POLICIES

a. Availability of Lands for Agriculture

The *Hawai'i State Constitution*, the *Hawai'i State Plan*, the *State Agriculture Functional Plan*, the *County of Maui General Plan 1990*, and the County's *Kihei-Makena Community Plan* call directly or implicitly for preserving the economic viability of plantation agriculture and promoting the growth of diversified agriculture. To accomplish this, an adequate supply of agriculturally suitable lands and water must be assured.

With regard to plantation agriculture, the Project site is no longer part of a sugarcane or pineapple plantation.

With regard to diversified agriculture, the Project will reduce the availability of agricultural land by a relatively small amount. However, the Project will not limit the statewide growth of diversified agriculture since ample agricultural land is available. This is due to the enormous supply of agricultural land that is now available due to the contraction of plantation agriculture. However, the growth of diversified agriculture in Central Maui might be limited due to the tighter agricultural land market there.

b. Conservation of Agricultural Lands

In addition to the above, State and County policies call for conserving and protecting prime agricultural lands, including protecting agricultural lands from urban development.

However, these policies—which for the State were written before the major contraction of plantation agriculture in the 1990s—assume implicitly that profitable agricultural activities eventually will be available to utilize all available agricultural lands. This has proven to be a questionable assumption in view of the enormity of the contraction of plantation agriculture, the abundant supply of land that came available for diversified agriculture, and the slow growth in the amount of land being utilized for diversified agriculture.

Furthermore, discussions in the Agriculture portion of the *State Functional Plan* recognize that redesignation of lands from Agricultural to Urban should be allowed "... upon a demonstrated change in economic or social conditions, and where the requested redesignation will provide greater benefits to the general public than its retention in ...agriculture;" that is, when an "overriding public interest exists." The enormous contraction in plantation agriculture, resulting in the supply of agricultural land far exceeding demand, constitutes a major change in economic conditions. Moreover, development of the Project will provide community and agricultural benefits (about 949 homes, construction jobs, jobs generated by the purchase of goods and services by Project residents, tax revenues, preservation of 85 acres of prime agricultural land supplied with

an ample volume of high-quality agricultural water, and occasional financial support for affiliated agricultural operations) that far exceed those provided by agriculture (less than one job with the current grazing operation).

In practice, development of the Project site is expected to have no significant adverse impact on existing or potential agricultural employment. However, it could contribute new agricultural jobs on the nearby 85 acres that will be preserved, and could contribute to preserving or increasing employment for the affiliated agricultural operations.

c. State Districting

The Project site is within State Agricultural District. However, Ma'alaea Properties is filing a petition with the State Land Use Commission for a District Boundary Amendment to redesignate the Project site to the "Urban" District.

d. County of Maui General Plan

County of Maui zoning for the project site is "Agricultural." However, Ma'alaea Properties plans to file a petition with the County for a change in zoning to conform to the *Kihei-Makena Community Plan*.

e. Kihei-Makena Community Plan

The Project is consistent with the *Kihei-Makena Community Plan* which designates the site "Project District 12," thereby allowing for a residential community at Ma'alaea Mauka.

MA'ALAEA MAUKA RESIDENTIAL SUBDIVISION: IMPACT ON AGRICULTURE

1. INTRODUCTION[1]

Ma'alaea Mauka, LLC proposes to develop Ma'alaea Mauka Residential Subdivision ("the Project"), a planned residential community on a 257-acre site located in the southeast corner of Central Maui—see Figures 1 and 2 for the location of the Project, and Figure 3 for the proposed development (the figures follow the body of the report). An additional 5 acres north of the Project will be used for a wastewater treatment plant. Some or all of the treated effluent will be dispersed on a nearby 85-acre site.

The Project is within the State Agricultural District (Figure 4), and the County of Maui ("County") zoning for the Project site is "Agricultural." However, the *Kihei-Makena Community Plan* designates the site as a residential Project District referred to as "Project District 12" (Figure 5). Development of the Project will require (1) a State Land Use Boundary Amendment to change the districting from Agricultural to Urban, (2) Project District Approval pursuant to Chapter 19.45 of the Maui County Code, and (3) changes in zoning to conform with the *Kihei-Makena Community Plan.*

This report addresses the impacts on agriculture of developing the Project. The material below gives the following information: its location; a description of the Project; the agricultural conditions at the Project site, along with supporting Figures 6, 7, 8 and 9; potential crops; locational advantages and disadvantages for crop production; surrounding land uses; past and current agricultural uses of the land; the impact of the Project on existing agricultural operations in or near the Project site; the impact the Project on the growth of diversified crop farming, along with supporting Figure 10; benefits of the Project that would offset adverse agricultural impacts; and consistency of the Project with State and County agricultural policies.

Two Appendices are at the end of the report. Appendix A provides a listing of planned and proposed development projects on Maui and the amount of agricultural land that would be affected. Appendix B provides a summary of State and County goals, objectives, policies and guidelines related to agricultural lands.

2. LOCATION OF THE PROJECT [1]

Figure 1 shows the location of the Project in the Central Maui region. As indicated, the Project site is in the southwest area of Central Maui near Ma'alaea Small Boat Harbor. Figure 2 shows a closer view of the site location and its Tax Map Key: (2) 3-6-01: 018.

The wastewater treatment plant will be located on a 5-acre site that is mauka and north of the intersection of Honoapi'ilani and Kuihelani Highways, and abutting Honoapi'ilani Highway. This treatment plant will be located over 600 feet north of the Project.

Also, the 85-acre effluent dispersal site is north of the treatment plant and mauka of Honoapi'ilani Highway. The site abuts both the treatment plant and the highway.

3. PROJECT DESCRIPTION[1,2]

Ma'alaea Mauka is a 257-acre master-planned residential development that will provide about 949 market and affordable residential units on about 165 acres (see Table 1 and Figure 3). Table 1 lists the types of single-family and multi-family homes that will be provided and, for each type, the approximate acreage involved and the number of homes. The remainder of the parcel will include a community center, a park, open space and buffer zones, a quasi-public facility, and interior roads.

As mentioned above, about 5 acres north of the Project site will be used for a wastewater treatment plant. This plant will discharge about 600,000 gallons per day of effluent that will be treated to the R-1 standard, which is the highest quality effluent designated by the Hawaii State Department of Health.[4] Because R-1 effluent undergoes a high level of treatment, State restrictions for reuse are minimal. In particular, R-1 effluent is sufficiently safe for any method of irrigation (drip, furrow, sprinkler, etc.) for any crop (fruit, vegetable, surface crop or below surface, processed or unprocessed, etc.). Some or all of the treated effluent from the Project will be used to irrigate about 85 acres lying north of the Project. The effluent can also be used to irrigate landscaping at the Project site.

4. AGRICULTURAL CONDITIONS

a. Soil Types[3]

As shown in Figures 6 and 7 respectively, the Project site has soils belonging to the Pulehu-Ewa-Jaucus association and consists of four specific soil types. Table 2 shows the acreages of the various soil types and their ratings by the Natural Resources Conservation Service (NRCS), formerly known as the Soil Conservation Service. The soil ratings are discussed in the next subsection.

Table 1. Ma'alaea Mauka Residential Subdivision: Summary of Preliminary Subdivision Plan[1]

Land Use	Acres	Homes
On-site		
Homes		
Custom lots (single-family homes)	38.0	144
Single-family homes	80.0	355
Patio homes (multi-family homes)	23.5	164
Town homes (multi-family homes)	7.0	100
Senior care housing	6.0	60
Apartments	11.5	126
Community Center and Open Space	37.0	
Park	15.0	
Quasi-public Facility	3.0	
Roads (including R-O-W)	36.0	
Total, On-site	**257.0**	**949**
Off-site: Wastewater Treatment Plant	5.0	

Table 2. Ma'alaea Mauka Residential Subdivision: Soil Types and NRCS Ratings[3]

Soil Types	Acres	%	NRCS Ratings
On-site			
High-Quality Soils			
EsB	65	25%	IIe
EtB	135	53%	IIe
PtB	35	14%	IIe
Low-Quality Soils			
rSM	22	8%	VIIs
Total	**257**	**100%**	
Off-site: High-quality PtB soil	5		IIe

For each of the four soil types, the complete name, range of slopes, and soil descriptions are:

— EsB: Ewa silty clay, 3 - 7% slopes

In a representative profile the surface layer is about 18 inches thick, and the subsoil is about 42 inches thick with a subangular blocky structure. The substratum is coral limestone, sand, or gravelly alluvium. In places, roots penetrate to a depth of 5 feet or more.

The soil is neutral in the surface layer and subsoil. Permeability is moderate. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.3 inches per foot in the surface layer and 1.4 inches per foot in the subsoil. This soil is more than 60 inches deep.

— EtB: Ewa cobbly silty clay, 3 - 7% slopes

This soil has a profile like that of EsB, except for the texture of the surface layer. Cobblestones in the surface layer interfere with tillage but do not make intertilled crops impracticable.

— PtB: Pulehu cobbly clay loam, 3 - 7% slopes

In a representative profile the surface layer is about 21 inches thick, and the subsoil is about 39 inches thick with massive and single grain, stratified loam, loamy sand, fine sandy loam, and silty loam. Below this is coarse, gravelly or sandy alluvium. Small areas that have thin, stratified layers of sand and gravel at a depth of 20 to 36 inches. In places, roots penetrate to a depth of 5 feet or more.

The soil is neutral in the surface layer and neutral to mildly alkaline below the surface layer. Permeability is moderate. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.4 inches per foot in the surface layer and subsoil. Low areas are subject to flooding.

— rSM: Stony alluvial land, 3 - 15% slopes

This soil consists of stones, boulders, and soil deposited by streams along the bottoms of gulches and on alluvial fans. Improvement of this land is difficult because of the stones and boulders.

b. Soil Ratings

Three classification systems are commonly used to rate soils in Hawai'i: (1) Land Capability Grouping, (2) Agricultural Lands of Importance to the State of Hawai'i, and (3) Overall Productivity Rating.

Land Capability Grouping (NRCS Rating)[5]

The 1972 Land Capability Grouping by the NRCS rates soils according to eight levels, ranging from the highest classification level "I" to the lowest "VIII."

As shown in Table 2, about 235 acres (92%) of the Project site and the 5 acres for the off-site wastewater treatment plant have soils that are rated IIe. Class II soils have moderate limitations that reduce the choice of plants or require moderate conservation practices. The subclassification "e" indicates that the limitation is due to erosion.

About 22 acres (8%) have soils rated VIIs. Class VII soils have very severe limitations that make them unsuitable for cultivation and restrict their use largely to pasture. The subclassification "s" indicates that the soils are rocky or stony.

Agricultural Lands of Importance in the State of Hawai'i (ALISH)[6]

ALISH ratings were developed in 1977 by the NRCS, the UH College of Tropical Agriculture and Human Resources, and the State Department of Agriculture. This system classifies land into three broad categories: (a) Prime agricultural land which is land that is best suited for the production of crops because of its ability to sustain high yields with relatively little input and with the least damage to the environment; (b) Unique agricultural land which is non-Prime agricultural land used for the production of specific high-value crops; and (c) Other agricultural land which is non-Prime and non-Unique agricultural land that is important to the production of crops.

About 245 acres (95%) of the Project site and the 5 acres for the off-site wastewater treatment plant have soils that are rated Prime; about 5 acres (2%) are rated Other; and about 7 acres (3%) are unclassified (Figure 8).

Overall Productivity Rating (LSB Rating)[5]

In 1972, the University of Hawai'i (UH) Land Study Bureau (LSB) developed the Overall Productivity Rating, which classifies soils according to five levels, with "A" representing the class of highest productivity and "E" the lowest.

All or nearly all of the soils at the Project site are rated "B" (see Figure 9). However, the 5 acres for the off-site wastewater treatment plant have soils that are rated "A."

Summary Evaluation of Soil Quality

These soil-rating systems suggest that about 240 ± 5 acres at the Project site and the 5 acres for the off-site wastewater treatment plant are comprised of higher-quality soils (II for the NRCS ratings, Prime for ALISH, and A or B for the LSB rating).

c. Soil Characteristics[3,7,8]

Consistent with the above soil ratings, the higher quality lands exhibit the following soil characteristics: deep (over 30 inches), well-drained, stony, and moderately suited for machine tillability. However, a plantation manager for the former landowner and the current agricultural tenant both report that the soils are shallow and rocky.

d. Elevation and Slopes[1,3]

The Project site ranges in elevation from about the 22 feet at the southern end to about 207 feet at the northern end. Slopes range from 3% to 7% over most of the property.

e. Climatic Conditions

Like other areas in Hawai'i, Central Maui has a mild *semi*tropical climate that is due primarily to three factors: (1) Hawai'i's mid-Pacific location near the Tropic of Cancer, (2) the surrounding warm ocean waters that vary little in temperature between the winter and summer seasons, and (3) the prevailing northeasterly tradewinds that bring air having temperatures that are close to those of the surrounding waters.

Solar Radiation[9]

The Project site receives considerable sunshine, with average daily insolation of nearly 480 calories per square centimeter.

Rainfall[10]

Rainfall at the Project site is low, averaging about 20 to 30 inches per year. Most of this rainfall occurs during the winter rainy season (October through April), while the summer months (May through September) are hot and dry.

Temperatures[10]

Along the coast at Ma'alaea, the average temperature ranges from about 58°F in the winter to about 83°F in the summer.

Winds[10,11]

The prevailing tradewinds blow from north to south across the isthmus and out to sea at a mean speed of about 20 miles per hour.

f. Irrigation Water[1,7]

Historically, the sugarcane fields in the Project site were irrigated with surface water from Waihee Ditch which runs along and occasionally passes through the western edge of the property, roughly paralleling Honoapi'ilani Highway (see Figure 8). Additional water came from a groundwater well located near the arrowhead pointing to the the Project Site in Figure 4.

A plantation manager of the former landowner reports that water requirements are high at the Project site because of the typically dry and windy conditions.

g. Road Access

Plantation roads provide access to the property from Honoapi'ilani Highway (see Figures 2 and 4).

h. Summary

About 240 ± 5 acres at the Project site and the 5 acres for the off-site wastewater treatment plant have favorable agronomic conditions for crop production as indicated by good soils (although they are stony in most areas), gently sloping terrain, high solar radiation, access to irrigation water, and good road access.

5. POTENTIAL CROPS[12]

Based on the above agronomic conditions, the Project site is suitable for low-elevation crops that are grown commercially in Hawai'i, including but not limited to: asparagus, beans (green, bush and snap), bell peppers, bittermelon, cantaloupe, Chinese peas, cucumbers, daikon, dry onions, eggplant, flowers/nursery products, ginger root, green onions, green peppers, head and semi-head lettuces, herbs, honeydew melons, limes, lotus root, lychee, Manoa lettuce, mango, mustard cabbage, Oriental squash, parsley, pineapple, pumpkins, seed crops, surgarcane, sweet corn, sweet potatoes, tangerines, and watermelons.

6. LOCATIONAL ADVANTAGES AND DISADVANTAGES FOR CROP PRODUCTION

a. Maui Island Market

Farmers in Central Maui are well-located for supplying the Maui Island market because of the short trucking distance to Kahului, which is the island's commercial, industrial, distribution and transportation center. While the Maui Island market is significant, it is comparatively small: in 2000, Maui had a *de facto* population of about 156,170 residents and visitors.[13]

b. Honolulu Market

All farmers on Maui are at a disadvantage in competing against farmers on O'ahu for supplying the Honolulu market due to the interisland shipping costs, delays and extra handling. In comparing barge and air-cargo services, shipping by barge is less expensive and larger loads can be shipped, but the shipments are slow and infrequent. Air service is faster and frequent, but it is far more expensive and capacities are limited. A planned new ferry system, if successful, will increase the speed and frequency of surface shipments, and costs will be lower than air freight. In turn, this will allow Maui farmers to be more competitive in O'ahu produce markets, and vice versa.

In 2000, O'ahu had a *de facto* population of about 927,170 residents and visitors.[13] Thus, the Honolulu market is nearly six-times larger than the Maui market.

c. Mainland Market

Compared to Hawai'i, the mainland market is enormous: in 2000, the U.S. population totaled 281.4 million.[14] In supplying this market with products that can be carried by container ship because they have long shelf-lives (e.g., canned fruit), farmers on Maui are competitive with farmers on O'ahu and other islands. Even though freight from Maui must first be barged to Honolulu then transferred onto a container ship, Matson's overseas shipping service includes interisland barge service at no additional fee; except for some minor port charges, Matson charges a common fare for all islands.[15]

In the case of fresh products that must be shipped by air to the mainland because of their short shelf-lives, farmers on Maui are at a disadvantage compared to farmers on O'ahu because most mainland air cargo is shipped via the Honolulu International Airport. Compared to farmers on O'ahu, Maui farmers encounter additional costs, delays and handling for interisland air-cargo service and for transferring the fresh products from small interisland aircraft to large overseas aircraft.

However, overseas air-cargo service from Maui has improved somewhat because the current generation of aircraft can depart from the short runway at Kahului with a full load of passengers and a full load of cargo in the hold. This direct service allows farmers on Maui to be more competitive in mainland markets. However, the lift capacity from Maui is limited by the number of direct flights.

In the U.S. mainland market, farmers in Hawai'i must also compete against farmers on the mainland and in Mexico, Central and South America, the Caribbean, Australia, New Zealand, Southeast Asia, etc. Most of the competing farm areas have lower production and delivery costs than Hawai'i does. Competing against Mexico is particularly difficult given the North America Free Trade Agreement (NAFTA) and Mexico's proximity to major U.S. markets.

d. Summary

In terms of location, farmers in Central Maui are well-located to supply the small Maui Island market. And compared to other farmers in Hawai'i, they can also compete reasonably well in supplying mainland markets, as long as their products have long shelf-lives and so can be shipped by surface vessel.

However, compared to farmers on O'ahu, they are at a disadvantage in supplying the Honolulu market. Furthermore, they are at a disadvantage supplying mainland markets if their products have short shelf-lives and so must be shipped by air. Also, farmers in Central Maui are at a disadvantage in competing against the low-cost producers who supply mainland markets.

7. SURROUNDING LAND USES

As shown in Figures 1 to 3, Honoapi'ilani Highway borders the eastern edge of the Project site, beyond which lie sugarcane fields. South and southeast of the Project site are Ma'alaea Triangle commercial complex, the Ma'alaea Small Boat Harbor, and apartment buildings. To the west of the Project site are the lower slopes of the West Maui Mountains. To the north are fallow agricultural lands, followed by the King Kamehameha Golf Courses and sugarcane fields.

Maui Pineapple Co. (Maui Pine) grew pineapple on abutting fields north of the Project site until they chose to return the land to the landowner in late 2006. Before 1988, sugarcane was grown on these fields.

8. PAST AND CURRENT AGRICULTURAL LAND USES[1,7,8,16,17]

a. Sugarcane (late 1800s to about 1988)

The Project lands and adjoining lands to the north were used to grow sugarcane for over 100 years, ending in about 1988 when Wailuku Agribusiness Co. Inc., a subsidiary of C. Brewer and Co., Ltd., ceased all sugarcane production due to unprofitable operations. Following sugar, the land was fallow for about 3 to 4 years.

b. Pineapple (about 1992 to 1995 and 2006 for adjoining lands)

Beginning in about 1992, Wailuku Agribusiness used the land at the Project site to grow pineapple to supply fruit to Maui Pine. The operation lasted 3 or 4 years until 1995 when production was discontinued due to low yields, rocky soils, high water requirements, and the availability of higher-quality agricultural lands in the region. After pineapple, the land laid fallow for about 3 years.

The 5-acre site for the wastewater treatment plant is on land to the north of the Project site that was leased to Maui Pine for continued pineapple operations. As mentioned in the previous section, Maui Pine chose to return this land to the landowner in late 2006, and it is now fallow.

c. Diversified Crops (about 1998 to 2004)

Beginning in about 1998, about 24 farmers were licensed to cultivate a little less than half the acreage at the Project site. The terms were month-to-month, and rents were about $360 per acre per year. Most of the tenants farmed for the lifestyle (that is, they were "hobby farmers"), with only about one, two or possibly three of them deriving most of their income from farming. Their crops included but were not limited to asparagus, bananas, cucumbers, papaya, squash, string beans, and tomatoes. Some of the tenants also raised fighting cocks on their land. Following a notice of over 7 months, the licenses were discontinued in August 2004 when the land was sold. Following the sale, the land laid fallow for about 2 years.

d. Cattle Grazing (since 2006)

Since 2006, the Project site has been used for grazing cattle (see next section for details).

9. IMPACT ON EXISTING AGRICULTURAL OPERATIONS

a. Maui Cattle Company, LLC[8,12]

Overview of Maui Cattle Co.

Maui Cattle Co. is a partnership of seven ranches on Maui that was formed in 2002. These ranches graze about 5,500 mother cows on about 60,000 acres. About 40% of the calves remain on Maui where they are grass-fed to heavier weights, then sold locally; the remaining calves are shipped to the mainland. The long-term goal is to keep all of the calves on Maui for the Hawai'i market. The operation employs about 60 ranch hands who earn about $10 to $20 per hour.

Ma'alaea Mauka Grazing Operations

Maui Cattle Co. leased the Project site in 2005 to graze cattle, but cattle were not placed on the land until 2006 after fencing and other improvements were installed. The lease is for a 3-year period, with an option to extend for an additional 4 years. No lease rent is paid for the land; instead, Maui Cattle provides land stewardship. Also, the landowner pays the property tax and paid for about 80% of the perimeter fencing.

Depending on rainfall, the land is used seasonally to grow out about 300 weaned calves to heavier weights. The original plan to irrigate the pasture for year-round operations proved uneconomical. The Ma'alaea Mauka operation requires the part-time effort of a single land manager who makes sure that the cattle have water, fences have not been breached, etc.

Impact on Maui Cattle Company

Development of the Project will remove about 257 acres of Maui Cattle Company grazing lands. However, the company anticipates no significant impact from this small loss of land, including no significant impact on the size of their herd, production, revenues, employment or payroll.

Statewide Availability of Grazing Land[12,13]

The total supply of grazing land in Hawaii is very large—about 1.15 million acres in 2004, most of which is located on the Big Island. For comparison, this is about three times the entire land area of O'ahu (381,632 acres). Thus, the Project will have a relatively small impact on the supply of grazing land in the state—a decrease of about 0.02%.

Furthermore, the supply of grazing land has increased statewide and on Maui due to the contraction of plantation agriculture (see Section 10.b and Figure 10). In contrast, from 1980 (or even earlier) until 2005, the number of beef cows in Hawaii has remained at about 80,600 ± about 3,340 beef cows.

This large and increasing supply of grazing land, combination with no growth in the number of beef cows, indicates that land is not the limiting factor to the growth of Hawai'i's cattle industry. It further suggests that other ranches in the state could increase their herd sizes to compensate for the loss in beef production that will result from the loss of grazing land at the Project site.

Mitigating Measures

As discussed above, the Project will result in a relatively insignificant loss of grazing land. Moreover, this loss will have an insignificant impact on (1) Maui Cattle Co. and (2) Hawai'i's cattle industry. In view of these findings, mitigation measures for this loss of grazing land are not recommended.

b. **Nearby Farm Operations and Nuisance Issues**

Historically, nuisances arising from some farm operations can become an issue for both residents and farmers. Residents who live close to and downwind from farming operations may complain about occasional noise, dust, chemical spraying, smoke, etc. In turn, farmers may have to change their operations in order to address these complaints. The potential for nuisance problems between future residents of the Project and nearby farm operations is addressed below.

Nearby Farm Operations

Nearby sugarcane operations located to the east of the Project are not likely to cause significant nuisance problems to Project residents because the homes will be separated from the sugarcane fields by Honoapi'ilani Highway and by a buffer along the eastern boundary of the Project site. Also, residents will not be downwind of farm areas during prevailing tradewinds since these winds blow across the isthmus roughly parallel to Honoapi'ilani Highway.

To the north, the upwind sugarcane operations are not likely to cause significant nuisance problems because of the distance: about 4,200 feet (0.8 mile) to the nearest homes in the Project. For comparison, the condominiums near the Ma'alaea Small Boat Harbor are about 100 feet to 1,000 feet downwind from sugarcane fields.

Farming of the adjoining fallow fields to the north, which are owned by an affiliate of the Project developer, could place agricultural operations within about 1,000 feet of some of the homes in the Project. The distance is based on the minimum separation between some homes in the Project and the proposed effluent disposal area where crops could be grown to take advantage of good soils and high-quality agricultural water. In order to avoid potential nuisance issues, both the landowner and one or more future agricultural tenants are likely to limit activities to ones that are compatible with nearby homes. Instead of short-term crops on this land, more compatible agricultural uses could include cattle grazing on an irrigated pasture that would allow high stocking densities, or one or more orchard crops.

Mitigating Measures

Before new residents purchase homes and lots, they will be informed that they will be living near farming areas. This point will be highlighted in promotional brochures and will be spelled out in the sales contracts. Under these circumstances, buyers are more likely to accept that nearby farm operations are part of the ambiance and lifestyle of the area.

In any case, Hawai'i's Right-to-Farm Act gives farmers who were operating before neighboring properties were developed the right to farm even if they cause a nuisance, provided that the farm activity does not threaten public health or safety.[18]

In view of the above, no additional measures are needed to mitigate potential nuisance problems.

10. IMPACT ON THE GROWTH OF DIVERSIFIED CROP FARMING

The Project will commit agricultural land to a non-agricultural use. The impact of this commitment on the growth of diversified crop farming is addressed below. The material covers the (1) amount of land required for the future growth of diversified crops, (2) availability of land for diversified crops, (3) potential loss of agricultural land on Maui to development, (4) cumulative impact of the Project and other projects on the growth of diversified crop farming, and (5) mitigating measures.

a. **Potential Acreage Requirements for Diversified Crops**

Crops to Replace Imports of Fruits and Vegetables[19]

For low-elevation fruits and vegetables that have a history of profitable production in Hawai'i, potential land requirements in 2010 for 100% import substitution for the state and for Maui County are estimated at 12,700 acres and 1,700 acres, respectively, plus additional acreage for fallowing land between crop plantings. When allowing for competition from imports, these estimates drop to about half. These estimates take into account estimated consumption, production trends, seasonal and annual market shares, yields, and the number of crops per year. Also, these figures reflect acreage in crop—not harvested acreage as is typically reported in government publications.

Market shares for Hawai'i growers are limited by the following factors: (1) local varieties are not perfect substitutes for all imports (e.g., premium-priced sweet Maui onions versus inexpensive storage onions); (2) some crops cannot be produced profitably in the summer due to competition from low-cost imports of fruits and vegetables from California, other states, and Mexico; and (3) overproduction must be avoided in order to maintain profitable price levels.

Since Hawai'i farmers already supply a portion of the Hawai'i market, land requirements for increased import substitution are a fraction of the above estimates.

Export Crops[12,13,14]

The potential market for export crops is far larger than the Hawai'i market. In 2005, the U.S. population was 296.41 million, compared to Hawai'i's resident-plus-visitor population of 1.45 million. To take advantage of this large potential, Hawai'i farmers are exploring various export crops on lands released from plantation agriculture. Over the next 20+ years, one or more of these crops may prove to be successful and may grow into a major export crop.

However, the history of agricultural efforts in Hawai'i reveals that the successful development of major new export crops requiring large amounts of land is infrequent. For example, over the past 50 years in Hawai'i, farmers have explored numerous possibilities for export crops, but they have developed overseas markets for just one diversified crop that requires more than 10,000 acres (macadamia nuts at 18,000 acres in 2004); one additional crop that requires more than 5,000 acres (coffee at 7,700 acres); and only five additional crops or crop categories that require more than 1,000 acres each (papaya at 2,105 acres, bananas at 1,360 acres, tropical specialty fruits at 1,260 acres, flowers/nursery products at 3,874 acres, and seed crops at 3,870 acres). Tropical specialty fruits include longan, lychee, mango, rambutan, star-fruit, etc.

Feed Crops[20]

If feed crops could be grown in Hawai'i and priced competitively against mainland imports, they could replace some of the grains and hay that is now being imported to the state. Unfortunately, a number of commercial attempts in Hawai'i to grow grains and alfalfa have been unsuccessful. The major problems have been (1) pests, particularly birds that eat the grains before they are harvested; (2) humidity that is too high for drying alfalfa properly; and (3) high production costs compared to those of mainland farms.

Biofuel Crops[21-27]

Crops can be grown to produce biomass to fuel a boiler, or as feedstock to produce fuels. Examples of the latter include sugarcane, corn or sorghum used to produce ethanol. In turn, the ethanol is used to produce E-10 gasohol (90% gasoline and 10% ethanol).

In Hawai'i, the common practice is to produce biomass as a by-product of some principal crop. For example, at HC&S on Maui and at Gay & Robinson on Kaua'i, the sugarcane by-product bagasse is burned to help fuel their respective power plants. In addition, the biofuel company Maui Ethanol plans to use the sugarcane by-product, molasses, from the two sugarcane plantations as a feedstock to produce ethanol. Using conventional technology, the sugar in the molasses will be fermented to produce ethanol, followed by distillation to extract the alcohol.

However, O'ahu Ethanol Corporation plans to build an ethanol plant at Campbell Industrial Park using conventional technology but, at least initially, using imported molasses as the feedstock. The rated capacity will be 15 million gallons of ethanol per year. For the longer term, this company is exploring the economics of growing sweet sorghum to supply feedstock to its ethanol plant. The sorghum would have to be grown on O'ahu because it would be too expensive to ship the sorghum juice from a Neighbor Island to O'ahu. Sorghum juice is mostly water having a low concentration of sugar compared to molasses.

Acreage requirements for a new sorghum biofuel plantation on O'ahu would range from about 6,000 acres for viability to 15,000 if it were to replace all imported molasses. This acreage comprises a substantial share, if not all, of the estimated 14,700 acres of crop land that is available on O'ahu at year-end 2006. But it is a small share of the 160,000+ acres of crop land that will be available statewide (see Section 11.b).

A number of substantial difficulties must be overcome in order to develop a biofuel plantation that supplies feedstock for ethanol production, including:

— Long-term Leases

In many areas of the state, it will be difficult to lease the large amount of land required for a biofuel plantation at low lease rents for the 30 or so years required to capitalize the investment in a new plantation. Over time, other farmers and other users of land are likely to make higher offers for lease rents or land purchases. In view of this potential, the current market value of available agricultural lands is likely to be higher if the lands are not committed long-term at rents that would be low enough to be affordable for a biofuel plantation.

— Capital

Substantial investment capital will be required to cover the cost of a mill to extract the juice from a biofuel crop, a generating plant to provide power, improvements and upgrades to irrigation systems that are in disrepair, trucks and equipment to harvest and haul the sorghum to the mill and haul the sorghum juice to the ethanol plant, etc.

— Short-term Profitability

Annual revenues from selling the ethanol plus direct subsidies are estimated by the consultant at about $2,250 per acre (based on an estimated 900 gallons per acre per year of ethanol at about $2.50 per gallon). Even with subsidies, this is low compared to revenues from other crops in Hawai'i.

Furthermore, the cost of importing molasses for feedstock or importing ethanol may prove to be less expensive than growing a biofuel crop in Hawai'i. For similar crops (such as feed crops), importing has proven to be less expensive than growing and processing crops locally. Also, the U.S. Department of Agriculture has found sorghum to be an expensive feedstock for producing ethanol—about 3.7 times more expensive than corn and 63% more expensive than molasses.

As ethanol production increases on the mainland and in Hawai'i, there is a risk that the combined Federal and State subsidies for ethanol (nearly $1 per gallon) could be reduced, thereby compromising the profitability of a biofuel crop.

— Long-term Profitability

Over the long-term, emerging technology promises a cheaper source of feedstock for ethanol than does growing a biofuel crop on a plantation. Instead of producing ethanol using sugars from conventional sources (e.g., molasses, sugarcane, grains, fruits, etc.), the sugar would come from "cellulosic" sources. Using new technology that is in the early stages of commercialization, sugar that is locked in complex carbohydrates of plants is separated into fermentable sugars. Feedstock would include agricultural wastes,

yard clippings, discarded paper, wood waste, etc.—i.e., the green waste that is now used for composting. This new technology promises (1) much higher ethanol yields per ton of biomass because the entire plant can be used as feedstock, and (2) lower costs—particularly if there are no growing costs when waste product is used, and if the operator is paid a fee to dispose of municipal and agricultural waste. Eventually, this less expensive source of feedstock could result in unprofitable biofuel plantations. In Hawai'i, this new technology is being explored by Clear-Fuels Technology Inc.

O'ahu's municipal waste could produce an estimated 160 million gallons of ethanol compared to the current annual consumption of about 400 million gallons of gasoline. Assuming a similar ratio for Maui, about 40% of the island's fuel could be supplied by ethanol, which is four times as much ethanol than is needed for E-10.

The above difficulties and risks suggest that the probability of successfully developing and sustaining a biofuel plantation in Hawai'i is low. The more likely scenario is that ethanol will be produced as a by-product of sugar and, over the long-term, it will be produced from green waste.

Recent Trends in Crop Acreage

For all diversified crops—i.e., all crops other than sugarcane and pineapple, including crops to replace imports and crops for export—statewide land requirements grew by an average of 240 acres per year from 1984 through 2004, or about 2,400 acres per decade (see Figure 10).[1]

From 1999 to 2004, crop acreage increased for just three of the major export crop categories: tropical specialty fruits up 350 acres, flowers/nursery products up 1,162 acres, and seed crops up 1,420 acres. During this same period, acreage declined for three of the major export crops: macadamia nuts down 1,900 acres, papaya down 1,395 acres, and bananas down 400 acres. Coffee remained unchanged. The net change was a decrease of 763 acres.

Factors Limiting the Growth of Diversified Crops[19]

A great many crops can be grown in Hawai'i's year-round subtropical climate, and a number of them can be grown profitably in volumes requiring a few hundred acres. However, the modest growth in land requirements for

1. In Figure 10, the temporary bump in diversified-crop acreage that occurred in the late 1990s reflects the fact that some former sugarcane fields were newly planted with grasses for future cattle grazing. After cattle grazing began in 2000, much of this acreage was recategorized from crop land to grazing land.

diversified crops reflects the fact that few crops can be grown profitably on a large scale. The primary factors that have limited the growth of diversified agriculture in Hawai'i are given below.

- Hawai'i's subtropical climate is not well-suited to the commercial production of major crops that grow better in the temperate mainland climates.
- For certain crops, special hybrids adapted to Hawai'i's subtropical climate are yet to be developed.
- Crop pests are more prevalent and more expensive to control in Hawai'i than they are on the mainland where the cold winters kill many pests.
- Fruit-fly infestations prevent exports of many crops, or require expensive treatment.
- Most soils in Hawai'i have low nutrient levels and therefore require high expenditures for fertilizer.
- Hawai'i suffers from high farm-labor costs, largely because the agriculture industry must compete against the visitor industry and related industries for its labor.
- Compared to many other farm areas that supply U.S. markets, the cost of shipping agricultural supplies and equipment to Hawai'i is high, as is the cost of exporting produce from Hawai'i to mainland markets. High shipping costs are due to Hawai'i's remote location and to Federal regulations that require use of American-built ships and U.S. crews between U.S. ports.
- For a number of crops, consumption volumes in Hawai'i are too small to support large, efficient farms (i.e., the volumes are too small to realize economies of scale).
- Trends towards crops that are certified as safe and towards a single supplier of many food items favor large farms.
- Hawai'i farmers must compete against highly efficient mainland and foreign farms which, in a number of cases, can deliver produce to Hawai'i more cheaply than it can be produced locally. This is due to economies of scale and, in comparison to Hawai'i, low costs for land, labor, supplies, fertilizer, pest control, equipment, etc.

b. Statewide Availability of Land for Diversified Crops

Statewide, a vast amount of land has been released from plantation agriculture: about 249,900 acres between 1968 and 2004—an average decrease of over 6,940 acres per year over a 36-year period (see Figure 10).[12,28] The 2006 closure

of Del Monte's pineapple plantation on O'ahu increased this acreage by about 5,100 acres, resulting in a total release of at least 255,000 acres from plantation agriculture between 1968 and 2007.[29]

Over this same period, the demand for land for diversified crops increased by about 26,500 acres, or an average of about 740 acres per year. Since 1984, the growth has slowed to an average of 240 acres per year, as previously mentioned.

As the above indicates, the release of land from plantation agriculture has far outpaced the demand for land for diversified crops. The net decrease in crop land between 1968 and 2004 amounted to 223,400 acres; this figure has increased to about 228,500 acres after adding the land fallowed by Del Monte. While some of the released land has been converted or is scheduled to be converted to urban uses and tree plantations, an estimated 160,000+ acres remain available for diversified crops.[27] Because of the increased availability of agricultural land, a number of landowners report lower per-acre land rents on O'ahu and the Neighbor Islands compared to rents that were charged before the major contraction of plantation agriculture.[26]

Once the Superferry begins operating in 2007, cultivating crops on the Neighbor Islands for the Honolulu market, and vice versa, will become more economically feasible. For a full load carried in a large pick-up truck, the one-way fare will be about 2¢ per pound.[30] This will increase the importance of the statewide availability of agricultural land vis-a-vis the island-wide availability.

The above indicates that ample land is available in Hawai'i to accommodate the growth of diversified crops, whether demand is based on potential or recent trends. In other words, the limiting factor to the growth of diversified crops is *not* the *land supply*, but rather the *size of the market* for crops that can be grown *profitably* in Hawai'i.

c. Maui Island Availability of Land for Diversified Crops

The above findings also apply to Maui. Since 1977, the contraction and eventual closure of Wailuku Sugar Co. and Pioneer Mill released about 11,200 acres from sugarcane production. In addition, the contraction of pineapple operations has released about 5,000 acres since 1993.

During the 1980s, about 4,700 acres of sugarcane land in Central Maui were made available for other uses. Some of this land was developed; some was planted in macadamia nuts which continued until 1999; some was planted in pineapple; some was transferred to HC&S; and some remains fallow.

During the 1990s, the reduction in sugarcane acreage occurred in West Maui, including about 6,000+ acres released in 2000. Similarly, most of the recent reduction in pineapple acreage occurred in West Maui, including about 3,200 acres that were released in 2003. Some of this former plantation land in

West Maui was developed and some was converted to other crops, but most of it remains fallow or is used for grazing cattle.

In summary, considerable land remains available on Maui for diversified agriculture, although most of it is in West Maui.

d. Potential Loss of Agricultural Land on Maui to Development[13,31-33]

Based on information provided by the Maui County Planning Department, Appendix A provides a summary of 202 major residential, resort, commercial, and industrial development projects on Maui Island that will either increase the number of residential and visitor units, or involve agricultural land. The listing, which reflects the known development projects as of April 2006 (with minor updates), excludes those having fewer than six dwelling units, and subdivisions having fewer than four lots.

The development projects listed in Appendix A are organized by District, entitlements, then alphabetically. Entitlements are defined as follows:

— Committed projects include (1) those having 201G approval, (2) those having Project District zoning, (3) Department of Hawaiian Home Lands (DHHL) projects, (4) approved agricultural subdivisions, and (5) other projects for which the land is zoned for development.

— Designated projects include those having (1) urban Community Plan designation, and (2) Project District zoning but no Phase 2 approval.

— Proposed projects include those lacking urban Community Plan designations.

To the extent that information was provided and is relevant, the information on each project listed in Appendix A includes:

— its entitlements;

— the number of homes (single-family and multi-family homes), the number of visitor units (hotel rooms and time-share units), and the total number of units;

— its total area (if provided and needed only for projects that involve agricultural land), along with the average acreage per unit (i.e., the reciprocal of the density, which applies only to projects that have residential or visitor units); and

— the acreage that is within the State Agricultural District, along with an acreage adjustment, explained below.

If all of the committed, designated and proposed residential and resort projects on Maui Island were approved, built and sold, they would supply about 45,740 homes, including about 30,250 single-family homes and 15,490 multi-family homes (see p. A-5).

Economic projections prepared by the Maui County Planning Department (June 2006) for the Maui County General Plan 2030 forecast that the number of homes on Maui Island will increase from about 49,870 in 2005 to about 84,350 in 2030, resulting in an increase of about 34,480 homes over this 25-year period. Over time, the pace of development is expected to follow a linear trend, fluctuating above and below the average of about 1,380 new homes per year (34,480 homes ÷ 25 years). At the projected demand of about 1,380 new homes per year, the potential supply of homes listed in Appendix A could be absorbed in about 33 years (a total of 45,740 homes ÷ 1,380 homes per year).

As can be seen on p. A-5, the projects listed in Appendix A would affect about 19,900 acres on Maui Island that are now in the State Agricultural District. Although this accounting includes some agricultural subdivisions where most of the land will be lost to homes, it also includes other agricultural subdivisions where most of the land will remain available for agriculture. In practice, an estimated 11,800 acres in the State Agricultural District would be lost to agriculture if all of these projects were approved and built. This estimate is based on the assumption that agricultural subdivisions having at least 2.5 acres per home will remain available for agriculture.

The estimated 11,800 acres of agricultural land includes prime agricultural land, low-quality land that is suitable for grazing but not farming, and gulch land. It represents less than 5% of the 244,600 acres on Maui Island that are in the State Agricultural District.

In summary, the eventual development over a period of about 33 years of all the committed, designated and proposed projects listed in Appendix A, including the loss of 210 acres for the Pu'unani Subdivision, would leave about 232,800 acres on Maui Island available for agricultural use (244,600 acres − 11,800 acres).

e. Cumulative Impact on the Growth of Diversified Crop Farming

Including the wastewater treatment plant, the Project will commit 262 acres of agricultural land to a non-agricultural use. If this land were used to grow a typical vegetable or fruit crop, then it could support about 33 farm jobs (based on about 12.5 jobs per 100 acres).

More realistically, development on this agricultural land—combined with other developments in Hawai'i and on Maui Island—involves the loss of too little agricultural land to significantly affect (1) the availability of land to farmers in Hawai'i, (2) agricultural land rents, (3) the growth of diversified crops, or (4) potential agricultural employment. This conclusion is based on the finding that, as a result of the contraction of plantation agriculture, ample land is available for diversified crops, with the available supply far exceeding likely or potential demand.

However, in Central Maui, the Project might adversely affect the growth of diversified agriculture somewhat since the market for agricultural land is tighter there than it is in most other areas of the state.

f. Mitigating Measures

In view of the small impact of the Project on the growth of diversified agriculture, mitigation measures for the lost agricultural land are not recommended.

11. OFFSETTING BENEFITS

a. Non-agricultural Benefits

The loss of 262 acres of agricultural land will be offset by the following benefits of the Project:

- 949 homes for Maui residents including senior care housing and affordable housing, along with a community center, parks, open space, and supporting infrastructure;
- construction jobs and other jobs provided by the development activity;
- at full development of the Project, jobs generated by residents of the Project who purchase goods and services on Maui;
- tax revenues (excise taxes, personal income taxes, corporate income taxes, property taxes, etc.) generated by development activity; and
- tax revenues generated by the families who occupy homes in the Project.

b. Agricultural Benefits

Preservation of Prime Agricultural Land Supplied with Water

In addition to the above, the Project will provide agricultural benefits—namely, it will preserve the 85-acre wastewater disposal area for future agricultural use. This is high-quality agricultural land consisting of soil type PtA, and rated IIe under the NRCS system, Prime under the ALISH system, and A under the LSB ratings (see Subsections 4.a and 4.b). Furthermore, about 600,000 gallons of water per day will be available for irrigating crops or pasture land (see Section 3). This volume is sufficient to irrigate about 150 acres at 4,000 gallons per acre per day. Furthermore, the water will be treated to the R-1 standard, which allows any method of irrigation of any crop. As mentioned in Subsection 9.b., agricultural uses that would be compatible with the Project would include orchard crops and cattle grazing. An irrigated pasture would allow a high-carrying capacity for grazing.

Support for Affiliated Agricultural Operations

The Project developer is affiliated with other Hawai'i companies that are engaged directly or indirectly in farming, including the following:

- Maui Tropical Plantation (MTP), which is a 60-acre commercial agricultural park that introduces various Hawaiian crops to visitors.
- Coffees of Hawai'i which restarted a 300-acre coffee plantation on Moloka'i in 2006, and which will be planting in 2007 a new 150-acre coffee farm on Maui *mauka* of MTP. The Moloka'i operation provides about 15 to 20 jobs during the off season, increasing to about 30 jobs during harvest. The Maui operation is expected to start with about 15 to 20 jobs.
- The owner of about 1,300 acres of agricultural land that is leased to HC&S for cultivating sugarcane. The fields are located *mauka* of Honoapi'ilani Highway and south of Waikapu.

Many agricultural operations in Hawai'i are marginally profitable, including MTP and probably most coffee farms. As such, the association of MTP and Coffees of Hawai'i with the Project may contribute to their economic health by having profits from development (1) cover losses from farming during lean years, and (2) contribute capital to improve or further expand the farms. For many major landowners in Hawai'i, this relationship between one or more development projects and affiliated agricultural operations has been evident since at least the 1960s.

12. CONSISTENCY WITH STATE AND COUNTY POLICIES[34]

a. Availability of Lands for Agriculture

The *Hawai'i State Constitution*, the *Hawai'i State Plan*, the *State Agriculture Functional Plan*, the *County of Maui General Plan 1990*, and the County's *Kihei-Makena Community Plan* call directly or implicitly for preserving the economic viability of plantation agriculture and promoting the growth of diversified agriculture. To accomplish this, an adequate supply of agriculturally suitable lands and water must be assured.

With regard to plantation agriculture, the Project site is no longer part of a sugarcane or pineapple plantation.

With regard to diversified agriculture, the Project will reduce the availability of agricultural land by a relatively small amount. However, the Project will not limit the statewide growth of diversified agriculture since ample agricultural land is available. This is due to the enormous supply of agricultural land that is now available due to the contraction of plantation agriculture (see Figure 10). However, the growth of diversified agriculture in Central Maui might be limited due to the tighter agricultural land market there.

b. Conservation of Agricultural Lands

In addition to the above, State and County policies call for conserving and protecting prime agricultural lands, including protecting agricultural lands from urban development.

However, these policies—which for the State were written before the major contraction of plantation agriculture in the 1990s—assume implicitly that profitable agricultural activities eventually will be available to utilize all available agricultural lands. This has proven to be a questionable assumption in view of the enormity of the contraction of plantation agriculture, the abundant supply of land that came available for diversified agriculture, and the slow growth in the amount of land being utilized for diversified agriculture (see Section 10 and Figure 10).

Furthermore, discussions in the Agriculture portion of the *State Functional Plan* recognize that redesignation of lands from Agricultural to Urban should be allowed "... upon a demonstrated change in economic or social conditions, and where the requested redesignation will provide greater benefits to the general public than its retention in ...agriculture;" that is, when an "overriding public interest exists." The enormous contraction in plantation agriculture, resulting in the supply of agricultural land far exceeding demand, constitutes a major change in economic conditions. Moreover, development of the Project will provide community and agricultural benefits (about 949 homes, construction jobs, jobs generated by the purchase of goods and services by Project residents, tax revenues, preservation of 85 acres of prime agricultural land supplied with an ample volume of high-quality agricultural water, and occasional financial support for affiliated agricultural operations) that far exceed those provided by agriculture (less than one job with the current grazing operation).

In practice, development of the Project site is expected to have no significant adverse impact on existing or potential agricultural employment. However, it could contribute new agricultural jobs on the nearby 85 acres that will be preserved, and could contribute to preserving or increasing employment for the affiliated agricultural operations.

c. State Districting

The Project site is within State Agricultural District (see Figure 4). However, Ma'alaea Properties is filing a petition with the State Land Use Commission for a District Boundary Amendment to redesignate the Project site to the "Urban" District.

d. County of Maui General Plan

County of Maui zoning for the project site is "Agricultural." However, Ma'alaea Properties plans to file a petition with the County for a change in zoning to conform to the *Kihei-Makena Community Plan.*

e. Kihei-Makena Community Plan

The Project is consistent with the *Kihei-Makena Community Plan* (Figure 5) which designates the site "Project District 12," thereby allowing for a residential community at Ma'alaea Mauka.

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[33] Appendix A. Maui Island Development Projects: April 2006.

[34] Appendix B. "Selected State and County Goals, Objectives, Policies and Guidelines Related to Agricultural Lands."

FIGURES

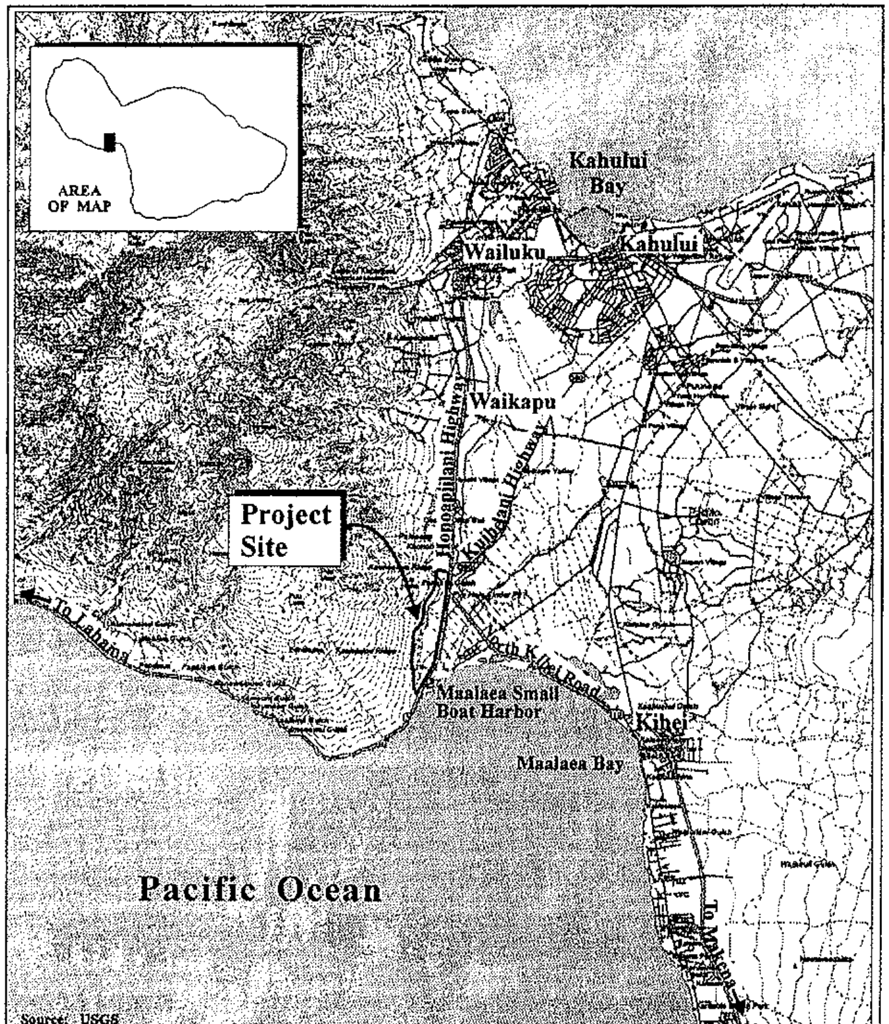


Figure 1 Proposed Ma`alaea Mauka Residential Subdivision
Regional Location Map
NOT TO SCALE

Prepared for: Maalaea Properties, LLC

MUNEKIYO HIRAGA, INC.

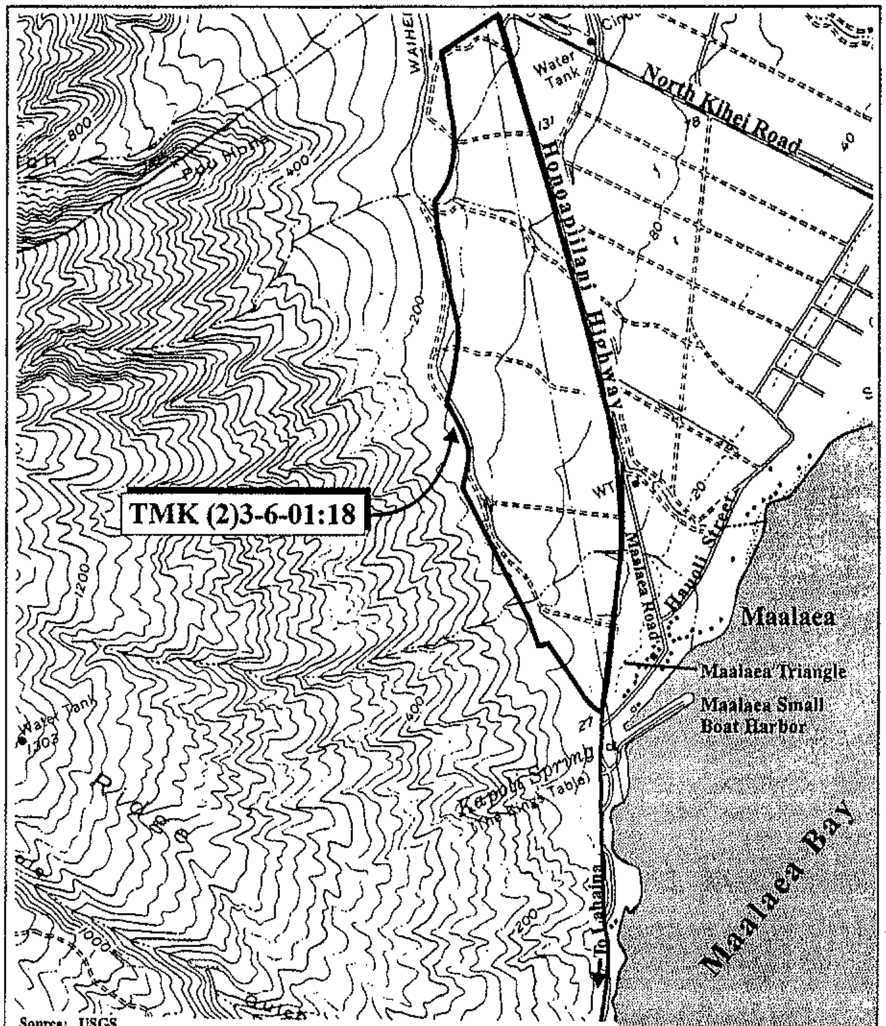
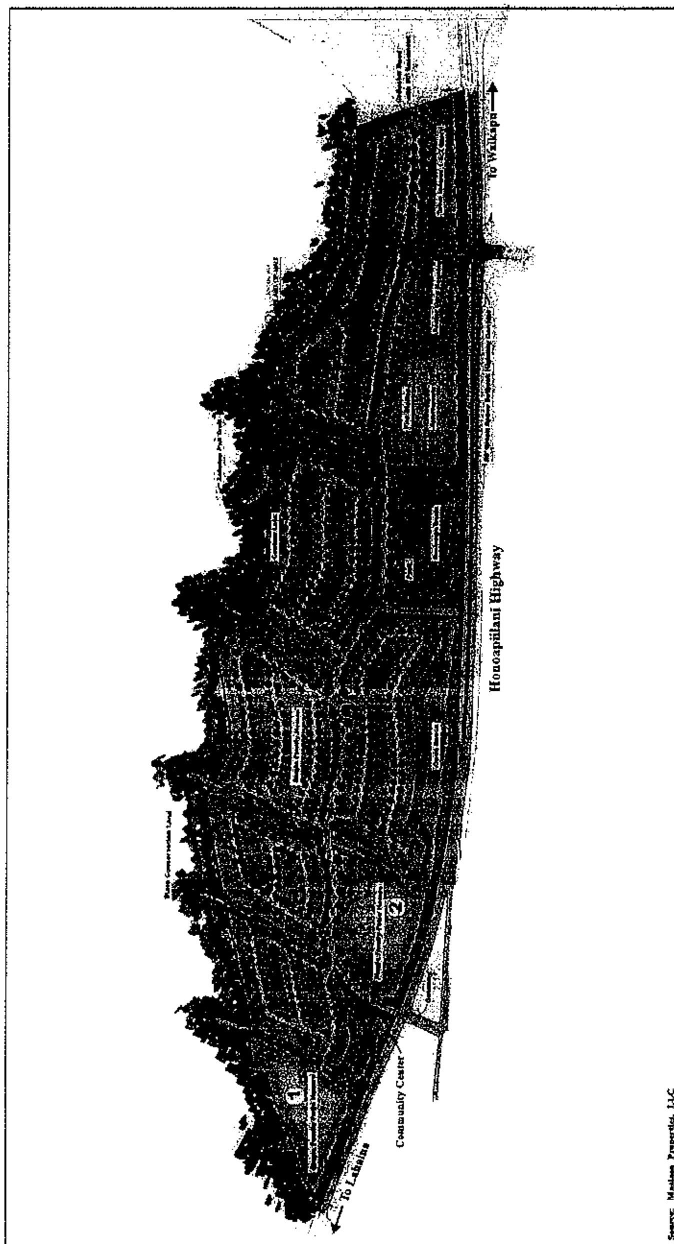


Figure 2 Proposed Ma`alaea Mauka Residential Subdivision
Site Location Map
NOT TO SCALE

Prepared for: Maalaea Properties, LLC

MUNEKIYO HIRAGA, INC.



Source: Maalaea Properties, LLC

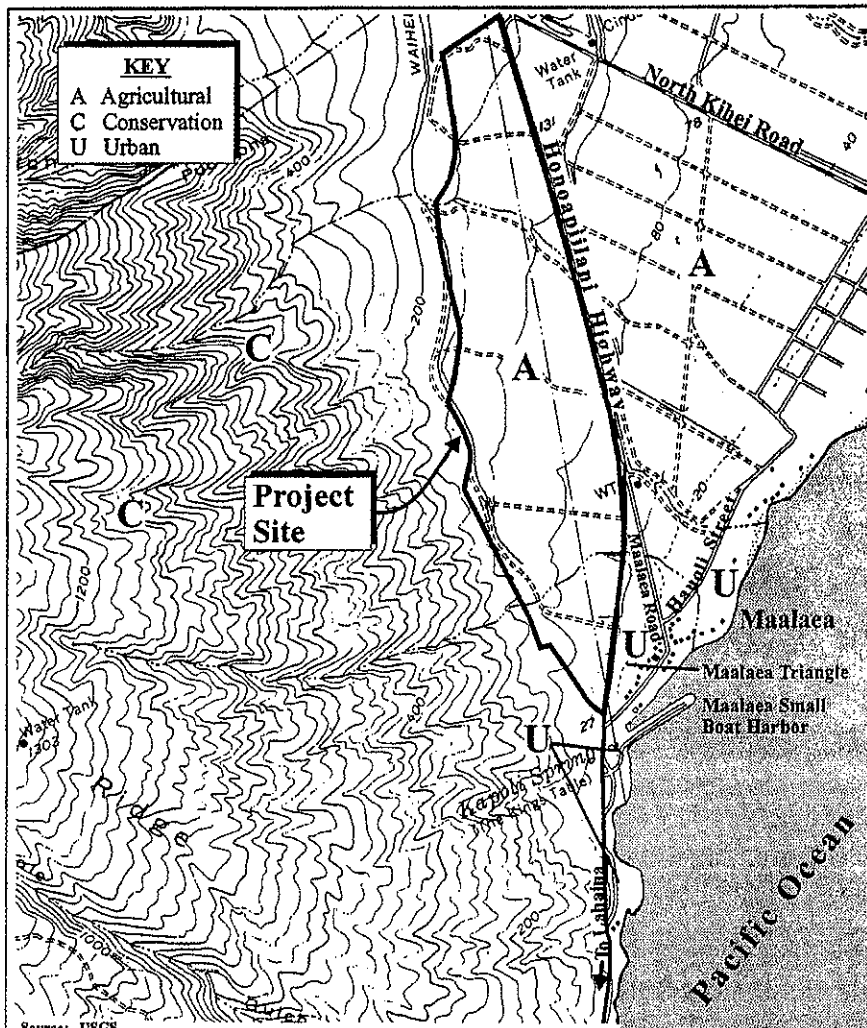
Figure 3

Proposed Ma`alaea Mauka Residential Subdivision
Preliminary Subdivision Plan

NOT TO SCALE

Prepared for: Maalaea Properties, LLC

MUNEKIYO HIRAGA, INC.



Source: USGS

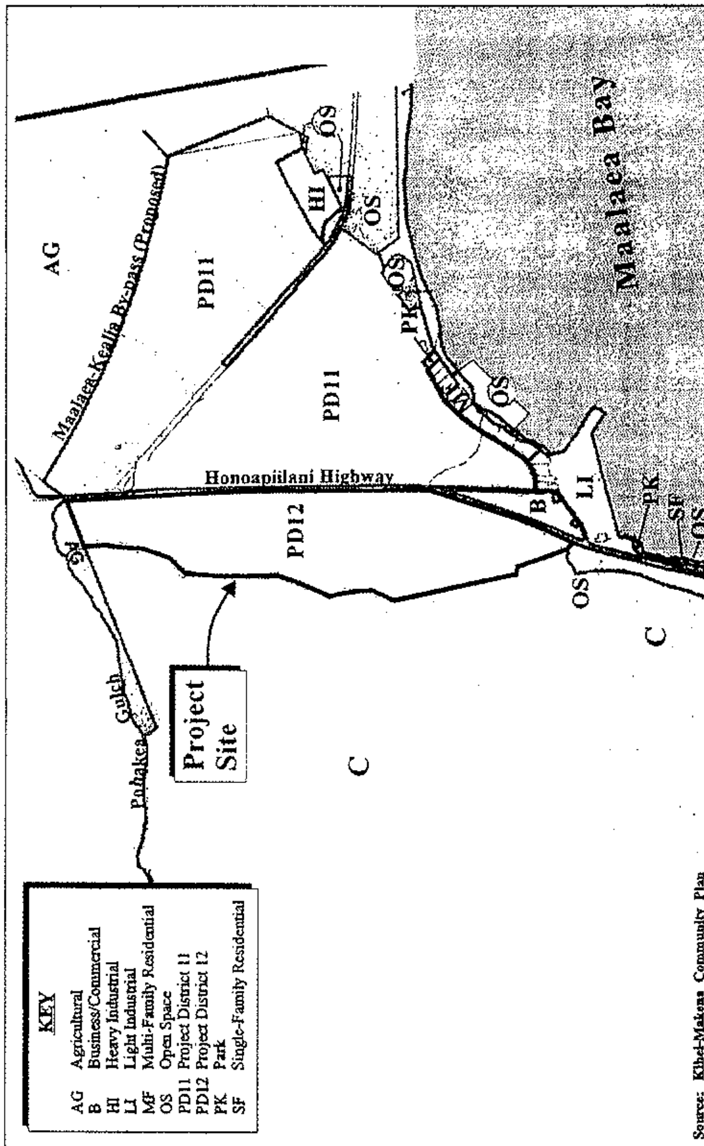
Figure 4

Proposed Ma`alaea Mauka Residential Subdivision
State Land Use Classification

NOT TO SCALE

Prepared for: Maalaea Properties, LLC

MUNEKIYO HIRAGA, INC.



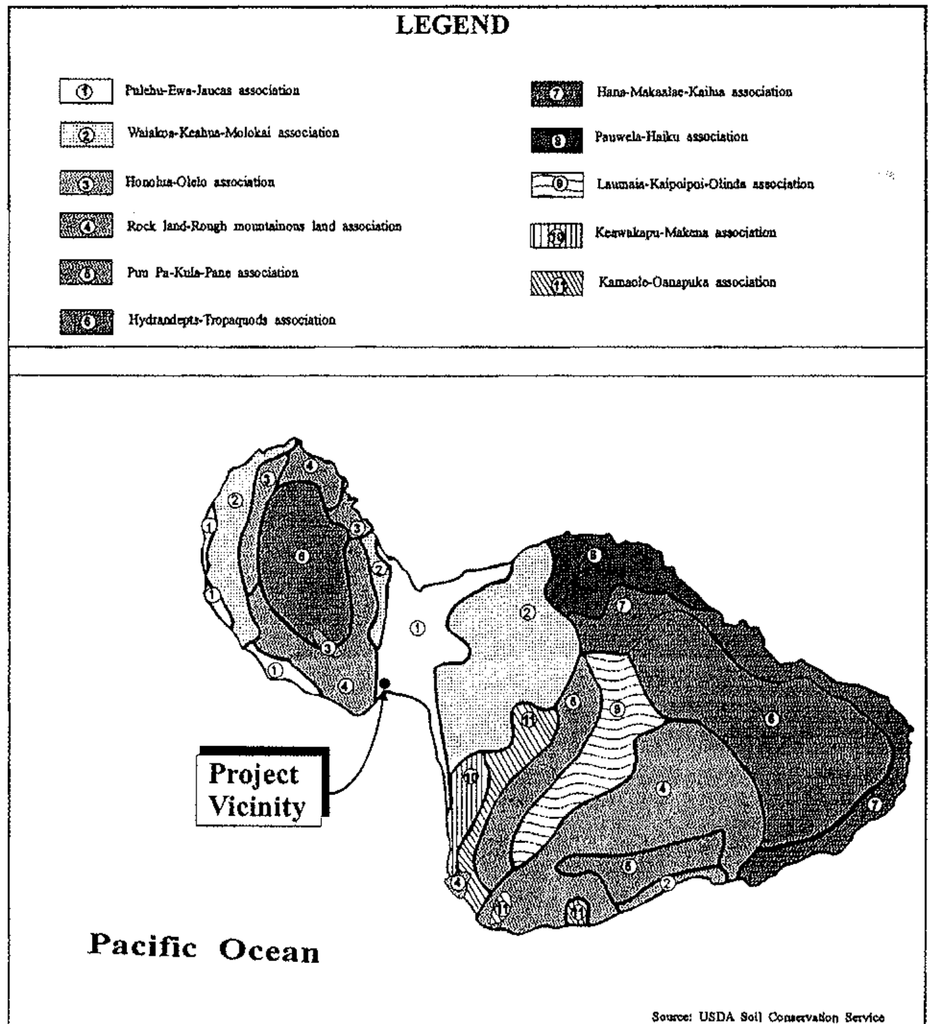
Source: Kihei-Makena Community Plan

Figure 5 Proposed Ma`alaea Mauka Residential Subdivision NOT TO SCALE

Kihei-Makena Community Plan Land Use Designations

Prepared for: Maalaea Properties, LLC

MUNEKIYO HIRAGA, INC.



Source: USDA Soil Conservation Service

Figure 6 Proposed Ma`alaea Mauka Residential Subdivision NOT TO SCALE

Soil Association Map

Prepared for: Maalaea Properties, LLC

MUNEKIYO HIRAGA, INC.

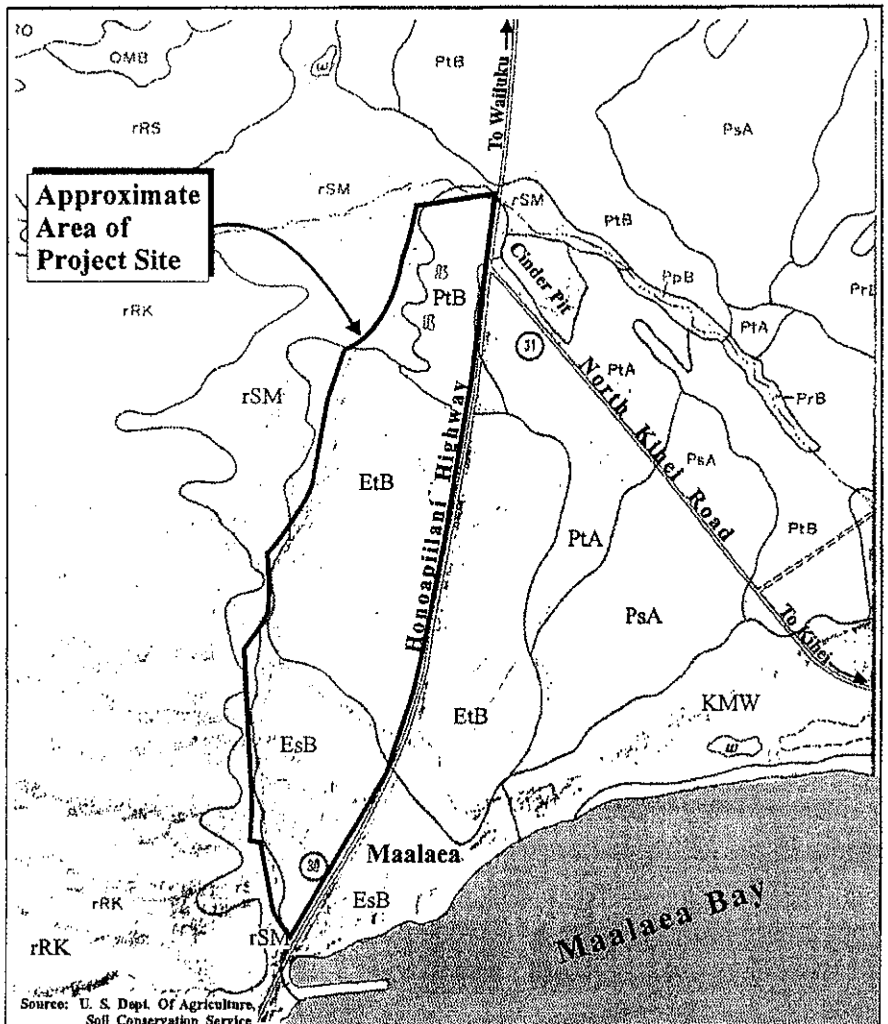


Figure 7 Proposed Ma`alaea Mauka Residential Subdivision Soil Classification Map

NOT TO SCALE

Prepared for: Maalaea Properties, LLC

MUNEKIYO & HIRAGA, INC.

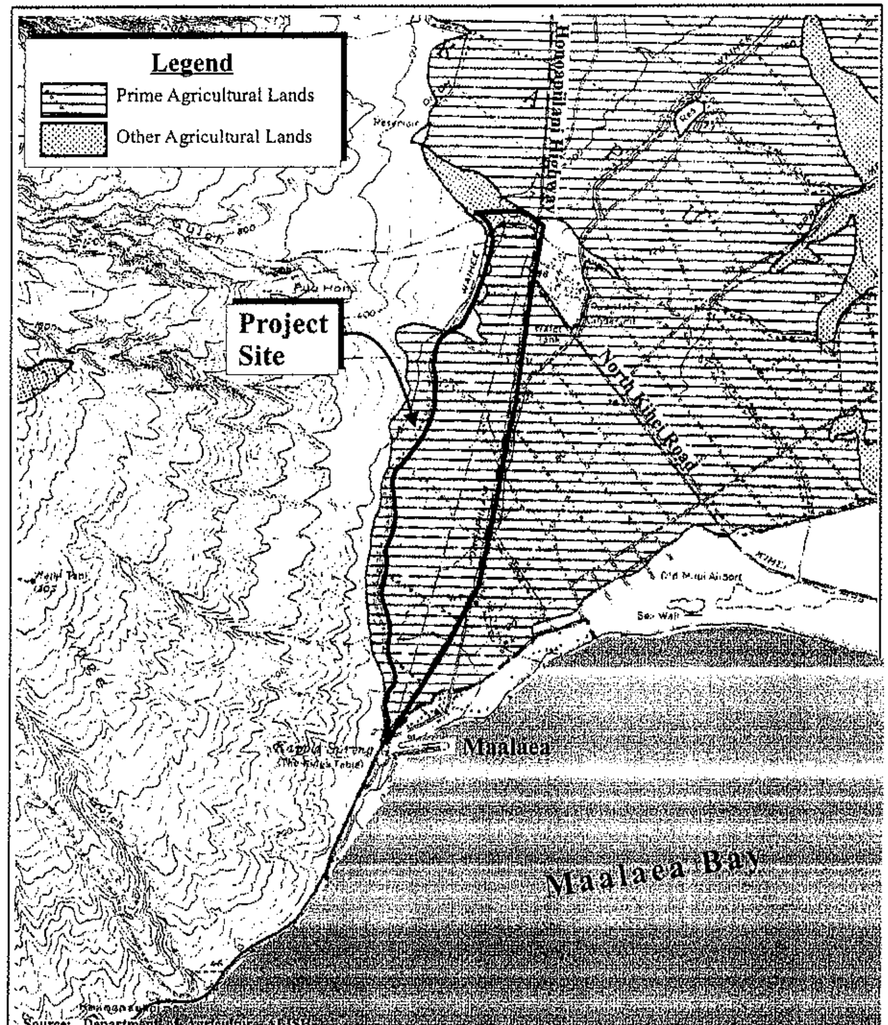


Figure 8 Proposed Ma`alaea Mauka Residential Subdivision Agricultural Lands of Importance to the State of Hawaii

NOT TO SCALE

Prepared for: Maalaea Properties, LLC

MUNEKIYO & HIRAGA, INC.

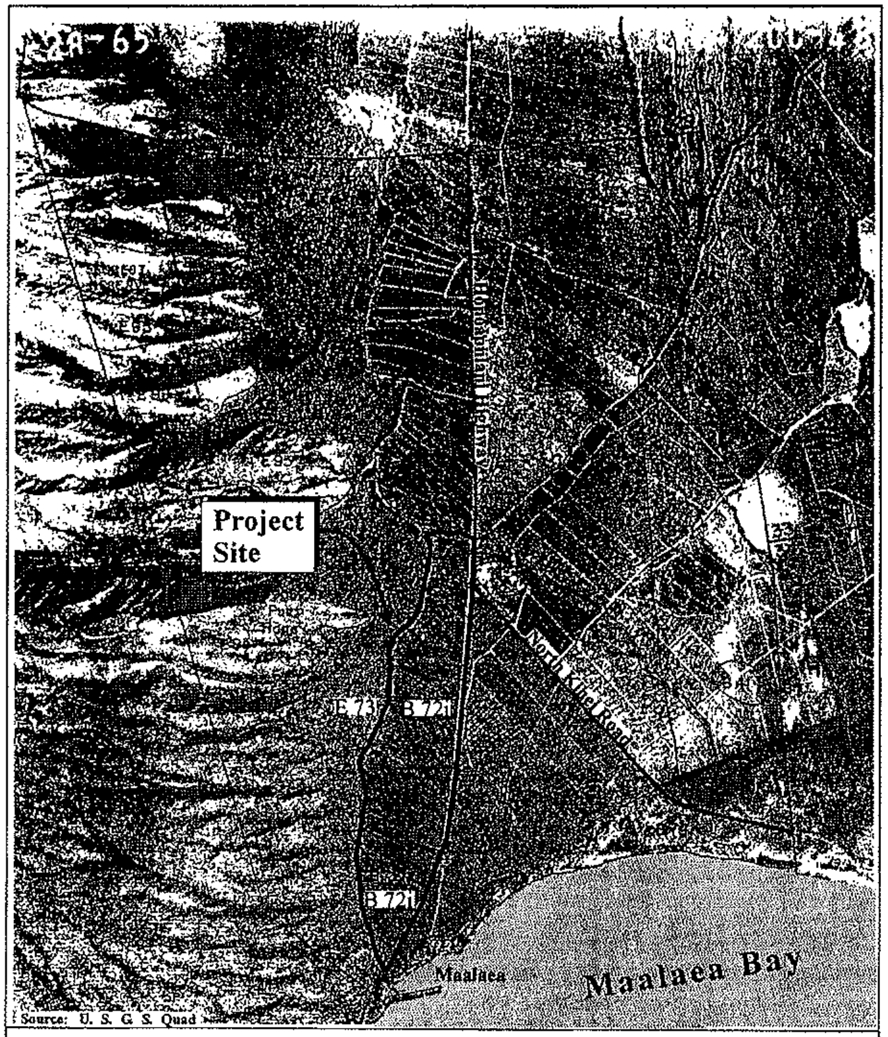
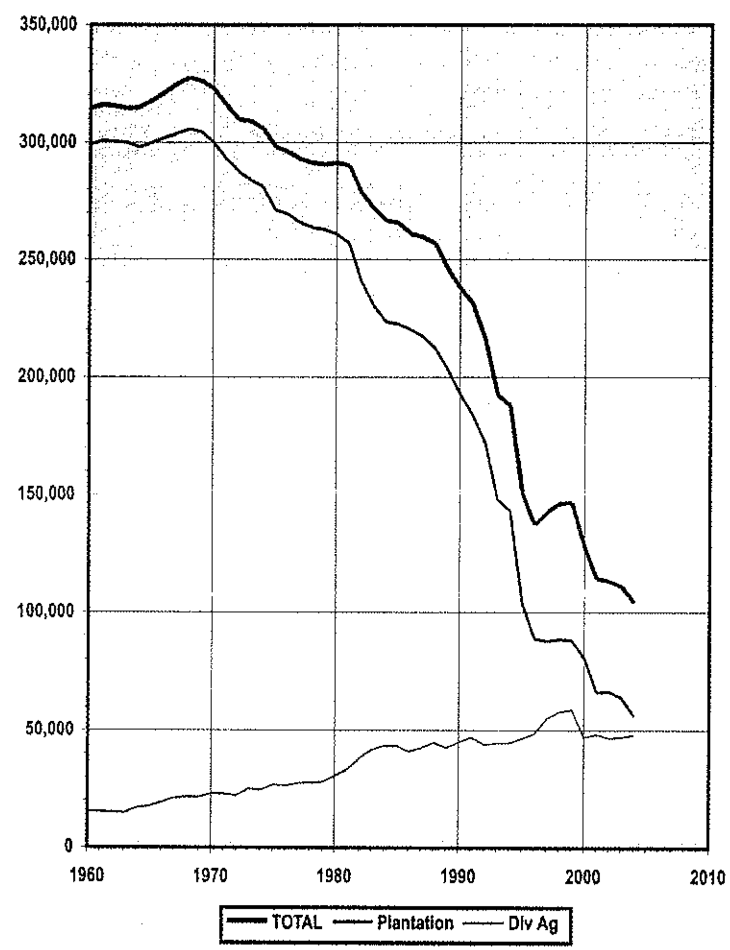


Figure 9 Proposed Ma`alaea Mauka Residential Subdivision Detailed Land Classification NOT TO SCALE

Prepared for: Maalaea Properties, LLC

MUNEKIYO HIRAGA, INC.

Figure 10 - Statewide Acreage in Crop: 1960 to 2004



APPENDICES

Appendix A. Maui Island Development Projects: April 2006

Project Location and Name	Entitlements	Homes or Units: Single-family Homes	Multi-family Homes	Hotel & Time-share Units	Total	Project Area: Total Project (acres)	Acres per Unit	State Ag District: Total (acres)	Adjusted (acres)
West Maui									
Honokowai DHHL	Committed	1,250			1,250	780	0.62	780	780
Honolua Ridge: Ph. 1&2	Committed	50			50	441	8.82	439	
Intrawest Honua Kai (North Beach Lot 4)	Committed		700		700	n.e.	n.e.	-	
Ka'anapali Coffee Farms	Committed	58			58	338	5.79	338	
Kaanapali Residences - Landtech: Parcel 10-H	Committed	18			18	n.e.	n.e.	-	
Kahana Ridge Villas	Committed		117		117	n.e.	n.e.	-	
Kapalua Bay	Committed			155	155	n.e.	n.e.	-	
Kapalua Mauka: Master Plan; PD 2	Committed	690			690	1,085	1.57	1,085	1,085
Kapalua: _Master Plan; PD 1	Committed	900		1,050	1,950	249	0.13	-	
Kapalua_Mauka Residential	Committed	690			690	n.e.	n.e.	-	
Kapua Village: ML&P employees	Committed	45			45	n.e.	n.e.	-	
Laipoa Point Homesites	Committed	40			40	n.e.	n.e.	-	
Launiupoko: Mahanalua Nui: 1	Committed	131			131	438	3.34	438	
Lokahi Kuhua	Committed	12			12	n.e.	n.e.	-	
Mahanalua Nui: Ph. 5	Committed	9			9	n.e.	n.e.	-	
Makila Plantation: Ph. 1 & 2	Committed	52			52	465	8.94	465	
Makila Ridge: Large Lots	Committed	11			11	458	41.64	458	
Marriott Maui Ocean Club: Sequel Towers	Committed			148	148	n.e.	n.e.	-	
Na Hale O Wainee: Ph. 2	Committed		26		26	5	0.19	5	5
Napili Kahuna (Kili Noe Subdiv)	Committed	10			10	n.e.	n.e.	-	
North Beach: Starwood (Lot 2)	Committed			516	516	n.e.	n.e.	-	
North Beach: Weston (Lot 1)	Committed			399	399	n.e.	n.e.	-	
Plantation Inn	Committed			14	14	n.e.	n.e.	-	
Pu'unoa: Ph. 1 & 2	Committed	24			24	168	7.00	168	
Royal Lahaina Resort revitalization	Committed			455	455	n.e.	n.e.	-	
Sunstone	Committed	5			5	n.e.	n.e.	-	
Ukumehama Homes: Ph. 1,2+Ohanas	Committed	46			46	280	6.09	280	
Ukumehame Park	Committed				-	111	n.a.	111	111
Villages of Leiali'i: Ph. 1A	Committed	104			104	n.e.	n.e.	-	
Villages of Leiali'i: Ph. 1B	Committed	253			253	99	0.39	-	
West Maui Breakers 1	Committed		90		90	n.e.	n.e.	-	
Hyatt Regency Maui: Timeshare Project	Proposed			806	806	n.e.	n.e.	-	
Ka'anapali 2020: _Residences	Proposed	1,257	1,553		2,810	2,004	0.71	1,695	1,695
Kahoma Employee Housing	Proposed	60	12		72	17	0.24	17	17
Kahoma: _Lots	Proposed	53			53	876	16.53	874	
Kamehameha Schools Ku'ia Residential Infill	Proposed	900			900	211	0.23	211	211
Lipoa Point Homes	Proposed	25			25	247	9.88	244	
Makila Farms: _Large Lots	Proposed	38			38	1,292	34.00	1,291	
Napili Mauka Residences	Proposed	10			10	n.e.	n.e.	-	
Olowalu Mauka & Makai Plan: Master	Proposed	1,500			1,500	631	0.42	609	609
Pineapple Ridge	Proposed	24			24	9	0.38	-	
Pulelehua: Maser, Proposed PD	Proposed	533	349		882	309	0.35	309	309
Villages of Leiali'i: Master	Proposed	2,006	2,840		4,846	n.e.	n.e.	-	
Wainee Villages	Proposed	401	464		865	193	0.22	184	184
Total West Maui		11,205	6,151	3,543	20,899	10,704		9,999	5,006

Project Location and Name	Entitlements	Homes or Units: Single-family Homes	Homes or Units: Multi-family Homes	Homes or Units: Hotel & Time-share Units	Homes or Units: Total	Project Area: Total Project (acres)	Project Area: Acres per Unit	State Ag District: Total (acres)	State Ag District: Adjusted (acres)
North Maui									
Kahul Pono Subdivision III	Committed	3			3	4	1.33	4	4
Krauss Subdivision	Committed	4			4	9	2.25	9	9
Maliko Bay Homes	Committed	8			8	45	5.63	45	
Maliko Ranch: _Lots	Committed	3			3	10	3.33	10	
Masaaki Doi Subdivision	Committed	3			3	36	12.00	33	
Pe'ahi Farms at Opana Point	Committed	16			16	270	16.88	270	
Pe'ahi Hui Lands	Committed	3			3	1	0.33	1	1
Puu o Maleli Rural Subdivision	Committed	3			3	n.e.	n.e.	-	
Ross Subdivision	Committed	5			5	11	2.20	11	11
Wagner Subdivision	Committed	3			3	5	1.67	5	5
Paia School Community: Project District 1	Designated	330			330	n.e.	n.e.	-	
Kuau Residential A&B	Proposed	140			140	67	0.48	-	
Total North Maui		521	-	-	521	458		388	30
Central Maui									
Central Maui Landfill, Phase IV	Committed				-	29	n.a.	29	29
Consolidated Baseyards	Committed				-	21	n.a.	21	21
E Paepae Ka Pukoa: Spreckelsville	Committed	16			16	45	2.81	-	
Hale Kapili Project	Committed		4		4	n.e.	n.e.	-	
Iao Valley Large Lot Subdivision	Committed	7			7	n.e.	n.e.	-	
Kahalui Town Center Redevelopment	Committed		302		302	n.e.	n.e.	-	
Kane Street Condos and Shops	Committed		90		90	n.e.	n.e.	-	
Kehalani Master Plan Project District 3	Committed	1,403	829		2,232	n.e.	n.e.	-	
Lokenani Hale: Sr. Affordable Housing	Committed		62		62	n.e.	n.e.	-	
Malaihi Ag Subdivision	Committed	10			10	72	7.20	69	
Malaihi Mauka Ag Subdivision	Committed	2			2	n.e.	n.e.	-	
Marriott Courtyard Hotel: Kahalua Airport	Committed			140	140	n.e.	n.e.	-	
Maui Lani: Master Plan PD 1	Committed	3,163	502		3,665	1,085	0.30	76	76
Maui Student Housing	Committed		400		400	n.e.	n.e.	-	
Pi'ihana: _Project District 2	Committed	95	440		535	73	0.14	5	5
Waiehu Aina	Committed	17			17	279	16.41	261	
Waiehu Kou, Phase 3	Committed	115			115	42	0.37	20	20
Waihee Mauka Ag Subdivision	Committed	16			16	113	7.06	113	
Waihee Valley Large Lot Subdivision	Committed	24			24	373	15.54	373	
Waikapu Gardens	Committed	410			410	95	0.23	95	95
Waiko Mauka Ag Subdivision	Committed	2			2	22	11.00	22	
Wailuku Country Estates	Committed	184			184	452	2.46	449	449
Waiolani: Elua	Committed	37			37	n.e.	n.e.	-	
Waiolani: Mauka	Committed	104			104	n.e.	n.e.	-	
Winn 4lot	Committed	4			4	152	38.00	152	
Waiehu Kou, Phase 4	Committed	96			96	n.e.	n.e.	-	
Waiolani : Pikaki	Committed	38			38	n.e.	n.e.	-	
Hale Hoomanu_Mental Health Kokua	Designated		6		6	n.e.	n.e.	-	
Hale Mua	Designated	466			466	234	0.50	227	227

Project Location and Name	Entitlements	Homes or Units: Single-family Homes	Homes or Units: Multi-family Homes	Homes or Units: Hotel & Time-share Units	Homes or Units: Total	Project Area: Total Project (acres)	Project Area: Acres per Unit	State Ag District: Total (acres)	State Ag District: Adjusted (acres)
Maui Business Park Phase II	Designated				-	245	n.a.	232	232
Maui Expo Systems (Eko Systems)	Designated				-	58	n.a.	58	58
Meo B.E.S.T. House	Designated		12		12	n.e.	n.e.	-	
Betsill Bros. Mixed Use	Proposed		5		5	n.e.	n.e.	-	
Central Maui Senior Housing	Proposed		40		40	n.e.	n.e.	-	
Free Church of Tonga	Proposed				-	9	n.a.	9	9
Kikuchi Residential at Wai'ale	Proposed	500			500	154	0.31	154	154
Na Mala O Waihee Homes	Proposed	35			35	11	0.31	11	11
Pu'unani	Proposed	310	240		550	210	0.38	210	210
Spreckelsville Mauka A&B	Proposed	380			380	228	0.60	228	228
Wai'ale	Proposed	1,065	2,715		3,780	847	0.22	846	846
Waikapu Mauka Towne	Proposed	190	190		380	n.e.	n.e.	-	
Total Central Maui		8,689	5,837	140	14,666	4,849		3,680	2,670
South Maui									
Alii Village Subdiv.	Committed	27			27	n.e.	n.e.	-	
Aloha Village	Committed		78		78	n.e.	n.e.	-	
Ameron Hawaii	Committed				-	2	n.a.	2	2
Central Maui Baseyard	Committed				-	451	n.a.	-	
Chambers Apartments	Committed		18		18	n.e.	n.e.	-	
Club World Mark Kihei	Committed			200	200	n.e.	n.e.	-	
Cove Beach Villas	Committed		32		32	n.e.	n.e.	-	
Hale Mahaolu Ehiku 1: Phase 1	Committed		54		54	n.a.	n.e.	-	
Hale Mahaolu Ehiku 2: Phase 2	Committed		58		58	n.e.	n.e.	-	
Hokulani Golf Villas	Committed	182	58		240	n.e.	n.a.	-	
Honu Ala Hele	Committed	62			62	n.e.	n.a.	-	
Hoohani Subdivision	Committed	28			28	n.e.	n.e.	-	
Hoolei Wailea MF-9	Committed		120		120	n.e.	n.a.	-	
Ilili Condos	Committed		4		4	n.e.	n.e.	-	
Kai Ani Village MF Residential Project	Committed		99		99	n.e.	n.e.	-	
Kai Makani	Committed		112		112	n.e.	n.e.	-	
Kai Malu Wailea Master	Committed		150		150	n.e.	n.e.	-	
Kalama Heights: Phase 2	Committed		80		80	n.e.	n.e.	-	
Kalama Hills	Committed	12			12	n.e.	n.e.	-	
Kamalii Alayna Estates (Waipuilani Estates)	Committed	92			92	n.e.	n.e.	-	
Kanani Wailea	Committed	38			38	n.e.	n.e.	-	
Ke Alii Homes	Committed	96			96	n.e.	n.e.	-	
Ke Alii Ocean Villas	Committed	14	144		158	n.e.	n.e.	-	
Kenolio Leilani Sub	Committed	7			7	n.e.	n.e.	-	
Kenolio Place	Committed	12			12	n.e.	n.e.	-	
Kihei Hanalei Condominiums	Committed		4		4	n.e.	n.e.	-	
Kihei Kauhale	Committed	26			26	n.e.	n.e.	-	
Kilohana: Hema	Committed	31			31	n.e.	n.e.	-	
Landry Apts.	Committed		18		18	n.e.	n.e.	-	
Liloa Village Subdivision	Committed	65			65	n.e.	n.e.	-	

Project Location and Name	Entitlements	Homes or Units: Single-family Homes	Multi-family Homes	Hotel & Time-share Units	Total	Project Area: Total Project (acres)	Acres per Unit	State Ag District: Total (acres)	Adjusted (acres)
Maluhia at Wailea: Condos	Committed		15		15	n.e.	n.e.	-	
Maui Lu Timeshare	Committed		388	400	788	n.e.	n.e.	-	
Maui Research & Tech Park: _Project District 6	Committed				-	387	n.a.	234	234
MF21 Subdivision: _PD 8	Committed	7			7	22	3.14	22	
Moana Estates	Committed	90			90	n.e.	n.e.	-	
One Palauea Bay; PD 8	Committed	17			17	n.e.	n.e.	-	
One Wailea Dev	Committed	20			20	n.e.	n.e.	-	
Osterstock Subdivision: 7 lot	Committed	7			7	n.e.	n.e.	-	
Papaanui Lots	Committed	16			16	5	0.31	3	3
Papaanui Subdivision	Committed	8			8	n.e.	n.e.	-	
Paradise Ridge Estates	Committed		32		32	n.e.	n.e.	-	
Wailea Beach Villas	Committed		105		105	n.e.	n.e.	-	
Wailea MF-10	Committed		144		144	n.e.	n.e.	-	
Wailea MF-10 Subdivision	Committed		9		9	n.e.	n.e.	-	
Wailea MF-11	Committed	12			12	n.e.	n.e.	-	
Wailea Villas (MF-4) (Papali)	Committed	25			25	n.e.	n.e.	-	
Garcia Makena Residences	Designated	10			10	5	0.50	5	5
Hale Pama Condos	Designated		6		6	n.e.	n.e.	-	
Kilohana: Mauka	Designated	73			73	n.e.	n.e.	-	
Kilohana: Waena	Designated	31			31	n.e.	n.e.	-	
Ma'alaea Mauka Residential: _Project District 12	Designated	499	450		949	257	0.27	262	262
Ma'alaea Village A&B: _Project District 11	Designated	2,000			2,000	808	0.40	765	765
Pu'unene Airstrip: _Project District 10	Designated				-	558	n.a.	558	558
Wailea 670 ('Honua`ula) _Project District 9	Designated	1,400			1,400	584	0.42	584	584
Ka Ono Ulu: _Industrial Park	Proposed				-	96	n.a.	96	96
Kalani Condos Makena	Proposed		4		4	1	0.25	1	1
Kamaole Heights	Proposed		98	24	122	n.e.	n.e.	-	
Kihei Kaiwahine Res. A&B	Proposed	600			600	114	0.19	114	114
Makena Resort: Hotel & Condos	Proposed		1,105	545	1,650	718	0.44	31	31
Total South Maui		5,507	3,385	1,169	10,061	4,008		2,677	2,655
Upcountry Maui									
A.L. & P. Phillips Subdivision	Committed	3			3	11	3.67	11	
Abner Delima Subdivision	Committed	3			3	6	2.00	6	6
Bayong Subdivision	Committed	3			3	8	2.67	8	
Blackburn Subdivision	Committed	5			5	n.e.	n.e.	-	
Cameron Kaluanui Subdivision	Committed	3			3	n.e.	n.e.	-	
DeRego Subdivision	Committed	7			7	59	8.43	59	
Erehwon Estates Subdivision	Committed	7			7	40	5.71	40	
Freitas Subdivision	Committed	4			4	3	0.75	-	
Haleakala Homesteads 1 & 2	Committed	15			15	81	5.40	87	
Hali'imaile: _Residential	Committed	148			148	69	0.47	8	8
Jacaranda Hill	Committed	3			3	2	0.67	2	2
Joan Feiteira Subdivision	Committed	3			3	24	8.00	24	
Kealahou 1 & 2 Homesteads	Committed	7			7	16	2.29	7	7

Project Location and Name	Entitlements	Homes or Units: Single-family Homes	Multi-family Homes	Hotel & Time-share Units	Total	Project Area: Total Project (acres)	Acres per Unit	State Ag District: Total (acres)	Adjusted (acres)
Keokea/Waiohuli Subdivision DHHL	Committed	406			406	445	1.10	445	445
Kulamalu: Mauka Res	Committed	14			14	n.e.	n.e.	-	
Kulamanu Estates: Phase 1	Committed	40			40	n.e.	n.e.	-	
Kulamanu Estates: Phase 2, Jacaranda Grove	Committed	13			13	n.e.	n.e.	-	
Kulumanu Ridge: Ridge at Kulumanu	Committed	57			57	n.e.	n.e.	-	
Maha Village Subdivision	Committed	24			24	n.e.	n.e.	-	
Mary Decambra Subdivision	Committed	3			3	n.e.	n.e.	-	
MauWikoli Subdivision	Committed	3			3	7	2.33	7	7
Piiholo Farms Subd.	Committed	10			10	23	2.30	23	23
Stice Subdivision	Committed	3			3	n.e.	n.e.	-	
Waiohuli Hikina Subdivision (Kula Res 1,2) DHHL	Committed	36			36	261	7.25	261	
Waiohuli Lot 134 (Kula Res 1,2) DHHL	Committed	4			4	200	50.00	200	
Waiohuli Uka Subdivision (Kula Res 1,2) DHHL	Committed	56			56	192	3.43	192	
Wilfred "Hoopai" Phillips Subd	Committed	3			3	2	0.67	2	2
Barto Project Crook Estate: Project District 3	Designated		64		64	n.e.	n.e.	-	
Kauhale Lani: _Pukalani Makai	Designated	155			155	81	0.52	81	81
Kula Lodge: Project District 1	Designated			15	15	n.e.	n.e.	-	
Silversword Inn: Project District 2	Designated			12	12	n.e.	n.e.	-	
Hali'imaile Expansion: _A&B400	Proposed	1,200			1,200	353	0.29	351	351
Hali'imaile Expansion: _ML&P348	Proposed	1,500			1,500	441	0.29	421	421
Ka Ono Ulu Lots	Proposed	2			2	3	1.50	-	
Kualono by Hanohano	Proposed	49			49	14	0.29	14	14
Kula Ridge Affordable Housing Subdivision	Proposed	116			116	48	0.41	48	36
Kula Senior Housing	Proposed		36		36	n.e.	n.e.	-	
Total Upcountry Maui		3,905	100	27	4,032	2,389		2,297	1,403
East Maui									
Hamoa Beach Subdivision	Committed	3			3	2	0.67	1	1
Hana Com. Health Ctr. Exp.	Committed		20		20	n.e.	n.e.	-	
Hana Ranch Affordable Housing	Committed	288			288	38	0.13	38	38
Hana Ranch Store	Committed				-	39	n.a.	3	3
Hana Substation Subdivision	Committed	3			3	25	8.33	20	
Honomaele Subdivision	Committed	8			8	42	5.25	42	
Wakiu Hana Homes: DHHL	Committed	102			102	724	7.10	724	
Garden of Eden Arboretum	Proposed	3			3	30	10.00	30	
Halani Gardens 2 Self Help Housing Corp	Proposed	14			14	6	0.43	6	6
Total East Maui		421	20	-	441	906		864	48
TOTAL MAUI ISLAND		30,248	15,493	4,879	50,620	23,314		19,885	11,812

n.e.: not estimated (i.e., acreages were not estimated for projects that do not involve agricultural land)
n.a.: not applicable (i.e., units per acre were not calculated for industrial and commercial projects)
Source: Maui County Planning Department. 2006.

Appendix B: Selected State and County Goals, Objectives, Policies and Guidelines Related to Agricultural Lands

1. **Hawai'i State Constitution** (Article XI, Section 3):

   ...to conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency and assure the availability of agriculturally suitable lands...

2. **Hawai'i State Plan** (Chapter 226, Hawaii Revised Statutes, as amended):[1,2]

Section 226-7 Objectives and policies for the economy--agriculture.

(a) Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:

(1) Viability in Hawaii's sugar and pineapple industries.

(2) Growth and development of diversified agriculture throughout the State.

(3) An agriculture industry that continues to constitute a dynamic and essential component of Hawaii's strategic, economic, and social well-being.

(b) To achieve the agricultural objectives, it shall be the policy of the State to:

(2) Encourage agriculture by making best use of natural resources.

(10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.

(16) Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.

Section 226-103 Economic priority guidelines.

(c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:

(1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.

(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:

(1) Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.

(10) Support the continuation of land currently in use for diversified agriculture.

Section 226-104 Population growth and land resources priority guidelines.

(b) Priority guidelines for regional growth distribution and land resource utilization:

(2) Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.

Section 226-106 Affordable housing

Priority guidelines for the provision of affordable housing:

(1) Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low- and moderate-income and gap-group households.

3. **Agricultural State Functional Plan** (1991)[3]

(Functional plans are guidelines for implementing the State Plan. They are approved by the Governor, but not adopted by the State Legislature.)

Objective H: Achievement of Productive Agricultural Use of Lands Most Suitable and Needed for Agriculture.

Policy H(2): Conserve and protect important agricultural lands in accordance with the Hawaii State Constitution.

Action H(2)(a): Propose enactment of standards and criteria to identify, conserve, and protect important agricultural lands and lands in agricultural use.

Action H(2)(c): Administer land use district boundary amendments, permitted land uses, infrastructure standards, and other planning and regulatory functions on important agricultural lands and lands in agricultural use, so as to ensure the availability of agriculturally suitable lands and promote diversified agriculture.

4. COUNTY OF MAUI GENERAL PLAN 1990[4]

Theme No. 1: PROTECT MAUI COUNTY'S AGRICULTURAL LAND AND RURAL IDENTITY

Amendments to the General Plan will preserve agricultural lands for the continuing pursuits of both land intensive and labor intensive agricultural pursuits. This action will also achieve preservation of an open space resource.

I. POPULATION, LAND USE, THE ENVIRONMENT AND CULTURAL RESOURCES

B. LAND USE

Objective

3. To preserve lands that are well suited for agricultural pursuits.

Policies

a. Protect prime agricultural lands from competing nonagricultural land uses.
b. Promote the use of agricultural lands for diversified agricultural pursuits by providing public incentives and encouraging private initiative.
c. Support the right to farm consistent with the identification of productive agricultural lands.
d. Discourage the conversion, through zoning or other means, of productive or potentially productive agricultural lands to nonagricultural uses, including but not limited to golf courses and residential subdivisions.
e. Provide adequate irrigation water and access to agricultural lands.

II. ECONOMIC ACTIVITY

C. AGRICULTURE

Objective

1. To foster growth and diversification of agriculture and aquaculture throughout Maui County.

Policies

a. Support programs to maintain the viability of the sugar and pineapple industry.
b. Support and promote programs to maintain the viability of diversified agriculture, specialty crops, forestry and aquaculture.

Objective

2. To maximize the use and yield of productive agricultural land throughout the County.

Policies

a. Ensure the availability of land that is well suited for agricultural production.
b. Encourage the development of agricultural parks throughout Maui County.
f. Support "right-to-farm" provisions in the event potential conflicts arise from adjacent residential uses.
g. Discourage establishment of pseudo-agricultural subdivisions.

5. COUNTY OF MAUI, KIHEI-MAKENA COMMUNITY PLAN (1998)[5]

LAND USE

Objectives and Policies

p. Prevent urbanization of important agricultural lands
r. Allow special permits in the State Agricultural Districts to accommodate unusual yet reasonable uses including: (1) limited agriculturally related commercial, public and quasi-public uses serving the immediate community; (2) uses clearly accessory or subordinate to a principal agricultural use on the property; (3) public facility uses such as utility installations or landfills whose location depends on technical considerations; and (4) extractive industries, such as quarrying, where the operation would not adversely affect the environment or surrounding agricultural uses.

ECONOMIC ACTIVITY

Objectives and Policies

e. Provide for the preservation and enhancement of important agricultural lands for a variety of agricultural activities, including sugar cane, diversified agriculture and aquaculture.

Planning Standards

2. Project District Standards

PROJECT DISTRICT 12 (Ma'alaea Mauka) 260 acres

This residential project is located mauka of Honoapi'ilani Highway from Ma'alaea Harbor to near the Kuihelani Highway intersection, and should provide a mix of single family and multi-family housing types for a range of consumer groups. Community amenities should include an open-space buffer along the highway, and a 15-acre community oriented park linked to the neighborhoods with a pedestrian/bicycle path.

The number of residential units based on an average gross density of 4.4 units per acre is 1,150 units.

Residential spacial allocations are:

Residential (single family and multi-family)	218 acres
Community Center	5 acres
Park, open space, and buffer zones	27 acres
Collector roadways	10 acres

6. References

[1] State of Hawaii, Office of State Planning, Office of the Governor. *The Hawaii State Plan, 1991.* Honolulu, Hawaii. 1991.

[2] Act 25, S.B. No. 1158, April 15, 1993.

[3] Hawaii Department of Agriculture. *The Hawaii State Plan: Agriculture, State Functional Plan.* Honolulu, Hawaii. 1991.

[4] County of Maui. *The General Plan of the County of Maui, 1990 Update.* Adopted by Ordinance No. 2039, as amended by Ordinance No. 2234. April 23, 1993

[5] County of Maui. *Kihei-Makena Community Plan.* Kahului, Maui. 1998.

APPENDIX D.

Phase I Environmental Site Assessment Reports

PHASE I
ENVIRONMENTAL SITE ASSESSMENT

MAALAEA MAUKA
WAILUKU, MAUI, HAWAII
TMK: (2) 3-6-001: PARCEL 018

November 15, 2006

Prepared for:

M&E Pacific, Inc.
841 Bishop Street, Suite 1900
Honolulu, Hawaii 96813

Prepared by:

element environmental llc
environmental · engineering · water resources
62-180 Emerson Road
Haleiwa, Hawaii 96712
Phone (808) 637-1200 • Fax (808) 637-0001

Job No. 060050

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EXECUTIVE SUMMARY

Element Environmental LLC (E2) conducted a Phase I Environmental Site Assessment (ESA) on approximately 259.885 acres of land designated as Tax Map Key (TMK): (2) 3-6-001 parcel 018 (the property). The property is located in West Maui between Waikapu and Maalaea along the western side of Honoapiilani Highway. The property is currently used as a pasture for cattle ranching.

The Phase I ESA was performed in accordance with the scope and limitations of the American Society of Testing and Materials Practice E 1527-05 to identify the presence of recognized environmental conditions associated with the property and included a review of environmental regulatory records in the site vicinity, a review of the site history, a review of the site geology and hydrogeology, a site reconnaissance, and interviews.

This assessment has revealed no significant evidence of recognized environmental conditions in connection with the property with the exception of fourteen (14) unmarked 55-gallon high density polyethylene (HDPE) drums located along the dirt road bordering the southwestern end of the property. Twelve (12) of the drums were partially full with an unknown liquid at the time of the field inspection. Two of the drums were damaged and empty indicating a potential release. In an interview with Mr. Alex Franco, Manager of Maui Cattle Company, Mr. Franco noted that the drums were present prior to their use of the property over a year ago. Mr. Franco believes that the drums may have been left by one of the farmers that were previously utilizing the property. In a follow-up request for additional information, Mr. Chumbley of Wailuku Agribusiness, indicated that the drums must have been left by a former licensee. As of the date of this report, Mr. Chumbley is planning to have the drums removed by November 17, 2006.

E2 recommends that the contents of the drums be determined and that drums and contents be properly disposed and/or recycled in accordance with all Federal, State and local regulations. Upon removal of the drums, the soil and vegetation beneath the drums should be inspected for indications of a release by an environmental professional. If a significant release is suspected, appropriate sampling and cleanup should be conducted.

E2 has also identified that the property has been historically used for sugarcane cultivation. In an interview, Mr. Chumbley of Wailuku Agribusiness (former user of the property) indicated that pesticides and herbicides were applied to the property as part of the normal agricultural operations. Therefore, residual levels of pesticides and herbicides are probably present on the property. Although proper applications of pesticides and herbicides does not constitute a release of hazardous chemicals, E2 recommends that limited composite soil sampling be conducted on the property should the intended land use of the property change from agricultural to residential. The purpose of the limited sampling would be to determine if residual levels of pesticides/herbicides are present in site soils. The sample analyses selected should be based on the list of potential pesticides and herbicides that may have been applied to the property as provided by Mr. Chumbley.

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Maalaea Mauka
Wailuku, Maui, Hawaii
TMK: (2) 3-6-001: Parcel 018

November 15, 2006

1.0 INTRODUCTION

1.1 OVERVIEW

This report presents the results of Element Environmental LLC's (E2's) Phase I Environmental Site Assessment (ESA) of the subject property. The general location of the property is shown on Figure 1 (Site Vicinity Map) in Appendix A.

This report details the work performed to identify the presence of recognized environmental conditions associated with this property. Throughout this ESA the property of interest is referred to as *the subject property, the property, the site, or the facility.*

1.2 PURPOSE

E2 conducted this Phase I ESA to identify recognized environmental conditions associated with the property. American Society for Testing and Materials (ASTM) guidance defines *recognized environmental conditions* as the "presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property" (ASTM, 2005). Recognized environmental conditions do not include *de minimis* conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies (ASTM, 2005).

This Phase I ESA constitutes all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice and is intended to permit the Phase I ESA user to satisfy one of the requirements to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations on Comprehensive Environmental Response Compensation and Liability Act (CERCLA) liability, hereinafter, the "landowner liability protections" or "LLPs".

1.3 DETAILED SCOPE OF SERVICES

Our Phase I ESA was performed in accordance with the ASTM "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (ASTM Designation E 1527-05). The ASTM standard defines good commercial and customary practice in the United States of America for conducting an environmental site assessment of a parcel of commercial real estate with respect to the range of contaminants within the scope of Comprehensive Environmental Response, Compensation and

Liability Act (CERCLA) (42 U.S.C. §9601) and petroleum products (ASTM, 2005). Adherence to the ASTM standard is intended to limit liability of property owners from inherited environmental contamination.

We performed the following tasks in completion of the Phase I ESA:

- **Review of regulatory records.** We reviewed standard environmental record sources including the U.S. Environmental Protection Agency's (EPA's) Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) database, EPA's Resource Conservation and Recovery Act (RCRA) database, U.S. Institutional Controls database, U.S. Engineering Controls database, EPA's Emergency Response Notification System (ERNS) database, State of Hawaii Department of Health (DOH) Office of Hazard Evaluation and Emergency Response (HEER) site list, DOH Underground Storage Tank (UST) lists, DOH list of landfills and other solid waste facilities, DOH Voluntary Response Program (VRP) sites list, and DOH Brownfield sites list.
- **Review of site history.** We reviewed reasonably ascertainable standard historical sources including historical maps; aerial photographs; building permits, zoning records and property tax records available online; various printed publications as well as publications posted on the internet; and information from the interview with the owner's representative.
- **Review of site geology and hydrogeology.** We reviewed reasonably ascertainable published information on surface and subsurface conditions at the site and surrounding area. We used this information to assess topography, drainage, surface water bodies, anticipated subsurface geology, and groundwater occurrence and usage in the area.
- **Site reconnaissance.** We performed a site reconnaissance of the property to note visual signs of contamination, and we conducted a limited assessment of portions of the neighboring properties visible from the subject property boundaries. During our site reconnaissance we specifically looked for stained soil, dead or stressed vegetation, hazardous substances, petroleum products, electrical and hydraulic equipment, aboveground and underground storage tanks, disposal areas, maintenance areas, wells, sumps, drains, and cesspools/sewers.
- **Interviews.** We interviewed the user of the Phase I ESA and owner's representative, Mr. Steven Kikuchi, Partner of Maalaea Properties; current site user, Mr. Alex Franco, of Maui Cattle Company; and former owner's representative, Mr. Avery Chumbley, President of Wailuku Agribusiness regarding past and current use and activities on the property and adjoining properties.
- **Data evaluation and report preparation.** We evaluated the information collected and prepared this report that documents our assessment and presents our findings, opinions, and conclusions.

1.4 SIGNIFICANT ASSUMPTIONS

Significant assumptions include the following:

1) The information provided during the interview with the owner's representative is complete and accurate and
2) The information provided by the regulatory database search service is complete and accurate.

1.5 LIMITATIONS AND EXCEPTIONS

Phase I ESAs, by their very nature, are limited. E2 has endeavored to meet what it believes is the applicable standard of care and, in so doing is obliged to advise M&E Pacific, Inc. and Maalaea Properties LLC of Phase I ESA limitations. This ESA did not assess environmental issues or conditions at the property that are outside the scope of ASTM Practice 1527-05, including asbestos-containing materials (ACMs), radon, lead-based paint, lead in drinking water, wetlands, regulatory compliance, cultural and historic resources, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality, biological agents and mold, and site geotechnical concerns, nor did it include any sampling or testing for biological agents and mold, radon, methane, ACMs, lead-based paint, or other environmental contaminants. Our investigation was limited to the procedures described in the Phase I ESA Standard Practice (ASTM, 2005).

The conclusions presented in this report are professional opinions based solely upon visual observations of the site and vicinity and our interpretation of the available historical and regulatory information and documents reviewed. They are intended exclusively for the purpose outlined herein and apply only to the site location and project indicated.

Our findings and opinions are based on information that we obtained on given dates through records review, site reconnaissance, interviews, and related activities. It is possible that other information exists or subsequently has become known, just as it is possible for conditions we observed to have changed after our observation. For these and associated reasons, E2 and many of its peers routinely advise clients for ESA services that it would be a mistake to place unmerited faith in findings and opinions conveyed via ESA reports. E2 cannot under any circumstances warrant or guarantee that not finding indicators of hazardous substances or petroleum products means that hazardous substances or petroleum products do not exist on the site.

1.6 SPECIAL TERMS AND CONDITIONS

E2's services are performed, within the limits prescribed by our Clients, with the usual thoroughness and competence of the consulting profession in accordance with the standard for professional services at the time those services are rendered. No warranty or representation, either expressed or implied, is included or intended in our proposals, contracts, or reports.

Findings and opinions presented herein apply to site conditions existing at the time of our investigation and those reasonably foreseeable; they cannot necessarily apply to site changes of which we are not aware and have not had the opportunity to evaluate.

1.7 USER RELIANCE

This report is intended for the sole use of M&E Pacific Inc. and Maalaea Properties LLC. The scope of services performed in execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

2.0 SITE DESCRIPTION

2.1 LOCATION AND LEGAL DESCRIPTION

The subject property consists of one parcel of developed land located in West Maui between Waikapu and Maalaea along the western side of Honoapiilani Highway. Figure 1 (Site Vicinity Map) and Figure 2 (Site Location Map) in Appendix A show the site location. The property consists of approximately 259.885 acres of land designated as Tax Map Key (TMK): (2) 3-6-001: parcel 018.

2.2 SITE AND VICINITY GENERAL CHARACTERISTICS

The subject property is located along the western side of Honoapiilani Highway (Route 30) between Kuihelani Highway (Route 380) and Kapoli Street on the Island of Maui. The western portion of the property is bounded by the eastern side of Kealaloloa Ridge.

The state land use designation for the property is Agricultural (County of Maui, 2006). The southern end of the property is located in a State Special Management Area (County of Maui, 2006). A portion of the southern end of the property is also located within the Federal Emergency Management Agency 500 year flood plain (County of Maui, 2006).

Maui is moderately warm with mean monthly temperatures ranging from 70° to 84° Fahrenheit. The average annual rainfall at the site is approximately 20 inches per year (Giambelluca et al., 1986).

2.3 CURRENT USE OF THE PROPERTY

The property is currently used as pasture land for cattle. The pasture is operated by Maui Cattle Company.

2.4 DESCRIPTIONS OF STRUCTURES, ROADS, AND OTHER IMPROVEMENTS ON THE SITE

The site is currently occupied by cattle and pasture land throughout most of the site. Maui Cattle Company has installed wire fences throughout the property to control grazing patterns of the cattle. Maui Cattle Company also has a cattle pen and storage area near the center of the property. Entrance to the cattle pen can be made via a dirt road and locked gate located along Honoapiilani Highway.

Honoapiilani Highway runs along the eastern and southern boundary of the site. A dirt road off of Honoapiilani Highway runs along the northern and western perimeter of the site. There is also a weather station along the perimeter, however, it could not be determined if the station was located within or outside of the property boundary. Photographs of the site showing some of the site improvements are included in Appendix A.

2.5 CURRENT USES OF THE ADJOINING PROPERTIES

Current uses of adjoining properties include the open lands and pineapple agricultural land to the north, a Hawaiian Cement quarry to the northwest, Maalaea Construction and Demolition Landfill to the northeast open lands and sugar cane agricultural land to the east, a gas station and aquarium to the southeast, Maalaea Small Boat Harbor to the south, and Kealaloloa Ridge to the west.

3.0 USER PROVIDED INFORMATION

3.1 ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS

Mr. Steven Kikuchi, of Maalaea Properties LLC, is not aware of any environmental cleanup liens against the property. A copy of the User Questionnaire completed by Mr. Kikuchi is included in Appendix C.

3.2 SPECIALIZED KNOWLEDGE

Mr. Kikuchi has no specialized knowledge or experience related to the property or nearby properties.

3.3 COMMONLY KNOWN OR REASONABLE ASCERTAINABLE INFORMATION

Mr. Kikuchi is not aware of commonly known or reasonably ascertainable information about the property that would help identify conditions indicative of releases or threatened releases of hazardous substances or petroleum products.

3.4 VALUATION REDUCTION FOR ENVIRONMENTAL ISSUES

Mr. Kikuchi did not indicate any valuation reduction of the subject property due to environmental issues.

3.5 OWNER, PROPERTY MANAGER, AND OCCUPANT INFORMATION

Maalaea Properties LLC owns the property and Maui Cattle Company currently uses the site for cattle grazing. Mr. Steven Kikuchi is a Partner of Maalaea Properties and Mr. Alex Franco is a representative of Maui Cattle Company. According to Mr. Kikuchi and Mr. Franco, no employees or tenants reside on the subject property.

3.6 REASON FOR PERFORMING THE PHASE I ESA

The Phase I ESA was conducted at the request of Maalaea Properties LLC as part of the due diligence process prior to developing the subject property for residential use.

3.7 OTHER INFORMATION

No other information was provided by the user.

4.0 RECORDS REVIEW

4.1 STANDARD ENVIRONMENTAL RECORD SOURCES

4.1.1 Overview

To identify the presence of adverse environmental conditions at the subject property, several published sources of environmental records were reviewed. This section lists the records that were searched and the results of each search.

ASTM E 1527-05 specifies a search distance for specific environmental record sources. The following record sources were searched for incidents or sites within the listed search distances of the subject property:

Standard Environmental Record Sources	Search Distance (miles)
Federal NPL (National Priorities List) site list	1.0
Federal Delisted NPL site list	0.5
Federal CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) list	0.5
Federal CERCLIS NFRAP (No Further Remedial Action Planned) site list	0.5
Federal RCRA (Resource Conservation and Recovery Act) CORRACTS facilities list (facilities subject to Corrective Action under RCRA)	1.0
Federal RCRAInfo list for TSDF (treatment, storage, and disposal facilities)	0.5
Federal RCRAInfo list for generators	Site and adjoining properties
Federal institutional control/engineering control registries	Site only
Federal ERNS (Emergency Response Notification System) list	Site only
State list of hazardous waste sites identified for investigation or remediation (NPL or CERCLIS equivalents)	1.0
State landfill and/or solid waste disposal site list	0.5
State leaking UST (underground storage tank) list	0.5
State registered UST list	Site and adjoining properties
State institutional control/engineering control registries	Site only
State voluntary cleanup sites	0.5
State Brownfield sites	0.5

E2 used a regulatory database search service, provided by Environmental Data Resources, Inc. (EDR), to review the above Federal and State government databases. A copy of *The EDR Radius Map with GeoCheck®* is included in Appendix B. The following sections summarize the findings of the regulatory database search. In reviewing the environmental databases, it should be noted that such databases are not instantaneously updated by the specific regulatory agencies. Depending on the database and the agency, update frequency may be as infrequent as annually. The dates of the most recent updates for the searched environmental databases are listed in the EDR report in Appendix B.

4.1.2 U.S. EPA National Priorities Site List

The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. The ASTM designated search distance for the NPL is one mile. EDR did not locate NPL sites within one mile of the subject property.

4.1.3 U.S. EPA Delisted NPL Site List

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425(e), sites may be deleted from the NPL where no further response is appropriate. The ASTM designated search distance for delisted NPL sites is one-half mile. EDR did not locate delisted NPL sites within one-half mile of the subject property.

4.1.4 U.S. EPA CERCLIS List

The CERCLIS list contains data on potentially hazardous sites that have been reported to the EPA by states, municipalities, private companies, and private persons pursuant to Section 103 of CERCLA. CERCLIS contains sites which are either proposed to or on the NPL and sites which are in the screening and assessment phase for possible inclusion on the NPL. The ASTM designated search distance for CERCLIS sites is one-half mile. EDR did not identify CERCLIS sites within one-half mile of the subject property.

4.1.5 U.S. EPA CERCLIS NFRAP Site List

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the NPL, unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site. The ASTM designated search distance for NFRAP sites is one-half mile. EDR did not locate CERCLIS NFRAP sites within one-half mile of the property.

4.1.6 U.S. EPA RCRA CORRACTS Facilities List

EPA's CORRACTS, or Corrective Action Sites database, identifies facilities that generate, treat, store, or dispose of hazardous wastes where RCRA corrective action activity has occurred. These sites have experienced spills or releases of hazardous chemicals prompting the need for corrective action. The ASTM designated search distance for the CORRACTS list is one mile. EDR did not identify any CORRACTS sites within one mile of the subject property.

4.1.7 U.S. EPA RCRAInfo List for TSD Facilities

The RCRAInfo list includes facilities that treat, store, dispose of, or incinerate hazardous waste (TSD facilities). The ASTM designated search distance for TSD facilities is one-half mile. EDR did not identify TSD facilities within one-half mile of the subject property.

4.1.8 U.S. EPA RCRA Generators List

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS). The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kilograms (kg) of hazardous waste, or less than one kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over one kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste. The ASTM designated search distance for RCRA generators is the subject property and adjoining properties. EDR located one orphan RCRA generators on an adjoining property.

RCRA Generator Name	Location Relative to the Subject Property	Site Status/Comments
Maalaea Store RR1 Box 374 Maalaea Road Wailuku, HI 96793	1/8 to ¼ miles southwest (lower elevation)	CESQG. No TSDF activities reported. No violations found.

It is unlikely that the CESQGs site has negatively impacted the subject property due to the relative elevation from the property (lower), and the "no violations found" status.

4.1.9 U.S. Institutional / Engineering Control Registries

U.S. Institutional / Engineering Control (IEC) registries are lists of sites that have institutional and/or engineering controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health. The ASTM designated search distance for federal institutional / engineering control registries is the subject property only. EDR did not locate federal IEC sites on the subject property or within one mile of the subject property.

4.1.10 U.S. EPA ERNS List

ERNS is a national database of more than 365,000 records, which contains information on specific notification of releases of oil and hazardous substances to the environment. The ASTM designated search distance for ERNS incidents is the subject property only. No reported ERNS incidents have occurred on the subject property.

4.1.11 State of Hawaii Hazardous Waste Sites List

The State Hazardous Waste Sites records are the states' equivalent to NPL or CERCLIS. These sites may or may not already be listed on the federal NPL or CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The DOH HEER office maintains a Sites of Interest Database, which includes sites that HEER has an interest in, has investigated, or may investigate under Hawaii Revised Statute 128D (the State Superfund law). The ASTM designated search distance for the State Hazardous Waste Sites List is one mile. EDR did not identify any State Hazardous Waste sites within one mile of the subject property.

4.1.12 State of Hawaii Landfill / Solid Waste Disposal Site List

The State DOH Solid and Hazardous Waste Branch has a list of permitted solid waste disposal facilities and landfills in the State of Hawaii. The ASTM designated search distance for permitted solid waste disposal sites / landfills is one-half mile. EDR did not locate permitted landfills or disposal sites within one-half mile of the subject property.

4.1.13 State of Hawaii LUST List

The leaking underground storage tank (LUST) database, compiled by the State DOH Solid and Hazardous Waste Branch (SHWB) UST Section, contains an inventory of reported leaking underground storage tank incidents. The ASTM designated search distance for LUST sites is one-half mile. EDR located three (one orphan) LUST sites within one-half mile of the subject property. The sites are listed below.

LUST Site Name	Location Relative to the Subject Property	Site Status/Comments
Hawaiian Cement - Waikapu Quarry Honoapiilani Highway Wailuku, HI 96793	1/8 to ¼ miles northwest (up gradient)	Site Cleanup Completed 5/16/95.
Maalaea 76 Station 15 Kapoli Street Wailuku, HI 96793	1/8 to ¼ miles southeast (down gradient)	Site Cleanup Initiated 10/25/04.
Maalaea Store RR1 Box 374 Maalaea Road Wailuku, HI 96793	1/8 to ¼ miles southeast (down gradient)	Site Cleanup Completed 8/23/05.

Note: Gradient direction refers to approximate groundwater flow direction.

It is unlikely that off-site LUST sites have negatively impacted the subject property due to the "Site Cleanup Completed" status for the up gradient site and the anticipated groundwater flow direction from the down gradient sites.

4.1.14 State of Hawaii Registered UST List

USTs are regulated under RCRA and must be registered with the state department responsible for administering the UST program. The list of registered UST sites is compiled by the State DOH SHWB UST Section. The ASTM designated search distance for UST sites is one-quarter mile. EDR located three (one orphan) UST sites within one-quarter mile of the subject property. The sites are listed below.

UST Site Name	Location Relative to the Subject Property	Site Status/Comments
Hawaiian Cement - Waikapu Quarry Honoapiilani Highway Wailuku, HI 96793	1/8 to ¼ miles northwest (up gradient)	6 USTs Permanently Out of Use.
Maalaea 76 Station 15 Kapoli Street Wailuku, HI 96793	1/8 to ¼ miles southeast (down gradient)	3 USTs Currently In Use: Tank ID: 2a-92 Capacity: 10,000 Gallons Substance: Gasoline Installed: 10/20/00 Tank ID: 87 Capacity: 15,000 Gallons Substance: Gasoline Installed: 10/20/00 Tank ID: 2b Capacity: 6,000 Gallons Substance: Diesel Installed: 10/20/00
Maalaea Store RR1 Box 374 Maalaea Road Wailuku, HI 96793	1/8 to ¼ miles southeast (down gradient)	2 USTs Permanently Out of Use.

Note: Gradient direction refers to approximate groundwater flow direction.

It is unlikely that off-site UST sites have negatively impacted the subject property due to the status of the closed USTS and groundwater flow direction (down gradient) of the USTs in service.

4.1.15 State of Hawaii Institutional Control Registry

Institutional controls on properties were obtained from the DOH VRP and Brownfield databases. The ASTM designated search distance for state institutional / engineering control registries is the subject property only. EDR did not identify the subject property on state institutional / engineering controls lists.

4.1.16 State of Hawaii Voluntary Response Program Sites

The ASTM designated search distance for VRP sites is one-half mile. EDR did not identify any VRP sites listed within one-half mile of the subject property.

4.1.17 State of Hawaii Brownfield Sites

The ASTM designated search distance for Brownfield sites is one-half mile. EDR did not list any state Brownfield sites within one-half mile of the subject property.

4.2 ADDITIONAL ENVIRONMENTAL RECORD SOURCES

Additional environmental record sources that were reviewed for this Phase I ESA included Maui County building permit and zoning records available online. The findings from review of these records are discussed in Section 4.4.2.

4.3 PHYSICAL SETTING SOURCES

4.3.1 USGS Topographic Map Coverage

According to the U.S. Geological Survey (USGS) topographic maps of the area (Maalaea Quadrangle), the property is located at approximately 20° 48' 14.4'' north latitude and 156° 30' 41.1'' west longitude. The elevation of the subject property ranges from approximately 40 feet above mean sea level at the southern end near Maalaea Small Boat Harbor to approximately 200 feet above mean sea level at the northern end near Kuihelani Highway. Topographic map coverage of the subject site is shown on Figure 1 in Appendix A.

4.3.2 Geologic and Hydrogeologic Setting

E2 reviewed published geologic and hydrogeologic reports and maps to obtain information regarding subsurface conditions in the general area of the site to evaluate potential migration of contaminants.

<u>Geology and Soils</u>

The subject property is located along the eastern base of the West Maui Mountains.

According to the U. S. Soil Conservation Service (Foote et al., 1972) the predominant soil types located in the site vicinity are:

> <u>Pulelu cobbly loam</u> – well drained and excessively drained, medium textured, moderately textured, and coarse-textured soils on alluvial fans and in basins on the island of Maui.
>
> <u>Stony alluvial land</u> – moderately well and well drained, moderately coarse textured soils with moderate infiltration rates.

<u>Hydrogeology</u>

The subject property is located within the Waikapu Aquifer System of the Wailuku Aquifer Sector (Mink and Lau, 1990). Two aquifers are located beneath the site, an upper aquifer that occurs in sedimentary (alluvial) deposits and a lower (deeper) aquifer that occurs in horizontally extensive lavas. Both aquifers are basal, where freshwater is in contact with seawater. The upper aquifer is unconfined, where the water table is the upper surface of the saturated aquifer; and the lower aquifer is confined by impermeable or poorly permeable formations (the sedimentary deposits) with the top of the saturated aquifer below the surface of the groundwater (Mink and Lau, 1990).

The upper aquifer has the potential to be used, is not a drinking water source or ecologically important, has a moderate salinity (1,000 to 5,000 milligrams per liter of chloride), is replaceable, and is moderately vulnerable to contamination. The lower aquifer has the potential to be used, is not a drinking water source or ecologically important, has a moderate salinity (1,000 to 5,000 milligrams per liter of chloride), is replaceable, and has a low vulnerability to contamination.

Based on regional topography, regional groundwater flow direction is expected to be south-southeast towards the ocean. The nearest drinking water supply wells are located over one mile from subject property to the northwest (EDR, 2006). There are five wells registered with the State Department of Land and Natural Resources within a one mile radius of the property. Three wells are being used for irrigation, one well may be used for drinking water for future residential development, and one well does not have a listed use.

Surface Water

The closest surface water body to the site is the Maalaea Small Boat Harbor, which is approximately 500 feet south of the southern end of the site, and is contiguous with the Pacific Ocean. The location of the Maalaea Small Boat Harbor in relation to the site is shown on Figure 1 in Appendix A. There is also an earthen reservoir located approximately 1,000 feet northwest of the site.

Storm water runoff appears that it would flow into swales and gullies to the south-southwest of the site towards Honoapiilani Highway and Maalaea Harbor.

4.4 HISTORICAL USE INFORMATION

4.4.1 Historical Review Sources

Past use of the subject property and adjoining properties was ascertained by reviewing the following standard historical sources: aerial photographs; building permits, zoning records, and property tax records available online; various printed publications; as well as publications posted on the internet; and information from the interview with the owner's representative. Appendix D contains copies of pertinent maps.

4.4.2 Past Uses of the Subject Property and Adjoining Properties

Past Uses of the Subject Property

Review of aerial photographs from 1950 through 1995 indicates that the property was used for agricultural purposes, specifically sugarcane cultivation, throughout the entire period.

Mr. Chumbley, of Wailuku Agribisuness, indicated that various pesticides and herbicides were properly applied to the property for sugarcane cultivation. Mr. Chumbley has provided a list of pesticides and herbicides, which is included in Appendix C.

Past Uses of Adjoining Properties

The earliest aerial photographs from 1950 indicate that a quarry was active at the location of the current Maalaea Construction and Demolition Landfill. The land to the north and east were being used for agriculture. There were many small structures, probably commercial, located to the south near Maalaea Harbor. The land to the west was undeveloped.

No changes are visible until the 1980s when larger structures were built near Maalaea Harbor. Quarry activities at the current Maalaea Construction and Demolition Landfill appear to be ongoing at this time.

The last aerial photograph in 1995 shows no changes, with the possible exception that quarry activity may have stopped.

From the site reconnaissance and interviews, also to be discussed in the following sections, we know that the quarry that had begun operations before 1950 is now being used as a demolition and construction debris landfill. Also, a new quarry began operations to the northwest of the site and is still in operation at this time.

5.0 SITE RECONNAISSANCE

5.1 METHODOLOGY AND LIMITING CONDITIONS

E2 personnel conducted the site reconnaissance November 1, 2006. The site reconnaissance consisted of a visual inspection of the property and the surrounding area.

The site reconnaissance was limited by the following condition:

1) The site had only a few dirt roads that were drivable. Overgrown grass in areas where the site was inaccessible by car may have obstructed the view of some surface or subsurface objects.

2) Drums containing liquids of unknown contents were found at the site. No sampling was performed to determine the contents.

5.2 GENERAL SITE SETTING

Site reconnaissance was conducted on November 1, 2006 by Mr. Roger Aoki and Mr. Ryan Yamauchi of E2. The reconnaissance included visual a survey of the property and a brief survey of the visible portions of the adjacent properties. Photographs are included in Appendix A.

The site is former sugar cane agricultural land that is currently being used as pasture land for cattle grazing. The cattle grazing is operated by the Maui Cattle Company. In addition to grazing fields, the Maui Cattle Company has a few pens and a feeding area near the center of the property. The Maui Cattle Company stores small quantities of gasoline and other petroleum products near the pen area to operate small tractors.

An active quarry facility is in operation to the northwest. Also, across Honoapiilani Highway to the northeast there is a former quarry that is currently being used as a demolition and construction debris landfill. The area to the west is undeveloped. The area to the east was used for sugar cane agriculture. Maalaea Small Boat Harbor and several commercial establishments are located to the south of the property.

5.3 HAZARDOUS SUBSTANCE AND PETROLEUM PRODUCTS IN CONNECTION WITH IDENTIFIED USES

E2 identified small quantities of petroleum products associated with the Maui Cattle Company operations during the site reconnaissance. There were five 5-gallon gasoline containers and seven 5-gallon containers of hydraulic and transmission oil stored near the pen area in the center of the property. Some of the containers were empty and none of the containers were completely full. One car battery was also observed in the pen area. No significant surface staining was observed in the petroleum product storage area.

5.4 HAZARDOUS SUBSTANCE AND PETROLEUM CONTAINERS *(NOT NECESSARILY IN CONNECTION WITH IDENTIFIED USES)*

E2 did not observe any hazardous substances or petroleum containers not necessarily associated with identified uses.

5.5 UNIDENTIFIED SUBSTANCE CONTAINERS

E2 observed fourteen (14) 55-gallon high density polyethylene (HDPE) drums along the southwestern perimeter of the property. Most of the drums were full with liquid. Two damaged drums were empty. The drums were not labeled and the contents of the drums are unknown at this time. Mr. Kikuchi was unaware of the drums being on-site. Mr. Franco indicated that the drums were on site before Maui Cattle Company began using the site about a year ago. As of the date of this report, Mr. Chumbley is planning to have the drums removed by November 17, 2006.

5.6 STORAGE TANKS

E2 did not observe the presence of storage tanks on the property during the site reconnaissance.

E2 observed two plastic storage containers (approximately 1 cubic yard in size) within the pen area. According to Mr. Franco, these containers are used to store molasses that is used in feed for the cattle.

5.7 INDICATIONS OF PCBS

E2 did not observe indications of the potential presence of PCBs on the property during the site reconnaissance.

5.8 INDICATIONS OF SOLID WASTE DISPOSAL

E2 observed one pile of solid waste, which appears to be discarded rain gauges, on the property. The pile was located near the southwestern end of the site. Also, the recent fire in September has exposed some illicit dumping of propane tanks along the western perimeter of the site.

5.9 MIGRATION OF OFF-SITE CONTAMINATION

E2 did not observe off-site contaminant migration onto the property.

5.10 OTHER CONDITIONS OF CONCERN

Odors
No strong, pungent, or noxious odors were identified at the property during the site reconnaissance.

Stressed Vegetation
No stressed vegetation was identified at the property during the site reconnaissance.

Wastewater and Septic Systems
No wastewater or septic systems were identified at the property during the site visit or from records reviewed.

Storm Water
Storm water run-on and/or run-off were not observed on the property during the site reconnaissance. Storm water runoff appears that it would flow into swales and gullies to the south-southwest of the site towards Honoapiilani Highway and Maalaea Harbor.

Drains and Sumps
No drains or sumps were identified at the property during the site reconnaissance.

Stained Soil or Pavement
No stained soil or pavement was identified at the property during the site reconnaissance.

Wells
No wells were identified at the property during the site reconnaissance. A well head located just adjacent to the property was observed along the western perimeter of the property. Wells are discussed in Section 4.3.2.

Pits, Ponds, or Lagoons
No pits, ponds, or lagoons were identified at the property during the site reconnaissance.

6.0 INTERVIEWS

6.1 INTERVIEW WITH CURRENT OWNER / FORMER OWNER / OCCUPANTS

E2 interviewed Mr. Steven Kikuchi, Partner of Maalaea Properties LLC; Mr. Avery Chumbley, President of Wailuku Agribusiness; and Alex Franco, Manager of Maui Cattle Company regarding the subject property. Information obtained during the interviews is included in pertinent sections of this report.

6.2 INTERVIEW WITH LOCAL GOVERNMENTAL OFFICIALS

Written requests for information were sent to the State of Hawaii Department of Health, the Maui County Department of Fire Control, and the Local Emergency Planning Committee. Copies of the information request and responses are included in Appendix D and information obtained is included in pertinent sections of this report.

7.0 FINDINGS AND OPINIONS

Review of Standard Environmental Record Sources

A review of the environmental regulatory databases indicated that the subject property was not listed on any of the federal or state databases searched by EDR.

A review of the environmental regulatory databases identified one SQG site, located within the respective search radii. However, due to its location, relative elevation, and status, the site is unlikely to have a significant environmental impact on the subject property.

Three LUST sites are located within one-half mile of the subject property. These sites have completed cleanup or are located at such a distance down gradient of the subject property that they are unlikely to have an environmental impact on the subject property. Likewise, three registered UST sites, one UST site currently in use and 2 UST sites permanently out of use, were identified within ¼ mile of the subject property. The active UST site has three USTs, a 10,000 gallon gasoline, a 15,000 gallon gasoline and a 6,000 gallon diesel. This UST site is located down gradient of the subject property and is unlikely to have an environmental impact on the subject property.

Historical Review

E2 identified that the property was historically used for agriculture, specifically for sugar cane cultivation. In an interview, Mr. Chumbley of Wailuku Agribusiness (former user of the property) indicated that pesticides and herbicides were applied to the property as part of the normal agricultural operations. Mr. Chumbley provided a list of potential pesticides and herbicides that may have been applied to the property (Appendix C).

E2 also identified a construction and demolition debris landfill, and a gas station operating adjacent to the subject property. Gas stations are also known to have petroleum products that are harmful to and persistent in the environment. However, no records have been filed with the Department of Health regarding hazardous material or substance releases from either of these sites.

Site Reconnaissance

E2 identified five (5) 5-gallon containers of gasoline, seven (7) 5-gallon containers of hydraulic and transmission oil, and one car battery within the pen area operated by the Maui Cattle Company near the center of the property. Gasoline and other petroleum products, if released, may be harmful to and persistent in the environment. No staining was observed on the ground surface below or around the gasoline containers, transmission oil, or battery.

Fourteen (14) 55-gallon unmarked HDPE drums containing an unknown liquid were observed along the western perimeter of the property. Twelve of the drums were partially full with liquid and two drums were empty, possibly indicating a potential release. Mr. Franco indicated that the drums were on site before the Maui Cattle Company began using the site about a year ago. In a follow-up request for additional information, Mr. Chumbley of Wailuku Agribusiness, indicated that the drums must have been left by a former licensee. As of the date of this report, Mr. Chumbley is planning to have the drums removed by November 17, 2006.

E2 did not observe any other recognized environmental conditions during the site reconnaissance.

8.0 CONCLUSIONS

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-05 of the subject property, located in Maalaea Mauka, Wailuku, Hawaii, designated as TMK: (2) 3-6-001: parcel 018. Any exceptions to, or deletions from, this practice are described in Section 1.5 of this report. This assessment has revealed no significant evidence of recognized environmental conditions in connection with the property with the exception of the fourteen (14) unmarked 55-gallon HDPE drums located along the dirt road bordering the southwestern end of the property. Twelve (12) of the drums were partially full with an unknown liquid at the time of the field

inspection. Two of the drums were damaged and empty indicating a potential release. In an interview with Mr. Alex Franco, Manager of Maui Cattle Company, Mr. Franco noted that the drums were present prior to their use of the property over a year ago. Mr. Franco believes that the drums may have been left by one of the farmers that were previously utilizing the property. In a follow-up request for additional information, Mr. Chumbley of Wailuku Agribusiness, indicated that the drums must have been left by a former licensee. As of the date of this report, Mr. Chumbley is planning to have the drums removed by November 17, 2006.

E2 recommends that the contents of the drums be determined and that drums and contents be properly disposed and/or recycled in accordance with all Federal, State and local regulations. Upon removal of the drums, the soil and vegetation beneath the drums should be inspected for indications of a release by an environmental professional. If a significant release is suspected, appropriate sampling and cleanup should be conducted.

E2 has also identified that the property has been historically used for sugarcane cultivation. In an interview, Mr. Chumbley of Wailuku Agribusiness (former user of the property) indicated that pesticides and herbicides were applied to the property as part of the normal agricultural operations. Therefore, residual levels of pesticides and herbicides are probably present on the property. Although proper applications of pesticides and herbicides does not constitute a release of hazardous chemicals, E2 recommends that limited composite soil sampling be conducted on the property should the intended land use of the property change from agricultural to residential. The purpose of the limited sampling would be to determine if residual levels of pesticides/herbicides are present in site soils. The sample analyses selected should be based on the list of potential pesticides and herbicides that may have been applied to the property as provided by Mr. Chumbley.

9.0 DEVIATIONS

In conducting this Phase I ESA, there were no deletions from the standard practice (ASTM Designation E1527-05) and no client-imposed constraints. In addition, no data gaps were encountered, other than the limitations described in Section 5.1.

10.0 REFERENCES

ASTM, 2005. *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM Designation E 1527-05). American Society for Testing and Materials (ASTM)*, Washington, 2005.

County of Maui, 2006. *Maui County Online Services.* County of Maui, November 2006. http://www.mauicounty.gov/online_services/index1.htm

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Foote, D.E., E. L. Hill, S. Nakamura, F. Stephens, 1972. *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* U.S. Dept. of Agriculture Soil Conservation Science, U.S. Government Printing Office, 1972.

EDR, 2006. *The EDR Radius Map with GeoCheck®, Maalaea Mauka, Honoapiilni Highway, WAILUKU, HI 96793. Inquiry Number: 1790052.2s.* EDR Environmental Data Resources, Inc., November 06, 2006.

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Mink, J. F. and Lau, S., 1990. *Aquifer Identification and Classification for Maui Groundwater Protection Strategy for Hawaii.* Water Resources Research Center, University of Hawaii, Technical Report 185, February.

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11.0 SIGNATURE OF ENVIRONMENTAL PROFESSIONALS

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental professional as defined in §312.10 of 40 CFR 312 and we have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Roger C. Aoki

Roger C. Aoki, P.E. Date: November 15, 2006

Ryan S. Yamauchi, P.E. Date: November 15, 2006

12.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

Qualifications of the environmental professional are included in Appendix E.

LIST OF ACRONYMS

ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response Compensation and Liability Information System
CESQG	Conditionally Exempt Small Quantity Generator
CORRACTS	Corrective Action Sites under RCRA
DOH	State of Hawaii, Department of Health
E2	Element Environmental LLC
EDR	Environmental Data Resources, Inc.
EPA	US Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
FINDS	Facility Index System
HECO	Hawaiian Electric Company, Inc.
HEER	Department of Health, Office of Hazard Evaluation and Emergency Response
IEC	Institutional / Engineering Controls
kg	kilogram
LLPs	Landowner Liability Protections
LQG	Large Quantity Generator
LUST	leaking underground storage tank
mg/l	milligrams per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	DOH issued No Further Action status for sites
NFRAP	No Further Remedial Action Planned
NPL	National Priorities List (Superfund sites)
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
SHWB	Department of Health, Solid and Hazardous Waste Branch
SQG	Small Quantity Generator
TMK	Tax Map Key
TSD	treatment, storage and disposal (category of RCRA facility)
USGS	United States Geological Survey (US Dept. of the Interior)
UST	underground storage tank
VRP	Department of Health, Voluntary Response Program

APPENDIX A

Figures and Photo Plates

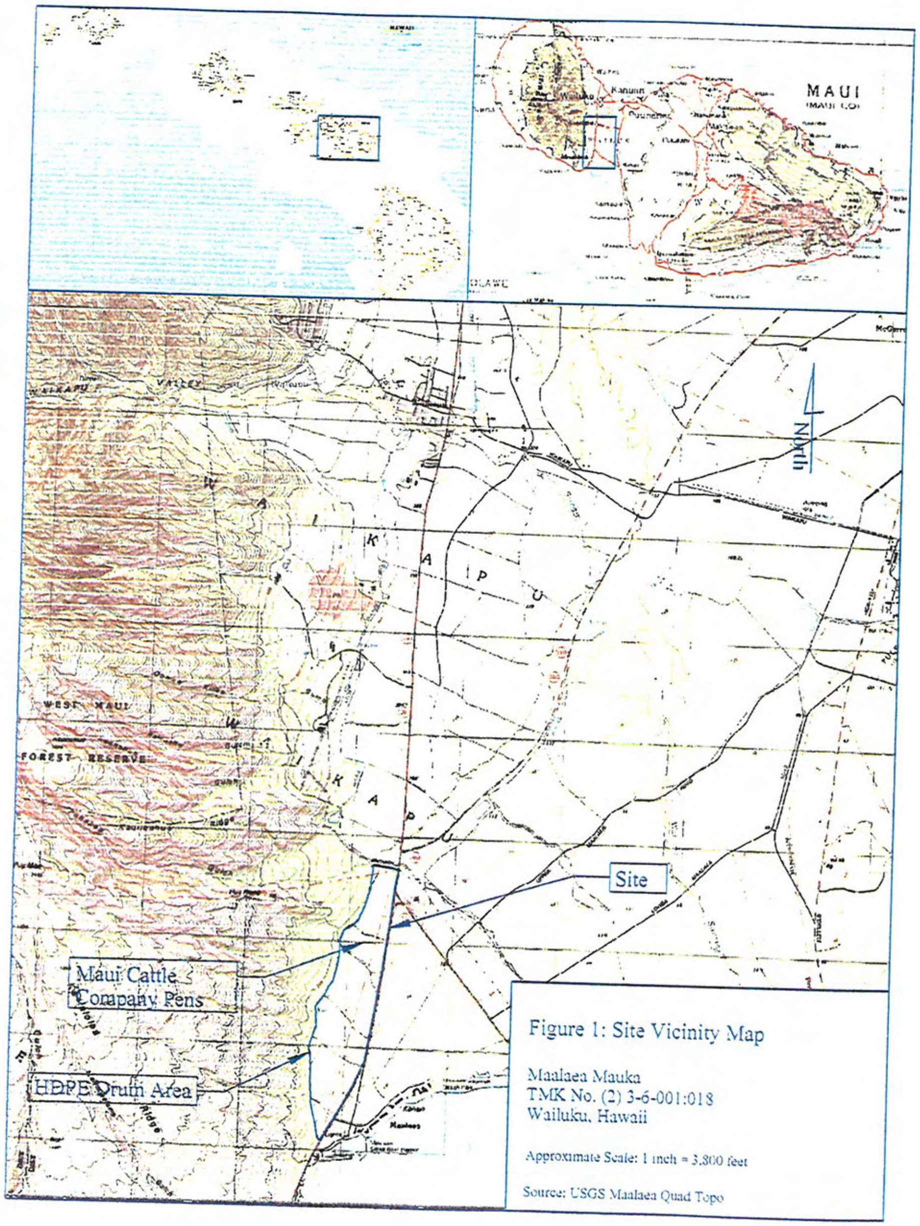

Figure 1: Site Vicinity Map

Maalaea Mauka
TMK No. (2) 3-6-001:018
Wailuku, Hawaii

Approximate Scale: 1 inch = 3,800 feet

Source: USGS Maalaea Quad Topo

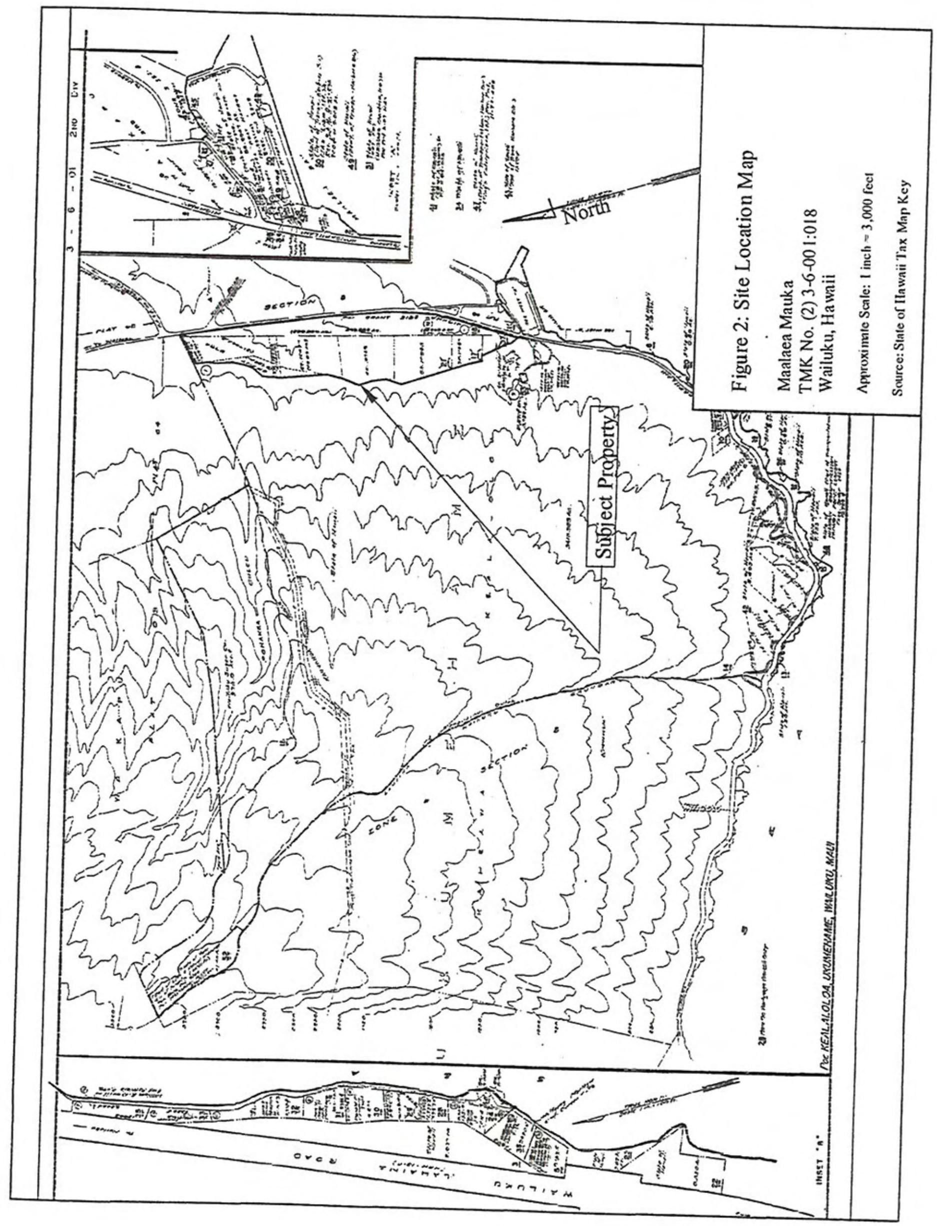

Figure 2: Site Location Map

Maalaea Mauka
TMK No. (2) 3-6-001:018
Wailuku, Hawaii

Approximate Scale: 1 inch = 3,000 feet

Source: State of Hawaii Tax Map Key


Photograph 1: Maalaea Mauka property. Direction: Northeast.


Photograph 2: Dirt road with cattle feed supplement. Honoapiilani Highway seen beyond the dirt road. Direction: East.


Photograph 3: Maui Cattle Company gasoline and transmission oil storage. Direction: West.


Photograph 4: Maui Cattle Company tractor and pens. Direction: South.

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Phase I ESA
Maalaea Mauka
November 15, 2006

Photograph 5: Fourteen 55-gallon HDPE drums along southwestern perimeter of the site. Direction: South.

Photograph 6: Pile of apparent solid waste near the southwestern portion of the property. Honoapiilani Highway seen in the background. Direction: Southeast.

Photograph 1: Maalaea Mauka property. Direction: Northeast.

Photograph 2: Dirt road with cattle feed supplement. Honoapiilani Highway seen beyond the dirt road. Direction: East.

Photograph 3: Maui Cattle Company gasoline and transmission oil storage. Direction: West.

Photograph 4: Maui Cattle Company tractor and pens. Direction: South.

Photograph 5: Fourteen 55-gallon HDPE drums along southwestern perimeter of the site. Direction: South.

Photograph 6: Pile of apparent solid waste near the southwestern portion of the property. Honoapiilani Highway seen in the background. Direction: Southeast.

APPENDIX B

The EDR Radius Map with GeoCheck®

The EDR Radius Map
with GeoCheck®

Maalaea Mauka
Honoapiilani Highway
WAILUKU, HI 96793

Inquiry Number: 1790052.2s

November 06, 2006

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

HONOAPIILANI HIGHWAY
WAILUKU, HI 96793

COORDINATES

Latitude (North):	20.804000 - 20˚ 48' 14.4"
Longitude (West):	156.511500 - 156˚ 30' 41.4"
Universal Tranverse Mercator:	Zone 4
UTM X (Meters):	759028.3
UTM Y (Meters):	2302318.8
Elevation:	131 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	20156-G5 LAHAINA, HI
Most Recent Revision:	Not reported
East Map:	20156-G4 WAILUKU, HI
Most Recent Revision:	Not reported

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

FEDERAL RECORDS

NPL........................ National Priority List
Proposed NPL............... Proposed National Priority List Sites
Delisted NPL............... National Priority List Deletions
NPL RECOVERY............... Federal Superfund Liens
CERCLIS.................... Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP................. CERCLIS No Further Remedial Action Planned

EXECUTIVE SUMMARY

CORRACTS................... Corrective Action Report
RCRA-TSDF.................. Resource Conservation and Recovery Act Information
RCRA-LQG................... Resource Conservation and Recovery Act Information
RCRA-SQG................... Resource Conservation and Recovery Act Information
ERNS....................... Emergency Response Notification System
HMIRS...................... Hazardous Materials Information Reporting System
US ENG CONTROLS............ Engineering Controls Sites List
US INST CONTROL............ Sites with Institutional Controls
DOD........................ Department of Defense Sites
FUDS....................... Formerly Used Defense Sites
US BROWNFIELDS............. A Listing of Brownfields Sites
CONSENT.................... Superfund (CERCLA) Consent Decrees
ROD........................ Records Of Decision
UMTRA...................... Uranium Mill Tailings Sites
ODL........................ Open Dump Inventory
TRIS....................... Toxic Chemical Release Inventory System
TSCA....................... Toxic Substances Control Act
FTTS....................... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
SSTS....................... Section 7 Tracking Systems
ICIS....................... Integrated Compliance Information System
PADS....................... PCB Activity Database System
MLTS....................... Material Licensing Tracking System
MINES...................... Mines Master Index File
FINDS...................... Facility Index System/Facility Registry System
RAATS...................... RCRA Administrative Action Tracking System

STATE AND LOCAL RECORDS

SHWS....................... Sites List
SWF/LF..................... Permitted Landfills in the State of Hawaii
SPILLS..................... Release Notifications
INST CONTROL............... Sites with Institutional Controls
VCP........................ Voluntary Response Program Sites
DRYCLEANERS................ Permitted Drycleaner Facility Listing
BROWNFIELDS................ Brownfields Sites
AIRS....................... List of Permitted Facilities

TRIBAL RECORDS

INDIAN RESERV.............. Indian Reservations
INDIAN LUST................ Leaking Underground Storage Tanks on Indian Land
INDIAN UST................. Underground Storage Tanks on Indian Land

EDR PROPRIETARY RECORDS

Manufactured Gas Plants... EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STATE AND LOCAL RECORDS

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Health's Active Leaking Underground Storage Tank Log Listing.

A review of the LUST list, as provided by EDR, and dated 08/11/2006 has revealed that there are 2 LUST sites within approximately 1 mile of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
MAALAEA 76 STATION Facility Status: LUST Cleanup Initiated: Petroleum	*15 KAPOLI ST.*	*1/2 - 1 S*	*1*	*6*
MAALAEA STORE Facility Status: Site Cleanup Completed	*RR1 BOX 374 MAALAEA RD*	*1/2 - 1 S*	*2*	*7*

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Health's Listing of Underground Storage Tanks.

A review of the UST list, as provided by EDR, and dated 08/11/2006 has revealed that there is 1 UST site within approximately 0.75 miles of the target property.

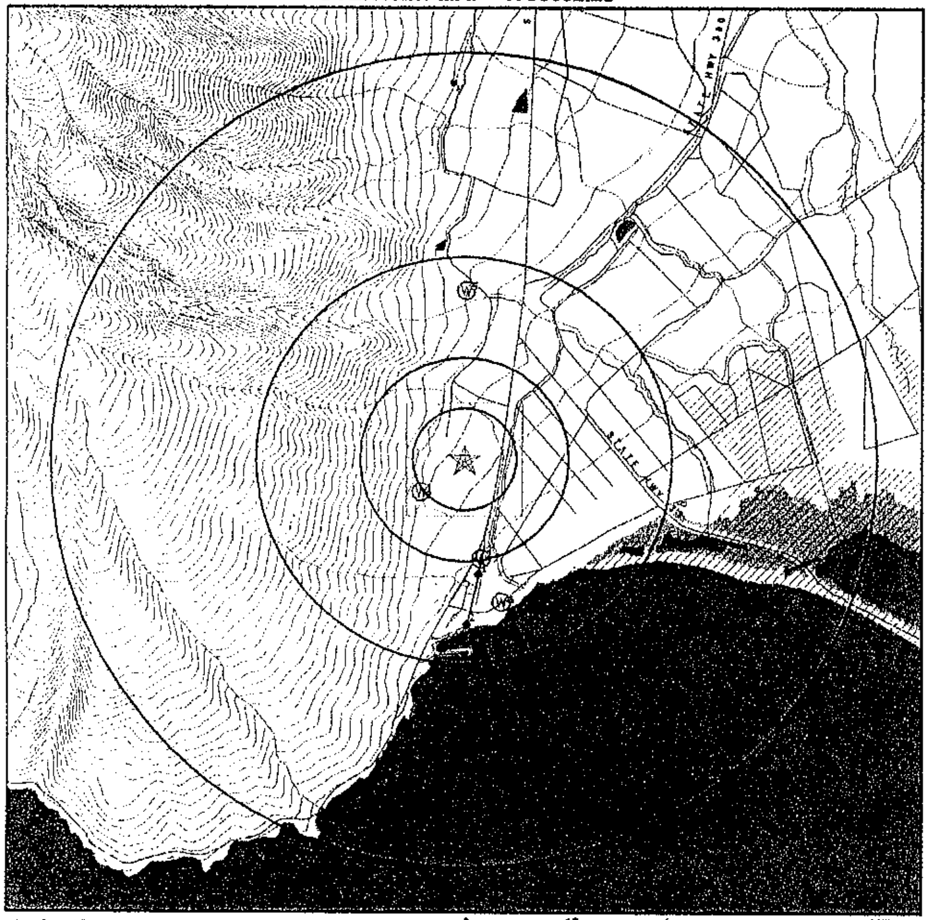
Lower Elevation	Address	Dist / Dir	Map ID	Page
MAALAEA 76 STATION	*15 KAPOLI ST.*	*1/2 - 1 S*	*1*	*6*

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
WAIHEE ELEMENTARY SCHOOL	FINDS, FTTS
VECTOR CONTROL BRANCH, MAUI	SHWS
KALAMAULA LANDFILL	SHWS
WAIALE ASH PILE	SHWS, FINDS
Y HATA- MAUI	SHWS
Y HATA- MAUI	INST CONTROL
KAHOOLAWE ISLAND	CERCLIS
MAKANI LDFL	CERC-NFRAP
OLOWALU LDFL	CERC-NFRAP
HANA LANDFILL	SWF/LF
CENTRAL MAUI LANDFILL	SWF/LF
KIHEI SPS #5 (EAST WELAKAHAO)	FINDS, LUST
KIHEI WWTP	LUST, UST
HAWAIIAN CEMENT - WAIKAPU QUARRY	FINDS, LUST
KIHEI SPS #3 (MENEHUNE SHORES)	UST
KIHEI SPS #8 (KIHEI FIRE HOUSE)	UST
KIHEI SPS #4 (YE'S ORCHARD)	UST
KIHEI SPS #5 (EAST WELAKAHAO)	UST
GTE HAWAIIAN TEL NORTH KIHEI REMOTE EQUIP BLDG	UST
KIHEI MINIT STOP	UST
ESTATE OF MARY HELELA	UST
BOARD OF WATER SUPPLY	UST
HERBERT HORITA REALTY INC.	UST
LANAI CITY LANDSCAPING	RCRA-SQG
VACANT LAND TMK NO (2) 3-8-7:101	RCRA-SQG
MAUI DISTRICT OFFICE DOE	RCRA-SQG
MAALAEA GENERATING STATION	RCRA-SQG
MAALAEA STORE	RCRA-SQG, FINDS
US NAVY KAHO'OLAWE ISLAND RESERVE	FINDS, RCRA-LQG
MAALAEA HARBOR	ERNS
KEHALANI MAUKA ROADWAY PLANS	FINDS
KEHALANI MAUKA LARGE LOT	FINDS
SUDA CONST & MASON INC	ICIS
COUNTY OF MAUI	ICIS
BREWER ENVIRONMENTAL INDUSTRIES L.L.C.	ICIS
BEI HAWAII - MAUI	SSTS
MAUI'S QUALITY DRY CLEANING & LAUNDRY, INC.	DRYCLEANERS
HAWAIIAN CHARCOAL COMPANY	AIRS
HAWAIIAN CEMENT	AIRS

OVERVIEW MAP - 1790052.2s



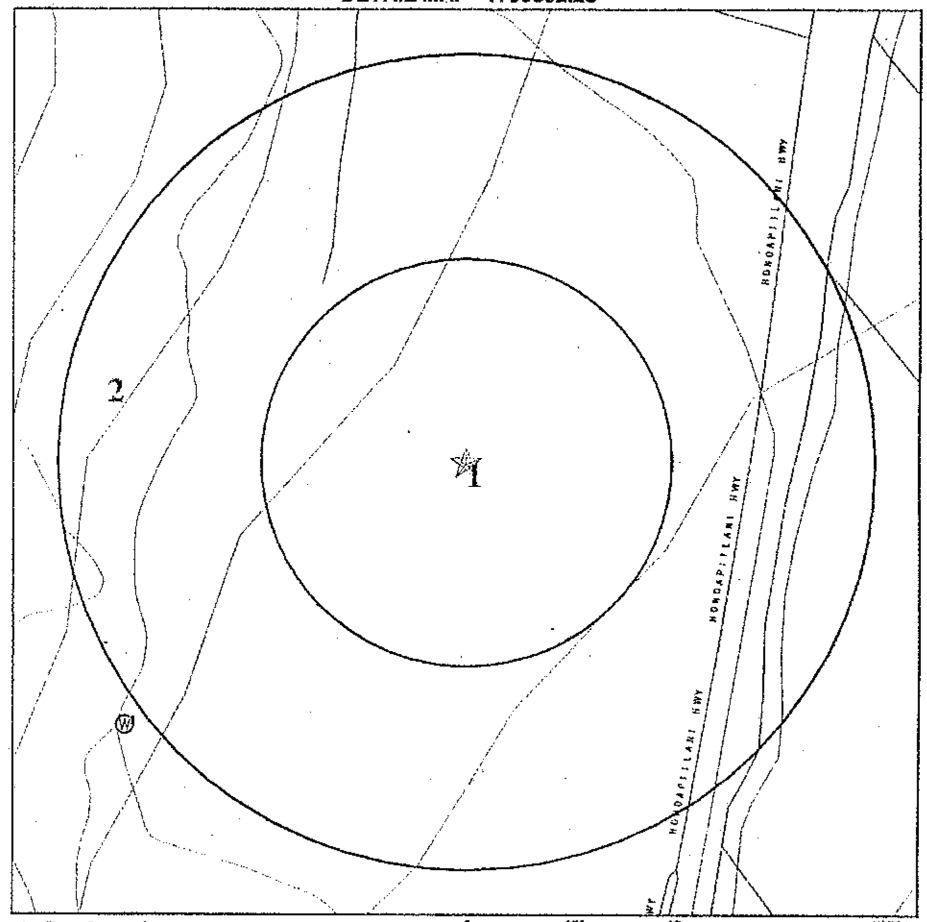
0 1/2 1 2 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Maalaea Mauka ADDRESS: Honoapiilani Highway WAILUKU HI 96793 LAT/LONG: 20.8040 / 156.5115	CLIENT: Element Environmental, LLC CONTACT: Roger Aoki INQUIRY #: 1790052.2s DATE: November 06, 2006 1:52 pm

DETAIL MAP - 1790052.2s



0 1/16 1/8 1/4 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Maalaea Mauka ADDRESS: Honoapiilani Highway WAILUKU HI 96793 LAT/LONG: 20.8040 / 156.5115	CLIENT: Element Environmental, LLC CONTACT: Roger Aoki INQUIRY #: 1790052.2s DATE: November 06, 2006 1:52 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FEDERAL RECORDS								
NPL		1.500	0	0	0	0	0	0
Proposed NPL		1.500	0	0	0	0	0	0
Delisted NPL		1.500	0	0	0	0	0	0
NPL RECOVERY		0.500	0	0	0	NR	NR	0
CERCLIS		1.000	0	0	0	0	NR	0
CERC-NFRAP		1.000	0	0	0	0	NR	0
CORRACTS		1.500	0	0	0	0	0	0
RCRA TSD		1.000	0	0	0	0	NR	0
RCRA Lg. Quan. Gen.		0.750	0	0	0	0	NR	0
RCRA Sm. Quan. Gen.		0.750	0	0	0	0	NR	0
ERNS		0.500	0	0	0	NR	NR	0
HMIRS		0.500	0	0	0	NR	NR	0
US ENG CONTROLS		1.000	0	0	0	0	NR	0
US INST CONTROL		1.000	0	0	0	0	NR	0
DOD		1.500	0	0	0	0	0	0
FUDS		1.500	0	0	0	0	0	0
US BROWNFIELDS		1.000	0	0	0	0	NR	0
CONSENT		1.500	0	0	0	0	0	0
ROD		1.600	0	0	0	0	0	0
UMTRA		1.000	0	0	0	0	NR	0
ODI		1.000	0	0	0	0	NR	0
TRIS		0.500	0	0	0	NR	NR	0
TSCA		0.500	0	0	0	NR	NR	0
FTTS		0.500	0	0	0	NR	NR	0
SSTS		0.500	0	0	0	NR	NR	0
ICIS		0.500	0	0	0	NR	NR	0
PADS		0.500	0	0	0	NR	NR	0
MLTS		0.500	0	0	0	NR	NR	0
MINES		0.750	0	0	0	0	NR	0
FINDS		0.500	0	0	0	NR	NR	0
RAATS		0.500	0	0	0	NR	NR	0
STATE AND LOCAL RECORDS								
SHWS		1.500	0	0	0	0	0	0
State Landfill		1.000	0	0	0	0	NR	0
LUST		1.000	0	0	0	2	NR	2
UST		0.750	0	0	0	1	NR	1
SPILLS		0.500	0	0	0	NR	NR	0
INST CONTROL		1.000	0	0	0	0	NR	0
VCP		1.000	0	0	0	0	NR	0
DRYCLEANERS		0.750	0	0	0	0	NR	0
BROWNFIELDS		1.000	0	0	0	0	NR	0
AIRS		0.500	0	0	0	NR	NR	0
TRIBAL RECORDS								
INDIAN RESERV		1.500	0	0	0	0	0	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST		1.000	0	0	0	0	NR	0
INDIAN UST		0.750	0	0	0	0	NR	0
EDR PROPRIETARY RECORDS								
Manufactured Gas Plants		1.500	0	0	0	0	0	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Map ID Direction Distance Distance (ft.) Elevation	Site	Database(s)	EDR ID Number EPA ID Number
1 South 1/2-1 2983 ft.	**MAALAEA 76 STATION** **15 KAPOLI ST.** **WAILUKU, HI 96793**	LUST UST	U003732593 N/A

Relative: Lower

Actual: 35 ft.

LUST:

Facility ID:	9-503641
Release ID:	040064
Facility Status Date:	2004-10-25 00:00:00
Facility Status:	LUST Cleanup Initiated; Petroleum
Project Officer:	Fu

UST:

Facility ID:	9-503641
Owner:	Mid Pac Petroleum LLC
Owner Address:	745 Fort Street, TOPA Financial Center, Suite 1800
Ownder City,St,Zip:	Wailuku, 96793 96793
Tank ID:	2a-- 92
Installed:	10/20/2000
Tank Status:	**Currently In Use**
Date Closed:	Not reported
Tank Capacity:	10000
Substance:	Gasoline
Pipe Material:	Fiberglass Reinforced Plastic
Pipe Other Material:	Not reported
Pipe 2nd Construction:	Double-Walled

Facility ID:	9-503641
Owner:	Mid Pac Petroleum LLC
Owner Address:	745 Fort Street, TOPA Financial Center, Suite 1800
Ownder City,St,Zip:	Wailuku, 96793 96793
Tank ID:	87
Installed:	10/20/2000
Tank Status:	**Currently In Use**
Date Closed:	Not reported
Tank Capacity:	15000
Substance:	Gasoline
Pipe Material:	Fiberglass Reinforced Plastic
Pipe Other Material:	Not reported
Pipe 2nd Construction:	Double-Walled

Facility ID:	9-503641
Owner:	Mid Pac Petroleum LLC
Owner Address:	745 Fort Street, TOPA Financial Center, Suite 1800
Ownder City,St,Zip:	Wailuku, 96793 96793
Tank ID:	2b
Installed:	10/20/2000
Tank Status:	**Currently In Use**
Date Closed:	Not reported
Tank Capacity:	6000
Substance:	Diesel
Pipe Material:	Fiberglass Reinforced Plastic
Pipe Other Material:	Not reported
Pipe 2nd Construction:	Double-Walled

Map ID Direction Distance Distance (ft.) Elevation	Site	Database(s)	EDR ID Number EPA ID Number
2 South 1/2-1 4247 ft.	**MAALAEA STORE** **RR1 BOX 374 MAALAEA RD** **WAILUKU, HI 96793**	LUST UST	U003222254 N/A

Relative: Lower

Actual: 7 ft.

LUST:

Facility ID:	9-502481
Release ID:	930126
Facility Status Date:	2005-08-23 00:00:00
Facility Status:	Site Cleanup Completed
Project Officer:	Takaba

UST:

Facility ID:	9-502481
Owner:	UNO, INC DBA MAALAEA ST
Owner Address:	RR1 BOX 374 MAALAEA RD
Ownder City,St,Zip:	Wailuku, 96793 96793
Tank ID:	R-2
Installed:	12/30/1960
Tank Status:	**Permanently Out of Use**
Date Closed:	8/26/1991
Tank Capacity:	1000
Substance:	Gasoline
Pipe Material:	Galvanized Steel
Pipe Other Material:	Not reported
Pipe 2nd Construction:	None

Facility ID:	9-502481
Owner:	UNO, INC DBA MAALAEA ST
Owner Address:	RR1 BOX 374 MAALAEA RD
Ownder City,St,Zip:	Wailuku, 96793 96793
Tank ID:	R-1
Installed:	12/30/1960
Tank Status:	**Permanently Out of Use**
Date Closed:	8/26/1991
Tank Capacity:	1000
Substance:	Gasoline
Pipe Material:	Galvanized Steel
Pipe Other Material:	Not reported
Pipe 2nd Construction:	None

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
HANA MAUI	S106401332	HANA LANDFILL	HANA MAUI	96793	SWF/LF
ISLAND OF LANAI	1008402608	LANAI CITY LANDSCAPING	3/10 MI FROM FREIGHT YARD ROAD	96793	RCRA-SQG
KAHULUI	S106820852	VECTOR CONTROL BRANCH, MAUI	54 HIGH ST, 641 MUA ST, KAHALE DR / PALAPALA ST	96753	SHWS
KALAMAULA	S106818091	KALAMAULA LANDFILL	HOAWA RD	96793	SHWS
KIHEI	1001227536	US NAVY KAHO OLAWE ISLAND RESERVE	KAHOOLAWE ISLAND RESERVE	96753	FINDS, RCRA-LQG
KIHEI	U003222170	KIHEI SPS #3 (MENEHUNE SHORES)	N KIHEI RD	96753	UST
KIHEI	U003222166	KIHEI SPS #6 (KIHEI FIRE HOUSE)	N KIHEI RD	96753	UST
KIHEI	U003222167	KIHEI SPS #4 (YE'S ORCHARD)	N KIHEI RD	96753	UST
KIHEI	U003155105	KIHEI SPS #5 (EAST WELAKAHAO)	N KIHEI RD	96753	UST
KIHEI	1006642431	KIHEI SPS #5 (EAST WELAKAHAO)	N KIHEI RD	96753	FINDS, LUST
KIHEI	1000486449	KAHOOLAWE ISLAND	LAT 20 32' 30', LONG 156 37' 30	96753	CERCLIS
KIHEI	U003732595	GTE HAWAIIAN TEL NORTH KIHEI REMOTE EQUIP BLDG	KA ONO ULU ESATE, LOT 15 HALALAI PLACE	96753	UST
KIHEI	U003762157	KIHEI MINIT STOP	PIILANI VILLAGE SHOPPING CENTER 233 PIIKEA AVE	96753	UST
KIHEI	U001236805	KIHEI WWTP	480 WELEKAHAO RD/PIILANI HWY	96753	LUST, UST
MAKANI	1003879124	MAKANI LDFL	MAUI	96793	CERC-NFRAP
OLOWALU	1002879127	OLOWALU LDFL	OLOWALU	96793	CERC-NFRAP
PUUNENE, MAUI	S103769652	CENTRAL MAUI LANDFILL	PUNENE, MAUI	96793	SWF/LF
WAIKAPU	1008184555	VACANT LAND TMK NO (2) 3-8-7 101	KUIHELANI HWY NEAR WAIKO RD	96793	RCRA-SQG
WAILEA	U003222380	ESTATE OF MARY HELELA	OLD COUNTRY RD	96753	UST
WAILUKU	1009295089	SUDA CONST & MASON INC	831 EHA ST	96793	ICIS
WAILUKU	1009260028	COUNTY OF MAUI	200 S HIGH ST	96793	ICIS
WAILUKU	1000244831	MAUI DISTRICT OFFICE DOE	54 HIGH ST	96793	RCRA-SQG
WAILUKU	S107769073	MAUI'S QUALITY DRY CLEANING & LAUNDRY, INC.	380 HO'OKAHI ST., #101	96793	DRYCLEANERS
WAILUKU	1006842014	HAWAIIAN CEMENT - WAIKAPU QUARRY	HONOAPIILANI HWY	96793	FINDS, LUST
WAILUKU	1004464674	WAIHEE ELEMENTARY SCHOOL	KAHEKILI HWY RT	96793	FINDS, FTTS
WAILUKU	1008171876	KEHALANI MAUKA ROADWAY PLANS	56-565 KAMEHAMEHA HWY	96793	FINDS
WAILUKU	1007092114	MAALAEA GENERATING STATION	NORTH KIHEI RD	96793	RCRA-SQG
WAILUKU	2001555343	MAALAEA HARBOR	MAALAEA HARBOR		ERNS
WAILUKU	1004688804	MAALAEA STORE	MAALAEA ROAD	96793	RCRA-SQG, FINDS
WAILUKU	1006819707	WAIALE ASH PILE	MAHALANI ST	96793	SHWS, FINDS
WAILUKU	U003402951	BOARD OF WATER SUPPLY	MOKUHAU RENOVATION END OF MOKUAHU RD	96793	UST
WAILUKU	S107769225	HAWAIIAN CHARCOAL COMPANY	SOUTH OF OLD WAIKAPU LANDFILL	96793	AIRS
WAILUKU	1009403395	KEHALANI MAUKA LARGE LOT	THE MAJORITY OF THE PROJECT	96793	FINDS
WAILUKU	U001236822	HERBERT HORITA REALTY INC.	TMK 2-3-4-13:100	96793	UST
WAILUKU	S107769222	HAWAIIAN CEMENT	TMK 3-6-04: POR. 7	96793	AIRS
WAILUKU	S108008644	Y HATA- MAUI	200 WAIEHU BEACH RD AND KAHULU BEACH RD	96793	SHWS
WAILUKU	S108008465	Y HATA- MAUI	200 WAIEHU BEACH RD AND KAHULU BEACH RD	96793	INST CONTROL
WAILUKU	1009303919	BEI HAWAII - MAUI	275 E WAIKO RD	96793	SSTS
WAILUKU	1009254377	BREWER ENVIRONMENTAL INDUSTRIES L.L.C.	275 E. WAIKO RD.	96793	ICIS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

FEDERAL RECORDS

NPL: National Priority List
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 07/05/2006
Date Data Arrived at EDR: 08/02/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 41

Source: EPA
Telephone: N/A
Last EDR Contact: 11/01/2006
Next Scheduled EDR Contact: 01/29/2007
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

Date of Government Version: 07/05/2006
Date Data Arrived at EDR: 08/02/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 41

Source: EPA
Telephone: N/A
Last EDR Contact: 11/01/2006
Next Scheduled EDR Contact: 01/29/2007
Data Release Frequency: Quarterly

DELISTED NPL: National Priority List Deletions
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 07/05/2006
Date Data Arrived at EDR: 08/02/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 41

Source: EPA
Telephone: N/A
Last EDR Contact: 11/01/2006
Next Scheduled EDR Contact: 01/29/2007
Data Release Frequency: Quarterly

NPL RECOVERY: Federal Superfund Liens
Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: No Update Planned

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 06/19/2006
Date Data Arrived at EDR: 06/22/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 62

Source: EPA
Telephone: 703-603-8960
Last EDR Contact: 09/21/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Quarterly

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 07/17/2006
Date Data Arrived at EDR: 08/02/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 41

Source: EPA
Telephone: 703-603-8960
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Quarterly

CORRACTS: Corrective Action Report
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/15/2006
Date Data Arrived at EDR: 03/17/2006
Date Made Active in Reports: 04/13/2006
Number of Days to Update: 27

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: Quarterly

RCRA: Resource Conservation and Recovery Act Information

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS). The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/13/2006
Date Data Arrived at EDR: 06/28/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 56

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 09/28/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

ERNS: Emergency Response Notification System
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 01/12/2006
Date Made Active in Reports: 02/21/2006
Number of Days to Update: 40

Source: National Response Center, United States Coast Guard
Telephone: 202-260-2342
Last EDR Contact: 10/24/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Annually

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 07/03/2006
Date Data Arrived at EDR: 07/19/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 35

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 10/18/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Annually

US ENG CONTROLS: Engineering Controls Sites List
A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 03/21/2006
Date Data Arrived at EDR: 03/27/2006
Date Made Active in Reports: 05/22/2006
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: 703-603-8905
Last EDR Contact: 09/07/2006
Next Scheduled EDR Contact: 10/02/2006
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls
A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/21/2006
Date Data Arrived at EDR: 03/27/2006
Date Made Active in Reports: 05/22/2006
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: 703-603-8905
Last EDR Contact: 09/07/2006
Next Scheduled EDR Contact: 10/02/2006
Data Release Frequency: Varies

DOD: Department of Defense Sites
This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 02/08/2005
Date Made Active in Reports: 08/04/2005
Number of Days to Update: 177

Source: USGS
Telephone: 703-692-8801
Last EDR Contact: 08/11/2006
Next Scheduled EDR Contact: 11/06/2006
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites
The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 01/19/2006
Date Made Active in Reports: 02/21/2006
Number of Days to Update: 33

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Varies

US BROWNFIELDS: A Listing of Brownfields Sites
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 07/10/2006
Date Data Arrived at EDR: 07/13/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 55

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 09/11/2006
Next Scheduled EDR Contact: 12/11/2006
Data Release Frequency: Semi-Annually

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/14/2004
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 04/25/2005
Number of Days to Update: 69

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 10/23/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Varies

ROD: Records Of Decision
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 07/10/2006
Date Data Arrived at EDR: 07/21/2006
Date Made Active in Reports: 09/08/2006
Number of Days to Update: 47

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 11/04/2005
Date Data Arrived at EDR: 11/28/2005
Date Made Active in Reports: 01/30/2006
Number of Days to Update: 63

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Varies

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 07/20/2006
Date Data Arrived at EDR: 07/21/2006
Date Made Active in Reports: 08/22/2006
Number of Days to Update: 32

Source: EPA
Telephone: 202-564-6064
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Quarterly

TRIS: Toxic Chemical Release Inventory System
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 06/22/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 62

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 09/22/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/30/2006
Number of Days to Update: 46

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 10/18/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/14/2006
Date Data Arrived at EDR: 07/18/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 50

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

Date of Government Version: 07/14/2006
Date Data Arrived at EDR: 07/18/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 50

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Quarterly

SSTS: Section 7 Tracking Systems
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 05/11/2006
Date Made Active in Reports: 05/22/2006
Number of Days to Update: 11

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 10/30/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 02/13/2006
Date Data Arrived at EDR: 04/21/2006
Date Made Active in Reports: 05/11/2006
Number of Days to Update: 20

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 07/17/2006
Next Scheduled EDR Contact: 10/16/2006
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/07/2006
Date Data Arrived at EDR: 08/09/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 28

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 08/09/2006
Next Scheduled EDR Contact: 11/06/2006
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/10/2006
Date Data Arrived at EDR: 07/20/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 48

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Quarterly

MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/16/2006
Date Data Arrived at EDR: 06/28/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 56

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 09/27/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: Semi-Annually

FINDS: Facility Index System/Facility Registry System
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/21/2006
Date Data Arrived at EDR: 07/25/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 43

Source: EPA
Telephone: N/A
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2003
Date Data Arrived at EDR: 06/17/2005
Date Made Active in Reports: 08/04/2005
Number of Days to Update: 48

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 10/20/2006
Next Scheduled EDR Contact: 12/11/2006
Data Release Frequency: Biennially

STATE AND LOCAL RECORDS

SHWS: Sites List
Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 07/24/2006
Date Data Arrived at EDR: 07/27/2006
Date Made Active in Reports: 08/30/2006
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/22/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Semi-Annually

SWF/LF: Permitted Landfills in the State of Hawaii
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/19/2004
Date Data Arrived at EDR: 05/20/2004
Date Made Active in Reports: 06/22/2004
Number of Days to Update: 33

Source: Department of Health
Telephone: 808-586-4245
Last EDR Contact: 10/24/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Varies

LUST: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 08/11/2006
Date Data Arrived at EDR: 08/14/2006
Date Made Active in Reports: 08/30/2006
Number of Days to Update: 16

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 09/26/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: Semi-Annually

UST: Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 08/11/2006
Date Data Arrived at EDR: 08/14/2006
Date Made Active in Reports: 09/20/2006
Number of Days to Update: 37

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 09/26/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: Semi-Annually

SPILLS: Release Notifications
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 07/24/2006
Date Data Arrived at EDR: 07/27/2006
Date Made Active in Reports: 08/30/2006
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/22/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Varies

INST CONTROL: Sites with Institutional Controls
Voluntary Remediation Program and Brownfields sites with institutional controls in place.

Date of Government Version: 07/24/2006
Date Data Arrived at EDR: 07/27/2006
Date Made Active in Reports: 08/30/2006
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/22/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Varies

VCP: Voluntary Response Program Sites

Date of Government Version: 07/24/2006
Date Data Arrived at EDR: 07/27/2006
Date Made Active in Reports: 08/30/2006
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/22/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Varies

DRYCLEANERS: Permitted Drycleaner Facility Listing
A listing of permitted drycleaner facilities in the state.

Date of Government Version: 09/07/2006
Date Data Arrived at EDR: 09/08/2006
Date Made Active in Reports: 10/13/2006
Number of Days to Update: 35

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 10/30/2006
Next Scheduled EDR Contact: 01/29/2007
Data Release Frequency: Varies

BROWNFIELDS: Brownfields Sites

Date of Government Version: 07/24/2006
Date Data Arrived at EDR: 07/27/2006
Date Made Active in Reports: 08/30/2006
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/22/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Varies

AIRS: List of Permitted Facilities
A listing of permitted facilities in the state.

Date of Government Version: 09/07/2006
Date Data Arrived at EDR: 09/08/2006
Date Made Active in Reports: 10/13/2006
Number of Days to Update: 35

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 10/30/2006
Next Scheduled EDR Contact: 01/29/2007
Data Release Frequency: Varies

TRIBAL RECORDS

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 02/08/2005
Date Made Active in Reports: 08/04/2005
Number of Days to Update: 177

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 08/11/2006
Next Scheduled EDR Contact: 11/06/2006
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 06/08/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 06/28/2006
Number of Days to Update: 19

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 01/04/2005
Date Data Arrived at EDR: 01/21/2005
Date Made Active in Reports: 02/28/2005
Number of Days to Update: 38

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 06/06/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 07/28/2006
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 06/08/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 07/28/2006
Number of Days to Update: 49

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 08/01/2006
Date Data Arrived at EDR: 06/23/2006
Date Made Active in Reports: 08/02/2006
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 06/01/2006	Source: EPA Region 7
Date Data Arrived at EDR: 07/10/2006	Telephone: 913-551-7003
Date Made Active in Reports: 09/12/2006	Last EDR Contact: 08/21/2006
Number of Days to Update: 64	Next Scheduled EDR Contact: 11/20/2006
	Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Minnesota, Mississippi and North Carolina.

Date of Government Version: 01/01/2006	Source: EPA Region 4
Date Data Arrived at EDR: 02/27/2006	Telephone: 404-562-8677
Date Made Active in Reports: 03/28/2006	Last EDR Contact: 08/21/2006
Number of Days to Update: 29	Next Scheduled EDR Contact: 11/20/2006
	Data Release Frequency: Semi-Annually

INDIAN UST R4: Underground Storage Tanks on Indian Land

Date of Government Version: 01/01/2006	Source: EPA Region 4
Date Data Arrived at EDR: 02/27/2006	Telephone: 404-562-9424
Date Made Active in Reports: 03/28/2006	Last EDR Contact: 08/21/2006
Number of Days to Update: 29	Next Scheduled EDR Contact: 11/20/2006
	Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land

Date of Government Version: 06/01/2006	Source: EPA Region 7
Date Data Arrived at EDR: 07/10/2006	Telephone: 913-551-7003
Date Made Active in Reports: 09/12/2006	Last EDR Contact: 08/21/2006
Number of Days to Update: 64	Next Scheduled EDR Contact: 11/20/2006
	Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

Date of Government Version: 12/02/2004	Source: EPA Region 5
Date Data Arrived at EDR: 12/29/2004	Telephone: 312-886-6136
Date Made Active in Reports: 02/04/2005	Last EDR Contact: 08/21/2006
Number of Days to Update: 37	Next Scheduled EDR Contact: 11/20/2006
	Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

Date of Government Version: 06/06/2006	Source: EPA Region 8
Date Data Arrived at EDR: 06/09/2006	Telephone: 303-312-6137
Date Made Active in Reports: 07/28/2006	Last EDR Contact: 08/21/2006
Number of Days to Update: 49	Next Scheduled EDR Contact: 11/20/2006
	Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land

Date of Government Version: 06/08/2006	Source: EPA Region 10
Date Data Arrived at EDR: 06/09/2006	Telephone: 206-553-2857
Date Made Active in Reports: 07/28/2006	Last EDR Contact: 08/21/2006
Number of Days to Update: 49	Next Scheduled EDR Contact: 11/20/2006
	Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land
A listing of underground storage tank locations on Indian Land.

Date of Government Version: 06/08/2006	Source: EPA, Region 1
Date Data Arrived at EDR: 06/09/2006	Telephone: 617-918-1313
Date Made Active in Reports: 06/30/2006	Last EDR Contact: 08/21/2006
Number of Days to Update: 21	Next Scheduled EDR Contact: 11/20/2006
	Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

Date of Government Version: 06/30/2006	Source: EPA Region 6
Date Data Arrived at EDR: 07/03/2006	Telephone: 214-665-7591
Date Made Active in Reports: 09/06/2006	Last EDR Contact: 08/21/2006
Number of Days to Update: 65	Next Scheduled EDR Contact: 11/20/2006
	Data Release Frequency: Semi-Annually

INDIAN UST R9: Underground Storage Tanks on Indian Land

Date of Government Version: 06/01/2006	Source: EPA Region 9
Date Data Arrived at EDR: 06/23/2006	Telephone: 415-972-3368
Date Made Active in Reports: 08/02/2006	Last EDR Contact: 08/21/2006
Number of Days to Update: 40	Next Scheduled EDR Contact: 11/20/2006
	Data Release Frequency: Quarterly

EDR PROPRIETARY RECORDS

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

AHA Hospitals:
Source: American Hospital Association, Inc
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

GEOCHECK®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

MAALAEA MAUKA
HONOAPIILANI HIGHWAY
WAILUKU, HI 96793

TARGET PROPERTY COORDINATES

Latitude (North):	20.80400 - 20˚ 48' 14.4"
Longitude (West):	156.5115 - 156˚ 30' 41.4"
Universal Tranverse Mercator:	Zone 4
UTM X (Meters):	759028.3
UTM Y (Meters):	2302318.8
Elevation:	131 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	20156-G5 LAHAINA, HI
Most Recent Revision:	Not reported
East Map:	20156-G4 WAILUKU, HI
Most Recent Revision:	Not reported

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

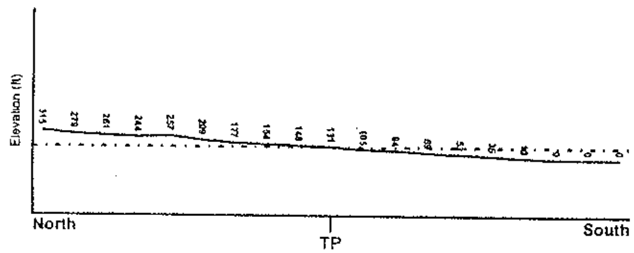
TOPOGRAPHIC INFORMATION

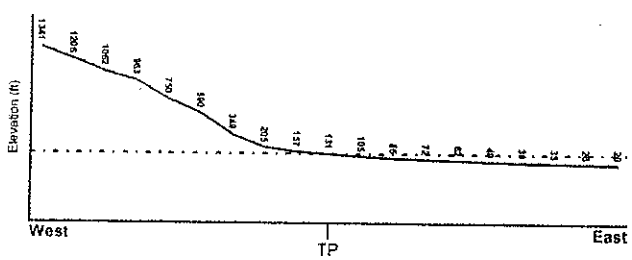
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General ESE

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 131 ft.

0 1/2 1 Miles

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
MAUI, HI	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 1500030235B

Additional Panels in search area: 1500030255B

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
NOT AVAILABLE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

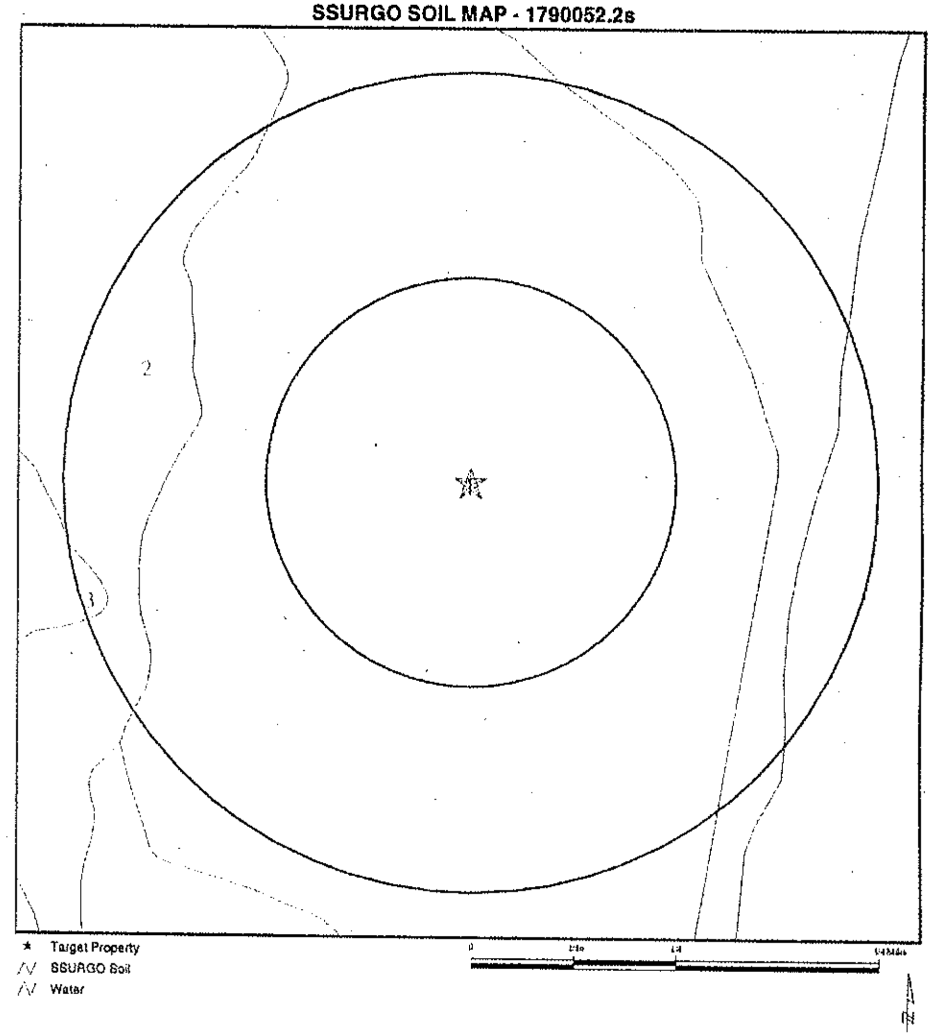
Era: -
System: -
Series: -
Code: N/A *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: -

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 1790052.2s



SITE NAME: Maalaea Mauka ADDRESS: Honoapiilani Highway WAILUKU HI 96793 LAT/LONG: 20.8040 / 156.5115	CLIENT: Element Environmental, LLC CONTACT: Roger Aoki INQUIRY #: 1790052.2s DATE: November 06, 2006 1:52 pm

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: EWA

Soil Surface Texture: cobbly - silty clay

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained. Soils have intermediate water holding capacity. Depth to water table is more than 6 feet.

Hydric Status: Soil does not meet the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel: MODERATE

Depth to Bedrock Min: > 0 inches

Depth to Bedrock Max: > 0 inches

Soil Layer Information							
	Boundary			Classification			
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	Permeability Rate (in/hr)	Soil Reaction (pH)
1	0 inches	16 inches	cobbly - silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	Kaolinitic suffix for CL.	Max: 2.00 Min: 0.60	Max: 7.80 Min: 6.60
2	16 inches	60 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	Kaolinitic suffix for CL.	Max: 2.00 Min: 0.60	Max: 7.80 Min: 6.60

Soil Map ID: 2

Soil Component Name: STONY ALLUVIAL LAND

Soil Surface Texture: extremely stony - clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained. Soils have intermediate water holding capacity. Depth to water table is more than 6 feet.

Hydric Status: Soil does not meet the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel: MODERATE

Depth to Bedrock Min: > 0 inches

Depth to Bedrock Max: > 0 inches

Soil Layer Information							
	Boundary			Classification			
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	Permeability Rate (in/hr)	Soil Reaction (pH)
1	0 inches	10 inches	extremely stony - clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	Kaolinitic suffix for MH	Max: 6.00 Min: 2.00	Max: 7.30 Min: 6.60
2	10 inches	60 inches	stratified	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	Kaolinitic suffix for MH	Max: 6.00 Min: 2.00	Max: 7.30 Min: 6.60

Soil Map ID: 3

Soil Component Name: ROCK LAND

Soil Surface Texture: silty clay loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained. Soils have intermediate water holding capacity. Depth to water table is more than 6 feet.

Hydric Status: Soil does not meet the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel: MODERATE

Depth to Bedrock Min: > 4 inches

Depth to Bedrock Max: > 10 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification			
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	Permeability Rate (in/hr)	Soil Reaction (pH)
1	0 inches	4 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	Kaolinitic sulfix for MH	Max: 2.00 Min: 0.60	Max: 7.30 Min: 6.60
2	4 inches	8 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	Kaolinitic sulfix for MH	Max: 2.00 Min: 0.60	Max: 7.30 Min: 6.60
3	8 inches	20 inches	unweathered bedrock	Not reported	Not reported	Max: 0.60 Min: 0.00	Max: 0.00 Min: 0.00

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

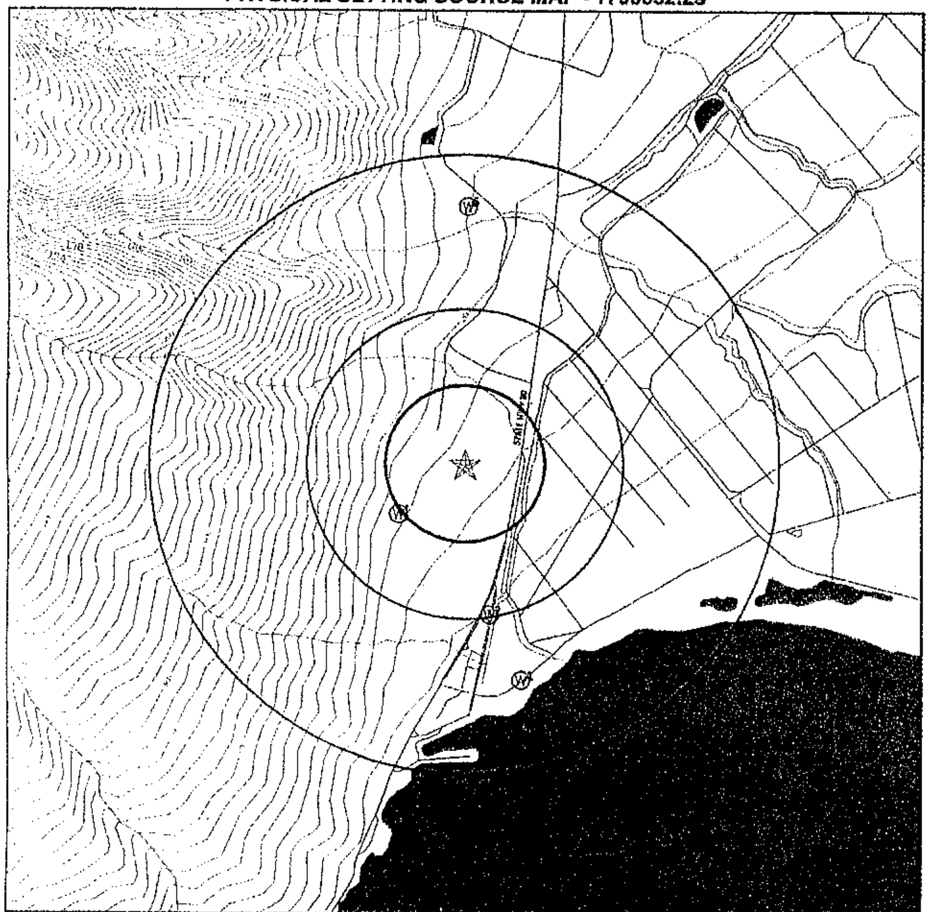
Note: PWS System location is not always the same as well location.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	HI10000848	1/4 - 1/2 Mile SW
2	HI10000823	1/4 - 1/2 Mile South
A3	HI10000810	1/2 - 1 Mile SSE
A4	HI10000809	1/2 - 1 Mile SSE
5	HI10000969	1/2 - 1 Mile North

PHYSICAL SETTING SOURCE MAP - 1790052.2s



County Boundary
Major Roads
Contour Lines
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons
Groundwater Flow Direction
Indeterminate Groundwater Flow at Location
Groundwater Flow Varies at Location

SITE NAME:	Maalaea Mauka	CLIENT:	Element Environmental, LLC
ADDRESS:	Honoapiilani Highway WAILUKU HI 96793	CONTACT:	Roger Aoki
		INQUIRY #:	1790052.2s
LAT/LONG:	20.8040 / 156.5116	DATE:	November 06, 2006 1:52 pm

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID / Direction / Distance / Elevation	Database	EDR ID Number
1 SW 1/4 - 1/2 Mile Higher	HI WELLS	HI10000848

Wid:	6-4631-001	Island:	6
Well no:	4631-01	Well name:	Maalaea 272
Old name:	Not Reported	Yr drilled:	1965
Driller:	LAYNE INTL	Quad map:	06
Latitude27:	204818	Longitude2:	1563103
Latitude83:	204808	Longitude8:	1563093
Gps:	0	Utm:	1
Owner user:	State Dowald	Old number:	272-
Well type:	PER	Casing dia:	8
Ground el:	166	Well depth:	219
Solid case:	187	Perf case:	187
Use:	OBS	Use year:	Not Reported
Init water:	4.7		
Init head:	4.7		
Init chlor:	250		
Init cl:	250		
Test date:	Not Reported	Test gpm:	400
Test ddown:	4.0	Test chlor:	280
Test temp:	21.0	Temp unit:	C
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	4.7
Max chlor:	284	Min chlor:	Not Reported
Geology:	Tw	Pump yr:	Not Reported
Draft yr:	Not Reported	Head yr:	65
Maxchl:	Not Reported	Maxchl yr:	0
Minchl:	Not Reported	Minchl yr:	0
Bot hole:	-53	Bot solid:	-1
Bot perf:	-21	Spec capac:	100
Pump mgd:	Not Reported	Draft mgd:	Not Reported
Aquifer:	60101	Tmk:	3-6-001:014
Old aqui:	Not Reported	Aqui code:	60101
Latest hd:	4.7		
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	Not Reported
Pir:	Not Reported	Surveyor:	Not Reported
T:	0		
Pump elev:	Not Reported	Pump depth:	Not Reported

Map ID / Direction / Distance / Elevation	Database	EDR ID Number
2 South 1/4 - 1/2 Mile Lower	HI WELLS	HI10000823

Wid:	6-4630-001	Island:	6
Well no:	4630-01	Well name:	Maalaea Triangle
Old name:	Not Reported	Yr drilled:	1997
Driller:	ROSCOE MOSS	Quad map:	06
Latitude27:	204801	Longitude2:	1563047
Latitude83:	204749	Longitude8:	1563037
Gps:	0	Utm:	1
Owner user:	Triangle Part	Old number:	Not Reported
Well type:	PER	Casing dia:	8
Ground el:	52	Well depth:	84

Solid case:	54	Perf case:	74
Use:	IRRLA	Use year:	97
Init water:	Not Reported		
Init head:	4.37		
Init chlor:	Not Reported		
Init cl:	215		
Test date:	Not Reported	Test gpm:	82
Test ddown:	0.0	Test chlor:	210
Test temp:	23.3	Temp unit:	C
Pump gpm:	75		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Tw	Pump yr:	97
Draft yr:	Not Reported	Head yr:	Not Reported
Maxchl:	Not Reported	Maxchl yr:	0
Mnchl:	Not Reported	Minchl yr:	0
Bot hole:	-32	Bot solid:	-2
Bot perf:	-22	Spec capac:	Not Reported
Pump mgd:	0.108	Draft mgd:	Not Reported
Aquifer:	Not Reported	Tmk:	3-6-001:001
Old aqui:	Not Reported	Aqui code:	60101
Latest hd:	0		
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	Not Reported
Pir:	Not Reported	Surveyor:	S D DEPONTE
T:	0		
Pump elev:	-2	Pump depth:	55

A3
SSE
1/2 - 1 Mile
Lower

HI WELLS HI10000810

Wid:	6-4730-001	Island:	6
Well no:	4730-01	Well name:	Tmk 3-8-14-18
Old name:	Not Reported	Yr drilled:	Not Reported
Driller:	PAUL SMITH	Quad map:	06
Latitude27:	204751	Longitude2:	1563041
Latitude83:	204739	Longitude8:	1563031
Gps:	0	Utm:	1
Owner user:	Mawson R	Old number:	Not Reported
Well type:	ROT	Casing dia:	Not Reported
Ground el:	Not Reported	Well depth:	35
Solid case:	Not Reported	Perf case:	35
Use:	Not Reported	Use year:	Not Reported
Init water:	Not Reported		
Init head:	0		
Init chlor:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Temp unit:	Not Reported
Pump gpm:	0		

Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	490
Geology:	Tw	Pump yr:	Not Reported
Draft yr:	Not Reported	Head yr:	Not Reported
Maxchl:	Not Reported	Maxchl yr:	84
Minchl:	Not Reported	Minchl yr:	Not Reported
Bot hole:	Not Reported	Bot solid:	Not Reported
Bot perf:	Not Reported	Spec capac:	Not Reported
Pump mgd:	Not Reported	Draft mgd:	Not Reported
Aquifer:	60101	Tmk:	3-8-014:018
Old aqui:	Not Reported	Aqui code:	60101
Latest hd:	0		
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	Not Reported
Pir:	Not Reported	Surveyor:	Not Reported
T:	0		
Pump elev:	Not Reported	Pump depth:	Not Reported

A4
SSE
1/2 - 1 Mile
Lower

HI WELLS HI10000809

Wid:	6-4730-002	Island:	6
Well no:	4730-02	Well name:	Tmk 3-8-14-19
Old name:	Not Reported	Yr drilled:	1958
Driller:	PACIFIC DRLG	Quad map:	06
Latitude27:	204749	Longitude2:	1563042
Latitude83:	204737	Longitude8:	1563032
Gps:	0	Utm:	1
Owner user:	Lindberg E	Old number:	271-
Well type:	ROT	Casing dia:	8
Ground el:	15	Well depth:	45
Solid case:	20	Perf case:	Not Reported
Use:	IRR	Use year:	71
Init water:	1.8		
Init head:	1.83		
Init chlor:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Temp unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	3.8
Max chlor:	834	Min chlor:	Not Reported
Geology:	Tw	Pump yr:	Not Reported
Draft yr:	Not Reported	Head yr:	70
Maxchl:	Not Reported	Maxchl yr:	0
Minchl:	Not Reported	Minchl yr:	0
Bot hole:	-30	Bot solid:	-5
Bot perf:	Not Reported	Spec capac:	Not Reported
Pump mgd:	Not Reported	Draft mgd:	Not Reported
Aquifer:	60101	Tmk:	3-8-014.019

Old aqui:	Not Reported	Aqui code:	60101
Latest hd:	0		
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	Not Reported
Plr:	Not Reported	Surveyor:	Not Reported
T:	0		
Pump elev:	Not Reported	Pump depth:	Not Reported

5
North
1/2 - 1 Mile
Higher

HI WELLS HI10000969

Wid:	6-4930-001	Island:	6
Well no:	4930-01	Well name:	Pohakea
Old name:	Not Reported	Yr drilled:	2004
Driller:	WAILANI DRLG	Quad map:	08
Latitude27:	204910	Longitude2:	1563051
Latitude83:	204858	Longitude8:	1563041
Gps:	1	Utm:	0
Owner user:	A & B Properties	Old number:	Not Reported
Well type:	Not Reported	Casing dia:	6
Ground el:	321	Well depth:	350
Solid case:	330	Perf case:	350
Use:	MUNPR	Use year:	04
Init water:	Not Reported		
Init head:	7.43		
Init chlor:	Not Reported		
Init cl:	160		
Test date:	Not Reported	Test gpm:	318
Test ddown:	4.0	Test chlor:	160
Test temp:	72.0	Temp unit:	F
Pump gpm:	300		
Draft mgy:	Not Reported	Head feet:	7.43
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Tw	Pump yr:	04
Draft yr:	Not Reported	Head yr:	Not Reported
Maxchl:	Not Reported	Maxchl yr:	Not Reported
Minchl:	Not Reported	Minchl yr:	Not Reported
Bot hole:	-29	Bot solid:	-9
Bot perf:	-29	Spec capac:	Not Reported
Pump mgd:	0.432	Draft mgd:	Not Reported
Aquifer:	Not Reported	Tmk:	3-6-004:003
Old aqui:	Not Reported	Aqui code:	60101
Latest hd:	0		
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	Not Reported
Plr:	Not Reported	Surveyor:	REED M ARIYOSHI
T:	10000		
Pump elev:	-19	Pump depth:	340

AREA RADON INFORMATION

Federal EPA Radon Zone for MAUI County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 96793

Number of sites tested: 11

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.291 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW[R] Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Ground Water Wells
Source: Department of Land and Natural Resources
Telephone: 808-587-0242

OTHER STATE DATABASE INFORMATION

RADON

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

EDR Site Report™

MAALAEA STORE
MAALAEA ROAD
WAILUKU, HI 96793

Inquiry Number:

November 10, 2006

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

TABLE OF CONTENTS

The EDR-Site Report™ is a comprehensive presentation of government filings on a facility identified in a search of over 4 million government records from more than 600 federal, state and local environmental databases. The report is divided into three sections:

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

AREA / FACILITY	FACILITY 1 MAALAEA STORE MAALAEA ROAD WAILUKU, HI 96793 EDR ID #1004688804 EPA #HID981656242
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	YES - p4
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	YES - p5
Facility is listed in a county/local unique database (LOCAL)	NO
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	2

SECTION 2: FACILITY DETAIL REPORTS

WASTE MANAGEMENT

Facility generates hazardous waste

DATABASE: Resource Conservation and Recovery Information (RCRAInfo)

MAALAEA STORE
MAALAEA ROAD
WAILUKU, HI 96793
EDR ID #1004688804

Facility Name: MAALAEA STORE
MAALAEA ROAD
WAILUKU, HI 96793

Mailing Address: RR-1 BOX THIRD HUNDRED SEVENTY
WAILUKU MAUI, HI 96793

Contact: KATHLEEN UNO
(808) 244-9888

EPA-ID: HID981656242

Classification: Conditionally Exempt Small Quantity Generator

Description: Handler:
- generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or
- generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time:
  - 1 kg or less of acutely hazardous waste; or
  - 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or
- generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time:
  - 1 kg or less of acutely hazardous waste; or
  - 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Legal Status: Private

Owner: JAMES UNO SR
NOT REQUIRED
NOT REQUIRED, ME 41565 - 5121
(415) 555-1212

SECTION 2: FACILITY DETAIL REPORTS
...Continued...

MULTIMEDIA

Facility Is listed in EPA's Index system

DATABASE: Facility Index System (FINDS)

MAALAEA STORE
MAALAEA ROAD
WAILUKU, HI 96793
EDR ID #1004688804

This site is listed in the Federal FINDS database. The FINDS database may contain references to records from government databases included elsewhere in the report.
Please note: the FINDS database may also contain references to out of date records formerly associated with the site.

Registry ID: 110007502078
Facility Name: MAALAEA STORE
Facility Address: MAALAEA ROAD
WAILUKU, HI 96793
Facility County: MAUI
EPA Region: 09
Fed. Gov. Facility: No
Indian Tribal Land: No
EPA Records Indicate Facility Is Listed In

The HI-ECS (Hawaii Environmental Compliance Program) is the Hawaii state regulatory program relating to environmental compliance and hazardous materials that ensures that program areas and facilities are in compliance with environmental regulations

HI-UST (Hawaii - Underground Storage Tank). Hawaii Underground Storage Tank Program regulates underground storage tanks which store petroleum or hazardous substances and offers documents and data products for downloading.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

Prg. Sys. ID: X104495
Supplemental Interest: Not reported
Facility SIC Codes: Not reported
Facility NAICS Codes: Not reported

Prg. Sys. ID: 9-502481
Supplemental Interest: Not reported
Facility SIC Codes: Not reported
Facility NAICS Codes: Not reported

Prg. Sys. ID: HID981658242
Supplemental Interest: Not reported
Facility SIC Codes: Not reported
Facility NAICS Codes: 441222

Alternative name: MAALAEA STORE

SECTION 3: DATABASES SEARCHED AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

WASTE MANAGEMENT

RCRA: Resource Conservation and Recovery Act Information
Source: EPA
Telephone: 800-424-9346
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS). The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/13/2006 — Date of Last EDR Contact: 09/28/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 11/20/2006

BRS: Biennial Reporting System
Source: EPA/NTIS
Telephone: 800-424-9346
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2003 — Date of Last EDR Contact: 10/20/2006
Database Release Frequency: Biennially — Date of Next Scheduled Update: 12/11/2006

RAATS: RCRA Administrative Action Tracking System
Source: EPA
Telephone: 202-564-4104
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995 — Date of Last EDR Contact: 09/05/2006
Database Release Frequency: No Update Planned — Date of Next Scheduled Update: 12/04/2006

CORRACTS: Corrective Action Report
Source: EPA
Telephone: 800-424-9346
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/15/2006 — Date of Last EDR Contact: 09/05/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 12/04/2006

PADS: PCB Activity Database System
Source: EPA
Telephone: 202-566-0500
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/07/2006 — Date of Last EDR Contact: 08/09/2006
Database Release Frequency: Annually — Date of Next Scheduled Update: 11/06/2006

MLTS: Material Licensing Tracking System
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/10/2006
Database Release Frequency: Quarterly
Date of Last EDR Contact: 10/02/2006
Date of Next Scheduled Update: 01/01/2007

HI UST: Underground Storage Tank Database
Source: Department of Health
Telephone: 808-586-4228
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 08/11/2006
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 09/26/2006
Date of Next Scheduled Update: 12/25/2006

HI LUST: Leaking Underground Storage Tank Database
Source: Department of Health
Telephone: 808-586-4228
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 08/11/2006
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 09/26/2006
Date of Next Scheduled Update: 12/25/2006

ERNS: Emergency Response Notification System
Source: National Response Center, United States Coast Guard
Telephone: 202-260-2342
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2005
Database Release Frequency: Annually
Date of Last EDR Contact: 10/24/2006
Date of Next Scheduled Update: 01/22/2007

HMIRS: Hazardous Materials Information Reporting System
Source: U.S. Department of Transportation
Telephone: 202-366-4555
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 07/03/2006
Database Release Frequency: Annually
Date of Last EDR Contact: 10/18/2006
Date of Next Scheduled Update: 01/15/2007

WASTE DISPOSAL

NPL: National Priority List
Source: EPA
Telephone: Not reported
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 07/05/2006
Date Made Active at EDR: 09/12/2006
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 08/02/2006
Elapsed ASTM Days: 41
Date of Last EDR Contact: 11/01/2006

Proposed NPL: Proposed National Priority List Sites
Source: EPA
Telephone: Not reported

Date of Government Version: 07/05/2006
Date Made Active at EDR: 09/12/2006
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 08/02/2006
Elapsed ASTM Days: 41
Date of Last EDR Contact: 11/01/2006

DELISTED NPL: National Priority List Deletions
Source: EPA
Telephone: Not reported
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 07/05/2006
Date Made Active at EDR: 09/12/2006
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 08/02/2006
Elapsed ASTM Days: 41
Date of Last EDR Contact: 11/01/2006

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
Source: EPA
Telephone: 703-603-8960
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 06/19/2006
Date Made Active at EDR: 08/23/2006
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 06/22/2006
Elapsed ASTM Days: 62
Date of Last EDR Contact: 09/21/2006

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Source: EPA
Telephone: 703-603-8960
Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 07/17/2006
Database Release Frequency: Quarterly
Date of Last EDR Contact: 09/18/2006
Date of Next Scheduled Update: 12/18/2006

ROD: Records Of Decision
Source: EPA
Telephone: 703-416-0223
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 07/10/2006
Database Release Frequency: Annually
Date of Last EDR Contact: 10/02/2006
Date of Next Scheduled Update: 01/01/2007

NPL RECOVERY: Federal Superfund Liens
Source: EPA
Telephone: 202-564-4267
Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Made Active at EDR: 03/30/1994
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 02/02/1994
Elapsed ASTM Days: 56
Date of Last EDR Contact: 08/21/2006

HI SHWS: Sites List
Source: Department of Health
Telephone: 808-586-4249
Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 07/24/2006
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

SECTION 3: DATABASES SEARCHED AND UPDATE DATES

...Continued...

HI SWF/LF: Permitted Landfills in the State of Hawaii
Source: Department of Health
Telephone: 808-586-4245
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites

Date of Government Version: 05/18/2004 — Date of Last EDR Contact: 10/24/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 01/22/2007

MULTIMEDIA

TRIS: Toxic Chemical Release Inventory System
Source: EPA
Telephone: 202-566-0250
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2004 — Date of Last EDR Contact: 09/22/2006
Database Release Frequency: Annually — Date of Next Scheduled Update: 12/18/2006

SSTS: Section 7 Tracking Systems
Source: EPA
Telephone: 202-564-4203
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2004 — Date of Last EDR Contact: 11/07/2006
Database Release Frequency: Annually — Date of Next Scheduled Update: 01/15/2007

TSCA: Toxic Substances Control Act
Source: EPA
Telephone: 202-260-5521
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002 — Date of Last EDR Contact: 10/18/2006
Database Release Frequency: N/A — Date of Next Scheduled Update: 01/15/2007

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/14/2006 — Date of Last EDR Contact: 09/18/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 12/18/2006

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA
Telephone: 202-566-1667

Date of Government Version: 07/14/2006 — Date of Last EDR Contact: 09/18/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 12/18/2006

SECTION 3: DATABASES SEARCHED AND UPDATE DATES

...Continued...

FINDS: Facility Index System/Facility Registry System
Source: EPA
Telephone: Not reported
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/21/2006 — Date of Last EDR Contact: 10/02/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 01/01/2007

RMP: Risk Management Plans
Source: Environmental Protection Agency
Telephone: 202-564-8600
When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 08/01/2006 — Date of Last EDR Contact: 08/21/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 11/20/2006

STORMWATER: Storm Water General Permits
Source: Environmental Protection Agency
Telephone: 202-564-0746
A listing of all facilities with Storm Water General Permits.

Date of Government Version: 08/02/2005 — Date of Last EDR Contact: 10/31/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 01/01/2007

US ENG CONTROLS: Engineering Controls Sites List
Source: Environmental Protection Agency
Telephone: 703-603-8905
A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 03/21/2006 — Date of Last EDR Contact: 09/07/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 10/02/2006

US INST CONTROL: Sites with Institutional Controls
Source: Environmental Protection Agency
Telephone: 703-603-8905
A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/21/2006 — Date of Last EDR Contact: 09/07/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 10/02/2006

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
Source: EPA Region 1
Telephone: 617-918-1313
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 09/07/2006 — Date of Last EDR Contact: 08/21/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 11/20/2006

SECTION 3: DATABASES SEARCHED AND UPDATE DATES

...Continued...

HI SPILLS: Release Notifications
Source: Department of Health
Telephone: 808-586-4249
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 07/24/2006
Database Release Frequency: Varies
Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI INST CONTROL: Sites with Institutional Controls
Source: Department of Health
Telephone: 808-586-4249
Voluntary Remediation Program and Brownfields sites with institutional controls in place.

Date of Government Version: 07/24/2006
Database Release Frequency: Varies
Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI VCP: Voluntary Response Program Sites
Source: Department of Health
Telephone: 808-586-4249

Date of Government Version: 07/24/2006
Database Release Frequency: Varies
Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI DRYCLEANERS: Permitted Drycleaner Facility Listing
Source: Department of Health
Telephone: 808-586-4200
A listing of permitted drycleaner facilities in the state.

Date of Government Version: 09/07/2006
Database Release Frequency: Varies
Date of Last EDR Contact: 10/30/2006
Date of Next Scheduled Update: 01/29/2007

HI BROWNFIELDS: Brownfields Sites
Source: Department of Health
Telephone: 808-586-4249

Date of Government Version: 07/24/2006
Database Release Frequency: Varies
Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI AIRS: List of Permitted Facilities
Source: Department of Health
Telephone: 808-586-4200
A listing of permitted facilities in the state.

Date of Government Version: 09/07/2006
Database Release Frequency: Varies
Date of Last EDR Contact: 10/30/2006
Date of Next Scheduled Update: 01/29/2007

POTENTIAL SUPERFUND LIABILITY

PRP: Potentially Responsible Parties
Source: EPA
Telephone: 202-564-6064
A listing of verified Potentially Responsible Parties

Date of Government Version: 07/20/2006
Database Release Frequency: Quarterly
Date of Last EDR Contact: 10/02/2006
Date of Next Scheduled Update: 01/01/2007

EDR Site Report™

HAWAIIAN CEMENT - WAIKAPU QUARRY
HONOAPIILANI HWY
WAILUKU, HI 96793

Inquiry Number:

November 10, 2006

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

TABLE OF CONTENTS

The EDR-Site Report™ is a comprehensive presentation of government filings on a facility identified in a search of over 4 million government records from more than 600 federal, state and local environmental databases. The report is divided into three sections:

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

AREA	FACILITY 1 HAWAIIAN CEMENT - WAIKAPU QUARRY HONOAPIILANI HWY WAILUKU, HI 96793 EDR ID #1008842014 EPA #110014034035
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	YES - p4
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a State hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	YES - p5
Facility is listed in a county/local unique database (LOCAL)	YES - p6
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	3

SECTION 2: FACILITY DETAIL REPORTS

WASTE MANAGEMENT

Facility has reported leaking underground storage tank incidents

DATABASE: Leaking Petroleum Storage Tank Database (LUST)

HAWAIIAN CEMENT - WAIKAPU QUARRY
HONOAPIILANI HWY
WAILUKU, HI 96793
EDR ID #1008842014

LUST:

Facility ID:	9-502529
Release ID:	950015
Facility Status Date:	1995-05-16 00:00:00
Facility Status:	Site Cleanup Completed
Project Officer:	Brewer

MULTIMEDIA

Facility is listed in EPA's index system

DATABASE: Facility Index System (FINDS)

HAWAIIAN CEMENT - WAIKAPU QUARRY
HONOAPIILANI HWY
WAILUKU, HI 96793
EDR ID #1006842014

This site is listed in the Federal FINDS database. The FINDS database may contain references to records from government databases included elsewhere in the report.
Please note: the FINDS database may also contain references to out of date records formerly associated with the site.

Registry ID:	110014034035
Facility Name:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Facility Address:	HONOAPIILANI HWY WAILUKU, HI 96793
Facility County:	MAUI
EPA Region:	09
Fed. Gov. Facility:	No
Indian Tribal Land:	Not reported
EPA Records Indicate Facility is Listed in	HI-UST (Hawaii - Underground Storage Tank). Hawaii Underground Storage Tank Program regulates underground storage tanks which store petroleum or hazardous substances and offers documents and data products for downloading.

Prg. Sys. ID:	9-502529
Supplemental Interest:	Not reported
Facility SIC Codes:	Not reported
Facility NAICS Codes:	Not reported

Alternative name: HAWAIIAN CEMENT - WAIKAPU QUARRY

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

HAWAIIAN CEMENT - WAIKAPU QUARRY
HONOAPIILANI HWY
WAILUKU, HI 96793
EDR ID #1006842014

Database:
HI FINANCIAL ASSURANCE:

edr_fname:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Tank Status Desc:	Permanently Out of Use
Alt Facility ID:	9-502529
Street Address:	HONOAPIILANI HWY
Insurance:	F
Risk Retention Group:	F
Surety Bond:	F
Guarantee:	F
Letter of Credit:	F
State Fund:	F
Trust Fund:	F
Other Finance:	F

edr_fname:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Tank Status Desc:	Permanently Out of Use
Alt Facility ID:	9-502529
Street Address:	HONOAPIILANI HWY
Insurance:	F
Risk Retention Group:	F
Surety Bond:	F
Guarantee:	F
Letter of Credit:	F
State Fund:	F
Trust Fund:	F
Other Finance:	F

edr_fname:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Tank Status Desc:	Permanently Out of Use
Alt Facility ID:	9-502529
Street Address:	HONOAPIILANI HWY
Insurance:	F
Risk Retention Group:	F
Surety Bond:	F
Guarantee:	F
Letter of Credit:	F
State Fund:	F
Trust Fund:	F
Other Finance:	F

edr_fname:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Tank Status Desc:	Permanently Out of Use
Alt Facility ID:	9-502529
Street Address:	HONOAPIILANI HWY
Insurance:	F
Risk Retention Group:	F
Surety Bond:	F
Guarantee:	F
Letter of Credit:	F
State Fund:	F
Trust Fund:	F
Other Finance:	F

edr_fname:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Tank Status Desc:	Permanently Out of Use
Alt Facility ID:	9-502529
Street Address:	HONOAPIILANI HWY
Insurance:	F
Risk Retention Group:	F
Surety Bond:	F
Guarantee:	F
Letter of Credit:	F
State Fund:	F
Trust Fund:	F
Other Finance:	F

edr_fname:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Tank Status Desc:	Permanently Out of Use

SECTION 2: FACILITY DETAIL REPORTS

...Continued...

All Facility ID:	9-502529
Street Address:	HONOAPIILANI HWY
Insurance:	F
Risk Retention Group:	F
Surety Bond:	F
Guarantee:	F
Letter of Credit:	F
State Fund:	F
Trust Fund:	F
Other Finance:	F

SECTION 3: DATABASES SEARCHED AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

WASTE MANAGEMENT

RCRA: Resource Conservation and Recovery Act Information
Source: EPA
Telephone: 800-424-9346
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS). The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/13/2006 — Date of Last EDR Contact: 09/28/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 11/20/2006

BRS: Biennial Reporting System
Source: EPA/NTIS
Telephone: 800-424-9346
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2003 — Date of Last EDR Contact: 10/20/2006
Database Release Frequency: Biennially — Date of Next Scheduled Update: 12/11/2006

RAATS: RCRA Administrative Action Tracking System
Source: EPA
Telephone: 202-564-4104
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995 — Date of Last EDR Contact: 09/05/2006
Database Release Frequency: No Update Planned — Date of Next Scheduled Update: 12/04/2006

CORRACTS: Corrective Action Report
Source: EPA
Telephone: 800-424-9346
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/15/2006 — Date of Last EDR Contact: 09/05/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 12/04/2006

PADS: PCB Activity Database System
Source: EPA
Telephone: 202-566-0500
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/07/2006 — Date of Last EDR Contact: 08/09/2006
Database Release Frequency: Annually — Date of Next Scheduled Update: 11/06/2006

MLTS: Material Licensing Tracking System
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/10/2006
Database Release Frequency: Quarterly
Date of Last EDR Contact: 10/02/2006
Date of Next Scheduled Update: 01/01/2007

HI UST: Underground Storage Tank Database
Source: Department of Health
Telephone: 808-586-4228
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 08/11/2006
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 09/26/2006
Date of Next Scheduled Update: 12/25/2006

HI LUST: Leaking Underground Storage Tank Database
Source: Department of Health
Telephone: 808-586-4228
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 08/11/2006
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 09/26/2006
Date of Next Scheduled Update: 12/25/2006

ERNS: Emergency Response Notification System
Source: National Response Center, United States Coast Guard
Telephone: 202-260-2342
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2005
Database Release Frequency: Annually
Date of Last EDR Contact: 10/24/2006
Date of Next Scheduled Update: 01/22/2007

HMIRS: Hazardous Materials Information Reporting System
Source: U.S. Department of Transportation
Telephone: 202-366-4555
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT

Date of Government Version: 07/03/2006
Database Release Frequency: Annually
Date of Last EDR Contact: 10/18/2006
Date of Next Scheduled Update: 01/15/2007

WASTE DISPOSAL

NPL: National Priority List
Source: EPA
Telephone: Not reported
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 07/05/2006
Date Made Active at EDR: 09/12/2006
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 08/02/2006
Elapsed ASTM Days: 41
Date of Last EDR Contact: 11/01/2006

Proposed NPL: Proposed National Priority List Sites
Source: EPA
Telephone: Not reported

Date of Government Version: 07/05/2006
Date Made Active at EDR: 09/12/2006
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 08/02/2006
Elapsed ASTM Days: 41
Date of Last EDR Contact: 11/01/2006

SECTION 3: DATABASES SEARCHED AND UPDATE DATES
...Continued...

DELISTED NPL: National Priority List Deletions
Source: EPA
Telephone: Not reported
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 07/05/2006
Date Made Active at EDR: 09/12/2006
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 08/02/2006
Elapsed ASTM Days: 41
Date of Last EDR Contact: 11/01/2006

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
Source: EPA
Telephone: 703-603-8960
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 08/19/2006
Date Made Active at EDR: 08/23/2006
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 06/22/2006
Elapsed ASTM Days: 62
Date of Last EDR Contact: 09/21/2006

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Source: EPA
Telephone: 703-603-8960
Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 07/17/2006
Database Release Frequency: Quarterly
Date of Last EDR Contact: 09/18/2006
Date of Next Scheduled Update: 12/18/2006

ROD: Records Of Decision
Source: EPA
Telephone: 703-416-0223
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 07/10/2006
Database Release Frequency: Annually
Date of Last EDR Contact: 10/02/2006
Date of Next Scheduled Update: 01/01/2007

NPL RECOVERY: Federal Superfund Liens
Source: EPA
Telephone: 202-564-4267
Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Made Active at EDR: 03/30/1994
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 02/02/1994
Elapsed ASTM Days: 56
Date of Last EDR Contact: 08/21/2006

HI SHWS: Sites List
Source: Department of Health
Telephone: 808-586-4249
Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 07/24/2006
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI SWF/LF: Permitted Landfills in the State of Hawaii
Source: Department of Health
Telephone: 808-586-4245
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/18/2004 — Date of Last EDR Contact: 10/24/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 01/22/2007

MULTIMEDIA

TRIS: Toxic Chemical Release Inventory System
Source: EPA
Telephone: 202-566-0250
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2004 — Date of Last EDR Contact: 09/22/2006
Database Release Frequency: Annually — Date of Next Scheduled Update: 12/18/2006

SSTS: Section 7 Tracking Systems
Source: EPA
Telephone: 202-564-4203
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2004 — Date of Last EDR Contact: 11/07/2006
Database Release Frequency: Annually — Date of Next Scheduled Update: 01/15/2007

TSCA: Toxic Substances Control Act
Source: EPA
Telephone: 202-260-5521
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002 — Date of Last EDR Contact: 10/18/2006
Database Release Frequency: N/A — Date of Next Scheduled Update: 01/15/2007

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/14/2006 — Date of Last EDR Contact: 09/18/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 12/18/2006

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA
Telephone: 202-566-1667

Date of Government Version: 07/14/2006 — Date of Last EDR Contact: 09/18/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 12/18/2006

FINDS: Facility Index System/Facility Registry System
Source: EPA
Telephone: Not reported
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/21/2006 — Date of Last EDR Contact: 10/02/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 01/01/2007

RMP: Risk Management Plans
Source: Environmental Protection Agency
Telephone: 202-564-8600
When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 06/01/2006 — Date of Last EDR Contact: 08/21/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 11/20/2006

STORMWATER: Storm Water General Permits
Source: Environmental Protection Agency
Telephone: 202-564-0746
A listing of all facilities with Storm Water General Permits.

Date of Government Version: 06/02/2005 — Date of Last EDR Contact: 10/31/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 01/01/2007

US ENG CONTROLS: Engineering Controls Sites List
Source: Environmental Protection Agency
Telephone: 703-603-8905
A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 03/21/2006 — Date of Last EDR Contact: 09/07/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 10/02/2006

US INST CONTROL: Sites with Institutional Controls
Source: Environmental Protection Agency
Telephone: 703-603-8905
A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/21/2006 — Date of Last EDR Contact: 09/07/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 10/02/2006

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
Source: EPA Region 1
Telephone: 617-918-1313
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 09/07/2006 — Date of Last EDR Contact: 08/21/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 11/20/2006

HI SPILLS: Release Notifications
Source: Department of Health
Telephone: 808-586-4249
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 07/24/2006
Database Release Frequency: Varies
Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI INST CONTROL: Sites with Institutional Controls
Source: Department of Health
Telephone: 808-586-4249
Voluntary Remediation Program and Brownfields sites with institutional controls in place.

Date of Government Version: 07/24/2006
Database Release Frequency: Varies
Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI VCP: Voluntary Response Program Sites
Source: Department of Health
Telephone: 808 586-4249

Date of Government Version: 07/24/2006
Database Release Frequency: Varies
Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI DRYCLEANERS: Permitted Drycleaner Facility Listing
Source: Department of Health
Telephone: 808-586-4200
A listing of permitted drycleaner facilities in the state.

Date of Government Version: 09/07/2006
Database Release Frequency: Varies
Date of Last EDR Contact: 10/30/2006
Date of Next Scheduled Update: 01/29/2007

HI BROWNFIELDS: Brownfields Sites
Source: Department of Health
Telephone 808-586-4249

Date of Government Version: 07/24/2006
Database Release Frequency: Varies
Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI AIRS: List of Permitted Facilities
Source: Department of Health
Telephone: 808-586-4200
A listing of permitted facilities in the state.

Date of Government Version: 09/07/2006
Database Release Frequency: Varies
Date of Last EDR Contact: 10/30/2006
Date of Next Scheduled Update: 01/29/2007

POTENTIAL SUPERFUND LIABILITY

PRP: Potentially Responsible Parties
Source: EPA
Telephone: 202-564-6064
A listing of verified Potentially Responsible Parties

Date of Government Version: 07/20/2006
Database Release Frequency: Quarterly
Date of Last EDR Contact: 10/02/2006
Date of Next Scheduled Update: 01/01/2007

EDR® Environmental Data Resources Inc

"Linking Technology with Tradition"®

Sanborn® Map Report

Ship To:	Roger Aoki	**Order Date:** 11/6/2006	**Completion Date:** 11/6/2006
	Element Environmental ,	**Inquiry #:**	1790052.3
	95-1038 Kihene Street	**P.O. #:**	NA
	Mililani, HI 96789	**Site Name:**	Maalaea Mauka
		Address:	Honoapiilani Highway
Customer Project:	NA	**City/State:**	WAILUKU, HI 96793
3013084BRU	808-479-3881	**Cross Streets:**	

This document reports that the largest and most complete collection of Sanborn fire insurance maps has been reviewed based on client supplied information, and fire insurance maps depicting the target property at the specified address were not identified.

NO COVERAGE

EDR Historical Topographic Map Report

Maalaea Mauka
Honoapiilani Highway
WAILUKU, HI 96793

Inquiry Number: 1790052.4

November 06, 2006

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Management Information

440 Wheelers Farms Rd
Milford, Connecticut 06461

Nationwide Customer Service

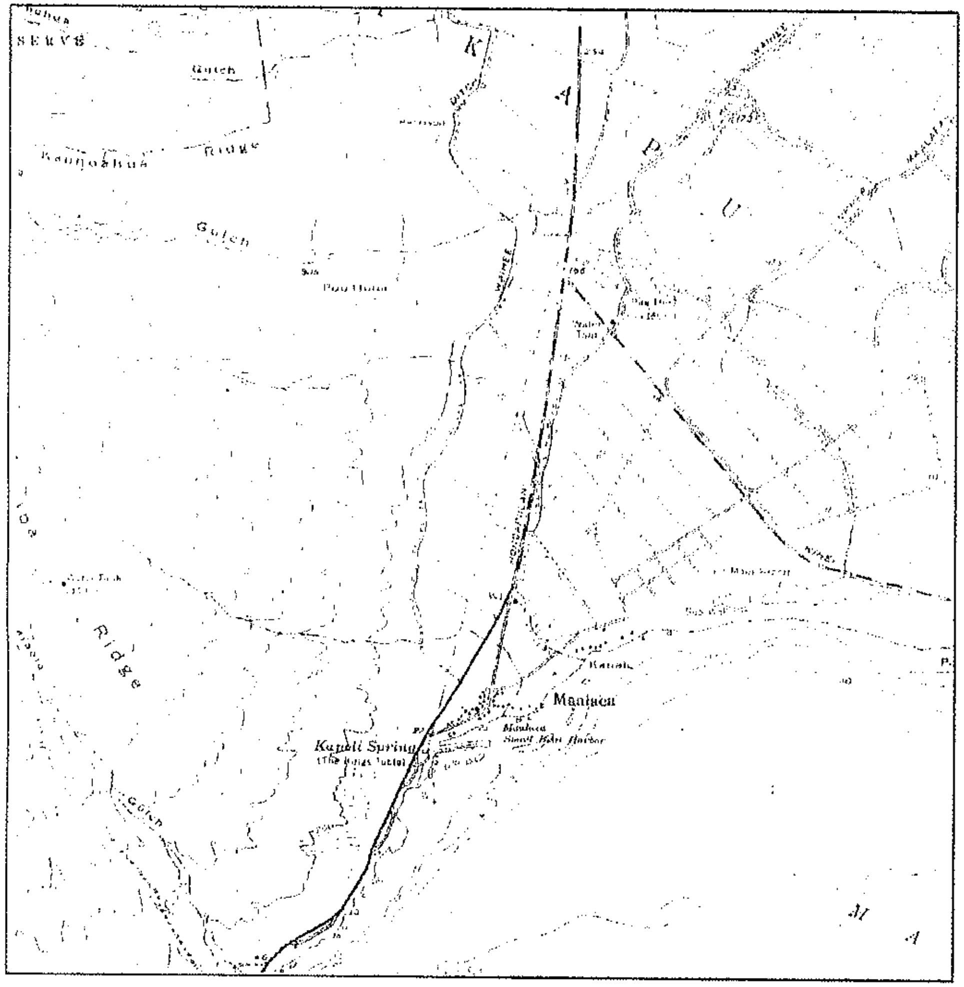
Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

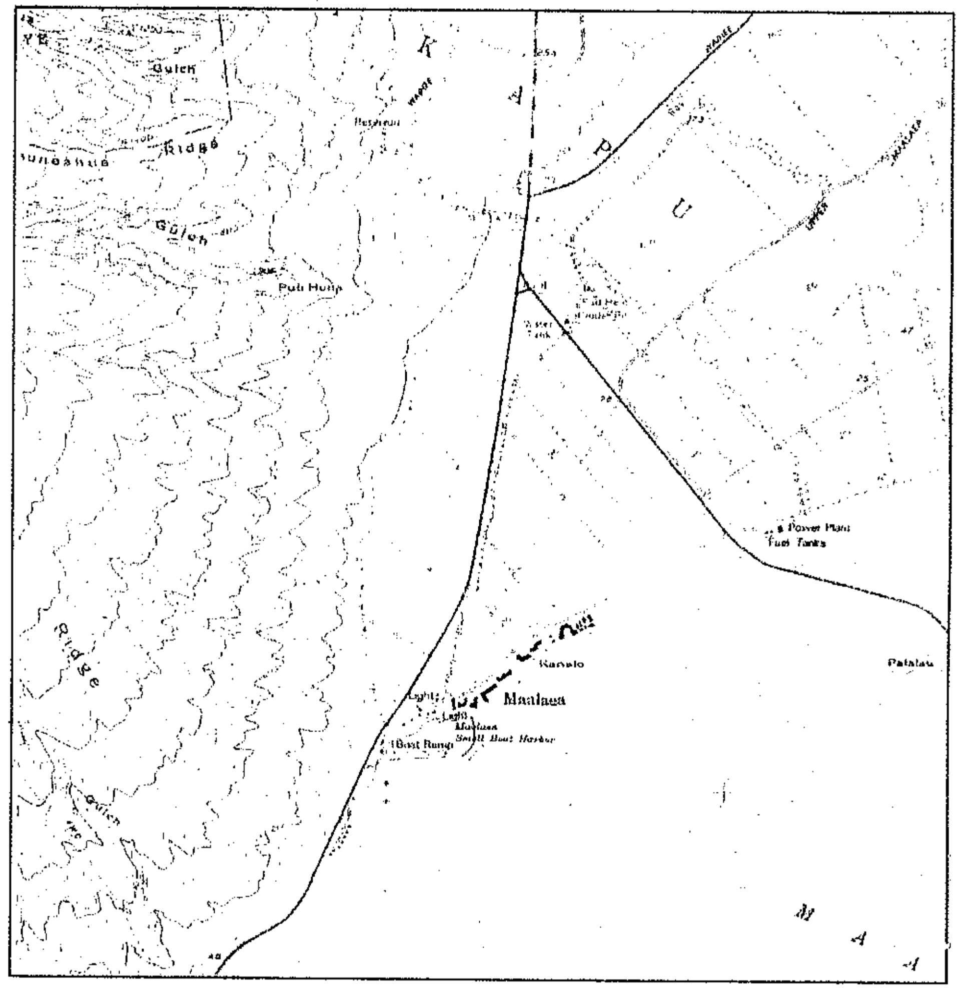
Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Historical Topographic Map



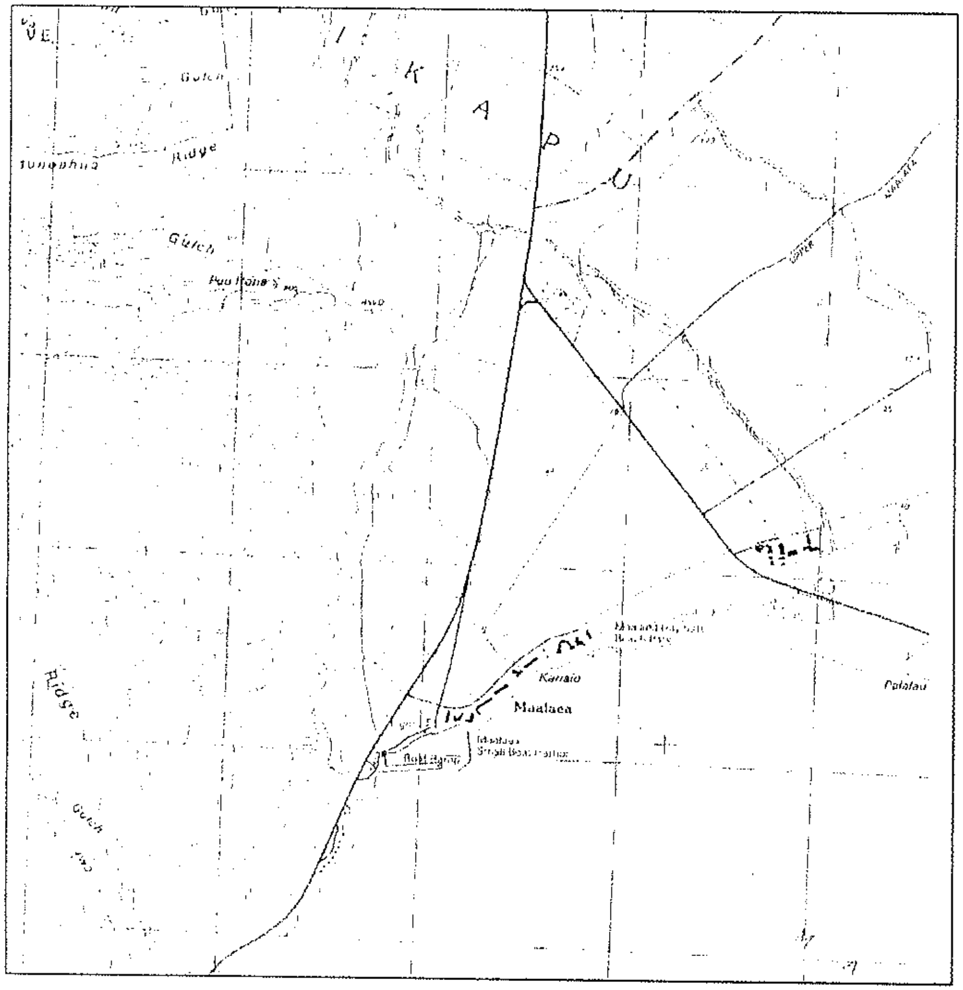
N ↑	TARGET QUAD NAME: Maalaea, HI MAP YEAR: 1954 SERIES: 7.5 SCALE: 1:24,000	SITE NAME: Maalaea Mauka ADDRESS: Honoapiilani Highway WAILUKU, HI 96793 LAT/LONG: 20.804 / 156.5115	CLIENT: Element Environmental , LLC CONTACT: Roger Aoki INQUIRY#: 1790052.4 RESEARCH DATE: 11/06/2006

Historical Topographic Map



N ↑	TARGET QUAD NAME: Maalaea, HI MAP YEAR: 1983 SERIES: 7.5 SCALE: 1:24,000	SITE NAME: Maalaea Mauka ADDRESS: Honoapiilani Highway WAILUKU, HI 96793 LAT/LONG: 20.804 / 156.5115	CLIENT: Element Environmental , LLC CONTACT: Roger Aoki INQUIRY#: 1790052.4 RESEARCH DATE: 11/06/2006

Historical Topographic Map



TARGET QUAD NAME: Maalaea, HI MAP YEAR: 1996 SERIES: 7.5 SCALE: 1:24,000	SITE NAME: Maalaea Mauka ADDRESS: Honoapiilani Highway WAILUKU, HI 96793 LAT/LONG: 20.804 / 156.5115	CLIENT: Element Environmental , LLC CONTACT: Roger Aoki INQUIRY#: 1790052.4 RESEARCH DATE: 11/06/2006

APPENDIX C

User Questionnaire

Site Evaluation Questionnaire

1. Date of Inquiry: November 2, 2006		
2. Facility or Project Name: Maalaea Properties: Maalaea Mauka, 710-acre site and 909-acre site.		
3. Facility Address: TMK (2) 3-6-001 Parcel 016; (2) 3-6-004 Parcels 3 and 6; (2) 3-6-002 Parcels 1 and 3 in Wailuku, Maui, Hawaii		
4. Describe activities that occur on the Subject Property: Agriculture: former sugar cane and pineapple, cattle grazing.		
5. Name, title, address, and phone number of the person conducting the interview: Roger Aoki, Element Environmental LLC, Senior Environmental Engineer, (808) 479-3881		
6a. Name and Title of Person Interviewed: Steven J. Kikuchi		6b. Telephone number: 209-481-8778
7a. How many years has the person being interviewed been familiar with the site: 3 years		7b. What is his or her association with the site: Partner of Maalaea Properties, Owner
8a. Are there individuals who have greater knowledge of the Subject Property that are available for interview? Yes.	8b. If so, please provide names and telephone numbers: Mr. Avery Chumbley, President of Wailuku Agribusiness, former owner of the site. Mr. Alex Franco, Manager of Maui Cattle Company, user of the site.	
9a. Is the Subject Property or any adjoining property currently used, or has it been used in the past, for an industrial or manufacturing use? No	9b. If so, please provide a description of those activities below: N/A	
10a. What is the source of Potable Water at the Subject Property? The Waihee Flume. Also one water well within 710-acre site. Water resources are maintained by Wailuku Agribusiness	10b. How is sewerage provided to the Subject Property (e.g., city, private)? None	10c. How is electricity provided to the Subject Property (electric company, private)? None
10d. Is there any gas service provided to the Subject Property? If so, who provides the service? None	10e. If water is provided by well, has the well been designated as contaminated by any governmental or health agency? No	
10f. Are there backflow preventers associated with the water system at the Subject Property? No		

11a. Does the facility generate or store, or has it ever generated or stored hazardous wastes? No.		11b. If so, where are, or were, the hazardous wastes generated and/or stored? How are these wastes disposed of? N/A
12a. Does the Subject Property generate, use, or store hazardous materials including pesticides, lead-acid batteries, paints, medical wastes, etc.? No.		12b. If so, where are these materials generated, used, and/or stored? N/A
13a. Does the Subject Property generate, use, or store petroleum products, including petroleum stored in pipelines? No		13b. If so, where are the petroleum products generated, used, and/or stored on site? N/A
14a. Have there ever been any on-site accumulation points for wastes? No		14b. If so, where have they been? N/A
15a. Has there been dirt fill brought on to the site? No If so, did the material originate from a contaminated site or unknown origin? N/A		15b. If contaminated soil or soil from an unknown origin has been used as fill material, where was it placed? N/A
16a. Are there currently, or have there been, any pits, ponds, or lagoons on the property or adjacent properties that have been used in connection with waste treatment or waste disposal (i.e. trash burning, pits, collection basins, etc.)? No.	16b. If so, where are, or were, they located? N/A	16c. Are there any permits associated with these facilities (NPDES, solid waste, RCRA)? N/A
17. Are there, or were there, any of the following on the Subject Property?	If so, where are, or were, they located?	Are there any chemical releases associated with these items or activities?
a. Aboveground storage tanks No	N/A	N/A
b. Underground storage tanks No	"	
c. Oil-separators No	"	
d. Septic tanks No	"	
e. Waste piles No	"	
f. Polychlorinated biphenyl (PCB)-containing equipment (including transformers, electrical equipment, hydraulic equipment, etc.) No		

g. Outdoor material storage areas No		
h. Painting and/or sandblasting operations No		
i. Drums or drum storage No		
j. Landfills No		
k. Wells (including monitoring wells, injection wells, water wells, etc.) One groundwater well	Near southwestern reservoir at 710-site	No
l. Lead based paints No		
m. Suspected asbestos containing materials No		
n. Buried objects No		
o. Pesticides and/or herbicides No		
p. Medical or biological wastes No		
q. Ordnance No		
r. Radioactive materials No		
s. Mixed wastes No		
t. Wash facilities No		
u. Radon No		
v. Heavy metals No		

18a. Are there any deteriorated painted surfaces on the Subject Property? No	18b. If so, where are these surface located? N/A
19a. Are there any stained sinks or floor drains? No	19b. If so, where are they located? N/A
20a. Is there any evidence of chemical spills or releases on the Subject Property? No	N/A
21a. Is there any evidence of improper disposal of solid or hazardous waste at the Subject Property? No	21b. If so, where are these wastes located? N/A
22a. Is there any evidence of any discolored soil on the Subject Property? No	22b. If so, where are these soils located? N/A
23a. Is there any evidence of any stressed or unseasonably dead vegetation on the Subject Property? No	23b. If so, where was the dead or stressed vegetation observed? N/A
24a. Are there any noxious odors associated with the Subject Property? No	24b. If so, where were the noxious odors observed? N/A

25a. Are there any sensitive receptors including protected or endangered natural resources at the Subject Property? No	25b. If so, what are they? N/A
26a. Are there any cultural resources at the Subject Property? Yes.	26b. If so, what are they? There is a burial site and various other archeological sites as documented in the Archeological Inventory Survey by Cultural Surveys Hawaii (Robins et al) as revised January 2000
27a. Are there any surface water bodies at the Subject Property? Two reservoirs and one flume– One reservoir located at the top (northwestern end) of the view plane of the 710-acre site.	27b. If so, where are they located? The second reservoir is located near the located at the southwestern end of the 710-acre site. Both reservoirs are associates with agricultural irrigation.
28. Are there any air permits currently or planned to be in use at the Subject Property? No	29. What is the estimated depth to groundwater at the Subject Property? Unknown
30a. Are there any areas on site that have been identified as requiring on-going monitoring or additional investigation by the USEPA, HDOH, or other agency including installation restoration program sites and/or areas of concern and environmental compliance sites that have not been issued a NFRAP or a letter of concurrence regarding no further action (e.g., sites that are still considered open and require additional work)? No	30b. If so, where are they located and what is the nature of the monitoring/investigation? N/A

31. Are there any Environmental Liens or activity and use limitations on the Subject Property? No
32. Do you have any specialized knowledge, related to environmental issues of the Subject Property? No.
33. Do you any additional commonly known or reasonable ascertainable information, related to environmental issues of the Subject Property? No.
34. Do you know of any valuation reduction for environmental issues of the Subject Property? No
35. What is the reason for performing the Phase I ESA? Confirm that no hazardous materials or disposal exist.

C. BREWER AND COMPANY, LIMITED

Real Estate and Corporate Development

FACSIMILE TRANSMITTAL SHEET

TO: Roger Aoki		FROM: Avery B. Chumbley, Executive Vice President	
COMPANY:		DATE: 10-31-06	
FAX NUMBER: 626-3881		TOTAL NO. OF PAGES (INCLUDING COVER)	
PHONE NUMBER:		COPY TO:	
RE: Maui Property - Maalaea Maka			

☐ URGENT ☐ FOR REVIEW/COMMENT ☐ PLEASE CALL ☐ PLEASE HANDLE ☐ FOR YOUR FILES

NOTES/COMMENTS:

Aloha Roger

here is the response to

the questions —

Avery

P.O. BOX 1826
PAPAIKOU, HAWAII 96781-1826
TEL: (808) 964-8434 / FAX: (808) 964-8428
EMAIL: abc@aloha.net

Site Evaluation Questionnaire

1. Date of Inquiry: October 31, 2006		
2. Facility or Project Name: Maalaea Properties Phase I Environmental Site Assessment		
3. Facility Address: TMK 3-6-01 Parcel 18; 3-6-02 Parcels 1 and 3; 3-6-04 Parcels 3 and 6		
4. Describe activities that occur on the Subject Property:		
5. Name, title, address, and phone number of the person conducting the interview: Roger Aoki, Senior Environmental Engineer, Element Environmental, (808) 479-3881		
6a. Name and Title of Person Interviewed: AVERY B. CHUMBLEY		6b. Telephone number 244-7077
7a. How many years has the person being interviewed been familiar with the site: 24 YEARS		7b. What is his or her association with the site: President of Co.
8a. Are there individuals who have greater knowledge of the Subject Property that are available for interview? YES	8b. If so, please provide names and telephone numbers: CLAYTON SUZUKI 250-4370	
9a. Is the Subject Property or any adjoining property currently used, or has it been used in the past, for an industrial or manufacturing use? NO	9b. If so, please provide a description of those activities below: N/A	
10a. What is the source of Potable Water at the Subject Property? NONE	10b. How is sewerage provided to the Subject Property (e.g., city, private)? NONE	10c. How is electricity provided to the Subject Property (electric company, private)? MECO
10d. Is there any gas service provided to the Subject Property? If so, who provides the service? NONE	10e. If water is provided by well, has the well been designated as contaminated by any governmental or health agency? N/A	
10f. Are there backflow preventers associated with the water system at the Subject Property? N/A		
11a. Does the facility generate or store, or has it ever generated or stored hazardous wastes? NONE	11b. If so, where are, or were, the hazardous wastes generated and/or stored? How are these wastes disposed of? N/A	

12a. Does the Subject Property generate, use, or store hazardous materials including pesticides, lead-acid batteries, paints, medical wastes, etc.? AG CHEMICALS		12b. If so, where are these materials generated, used, and/or stored? OFF SITE
13a. Does the Subject Property generate, use, or store petroleum products, including petroleum stored in pipelines? NONE		13b. If so, where are the petroleum products generated, used, and/or stored on site? N/A
14a. Have there ever been any on-site accumulation points for wastes? NONE		14b. If so, where have they been?. N/A
15a. Has there been dirt fill brought on to the site? If so, did the material originate from a contaminated site or unknown origin? NONE		15b. If contaminated soil or soil from an unknown origin has been used as fill material, where was it placed? N/A
16a. Are there currently, or have there been, any pits, ponds, or lagoons on the property or adjacent properties that have been used in connection with waste treatment or waste disposal (i.e. trash burning, pits, collection basins, etc.)? NONE	16b. If so, where are, or were, they located? N/A	16c. Are there any permits associated with these facilities (NPDES, solid waste, RCRA)? N/A
17. Are there, or were there, any of the following on the Subject Property?	If so, where are, or were, they located?	Are there any chemical releases associated with these items or activities?
a. Aboveground storage tanks NO		
b. Underground storage tanks. NO		
c. Oil-separators NO		
d. Septic tanks NO		N/A
e. Waste piles NO		
f. Polychlorinated biphenyl (PCB)-containing equipment (including transformers, electrical equipment, hydraulic equipment, etc.) NO		
g. Outdoor material storage areas NO		
h. Painting and/or sandblasting operations NO		
i. Drums or drum storage NO		
j. landfills NO		

k. Wells (including monitoring wells, injection wells, water wells, etc.)		
l. Lead based paints	NO	
m. Suspected asbestos containing materials	NO	
n. Buried objects	NO	
o. Pesticides and/or herbicides	yes	SUGAR / PINEAPPLE [illegible]
p. Medical or biological wastes	NO	
q. Ordnance	NO	
r. Radioactive materials	NO	
s. Mixed wastes	NO	
t. Wash facilities	NO	
u. Radon	NO	
v. Heavy metals	NO	

18a. Are there any deteriorated painted surfaces on the Subject Property? . NO	18b. If so, where are these surface located?
19a. Are there any stained sinks or floor drains? NO	19b. If so, where are they located?
20a. Is there any evidence of chemical spills or releases on the Subject Property? NONE	20b. If so, where were the releases observed?
21a. Is there any evidence of improper disposal of solid or hazardous waste at the Subject Property? NO	21b. If so, where are these wastes located?
22a. Is there any evidence of any discolored soil on the Subject Property? NO	22b. If so, where are these soils located?
23a. Is there any evidence of any stressed or unseasonably dead vegetation on the Subject Property? NO	23b. If so, where was the dead or stressed vegetation observed?
24a. Are there any noxious odors associated with the Subject Property? NONE	24b. If so, where were the noxious odors observed?
25a. Are there any sensitive receptors including protected or endangered natural resources at the Subject Property? NONE	25b. If so, what are they?
26a. Are there any cultural resources at the Subject Property? NO	26b. If so, what are they?
27a. Are there any surface water bodies at the Subject Property? NO	27b. If so, where are they located?

WAILUKU WATER CO.
WAIKAPU·IAO·WAIEHU·WAIHEE
Na Wai Eha

November 1, 2006

To: Avery Chumbley
From: Clayton Suzuki

Subject: Waikapu to Maalaea Fields

The following chemicals may have been used during the cultivation of sugarcane in the Waikapu to Maalaea Fields,

Active Ingredient:	Brand Name:
Atrazine	Aatrex Nine-O
Ametryn	Evik 80W
2, 4-D	Formula 40
Diuron	Karmex DF
Glyphosate	Roundup
Metribuzin	Sinbar
Hexazinone	Velpar
Glyphosate	Polado

The following fertilizers were used in the cultivation of sugarcane.
- Nitrogen
- Potassium
- Phosphorus
- Calcium carbonate

The following chemicals may have been used during the cultivation of pineapple in the Waikapu to Maalaea fields.

Aliette	Ethrel
Amdro	Evik
Diazinon	Hyvar X
Karmex (Diuron)	Velpar DF
Roundup (non crop area)	Atrazine
Fruitone	Nemcur 3

The following fertilizers were used in the cultivation of pineapple.

Nitrogen	Sulfate of Potash
Iron Sulfate	Magnesium Sulfate
Zinc Sulfate	Sulfate of Amonia
Phosic Acid	

255 EAST WAIKO ROAD • WAILUKU, MAUI, HAWAII 96793-9355 • TELEPHONE (808) 244-9570 • FACSIMILE (808) 242-7068

28. Are there any air permits currently or planned to be in use at the Subject Property? NO	29. What is the estimated depth to groundwater at the Subject Property?
30a. Are there any areas on site that have been identified as requiring on-going monitoring or additional investigation by the USEPA, HDOH, or other agency including installation restoration program sites and/or areas of concern and environmental compliance sites that have not been issued a NFRAP or a letter of concurrence regarding no further action (e.g., sites that are still considered open and require additional work)? NO	30b. If so, where are they located and what is the nature of the monitoring/investigation?

Site Evaluation Questionnaire

1. Date of Inquiry: October 31, 2006		
2. Facility or Project ~~Name: Maalaea~~ Maalaea Properties Phase I Environmental Site Assessment		
3. Facility Address: TMK 3-6-01 Parcel 18; 3-6-02 Parcels 1 and 3; 3-6-04 Parcels 3 and 6		
4. Describe activities that occur on the Subject Property: Pasture		
5. Name, title, address, and phone number of the person conducting the interview: Roger Aoki, Senior Environmental Engineer, Element Environmental, (808) 479-3881		
6a. Name and Title of Person Interviewed: ALEX FRANCO MGR	6b. Telephone number 357 1720	
7a. How many years has the person being interviewed been familiar with the site: 1 YEAR	7b. What is his or her association with the site: CATTLE RANCHING	
8a. Are there individuals who have greater knowledge of the Subject Property that are available for interview?	8b. If so, please provide names and telephone numbers: Wailuku AG.	
9a. Is the Subject Property or any adjoining property currently used, or has it been used in the past, for an industrial or manufacturing use?	9b. If so, please provide a description of those activities below:	
10a. What is the source of Potable Water at the Subject Property? NONE	10b. How is sewerage provided to the Subject Property (e.g., city, private)? NONE	10c. How is electricity provided to the Subject Property (electric company, private)? NONE
10d. Is there any gas service provided to the Subject Property? If so, who provides the service? NONE	10e. If water is provided by well, has the well been designated as contaminated by any governmental or health agency? NONE	
10f. Are there backflow preventers associated with the water system at the Subject Property? NONE		
11a. Does the facility generate or store, or has it ever generated or stored hazardous wastes?	11b. If so, where are, or were, the hazardous wastes generated and/or stored? How are these wastes disposed of? .	

TO OUR USE PLEASE CHECK w/ Wailuku AG.

12a. Does the Subject Property generate, use, or store hazardous materials including pesticides, lead-acid batteries, paints, medical wastes, etc.? PROPERTY WAS OCCUPIED BY FARMERS PRIOR	12b. If so, where are these materials generated, used, and/or stored?	
13a. Does the Subject Property generate, use, or store petroleum products, including petroleum stored in pipelines? NONE (WE DO HAVE ABOUT 3-5 GAL CANS OF GASOLINE ON SITE	13b. If so, where are the petroleum products generated, used, and/or stored on site? .	
14a. Have there ever been any on-site accumulation points for wastes?	14b. If so, where have they been?.	
15a. Has there been dirt fill brought on to the site? If so, did the material originate from a contaminated site or unknown origin?	15b. If contaminated soil or soil from an unknown origin has been used as fill material, where was it placed?	
16a. Are there currently, or have there been, any pits, ponds, or lagoons on the property or adjacent properties that have been used in connection with waste treatment or waste disposal (i.e. trash burning, pits, collection basins, etc.)?	16b. If so, where are, or were, they located?	16c. Are there any permits associated with these facilities (NPDES, solid waste, RCRA)?
17. Are there, or were there, any of the following on the Subject Property?	If so, where are, or were, they located?	Are there any chemical releases associated with these items or activities?
a. Aboveground storage tanks		
b. Underground storage tanks.		
c. Oil-separators		
d. Septic tanks		
e. Waste piles		
f. Polychlorinated biphenyl (PCB)-containing equipment (including transformers, electrical equipment, hydraulic equipment, etc.)		
g. Outdoor material storage areas		
h. Painting and/or sandblasting operations		
i. Drums or drum storage		
j. landfills		

k. Wells (including monitoring wells, injection wells, water wells, etc.)		
l. Lead based paints		
m. Suspected asbestos containing materials		
n. Buried objects		
o. Pesticides and/or herbicides		
p. Medical or biological wastes		
q. Ordnance		
r. Radioactive materials		
s. Mixed wastes		
t. Wash facilities		
u. Radon		
v. Heavy metals		

18a. Are there any deteriorated painted surfaces on the Subject Property?.	**18b. If so, where are these surface located?**
19a. Are there any stained sinks or floor drains?	**19b. If so, where are they located?**
20a. Is there any evidence of chemical spills or releases on the Subject Property?	**20b. If so, where were the releases observed?**
21a. Is there any evidence of improper disposal of solid or hazardous waste at the Subject Property?	**21b. If so, where are these wastes located?**
22a. Is there any evidence of any discolored soil on the Subject Property?	**22b. If so, where are these soils located?**
23a. Is there any evidence of any stressed or unseasonably dead vegetation on the Subject Property?	**23b. If so, where was the dead or stressed vegetation observed?**
24a. Are there any noxious odors associated with the Subject Property?	**24b. If so, where were the noxious odors observed?**
25a. Are there any sensitive receptors including protected or endangered natural resources at the Subject Property?	**25b. If so, what are they?**
26a. Are there any cultural resources at the Subject Property?	**26b. If so, what are they?**
27a. Are there any surface water bodies at the Subject Property?	**27b. If so, where are they located?**

28. Are there any air permits currently or planned to be in use at the Subject Property?	**29. What is the estimated depth to groundwater at the Subject Property? .**
30a. Are there any areas on site that have been identified as requiring on-going monitoring or additional investigation by the USEPA, HDOH, or other agency including installation restoration program sites and/or areas of concern and environmental compliance sites that have not been issued a NFRAP or a letter of concurrence regarding no further action (e.g., sites that are still considered open and require additional work)?	**30b. If so, where are they located and what is the nature of the monitoring/investigation?**

APPENDIX D

Historical Research Documentation

05/30/2003 --
INSTR-DESC:LUCA
TRANS NO:265927
INSTR-DATE:05/30/2003
REC-DATE:05/30/2003

AREA:259.8850 ACRES
- HONOAPIILANI HIGHWAY WIDENING MAALAEA ROAD TO NORTH
KIHEI ROAD - LUCA 3.1976 APPROVED 5/30/2003
-
TMK: 3601-18
SUBDIVIDE LOT 1 INTO LOTS 1-A (38,369 SF OR 0.881 AC) & 1-B
(10,656 SF OR 0.245 AC) & LOT 2 INTO LOTS 2-A (259.004 AC) & 2-B
(32,645 SF OR 0.749 AC), PER PLAN BY STATE OF HAWAII, D.O.T.,
HWYS DIVISION, APPROVED 5/30/2003
-
TMB NOTE: LOTS 1-B & 2-B, CONVEYED (AS PARCELS 1 & 2) TO
STATE OF HAWAII, D.O.T., BY DEED DOC 2002-10678

F/D: LOTS 1-A & 2-A

GROUP# NAME F TC %-OWNER TITLE-DESC
2 0011 WAILUKU AGRIBUSINESS CO INC

01/22/2002 --
INSTR-DESC:WARNT DEED
INSTR_NO:02-10678
TRANS NO:244772
INSTR-DATE:01/16/2002
REC-DATE:01/22/2002

AREA:259.8850 ACRES STATE-CONV-TAX: $ 0
(10,656 SF OR 0.245 AC, PARCEL 1, &
32,645 SF OR 0.749 AC, PARCEL 2), DROPPED INTO ROAD
FROM: WAILUKU AGRIBUSINESS CO., INC., ON 5/24/85 PER DCCA
TO: STATE OF HAWAII, DEPARTMENT OF TRANSPORTATION
TMB NOTE: NAME OF WAILUKU SUGAR COMPANY CHANGED TO
WAILUKU AGRIBUSINESS CO., INC., ON 5/24/85 PER DCCA
F/D: AREA, BDRY

GROUP# NAME F TC %-OWNER TITLE-DESC
2 0011 WAILUKU AGRIBUSINESS CO INC

07/13/1998 --
INSTR-DESC:AMENDMENT OF ESMT
INSTR_NO:9800101152
TRANS NO:59029
INSTR-DATE:07/01/1998
REC-DATE:07/13/1998
ACK/EFF DATE:07/13/1998

AREA:260.8790 ACRES
WAILUKU AGRIBUSINESS CO INC "GRANTOR"
MAUI ELECTRIC COMPANY LIMITED "GRANTEE"
GRANTOR AND GRANTEE AMEND ESMT GRANT, DOCS 95-1279 & 95-1612
80 TO DELETE
EXH "A" & SUBSTITUTE EXH "A" ATTACHED.
ESMT B ELECTRICAL TRANSMISSION PORS GR 3152 & 9794 6,9
49 SF DES
F/D: SUBJ TO ELEC TRANSMISSION ESMT "B" (6,949 SF) IN FAVOR
OF MAUI
ELEC CO LTD

GROUP# NAME F TC %-OWNER TITLE-DESC
2 0011 WAILUKU SUGAR COMPANY

08/27/1997 --
INSTR-DESC:SUBD LUCA# 3.1717
INSTR_NO:0000000000
TRANS NO:59027
INSTR-DATE:02/05/1998
ACK/EFF DATE:08/27/1997

AREA:260.8790 ACRES
SUBD GR'S S-131975, 11067, 10962, 10745, 10497, 10294 & 9794
INTO LOTS 1 & 2 PER PLAN BY WARREN S UNEMORI APPROVED 8/2
7/97
F/D: LOTS 1 & 2

GROUP# NAME F TC %-OWNER TITLE-DESC
2 0011 WAILUKU SUGAR COMPANY

12/13/1995 --
INSTR-DESC:UTILITY ESMT
INSTR_NO:9500161279
TRANS NO:59028
INSTR-DATE:11/01/1995
REC-DATE:12/13/1995
ACK/EFF DATE:12/13/1995

AREA:260.8790 ACRES
FROM: WAILUKU AGRIBUSINESS CO INC
TO: MAUI ELECTRIC COMPANY LIMITED
GRANTOR GRANT UNTO GRANTEE A PERPETUAL RIGHT & ESMT TO CONST
RUCT,
MAINTAIN & OPERATE POLE, WIRE LINES & UNDERGROUND POWER LINE
S FOR THE
TRANSMISSION OF ELECTRICITY FOR LIGHT, POWER & COMMUNICATION
, OVER,
ACROSS & UNDER PARCEL SHOWN ON MAP ATTACHED AS EXH "A". TOG
ETHER WITH
RIGHT OF INGRESS & EGRESS.
ESMT B 9.95 SF
TMB NOTE: ESMT NOT SHOWN; NO DESC. WAILUKU SUGAR CO NKA WA
ILUKU
AGRIBUSINESS CO INC PER LCO 83522.
F/D: SUBJ TO ELEC TRANS LINE ESMT "B" IN FAVOR OF MAUI ELEC
CO LTD

GROUP# NAME F TC %-OWNER TITLE-DESC
2 0011 WAILUKU SUGAR COMPANY

01/04/1993 --
INSTR-DESC:LUC MAP R/S
INSTR_NO:0000000000
TRANS NO:59026
INSTR-DATE:03/30/1993
ACK/EFF DATE:01/04/1993

AREA:260.8790 ACRES
FORMER ZONING: A & C
CHANGED TO: A
A: 260.879 AC
TOTAL: 260.879 AC
SOURCE: LUC BDRY AWD A91-672 12/1/92
TMB NOTE: AREA BY TAX MAPS BR FOR ASSESSEMENT PURPOSES ONLY
.

GROUP# NAME F TC %-OWNER TITLE-DESC
2 0011 WAILUKU SUGAR COMPANY

05/27/1992 --
INSTR-DESC:LUC MAP R/S
INSTR_NO:0000000000
TRANS NO:59025
INSTR-DATE:05/27/1992
ACK/EFF DATE:05/27/1992

AREA:260.8790 ACRES
FORMER ZONING: A
CHANGED TO: A & C
A: 232.604 AC
C: (17.4 AC) (0.115 AC) (10.0 AC) (0.62 AC)
(0.14 AC)
TOTAL: 260.879 AC
SOURCE: LUC BDRY INT 92-15 4/7/92
TMB NOTE: AREA BY TAX MAPS BR. FOR ASSESSMENT PURPOSES ONLY
.

GROUP# NAME F TC %-OWNER TITLE-DESC
2 0011 WAILUKU SUGAR COMPANY

10/07/1987 --

GROUP# NAME F TC %-OWNER TITLE-DESC
2 0011 WAILUKU SUGAR COMPANY

------------------SEE HISTORY SHEET FOR MORE INFORMATION------------------

TERRITORY OF HAWAII
FIELD BOOK LAND SHEET

DESCRIPTION	DIVISION: Second
Portion Grant 3152, Ukumehame, Wailuku	ZONE: 3 · SEC.: 6 · PLAT.: 01 · PARCEL: 18

OWNER	TITLE HISTORY	MAILING ADDRESS
Wailuku Sugar Company	TMB 1341 1/4/63 7.219 Ac dropped into 18	Wailuku, Maui 260.879 Ac

YEAR	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
AREA							43950			
LAND	83615	87610	87352	87352	87352	87352			C A M A	
IMP.										
TOT.										
EX.										
NET	83615	87610	87352	87352	87352	87352				
TAX										

YEAR	1959	1960	1961	1962	1963	1964	1965	1966	1967
AREA	253.66 Ac	253.66 Ac	253.66 Ac	253.66 Ac	260.879 Ac	260.879 Ac			
LAND	45,852	70,423.	68969.	69,059	71280	71280	[illegible]	[illegible]	76185
IMP.	150	-	-	-					
TOT.	46,002	70,423.	68,869.	69,059	71280	71280			
EX.	-	-	-	-					
NET	46,002	70,423.	68,869.	69,059	71280	71280			
TAX	762.25	958.46	932.31	939.89	997.92	997.92			

REQUEST TO ACCESS A GOVERNMENT RECORD

DATE: October 31, 2006

TO: Hazard Evaluation & Emergency Response Office (Fax: 586-7537)

FROM: Roger Aoki
Element Environmental, LLC
62-180 Emerson Road
Haleiwa, HI 96712
Tel: 479-3881 (cell)
Fax: 637-0001
Email: raoki@e2hi.com

Although you are not required to provide any personal information, you should provide enough information to allow the agency to contact you about this request. The processing of this request may be stopped if the agency is unable to contact you. Therefore, please provide any information that will allow the agency to contact you (name or alias, telephone or fax number, mailing address, e-mail address, etc.).

I WOULD LIKE THE FOLLOWING GOVERNMENT RECORD

Describe the government record as specifically as possible so that it can be located. Try to provide a record name, subject matter, date, location, purpose, or name of persons to whom the record refers, or other information that could help the agency identify the record. A complete and accurate description of the government record you request will prevent delays in locating the record. Attach a second page if needed.

Maalaea Property located at Honoapiilani Highway, Wailuku, Maui, Hawaii 96793

TMK (2) 3-6-001:018

I WOULD LIKE : (please check one or more of the options below)

x To inspect the government record.
☐ A copy of the government record: (Please check one of the options below.) See the back of this page for information about fees that you may be required to pay for agency services to process your record request.

Note: Copying and transmission charges may also apply to certain options.
- ☐ Pick up at agency (date and time):
- ☐ Mail
- ☐ Fax (toll free and only if available)
- ☐ Other, if available (please specify):

☐ If the agency maintains the records in a form other than paper, please advise in which format you would prefer to have the record.

x Electronic ☐Audio ☐Other (please specify):,

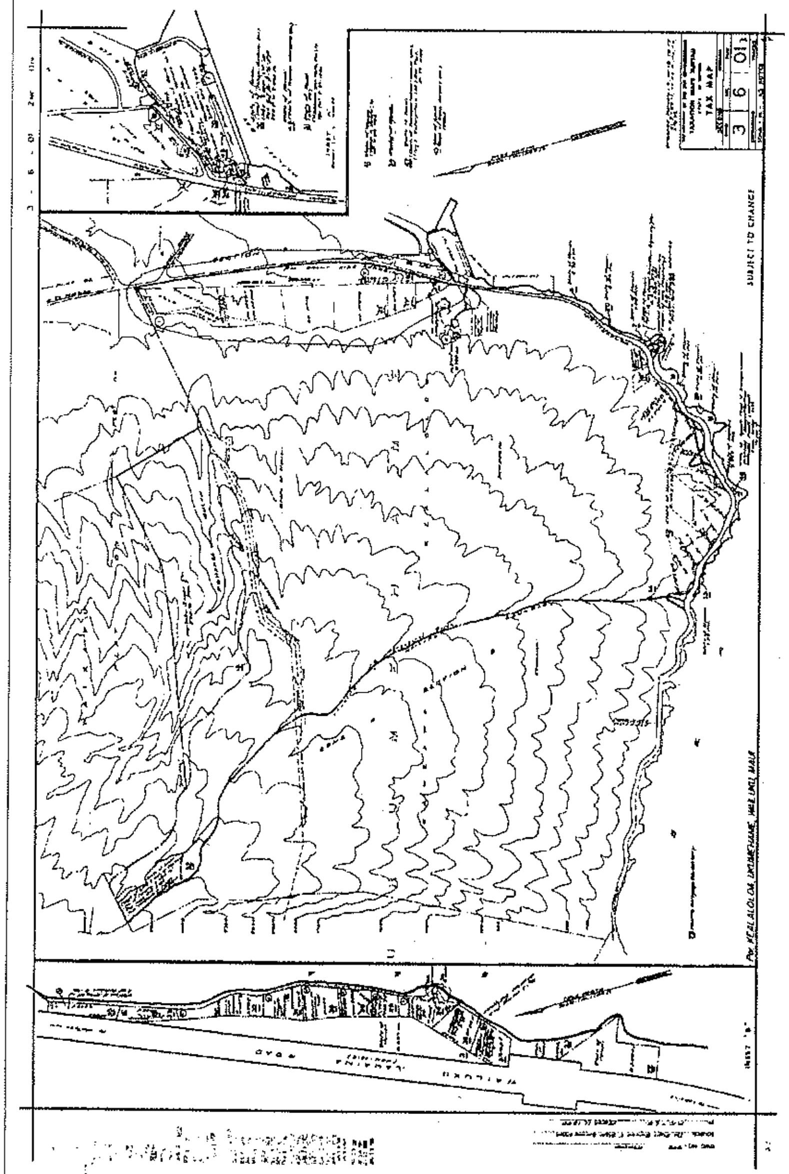
☐ Check this box if you are attaching a request for waiver of fees in the public interest (see waiver information on back).

SEE BACK FOR IMPORTANT INFORMATION

OFFICIAL USE ONLY:

Office Manager

Date



element environmental llc
environmental · engineering · water resources

October 31, 2006

Department of Fire Control
Assistant Chief's Office
200 Dairy Road
Kahului, HI 96732

Subject: Request for Records on Reported Hazardous Material Spill Events

To Whom It May Concern:

Element Environmental, LLC (E2) is engaged in a Phase I Environmental Site Assessment for the TMK 3-6-001 Parcel 018 Property located along Honoapiilani Highway, Wailuku, Hawaii 96793. A map showing the site location is attached with this request.

The site assessment includes the identification of facilities on the site or adjacent to it which use or generate hazardous substances on their premises. It is our understanding that the Maui County Department of Fire Control has maintained files containing such information. We would be interested in any information regarding unauthorized hazardous material spills/releases, violations (including safety violations), or aboveground tank registrations for any facility located at or within a ¼ mile radius of the subject property. If no such records exist, a negative response would be appreciated. The information will be used in a Phase I – Environmental Site Assessment. It would be greatly appreciated if you could respond as soon as possible.

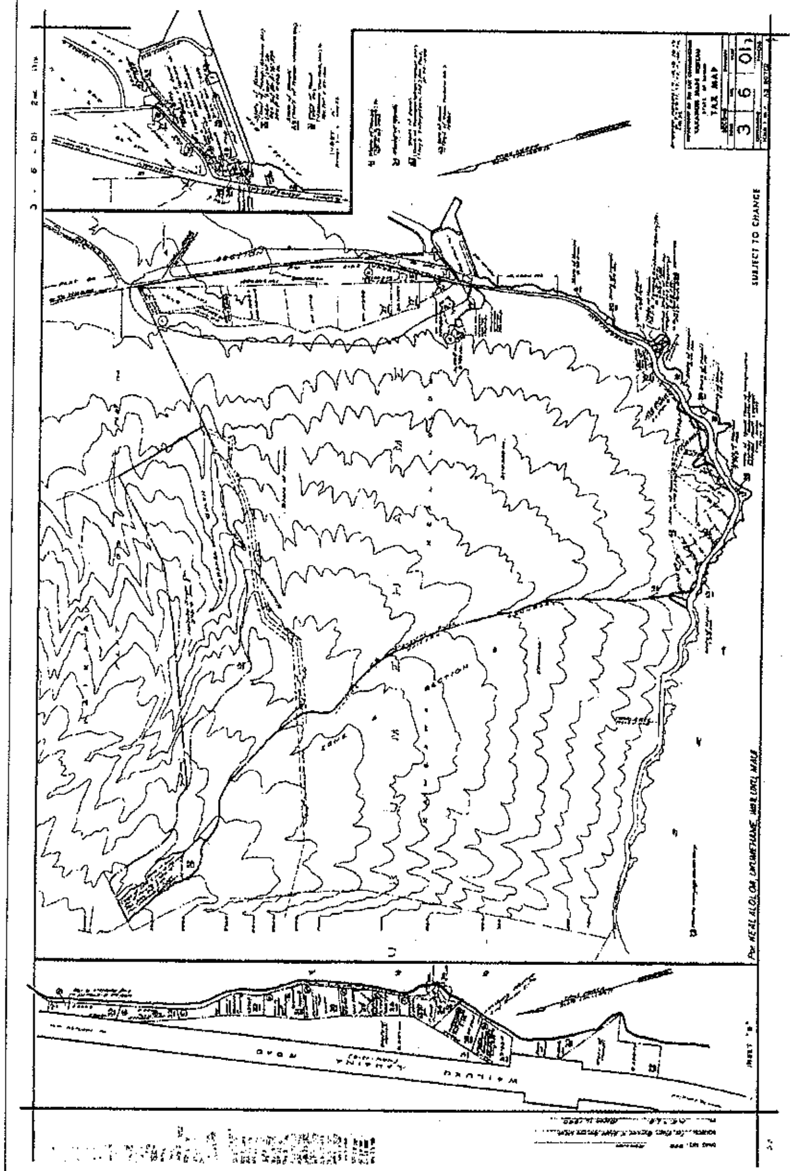
Should you have further questions, please do not hesitate to contact me at (808) 479-3881 (cell).

Sincerely:
Element Environmental, LLC

Roger C. Aoki, P.E.
Senior Environmental Engineer

Enclosure

62-180 Emerson Road, Haleiwa, Hawaii 96712 tel: (808) 637-1200 fax: (808) 637-0001 email: raoki@hawaii.rr.com



element environmental llc

October 31, 2006

Maui County Local Emergency Planning Committee
200 Dairy Road
Kahului, HI 96732

Attention: Mr. Scott Kekuewa

Subject: Revision to a Request for Tier 2 Reports

Dear Mr. Kekuewa:

Element Environmental, LLC (E2) is conducting an environmental site assessment project for the TMK 3-6-001 Parcel 018 Property located along Honoapiilani Highway, Wailuku, Hawaii 96793. A map showing the site location is attached with this request.

The site assessment includes the identification of facilities on the site or adjacent to it which store, use, or generate hazardous materials/substances on their premises. It is our understanding that the Maui County Local Emergency Planning Committee (LEPC) has maintained Tier 2 Reports under the Superfund Amendments and Reauthorization Act (SARA) Title III containing such information. We would be interested in receiving Tier 2 Reports for any such property or facility. If no such records exist, a negative response would be appreciated. The information will be used in a Phase I – Environmental Site Assessment.

Should you have any questions or need more information, please do not hesitate to contact me at (808) 479-3881.

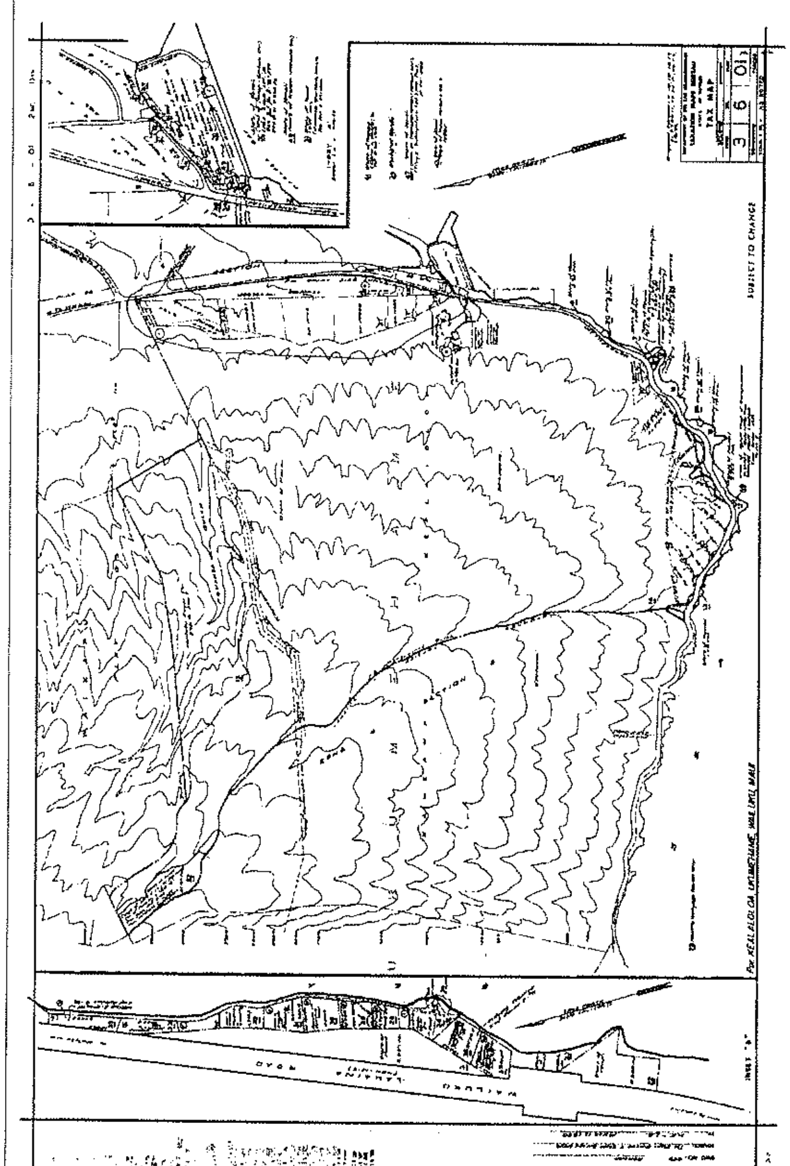
Your help and prompt response is greatly appreciated.

Sincerely:
Element Environmental, LLC

Roger Aoki

Roger C. Aoki, P.E.
Senior Environmental Engineer

62-180 Emerson Road, Haleiwa, Hawaii 96712 cel: (808) 637-1200 fax: (808) 637-0001 email: raoki@hawaii.rr.com



APPENDIX E

Qualifications of the Environmental Professionals

Roger C. Aoki, P.E.
Senior Environmental Engineer

BACKGROUND:

EDUCATION
Masters of Science in Civil (Environmental) Engineering – Purdue University, 1995
B.S., Civil Engineering - University of Hawaii at Manoa, 1994

PROFESSIONAL REGISTRATIONS
Licensed Professional Engineer – Civil (Hawaii 2000), Certificate No. 10019-C

SPECIALIZED TRAINING
OSHA 40-hour Initial HAZWOPER Training and Current 8-hour Refresher
Hazardous Waste Site Supervisor Training
First Aid and CPR Training

SUMMARY OF EXPERIENCE

Mr. Aoki is has over ten years (10) of experience in the environmental consulting industry. He has over five (5) years of project management experience and has managed Federal Indefinite Delivery, Indefinite Quantity Contracts and environmental consulting/engineering design contracts.

Mr. Aoki has been involved in a wide range of environmental investigation and engineering projects dealing with water, wastewater, petroleum contamination, solid waste, and hazardous waste. His professional experience has included work on projects in Hawaii and Guam. Mr. Aoki's areas of expertise consist of environmental investigations, environmental baseline surveys, regulatory compliance, remedial design, storm water planning, and wastewater engineering. He has prepared risk-based corrective action reports on sites contaminated with petroleum-related compounds, polychlorinated biphenyls (PCBs) and heavy metals, is experienced in preparing work plans, project management plans, sampling and analysis plans, site safety and health plans, and reports for soil and groundwater investigation projects.

Keehi Place Pump Station Evaluation, State of Hawaii Department of Transportation: Engineer assisting with the evaluation of the existing pump station and determining a rational service population estimate to generate projected wastewater flows to allow for planning of future wastewater facility infrastructure.

3/01 – 7/06
Project Engineer and Project Manager with Environet, Inc.

Waimanalo Wastewater Treatment Plant Improvements, State of Hawaii Department of Land and Natural Resources: At Engineer assisting in the design of a new secondary treatment system. Responsibilities included calculations for tank and equipment sizing, hydraulic calculations, mechanical process design including equipment selection, and design and layout of the dissolved air floatation thickener process units and equipment. Mr. Aoki also assisted with the preparation of construction plans and specifications.

Environmental Assessments: Project Manager for the preparation of several Environmental Assessments for the private clients, City and County of Honolulu, State of Hawaii, and US Army Corps of Engineers. The Environmental Assessments supported wide ranging developments and rehabilitation

work including sewer line replacement, new housing developments, and flood control improvements.

Remedial Action Operations/Long Term Monitoring Contract N62742-01-D-1805. Served as the Project Manager for all 19 Contract Task Orders (CTOs) during the 5 years of the contract.

Environmental Engineering Services Contract N62742-02-D-1801. Served as the Project Manager for 10 of the 30 CTOs during 4 years of the contract. Served as the primary Technical Program Manager for the Environmental Baseline Surveys, Findings of Suitability to Lease/Transfer CTOs.

Environmental Technical Services Contract N62742-04-D-1863. Served as the Project Manager for all three Contract Task Orders (CTOs) during the one-and-a-half years of the contract.

Site Investigation at Building 15-46A at the Former Naval Air Station, Agana in Tiyan, Guam. Served as the Project Manager for a site investigation to evaluate an illicit sewer system that was historically used for waste oil disposal. Work tasks included conducting a site reconnaissance to identify the sewer system, field sampling to evaluate the nature and extent of contamination, and data evaluation and reporting to promote an expedited site closure.

Groundwater Monitoring at the Former Agana Power Plant in Mongmong, Guam. Served as the Project Manager to assess the quality of groundwater at the former Agana Power Plant. The results were compared to drinking water and EPA Region 9 tap water criteria to assess the quality of groundwater for the on-going Remedial Investigation of the site. Work tasks included installing two groundwater wells, conducting two rounds of groundwater sampling at six wells; having the sample analyzed by several analytical methods; developing trends from historic data; and comparing the results to current regulatory standards.

Maintenance and Groundwater Monitoring at Former Naval Air Station (NAS), Barbers Point, Oahu, Hawaii. Served as the Project Manager to assess the quality of groundwater beneath the former NAS Barbers Point. The results were compared to drinking water criteria to assess the quality of groundwater for property transfer. Data were also compared to State of Hawaii Water Quality Standards for surface water to determine potential risk via transport to the Pacific Ocean. Work tasks included conducting a groundwater sampling at 21 wells; having the sample analyzed by over 20 analytical methods; developing trends from historic data; and comparing the results to current regulatory standards.

Long-Term Maintenance and Monitoring at the Construction Battalion Landfill in South Finegayan, Guam. Served as the Project Manager to conduct landfill gas monitoring at three landfill gas vents and collected two landfill gas samples to determine the volatile organic compound constituents. Six settlement monuments located atop the cap were surveyed to determine settlement of the cap. Vegetation was cleared on the landfill cap and drainage swales.

Phytoremediation of PCB-Contaminated Soils at Haiku Valley. Served as Project Engineer for the phytoremediation project. Preliminary laboratory screening trials and data search were conducted prior to the field study. A pilot-scale phytoremediation demonstration system was performed in the field with the selected processes in combination with the selected plants. The field study evaluated contaminant removal efficiency of the selected phytoremediation system and design issues such as plant growth, microbial populations in the rhizosphere, soil contaminant levels, phytotoxicity, and rooting depth.

Phytoremediation at the Former Open Burn/Open Detonation (OB/OD) Unit at the Makua Military Reservation. Served as Project Engineer for the phytoremediation project. The project consisted of a greenhouse study to be conducted at the University of Hawaii College of Tropical Agriculture and Human Resources (CTAHR). The purpose of the greenhouse screening trials was to identify candidate plant species for phytoremediation. Approximately six to ten different plant species were screened for their effectiveness in bioaccumulating/biodegrading the contaminants of concern. The greenhouse study also determined planting requirements, fertilization levels, soil characterization and applicable amendment requirements, irrigation needs, and any other requirements for enhancing plant propagation in the Makua OB/OD soils based on the existing contaminant concentrations. The goal of the field study is to apply the results obtained in the greenhouse study in an actual field setting.

Kapalama Incinerator Cleanup. Served as Project Manager. Provided the following services for the removal of hazardous (brick and ash) and non-hazardous (lead-contaminated soil) wastes from the former Kapalama incinerator: prepared a site health and safety plan; prepared a project work plan; prepared a sampling and analysis plan; prepared construction plans and specifications; provided oversight of the cleanup; and reviewed manifests and other cleanup documentation.

RCRA Corrective Action of Solid Waste Management Units, Areas of Interest and Various Bunkers, Johnston Island Phase II. Participated in the site characterization, remedial design, removal action, confirmation testing, and final report writing for remedial work conducted at a number of solid waste management units located on Johnston Atoll. A total of 1,000 tons of hazardous and non-hazardous contaminated soil was being excavated and disposed off-island. Environmental Chemical Corporation (ECC) a subconsultant, assisted Environet on Johnston Island with the excavation and packaging of the contaminated soil/materials for shipment to U.S. Ecology's landfill in Nevada.

4/96 – 3/01
Staff Engineer and Project Engineer with Earth Tech

Site Summary Report (SSR), Pearl Harbor Naval Complex (PHNC), Oahu, Hawaii. Environmental Project Engineer for an environmental site evaluation of existing and past activities with potential hazardous substance or waste releases throughout PHNC. This project involved the review of historical records at various government agencies including PACDIV, the Hawaii Department of Health, and the USEPA, regarding the use, storage, disposal, and release of hazardous materials and wastes at PHNC. The assessment also included a review of site and hydrogeologic characteristics, (based on topographic maps, aerial photographs, previous site characterization reports, and other documents) and a site reconnaissance of Navy property. An electronic database associated with a GIS was developed to manage the large volume of data collected.

PCB Removal Actions at Transformer Substations, NAS Barbers Point. Primary author for an engineering evaluation/cost analysis (EE/CA) that involved analyzing 16 removal action technologies, estimating costs for recommended remediation alternatives, researching and evaluating various federal and state statutes and regulations for Applicable or Relevant and Appropriate Requirements (ARARs) for a non-time critical removal action for PCB-contaminated soils and concrete. Supervised the site reconnaissance and field sampling teams. Estimated removal action costs using Remediation Action Cost Engineering and Requirements (RACER). Oversaw PCB removal activities. Primary author for the Remediation Verification Report and Record of Decision closure documents.

Stormwater Pollution Control Plan (SWPCP) Updates, Naval Station and Naval Magazine, Pearl Harbor, Oahu, Hawaii. Evaluated Naval Station facilities at the PHNC and Naval Magazine facilities at Naval Magazine Lualualei Headquarters Branch and West Loch Branch. Facilities were investigated to identify the practices used to reduce the pollutants in storm water discharges associated with industrial activities and to assure compliance with their respective National Pollutants Discharge Elimination System (NPDES) permits. Facility assessments determined the types and quantities of significant materials stored, and their utilization. Best management practices to prevent non-stormwater discharges were then proposed for implementation.

Petroleum, Oils, and Lubricants (POL) Remediation Study, Honolulu Harbor, Hawaii. Conducted an environmental site assessment of Piers 16 through 38. Although the site assessment looked at hazardous materials in general, the project focused on the presence and use of petroleum products in the area. Reviewed historical records at various government agencies, including the Hawaii Department of Health, the Hawaii Department of Transportation, and the U.S. Coast Guard, regarding the use and storage of hazardous materials. Assisted with the development of an electronic database associated with a GIS to manage the large volume of data collected.

09/92 – 01/95
Student Aide and Engineer's Aide with R.M. Towill Corporation

Drainage Structure Design, Ewa Villages Municipal Golf Course, City & County of Honolulu, Ewa, Oahu, Hawaii. Assisted in the design of drainage structures for the municipal golf course in Ewa. Used hydraulic computer programs to determine drainage flow rates and water surface elevations during flood events for the design of a spillway, golf cart underpasses, and drainage retention basins and culverts.

Villages of Kapolei Master Plan. Assisted registered civil engineers and planners with design of storm drain, sewer, and water distribution systems for the Villages of Kapolei Master Plan. Prepared preliminary design of the stormwater drainage system with the capability of managing various flood events. Determined peak, average, and fire flow requirements of the sewer and water systems for residential and commercial land use areas with varying population densities.

element environmental llc
environmental · engineering · water resources

Ryan S. W. Yamauchi, P.E.
President
Senior Environmental Engineer

BACKGROUND:

EDUCATION
Masters of Science in Civil (Environmental) Engineering (1995) - University of California at Berkeley
Bachelor of Science in Civil Engineering (1994) - University of Hawaii at Manoa

PROFESSIONAL REGISTRATIONS
Licensed Professional Engineer – Civil (Hawaii 1998), Certificate No. 9566-C
Registered Environmental Assessor-California-2003

SPECIALIZED TRAINING
OSHA 40-hour Initial HAZWOPER Training and Current 8-hour Refresher
Hazardous Waste Site Supervisor Training
First Aid and CPR Training

Mr. Yamauchi is the Responsible Corporate Officer for Element Environmental, LLC. He has one year of experience as a Chief Executive Officer and five years of experience as a Program/Project manager. He has over twelve years (12) of experience in the environmental consulting industry. He has over six (6) years of project management experience and has managed Federal Indefinite Delivery, Indefinite Quantity Contracts and environmental consulting/engineering design contracts. He is customer-focused and performance-driven.

Mr. Yamauchi has been involved in a wide range of environmental investigation and engineering projects dealing with water, wastewater, petroleum contamination, solid waste, and hazardous waste. His professional experience has included work on projects in Hawaii, Guam, Korea and the Pacific Islands. Mr. Yamauchi's areas of expertise consist of environmental investigations, remedial design and engineering, groundwater modeling, storm water planning, and wastewater engineering. He has prepared risk-based corrective action reports on sites contaminated with polychlorinated biphenyls (PCBs) and heavy metals, is experienced in preparing work plans, project management plans, sampling and analysis plans, site safety and health plans, and final reports for soil, groundwater and sediment investigation projects.

Mr. Yamauchi has also completed several large storm water and wastewater engineering design projects and studies. He has also performed and managed water and wastewater treatment design, wastewater reuse, sewer collection system preventive maintenance, and sewage spill response procedure development projects. He is an active member of the American Water Works Association and the Water Environment Federation.

SPECIFIC PROJECT EXPERIENCE:

Environmental Management Program, State of Hawaii, Department of Transportation, Highways Division: Project Manager for the development of a comprehensive Environmental Management Program (EMP). The program components included: completion of Storm Water Pollution Control Plans (SWPCPs) for the eight Oahu maintenance baseyards, development of training materials for storm water awareness, SWPCP elements, and construction BMPs; development of a training plan for the Chemical Application BMP Program Plan; and development of a Hazard Communication Program, Hazardous Waste Management Program, Solid Waste Management Program, Petroleum, Oil and Lubricant

Management Program, and Facility Maintenance Program. The EMP targeted maintenance operations and maintenance baseyards statewide.

Sand Island Wastewater Treatment Plant Site Assessment and Remedial Design, City and County of Honolulu: Project Manager for the site investigation and Toxic Substances Control Act (TSCA) cleanup of contaminated soil. Responsibilities included overall project management, coordination of subconsultants, development of the technical approach for all environmental investigations and the remedial design, and negotiating with the USEPA Region 9 and the State Department of Health (DOH) for all investigative and remedial activities. Supervised the preparation of the Phase I Environmental Site Assessment (ESA). Conducted and prepared the Phase II ESA, the Human Health Risk Assessment, the TSCA Notification Remediation Report, and the Soil Management Plan. Prepared construction plans and specifications and a construction cost estimate for the TSCA remediation. Performed services during construction including oversight and review of the TSCA cleanup. Coordinated all of the investigation and cleanup work for the two ongoing construction projects. Negotiated with the USEPA Region 9 and the State DOH throughout the duration of the project to allow construction to proceed concurrently with the investigation and cleanup. A follow- on remedial design including the completion of construction documents for the reuse of remaining low level PCB contaminated soil was completed for 76,000 cubic yards of stockpiled soil. Mr. Yamauchi served as the senior design engineer and designed a geofabric retaining wall system to contain the contaminated soil, which allowed for immediate future use of the site as a construction staging area.

Miscellaneous Public Building Facilities Improvements at Ewa Sugar Mill, City and County of Honolulu, Department of Design and Construction: Project Engineer for the remediation project involving preparation of construction documents including plans, specifications, and cost estimates. Other work included an asbestos and lead paint survey and hazardous waste/material survey. Responsibilities included: management of all environmental sampling and analysis work, conducting soil and groundwater sampling and analysis, performance of a magnetometer survey for underground storage tanks and pipelines, preparation of all environmental reports, preparation of construction plans and specifications for the soil removal and soil capping, and negotiating with the Hawaii State Department of Health (DOH) to obtain approval of the remediation plan. Reviewed contractor's work plan, waste manifests and confirmation sampling results during construction. Reviewed and approved closure report, and obtained DOH acceptance of soil removal action and soil cap construction. Due to immediate exposure risks, Mr. Yamauchi also managed the sampling, analysis, removal, and disposal of on-site solid waste/hazardous waste surface debris.

Waimanalo Wastewater Treatment Plant Improvements, State of Hawaii Department of Land and Natural Resources: Project Engineer for the design of a new secondary treatment system. Responsibilities included secondary biological process calculations for tank and equipment sizing, hydraulic calculations for plant hydraulics, mechanical process design including equipment selection, design and layout of new site piping, and development of process control strategies. Process units that Mr. Yamauchi was responsible for included the new anoxic/aerobic tanks, the new equalization basin, the new equalization flow splitter box, the additional effluent sand filters, the new injection wells, and the new dissolved air floatation thickener. Process equipment that Mr. Yamauchi was responsible for included fine air bubble diffusers, coarse air bubble diffusers, process air blowers, mixed liquor internal recycle pumps, return activated sludge pumps, thickened sludge transfer pumps, dissolved air floatation recirculation pumps and pressurization tanks, magnetic flow meters, and ultrasonic flow measuring devices. Prepared plans and specifications for construction, and assisted with the construction cost estimate and construction phasing schedule.

Moanalua and Kalihi Stream Dredging, State of Hawaii Department of Land and Natural Resources: Project Manager for the maintenance dredging sediment sampling and design project. Responsibilities included overall project management including coordinating subconsultants, development and execution of the sediment sampling plans, preparation of the sediment sampling results and alternatives analysis report, and management and coordination of the environmental assessment (EA) and hydrographic survey. As part of the sediment sampling and analysis report, Mr. Yamauchi researched the alternatives for disposal of the sediment.

Inflow and Infiltration Study at Schofield Barracks, Wheeler Army Airfield, and Helemano Military Reservation: Project Manager for this inflow and infiltration (I&I) study. Responsibilities included overall project management; coordination of subconsultants, preparation of the work plan and site safety and health plan, supervision and coordination of the smoke testing, CCTV inspections, manhole inspections, and minor construction repairs, and preparation of the preliminary engineering analysis of the recommended I&I construction repairs, including analysis of repair alternatives and development of construction cost estimates.

Saipan Lagoon Aquatic Ecosystem Restoration Study, Saipan, U.S. Army Corps of Engineers – Honolulu Engineering District: Project Engineer for this study to identify potential restoration alternatives for the nearshore lagoon environment. Responsibilities included calculation of stormwater runoff volumes using rainfall frequency intensity curves and preliminary engineering design of two stormwater conveyance and treatment system alternatives. Completed preliminary engineering design, including sizing and layout of conveyance structures and infiltration basins, and cost estimates for construction.

RCRA Corrective Action of Solid Waste Management Units, Areas of Interest, and Various Bunkers on Johnston Atoll, U.S. Army Corps of Engineers – Honolulu Engineering District: Project Engineer for the excavation and removal of contaminated soils from a number of former SWMU and AOI on Johnston Island. Assisted with preparation of the remediation work plan and site safety and health plan. Performed confirmation sample management and coordinated shipment of confirmation samples from Hawaii to the mainland laboratory. Assisted in the preparation of post-remediation excavation and sampling drawings.

Jonathan Springs Well Granulated Activated Carbon Treatment Unit Design, Honolulu Board of Water Supply: Project Manager for the preliminary sizing and design of the new granular activated carbon (GAC) treatment facility. This was the first project within Hawaii to utilize GAC technology for the removal of dieldrin and chlordane. Responsibilities included overall project management, coordination of subconsultants, and preparation of the preliminary design. Performed preliminary sizing calculations for the GAC unit, and the backwash settling tank and filter units. Prepared the preliminary layout of the GAC facilities and the construction cost estimate.

Collection System Maintenance Spill Response Procedures Manual, City and County of Honolulu: Project Engineer for the development of standardized spill response procedures for the City. Wrote a Spill Response Procedures Manual for the handling of wastewater spills in the collection system.

PUBLICATIONS:

S.R. Spengler, W. Freeman, D.W. Schlack, and R.S. Yamauchi. 1997. Exploring Electronic Project Data Management Alternatives for Environmental Projects. Paper presented at 1998 Pacific Basin Conference on Hazardous Waste, East-West Center, Program on Environment.

S.R. Spengler, R.S.W. Yamauchi, B.M.B. Pabingwit, and R. Babcock. 1999. Evaluating the Environmental Impact from Injection of Treated Wastewater in a Coastal Aquifer. Paper presented at ModelCARE'99 Conference, Zurich, Switzerland, September 20-23, 1999.

PHASE I
ENVIRONMENTAL SITE ASSESSMENT

MAALAEA 710-ACRE SITE
WAILUKU, MAUI, HAWAII
TMK: (2) 3-6-004: PARCELS 003 & 006

December 12, 2006

Prepared for:

M&E Pacific, Inc.
841 Bishop Street, Suite 1900
Honolulu, Hawaii 96813

Prepared by:

element environmental llc
environmental · engineering · water resources
62-180 Emerson Road
Haleiwa, Hawaii 96712
Phone (808) 637-1200 • Fax (808) 637-0001

Job No. 060050

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EXECUTIVE SUMMARY

Element Environmental LLC (E2) conducted a Phase I Environmental Site Assessment (ESA) on approximately 710.171 acres of land designated as Tax Map Key (TMK): (2) 3-6-004 parcels 003 and 006 (the property). The property is located in West Maui between Waikapu and Maalaea along the western side of Honoapiilani Highway. The property was formerly used for sugar cane and pineapple cultivation and is still partially used for sugar cane cultivation.

The Phase I ESA was performed in accordance with the scope and limitations of the American Society of Testing and Materials Practice E 1527-05 to identify the presence of recognized environmental conditions associated with the property and included a review of environmental regulatory records in the site vicinity, a review of the site history, a review of the site geology and hydrogeology, a site reconnaissance, and interviews.

This assessment has revealed no significant evidence of recognized environmental conditions in connection with the property with the exception of chlorine and fertilizer storage and mixing tanks, pole-mounted transformers, and illicit solid waste dumping areas. It is not known if the chlorine gas canisters and fertilizer storage tanks or the mixing tanks still contain chlorine or fertilizers, although the chlorine gas storage cabinets did have a chlorine odor. The pole-mounted transformers did not have visible labels that would indicate whether they contain polychlorinated biphenyls (PCBs). The solid waste dump areas consisted of abandoned vehicles, disposed tires, refrigerators, and other appliances.

E2 recommends that the chlorine and fertilizer storage and mixing tanks be properly disposed and/or recycled in accordance with all Federal, State and local regulations. Upon removal of the storage and mixing tanks, the soil and vegetation beneath the storage and mixing tanks should be inspected for indications of a release by an environmental professional. If a significant release is suspected, appropriate sampling and cleanup should be conducted.

E2 recommends that the pole-mounted transformers be tested for PCBs. If a significant release of PCBs is suspected, appropriate sampling and cleanup should be conducted.

E2 recommends that the illicit solid waste dumping areas be cleared and the solid wastes be disposed in accordance with all Federal, State and local regulations. Upon removal of the solid waste, the soil and vegetation beneath the solid waste should be inspected for indications of a release by an environmental professional. If a significant release is suspected, appropriate sampling and cleanup should be conducted.

E2 has also identified that the property has been historically used for sugarcane and pineapple cultivation. In an interview, Mr. Chumbley of Wailuku Agribusiness (former user of the property) indicated that pesticides and herbicides were applied to the property as part of the normal agricultural operations. Therefore, residual levels of pesticides and herbicides are probably present on the property. Although proper applications of pesticides and herbicides does not constitute a release of hazardous chemicals, E2 recommends that limited composite soil sampling be conducted on the property should the intended land use of the property change from agricultural to residential. The purpose of the limited sampling would be to determine if residual levels of pesticides/herbicides are present in site soils. The sample analyses selected should be based on the list of potential pesticides and herbicides that may have been applied to the property as provided by Mr. Chumbley.

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Maalaea Mauka
Wailuku, Maui, Hawaii
TMK: (2) 3-6-004: Parcels 003 & 006

December 12, 2006

1.0 INTRODUCTION

1.1 OVERVIEW

This report presents the results of Element Environmental LLC's (E2's) Phase I Environmental Site Assessment (ESA) of the subject property. The general location of the property is shown on Figure 1 (Site Vicinity Map) in Appendix A.

This report details the work performed to identify the presence of recognized environmental conditions associated with this property. Throughout this ESA the property of interest is referred to as *the subject property, the property, the site, or the facility.*

1.2 PURPOSE

E2 conducted this Phase I ESA to identify recognized environmental conditions associated with the property. American Society for Testing and Materials (ASTM) guidance defines *recognized environmental conditions* as the "presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property" (ASTM, 2005). Recognized environmental conditions do not include *de minimis* conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies (ASTM, 2005).

This Phase I ESA constitutes all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice and is intended to permit the Phase I ESA user to satisfy one of the requirements to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations on Comprehensive Environmental Response Compensation and Liability Act (CERCLA) liability, hereinafter, the "landowner liability protections" or "LLPs".

1.3 DETAILED SCOPE OF SERVICES

Our Phase I ESA was performed in accordance with the ASTM "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (ASTM Designation E 1527-05). The ASTM standard defines good commercial and customary practice in the United States of America for conducting an environmental site assessment of a parcel of commercial real estate with respect to the range of contaminants within the scope of Comprehensive Environmental Response, Compensation and

Liability Act (CERCLA) (42 U.S.C. §9601) and petroleum products (ASTM, 2005). Adherence to the ASTM standard is intended to limit liability of property owners from inherited environmental contamination.

We performed the following tasks in completion of the Phase I ESA:

- **Review of regulatory records.** We reviewed standard environmental record sources including the U.S. Environmental Protection Agency's (EPA's) Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) database, EPA's Resource Conservation and Recovery Act (RCRA) database, U.S. Institutional Controls database, U.S. Engineering Controls database, EPA's Emergency Response Notification System (ERNS) database, State of Hawaii Department of Health (DOH) Office of Hazard Evaluation and Emergency Response (HEER) site list, DOH Underground Storage Tank (UST) lists, DOH list of landfills and other solid waste facilities, DOH Voluntary Response Program (VRP) sites list, and DOH Brownfield sites list.
- **Review of site history.** We reviewed reasonably ascertainable standard historical sources including historical maps; aerial photographs; building permits, zoning records and property tax records available online; various printed publications as well as publications posted on the internet; and information from the interview with the owner's representative.
- **Review of site geology and hydrogeology.** We reviewed reasonably ascertainable published information on surface and subsurface conditions at the site and surrounding area. We used this information to assess topography, drainage, surface water bodies, anticipated subsurface geology, and groundwater occurrence and usage in the area.
- **Site reconnaissance.** We performed a site reconnaissance of the property to note visual signs of contamination, and we conducted a limited assessment of portions of the neighboring properties visible from the subject property boundaries. During our site reconnaissance we specifically looked for stained soil, dead or stressed vegetation, hazardous substances, petroleum products, electrical and hydraulic equipment, aboveground and underground storage tanks, disposal areas, maintenance areas, wells, sumps, drains, and cesspools/sewers.
- **Interviews.** We interviewed the user of the Phase I ESA and owner's representative, Mr. Steven Kikuchi, Partner of Maalaea Properties; and former owner's representative, Mr. Avery Chumbley, President of Wailuku Agribusiness regarding past and current use and activities on the property and adjoining properties.
- **Data evaluation and report preparation.** We evaluated the information collected and prepared this report that documents our assessment and presents our findings, opinions, and conclusions.

1.4 SIGNIFICANT ASSUMPTIONS

Significant assumptions include the following:

1) The information provided during the interview with the owner's representative is complete and accurate and
2) The information provided by the regulatory database search service is complete and accurate.

1.5 LIMITATIONS AND EXCEPTIONS

Phase I ESAs, by their very nature, are limited. E2 has endeavored to meet what it believes is the applicable standard of care and, in so doing is obliged to advise M&E Pacific, Inc. and Maalaea Properties LLC of Phase I ESA limitations. This ESA did not assess environmental issues or conditions at the property that are outside the scope of ASTM Practice 1527-05, including asbestos-containing materials (ACMs), radon, lead-based paint, lead in drinking water, wetlands, regulatory compliance, cultural and historic resources, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality, biological agents and mold, and site geotechnical concerns, nor did it include any sampling or testing for biological agents and mold, radon, methane, ACMs, lead-based paint, or other environmental contaminants. Our investigation was limited to the procedures described in the Phase I ESA Standard Practice (ASTM, 2005).

The conclusions presented in this report are professional opinions based solely upon visual observations of the site and vicinity and our interpretation of the available historical and regulatory information and documents reviewed. They are intended exclusively for the purpose outlined herein and apply only to the site location and project indicated.

Our findings and opinions are based on information that we obtained on given dates through records review, site reconnaissance, interviews, and related activities. It is possible that other information exists or subsequently has become known, just as it is possible for conditions we observed to have changed after our observation. For these and associated reasons, E2 and many of its peers routinely advise clients for ESA services that it would be a mistake to place unmerited faith in findings and opinions conveyed via ESA reports. E2 cannot under any circumstances warrant or guarantee that not finding indicators of hazardous substances or petroleum products means that hazardous substances or petroleum products do not exist on the site.

1.6 SPECIAL TERMS AND CONDITIONS

E2's services are performed, within the limits prescribed by our Clients, with the usual thoroughness and competence of the consulting profession in accordance with the standard for professional services at the time those services are rendered. No warranty or representation, either expressed or implied, is included or intended in our proposals, contracts, or reports.

Findings and opinions presented herein apply to site conditions existing at the time of our investigation and those reasonably foreseeable; they cannot necessarily apply to site changes of which we are not aware and have not had the opportunity to evaluate.

1.7 USER RELIANCE

This report is intended for the sole use of M&E Pacific Inc. and Maalaea Properties LLC. The scope of services performed in execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

2.0 SITE DESCRIPTION

2.1 LOCATION AND LEGAL DESCRIPTION

The subject property consists of two parcels of developed land located in West Maui between Waikapu and Maalaea along the western side of Honoapiilani Highway. Figure 1 (Site Vicinity Map) and Figure 2 (Site Location Map) in Appendix A show the site location. The property consists of approximately 710.171 acres of land designated as Tax Map Key (TMK): (2) 3-6-004; parcels 003 & 006.

2.2 SITE AND VICINITY GENERAL CHARACTERISTICS

The subject property is located along the western side of Honoapiilani Highway (Route 30) between Waikapu Stream (Waikapu Ditch) and Kuihelani Highway on the Island of Maui. The western portion of the property is partially bounded by the Waihee Ditch, the eastern side of the West Maui Mountains between Waikapu Valley and Kauneahua Ridge, the King Kamehameha Golf Course, Kahili Golf Course, and a former quarry.

The state land use designation for the property is Agricultural (County of Maui, 2006). The property is not located in a State Special Management Area (County of Maui, 2006). The property is not located within the Federal Emergency Management Agency 500 year flood plain (County of Maui, 2006).

Maui is moderately warm with mean monthly temperatures ranging from 70° to 84° Fahrenheit. The average annual rainfall at the site is approximately 20 inches per year (Giambelluca et al., 1986).

2.3 CURRENT USE OF THE PROPERTY

A portion of the property is currently used for sugar cane cultivation. The sugar cane cultivation activities are operated by Hawaii Commercial & Sugar Company (HC&S). The Waihee Ditch is currently operated by Wailuku Water Company.

2.4 DESCRIPTIONS OF STRUCTURES, ROADS, AND OTHER IMPROVEMENTS ON THE SITE

The site is currently occupied by sugar cane cultivation throughout a portion of the site. HC&S has operated drip irrigation lines throughout the property to irrigate the sugar cane crops. Wailuku Water Company operates the Waihee Ditch, which is located primarily along the western boundary of the site. Honoapiilani Highway runs along the eastern boundary of the site.

At least three sets of chlorine and fertilizer storage and mixing tanks are located throughout the site. An access road from Honoapiilani Highway to the King Kamehameha and Kahili Golf Courses bisects the northern and southern portions of the site. Dirt roads also traverse various portions of the site. There is also two reservoirs, one near the northwestern corner of the site and one near the south western corner of the site.

Photographs of the site showing some of the site improvements are included in Appendix A.

2.5 CURRENT USES OF THE ADJOINING PROPERTIES

Current uses of adjoining properties include the open land to the north, the Maui Tropical Plantation to the northeast; sugar cane and former pineapple cultivation areas across Honoapiilani Highway to the east; Maalaea Construction and Demolition Landfill to the southeast; open lands and former sugar cane agricultural land to the south; the Hawaiian Cement quarry to the southwest; the Waihee Ditch, Kahili Golf Course, King Kamehameha Golf Course, and former quarry, and the West Maui Mountains to the west.

3.0 USER PROVIDED INFORMATION

3.1 ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS

Mr. Steven Kikuchi, of Maalaea Properties LLC, is not aware of any environmental cleanup liens against the property. A copy of the User Questionnaire completed by Mr. Kikuchi is included in Appendix C.

3.2 SPECIALIZED KNOWLEDGE

Mr. Kikuchi has no specialized knowledge or experience related to the property or nearby properties.

3.3 COMMONLY KNOWN OR REASONABLE ASCERTAINABLE INFORMATION

Mr. Kikuchi is not aware of commonly known or reasonably ascertainable information about the property that would help identify conditions indicative of releases or threatened releases of hazardous substances or petroleum products.

3.4 VALUATION REDUCTION FOR ENVIRONMENTAL ISSUES

Mr. Kikuchi did not indicate any valuation reduction of the subject property due to environmental issues.

3.5 OWNER, PROPERTY MANAGER, AND OCCUPANT INFORMATION

Maalaea Properties LLC owns the property and HS&C currently uses a portion of the site for sugar cane cultivation. Mr. Steven Kikuchi is a Partner of Maalaea Properties. According to Mr. Kikuchi no employees or tenants reside on the subject property.

3.6 REASON FOR PERFORMING THE PHASE I ESA

The Phase I ESA was conducted at the request of Maalaea Properties LLC as part of the due diligence process prior to developing the subject property for varied agricultural and potential residential uses.

3.7 OTHER INFORMATION

No other information was provided by the user.

4.0 RECORDS REVIEW

4.1 STANDARD ENVIRONMENTAL RECORD SOURCES

4.1.1 Overview

To identify the presence of adverse environmental conditions at the subject property, several published sources of environmental records were reviewed. This section lists the records that were searched and the results of each search.

ASTM E 1527-05 specifies a search distance for specific environmental record sources. The following record sources were searched for incidents or sites within the listed search distances of the subject property:

Standard Environmental Record Sources	Search Distance (miles)
Federal NPL (National Priorities List) site list	1.0
Federal Delisted NPL site list	0.5
Federal CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) list	0.5
Federal CERCLIS NFRAP (No Further Remedial Action Planned) site list	0.5
Federal RCRA (Resource Conservation and Recovery Act) CORRACTS facilities list (facilities subject to Corrective Action under RCRA)	1.0
Federal RCRAInfo list for TSDF (treatment, storage, and disposal facilities)	0.5
Federal RCRAInfo list for generators	Site and adjoining properties
Federal institutional control/engineering control registries	Site only
Federal ERNS (Emergency Response Notification System) list	Site only
State list of hazardous waste sites identified for investigation or remediation (NPL or CERCLIS equivalents)	1.0
State landfill and/or solid waste disposal site list	0.5
State leaking UST (underground storage tank) list	0.5
State registered UST list	Site and adjoining properties
State institutional control/engineering control registries	Site only
State voluntary cleanup sites	0.5
State Brownfield sites	0.5

E2 used a regulatory database search service, provided by Environmental Data Resources, Inc. (EDR), to review the above Federal and State government databases. A copy of *The EDR Radius Map* is included in Appendix B. The following sections summarize the findings of the regulatory database search. In reviewing the environmental databases, it should be noted that such databases are not instantaneously updated by the specific regulatory agencies. Depending on the database and the agency, update frequency update frequency may be as infrequent as annually. The dates of the most recent updates for the searched environmental databases are listed in the EDR report in Appendix B.

4.1.2 U.S. EPA National Priorities Site List

The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. The ASTM designated search distance for the NPL is one mile. EDR did not locate NPL sites within one mile of the subject property.

4.1.3 U.S. EPA Delisted NPL Site List

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425(e), sites may be deleted from the NPL where no further response is appropriate. The ASTM designated search distance for delisted NPL sites is one-half mile. EDR did not locate delisted NPL sites within one-half mile of the subject property.

4.1.4 U.S. EPA CERCLIS List

The CERCLIS list contains data on potentially hazardous sites that have been reported to the EPA by states, municipalities, private companies, and private persons pursuant to Section 103 of CERCLA. CERCLIS contains sites which are either proposed to or on the NPL and sites which are in the screening and assessment phase for possible inclusion on the NPL. The ASTM designated search distance for CERCLIS sites is one-half mile. EDR did not identify CERCLIS sites within one-half mile of the subject property.

4.1.5 U.S. EPA CERCLIS NFRAP Site List

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the NPL, unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site. The ASTM designated search distance for NFRAP sites is one-half mile. EDR did not locate CERCLIS NFRAP sites within one-half mile of the property.

4.1.6 U.S. EPA RCRA CORRACTS Facilities List

EPA's CORRACTS, or Corrective Action Sites database, identifies facilities that generate, treat, store, or dispose of hazardous wastes where RCRA corrective action activity has occurred. These sites have experienced spills or releases of hazardous chemicals prompting the need for corrective action. The ASTM designated search distance for the CORRACTS list is one mile. EDR did not identify any CORRACTS sites within one mile of the subject property.

4.1.7 U.S. EPA RCRAInfo List for TSD Facilities

The RCRAInfo list includes facilities that treat, store, dispose of, or incinerate hazardous waste (TSD facilities). The ASTM designated search distance for TSD facilities is one-half mile. EDR did not identify any TSD facilities within one-half mile of the subject property.

4.1.8 U.S. EPA RCRA Generators List

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS). The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kilograms (kg) of hazardous waste, or less than one kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over one kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste. The ASTM designated search distance for RCRA generators is the subject property and adjoining properties. EDR did not identify any RCRA generators on an adjoining property.

4.1.9 U.S. Institutional / Engineering Control Registries

U.S. Institutional / Engineering Control (IEC) registries are lists of sites that have institutional and/or engineering controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health. The ASTM designated search distance for federal institutional / engineering control registries is the subject property only. EDR did not locate any federal IEC sites on the subject property or within one mile of the subject property.

4.1.10 U.S. EPA ERNS List

ERNS is a national database of more than 365,000 records, which contains information on specific notification of releases of oil and hazardous substances to the environment. The ASTM designated search distance for ERNS incidents is the subject property only. No reported ERNS incidents have occurred on the subject property.

4.1.11 State of Hawaii Hazardous Waste Sites List

The State Hazardous Waste Sites records are the states' equivalent to NPL or CERCLIS. These sites may or may not already be listed on the federal NPL or CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The DOH HEER office maintains a Sites of Interest Database, which includes sites that HEER has an interest in, has investigated, or may investigate under Hawaii Revised Statute 128D (the State Superfund law). The ASTM designated search distance for the State Hazardous Waste Sites List is one mile. EDR did not identify any State Hazardous Waste sites within one mile of the subject property.

4.1.12 State of Hawaii Landfill / Solid Waste Disposal Site List

The State DOH Solid and Hazardous Waste Branch has a list of permitted solid waste disposal facilities and landfills in the State of Hawaii. The ASTM designated search distance for permitted solid waste disposal sites / landfills is one-half mile. EDR did not locate any permitted landfills or disposal sites within one-half mile of the subject property.

4.1.13 State of Hawaii LUST List

The leaking underground storage tank (LUST) database, compiled by the State DOH Solid and Hazardous Waste Branch (SHWB) UST Section, contains an inventory of reported leaking underground storage tank incidents. The ASTM designated search distance for LUST sites is one-half mile. EDR located two (one orphan) LUST sites within one-half mile of the subject property. The sites are listed below.

LUST Site Name	Location Relative to the Subject Property	Site Status/Comments
Hawaiian Cement - Waikapu Quarry Honoapiilani Highway Wailuku, HI 96793	adjacent to site – northeast (down gradient)	Site Cleanup Completed 5/16/95.
Maui Tropical Plantation 1670 Honoapiilani Highway Wailuku, HI 96793	adjacent to site – southwest (down gradient)	Site Cleanup Completed 8/25/05.

Note: Gradient direction refers to approximate groundwater flow direction.

It is unlikely that off-site LUST sites have negatively impacted the subject property due to the "Site Cleanup Completed" status of the sites and the anticipated groundwater flow direction from the down gradient sites.

4.1.14 State of Hawaii Registered UST List

USTs are regulated under RCRA and must be registered with the state department responsible for administering the UST program. The list of registered UST sites is compiled by the State DOH SHWB UST Section. The ASTM designated search distance for UST sites is one-quarter mile. EDR located two UST sites within one-quarter mile of the subject property. The sites are listed below.

UST Site Name	Location Relative to the Subject Property	Site Status/Comments
Hawaiian Cement - Waikapu Quarry Honoapiilani Highway Wailuku, HI 96793	adjacent to site – northeast (down gradient)	6 USTs Permanently Out of Use.
Maui Tropical Plantation 1670 Honoapiilani Highway Wailuku, HI 96793	adjacent to site – northeast (down gradient)	2 USTs Permanently Out of Use.

Note: Gradient direction refers to approximate groundwater flow direction.

It is unlikely that the off-site UST sites have negatively impacted the subject property due to the status and groundwater flow direction (down gradient) of the USTs.

4.1.15 State of Hawaii Institutional Control Registry

Institutional controls on properties were obtained from the DOH VRP and Brownfield databases. The ASTM designated search distance for state institutional / engineering control registries is the subject property only. EDR did not identify the subject property on state institutional / engineering controls lists.

4.1.16 State of Hawaii Voluntary Response Program Sites

The ASTM designated search distance for VRP sites is one-half mile. EDR did not identify any VRP sites listed within one-half mile of the subject property.

4.1.17 State of Hawaii Brownfield Sites

The ASTM designated search distance for Brownfield sites is one-half mile. EDR did not list any state Brownfield sites within one-half mile of the subject property.

4.2 ADDITIONAL ENVIRONMENTAL RECORD SOURCES

Additional environmental record sources that were reviewed for this Phase I ESA included Maui County building permit and zoning records available online. The findings from review of these records are discussed in Section 4.4.2.

4.3 PHYSICAL SETTING SOURCES

4.3.1 USGS Topographic Map Coverage

According to the U.S. Geological Survey (USGS) topographic maps of the area (Wailuku and Maalaea Quadrangles), the property is located at approximately 20° 50' 17.5'' north latitude and 156° 30' 28.3'' west longitude. The elevation of the subject property ranges from approximately 200 feet above mean sea level at the southeastern end near Kuihelani Highway to approximately 1,080 feet above mean sea level at the northwestern end near the Maui Tropical Plantation. Topographic map coverage of the subject site is shown on Figure 1 in Appendix A.

4.3.2 Geologic and Hydrogeologic Setting

E2 reviewed published geologic and hydrogeologic reports and maps to obtain information regarding subsurface conditions in the general area of the site to evaluate potential migration of contaminants.

<u>Geology and Soils</u>

The subject property is located along the eastern base of the West Maui Mountains.

According to the U. S. Soil Conservation Service (Foote et al., 1972) the predominant soil types located in the site vicinity are:

Wailuku silty clay – well drained soils on alluvial fans on the island of Maui.

Iao clay – well drained soils on alluvial fans and in basins on the island of Maui.

Pulelu cobbly loam – well drained and excessively drained, medium textured, moderately textured, and coarse-textured soils on alluvial fans and in basins on the island of Maui.

Stony alluvial land – moderately well and well drained, moderately coarse textured soils with moderate infiltration rates.

Ewa silty clay – well drained on alluvial fans and in basins on the islands of Maui and Oahu.

Hydrogeology

The subject property is located within the Waikapu Aquifer System of the Wailuku Aquifer Sector (Mink and Lau, 1990). There are two aquifers located beneath the majority of the site, which is located east of the Waihee Ditch, an upper aquifer that occurs in sedimentary (alluvial) deposits and a lower (deeper) aquifer that occurs in horizontally extensive lavas. Both aquifers are basal, where freshwater is in contact with seawater. The upper aquifer is unconfined, where the water table is the upper surface of the saturated aquifer; and the lower aquifer is confined by impermeable or poorly permeable formations (the sedimentary deposits) with the top of the saturated aquifer below the surface of the groundwater (Mink and Lau, 1990).

The upper aquifer has the potential to be used, is not a drinking water source or ecologically important, has a moderate salinity (1,000 to 5,000 milligrams per liter of chloride), is replaceable, and is moderately vulnerable to contamination. The lower aquifer has the potential to be used, is not a drinking water source or ecologically important, has a moderate salinity (1,000 to 5,000 milligrams per liter of chloride), is replaceable, and has a low vulnerability to contamination.

For a portion of the site, which is located west of the Waihee Ditch, there is an aquifer located beneath the site. The aquifer occurs in horizontally extensive lavas; is basal, where freshwater is in contact with seawater; and is unconfined, where the water table is the upper surface of the saturated aquifer (Mink and Lau, 1990).

Based on regional topography, regional groundwater flow direction is expected to be south-southeast towards the ocean. The nearest drinking water supply wells are located within the site near the southwestern reservoir (EDR, 2006). There are five wells registered with the State Department of Land and Natural Resources within a one mile radius of the property. Three wells are being used for irrigation, one well may be used for drinking water for future residential development, and one well does not have a listed use.

Surface Water

There are two earthen reservoirs located on the site. Both reservoirs are located topographically up gradient of the surrounding on-site areas. The closest down-gradient surface water body to the site is the Maalaea Small Boat Harbor, which is approximately 1 mile south of the southern end of the site, and is contiguous with the Pacific Ocean. The location of the Maalaea Small Boat Harbor in relation to the site is shown on Figure 1 in Appendix A.

Storm water runoff appears that it would flow into streams, swales and gullies throughout the site towards Honoapiilani Highway and Maalaea Harbor.

4.4 HISTORICAL USE INFORMATION

4.4.1 Historical Review Sources

Past use of the subject property and adjoining properties was ascertained by reviewing the following standard historical sources: aerial photographs; building permits, zoning records, and property tax records available online; various printed publications; as well as publications posted on the internet; and information from the interview with the owner's representative. Appendix D contains copies of pertinent maps.

4.4.2 Past Uses of the Subject Property and Adjoining Properties

Past Uses of the Subject Property

Review of aerial photographs from 1950 through 1995 indicates that the property was used for agricultural purposes throughout the entire period.

In the 1950 aerial photograph indicates that a plantation village was located near the center of the property. As many as 12 to 20 small structures are visible in the aerial photograph. The 1964 aerial photograph shows that all of the structures have been removed.

The property was historically used for agriculture, specifically for pineapple and sugar cane cultivation. In an interview, Mr. Chumbley of Wailuku Agribusiness (former user of the property) indicated that pesticides and herbicides were applied to the property as part of the normal agricultural operations. Mr. Chumbley provided a list of potential pesticides and herbicides that may have been applied to the property (Appendix C).

Past Uses of Adjoining Properties

The earliest aerial photographs from 1950 indicate that a quarry was active at the location of the current Maalaea Construction and Demolition Landfill, located to the southeast of the property. The aerial photograph indicates that the land to the north had some residential development that was part of Waikapu; to the south was open, undeveloped land; and to the east, across Honoapiilani Highway, the land was being used for agriculture.

No changes are visible until the 1974 aerial photograph where new quarry activities had begun to the west of the central portion of the site.

In the 1985 aerial photograph, two large reservoirs to the northeast of the site had been filled in and two large structures were constructed at the current location of the Maui Tropical Plantation.

The last aerial photograph in 1995 shows that quarry activity to the west may have stopped and two golf courses have been developed to the west of the site.

From the site reconnaissance and interviews, also to be discussed in the following sections, we know that the quarry to the southeast had begun operations before 1950 is now being used as a demolition and construction debris landfill. The quarry to the west of the site that began operations in the early 1970s closed sometime in the 1990s. Also, another new quarry (currently operated by Hawaiian Cement) began operations to the southwest of the site and is still in operation at this time.

5.0 SITE RECONNAISSANCE

5.1 METHODOLOGY AND LIMITING CONDITIONS

E2 personnel conducted the site reconnaissance from November 1, 2006 through November 3, 2006. The site reconnaissance consisted of a visual inspection of the property and the surrounding area.

The site reconnaissance was limited by the following condition:

1) The site had only a few dirt roads that were drivable. Overgrown grass and the site topography in areas where the site was inaccessible by car may have obstructed the view of some surface or subsurface objects.

2) Chlorine and fertilizer storage and mixing tanks were found at the site. No sampling was performed to determine the exact contents.

3) Abandoned vehicles, vehicle parts, and household appliances were found at the site. No sampling was performed to determine if hazardous materials or wastes were present.

5.2 GENERAL SITE SETTING

Site reconnaissance was conducted from November 1, 2006 through November 3, 2006 by Mr. Roger Aoki and Mr. Ryan Yamauchi of E2. The reconnaissance included visual a survey of the property and a brief survey of the visible portions of the adjacent properties. Photographs are included in Appendix A.

The site is former sugar cane and pineapple agricultural land that is currently being used as sugar cane agricultural land operated by HS&C.

An active quarry facility is in operation to the southwest. Also, across Honoapiilani Highway to the southeast there is a former quarry that is currently being used as a demolition and construction debris landfill. There is a former quarry and two golf courses to the west. The area to the east was used for sugar cane agriculture. The Maui Tropical Plantation is located to the northeast of the property.

5.3 HAZARDOUS SUBSTANCE AND PETROLEUM PRODUCTS IN CONNECTION WITH IDENTIFIED USES

E2 did not identify any hazardous substance and petroleum products during the site reconnaissance.

5.4 HAZARDOUS SUBSTANCE AND PETROLEUM CONTAINERS *(NOT NECESSARILY IN CONNECTION WITH IDENTIFIED USES)*

E2 did not observe any hazardous substances or petroleum containers not necessarily associated with identified uses.

5.5 UNIDENTIFIED SUBSTANCE CONTAINERS

E2 did not locate any unidentified substance containers within the property.

5.6 STORAGE TANKS

E2 observed three sets of chlorine and fertilizer storage and mixing tanks on the property during the site reconnaissance.

5.7 INDICATIONS OF PCBS

E2 observed three canister pole-mounted transformers located near the earthen reservoir at the southwestern corner of the property. No labels were apparent on the canisters, which could indicate the potential presence of PCBs. No staining was observed on the ground surface below the pole mounted transformers. According to the Mr. Steven Kikuchi, partner of Maalaea Properties, the transformers located on, or adjacent to the property are owned by the Maui Electric Company (MECO). It is possible that some of these transformers contain PCBs in their dielectric fluid. According to the HECO, all MECO-owned leaking transformers are replaced, and any associated oil spills are remediated (at their expense) in accordance with all applicable EPA and DOH guidelines.

5.8 INDICATIONS OF SOLID WASTE DISPOSAL

E2 observed several piles of solid waste, which appears to be abandoned vehicles, discarded vehicle parts and major household appliances, on the property. The piles of illicit dumping were located near the central portion of the site near a paved road off of Honoapiilani Highway.

5.9 MIGRATION OF OFF-SITE CONTAMINATION

E2 did not observe off-site contaminant migration onto the property.

5.10 OTHER CONDITIONS OF CONCERN

Odors
No strong, pungent, or noxious odors were identified at the property during the site reconnaissance.

Stressed Vegetation
No stressed vegetation was identified at the property during the site reconnaissance.

Wastewater and Septic Systems
No wastewater or septic systems were identified at the property during the site visit or from records reviewed.

Storm Water
Storm water run-on and/or run-off was observed on the property during the site reconnaissance. Storm water runoff flowed into streams, swales and gullies to the south-southwest of the site towards Honoapiilani Highway and Maalaea Harbor.

Drains and Sumps
No drains or sumps were identified at the property during the site reconnaissance.

Stained Soil or Pavement
No stained soil or pavement was identified at the property during the site reconnaissance.

Wells
Although a registered well is located near the reservoir in the southwestern corner of the site, no wells were identified at the property during the site reconnaissance. Wells are discussed in Section 4.3.2.

Pits, Ponds, or Lagoons
One earthen reservoir was located at the southwestern corner of the site. A second earthen reservoir was reported to be located at the northwestern corner of the site, however, due to road and weather conditions, this reservoir was not accessible and was not visually located. No other pits, ponds, or lagoons were identified at the property during the site reconnaissance.

6.0 INTERVIEWS

6.1 INTERVIEW WITH CURRENT OWNER / FORMER OWNER / OCCUPANTS

E2 interviewed Mr. Steven Kikuchi, Partner of Maalaea Properties LLC and Mr. Avery Chumbley, President of Wailuku Agribusiness regarding the subject property. Information obtained during the interviews is included in pertinent sections of this report.

6.2 INTERVIEW WITH LOCAL GOVERNMENTAL OFFICIALS

Written requests for information were sent to the State of Hawaii Department of Health, the Maui County Department of Fire Control, and the Local Emergency Planning Committee. Copies of the information request and responses are included in Appendix D and information obtained is included in pertinent sections of this report.

7.0 FINDINGS AND OPINIONS

Review of Standard Environmental Record Sources

A review of the environmental regulatory databases indicated that the subject property was not listed on any of the federal or state databases searched by EDR.

Two LUST sites are located within one-half mile of the subject property. These sites have completed cleanup and are located down gradient of the subject property, therefore, are unlikely to have an environmental impact on the subject property. Likewise, two registered UST sites, both with UST sites

permanently out of use, were identified within ¼ mile of the subject property. The UST sites are located down gradient of the subject property and are unlikely to have an environmental impact on the subject property.

Historical Review

E2 identified that the property was historically used for agriculture, specifically for pineapple and sugar cane cultivation. In an interview, Mr. Chumbley of Wailuku Agribusiness (former user of the property) indicated that pesticides and herbicides were applied to the property as part of the normal agricultural operations. Mr. Chumbley provided a list of potential pesticides and herbicides that may have been applied to the property (Appendix C).

E2 also identified a construction and demolition debris landfill operating adjacent to the subject property. No records have been filed with the Department of Health regarding hazardous material or substance releases from this site.

Site Reconnaissance

E2 identified two (2) abandoned cars, one (1) abandoned motorcycle, 1 discarded vehicle engine, four (4) tires, at least nine (9) discarded major household appliances and other miscellaneous solid waste at the site. Gasoline and other petroleum products, if released from this debris, may be harmful to and persistent in the environment. No staining was observed on the ground surface below or around the vehicles or vehicle parts.

Three (3) sets of chlorine and fertilizer storage and mixing tanks were observed along the western and eastern perimeter of the property. Each of the sites contained a cabinet with chlorine gas canisters, storage tanks labeled as fertilizer and mixing/contact chambers.

Three (3) pole-mounted transformers were observed near the earthen reservoir located at the southwestern corner of the property. No labels were visible to indicate whether the transformer oil contains PCBs. No staining was observed on the ground surface below the pole mounted transformers. According to the Mr. Steven Kikuchi, partner of Maalaea Properties, the transformers located on, or adjacent to the property are owned by the Maui Electric Company (MECO). It is possible that some of these transformers contain PCBs in their dielectric fluid. According to the HECO, all MECO-owned leaking transformers are replaced, and any associated oil spills are remediated (at their expense) in accordance with all applicable EPA and DOH guidelines.

E2 did not observe any other recognized environmental conditions during the site reconnaissance.

8.0 CONCLUSIONS

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-05 of the subject property, located in Wailuku, Hawaii, designated as TMK: (2) 3-6-004: parcels 003 & 006. Any exceptions to, or deletions from, this practice are described in Section 1.5 of this report. This assessment has revealed no significant evidence of recognized environmental conditions in connection with the property with the exception of the solid waste piles and abandoned vehicles located along the paved and dirt road off of Honoapiilani Highway near the central potion of the property; three sets of chlorine and fertilizer storage and mixing tanks, and three pole mounted transformers located near the earthen reservoir located at the southwestern corner of the property.

E2 recommends that the abandoned vehicles and other solid waste be removed and properly disposed and/or recycled in accordance with all Federal, State and local regulations. Upon removal of the solid waste, the soil and vegetation beneath the solid waste debris should be inspected for indications of a release by an environmental professional. If a significant release is suspected, appropriate sampling and cleanup should be conducted.

E2 recommends that the chlorine and fertilizer storage and mixing tanks be properly disposed and/or recycled in accordance with all Federal, State and local regulations. Upon removal of the storage and mixing tanks, the soil and vegetation beneath the storage and mixing tanks should be inspected for indications of a release by an environmental professional. If a significant release is suspected, appropriate sampling and cleanup should be conducted.

E2 recommends that the pole-mounted transformers be tested for PCBs. If a significant release of PCBs is suspected, appropriate sampling and cleanup should be conducted.

E2 has also identified that the property has been historically used for sugarcane and pineapple cultivation. In an interview, Mr. Chumbley of Wailuku Agribusiness (former user of the property) indicated that pesticides and herbicides were applied to the property as part of the normal agricultural operations. Therefore, residual levels of pesticides and herbicides are probably present on the property. Although proper applications of pesticides and herbicides does not constitute a release of hazardous chemicals, E2 recommends that limited composite soil sampling be conducted on the property should the intended land use of the property change from agricultural to residential. The purpose of the limited sampling would be to determine if residual levels of pesticides/herbicides are present in site soils. The sample analyses selected should be based on the list of potential pesticides and herbicides that may have been applied to the property as provided by Mr. Chumbley.

9.0 DEVIATIONS

In conducting this Phase I ESA, there were no deletions from the standard practice (ASTM Designation E1527-05) and no client-imposed constraints. In addition, no data gaps were encountered, other than the limitations described in Section 5.1.

10.0 REFERENCES

ASTM, 2005. *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM Designation E 1527-05). American Society for Testing and Materials (ASTM)*, Washington, 2005.

County of Maui, 2006. *Maui County Online Services.* County of Maui, November 2006. http://www.mauicounty.gov/online_services/index1.htm

DLNR, 2001. *Commission on Water Resources Management Well Database*. State of Hawaii Department of Land and Natural Resources, April 16, 2001.

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Foote, D.E., E. L. Hill, S. Nakamura, F. Stephens, 1972. *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* U.S. Dept. of Agriculture Soil Conservation Science, U.S. Government Printing Office, 1972.

EDR, 2006. *The EDR Radius Map, TMK 3-6-04, Wailuku, HI 96793. Inquiry Number: 1787728.3r.* EDR Environmental Data Resources, Inc., November 08, 2006.

Giambelluca, Thomas W., Michael A. Nuller, and Thomas A. Schroeder, 1986. *Rainfall Atlas of Hawai'i.* State of Hawaii Department of Land and Natural Resources, Division of Water and Land Development. Honolulu, Hawaii, Report R76.

Macdonald, G. A., Abbott, A. T. and Peterson, F. L., 1983. *Volcanoes in the Sea: The Geology of Hawaii.* Honolulu (University of Hawaii Press).

Mink, J. F. and Lau, S., 1990. *Aquifer Identification and Classification for Maui Groundwater Protection Strategy for Hawaii.* Water Resources Research Center, University of Hawaii, Technical Report 185, February.

R.M. Towill Corporation, 9/28/1950, 12/20/1950, 5/19/1964, 6/2/1964, 3/17/1974, 1/6/1977, 9/11/1985, 6/23/1995. *Aerial Photograph.* R.M. Towill, Aerial Photograph Collection.

11.0 SIGNATURE OF ENVIRONMENTAL PROFESSIONALS

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental professional as defined in §312.10 of 40 CFR 312 and we have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Roger C. Aoki
Roger C. Aoki, P.E. Date: December 12, 2006

Ryan S. Yamauchi
Ryan S. Yamauchi, P.E. Date: December 12, 2006

12.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

Qualifications of the environmental professional are included in Appendix E.

LIST OF ACRONYMS

ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response Compensation and Liability Information System
CESQG	Conditionally Exempt Small Quantity Generator
CORRACTS	Corrective Action Sites under RCRA
DOH	State of Hawaii, Department of Health
E2	Element Environmental LLC
EDR	Environmental Data Resources, Inc.
EPA	US Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
FINDS	Facility Index System
HEER	Department of Health, Office of Hazard Evaluation and Emergency Response
HSC	Hawaii Commercial & Sugar Company
IEC	Institutional / Engineering Controls
kg	kilogram
LLPs	Landowner Liability Protections
LQG	Large Quantity Generator
LUST	leaking underground storage tank
mg/l	milligrams per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	DOH issued No Further Action status for sites
NFRAP	No Further Remedial Action Planned
NPL	National Priorities List (Superfund sites)
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
SHWB	Department of Health, Solid and Hazardous Waste Branch
SQG	Small Quantity Generator
TMK	Tax Map Key
TSD	treatment, storage and disposal (category of RCRA facility)
USGS	United States Geological Survey (US Dept. of the Interior)
UST	underground storage tank
VRP	Department of Health, Voluntary Response Program

APPENDIX A

Figures and Photo Plates

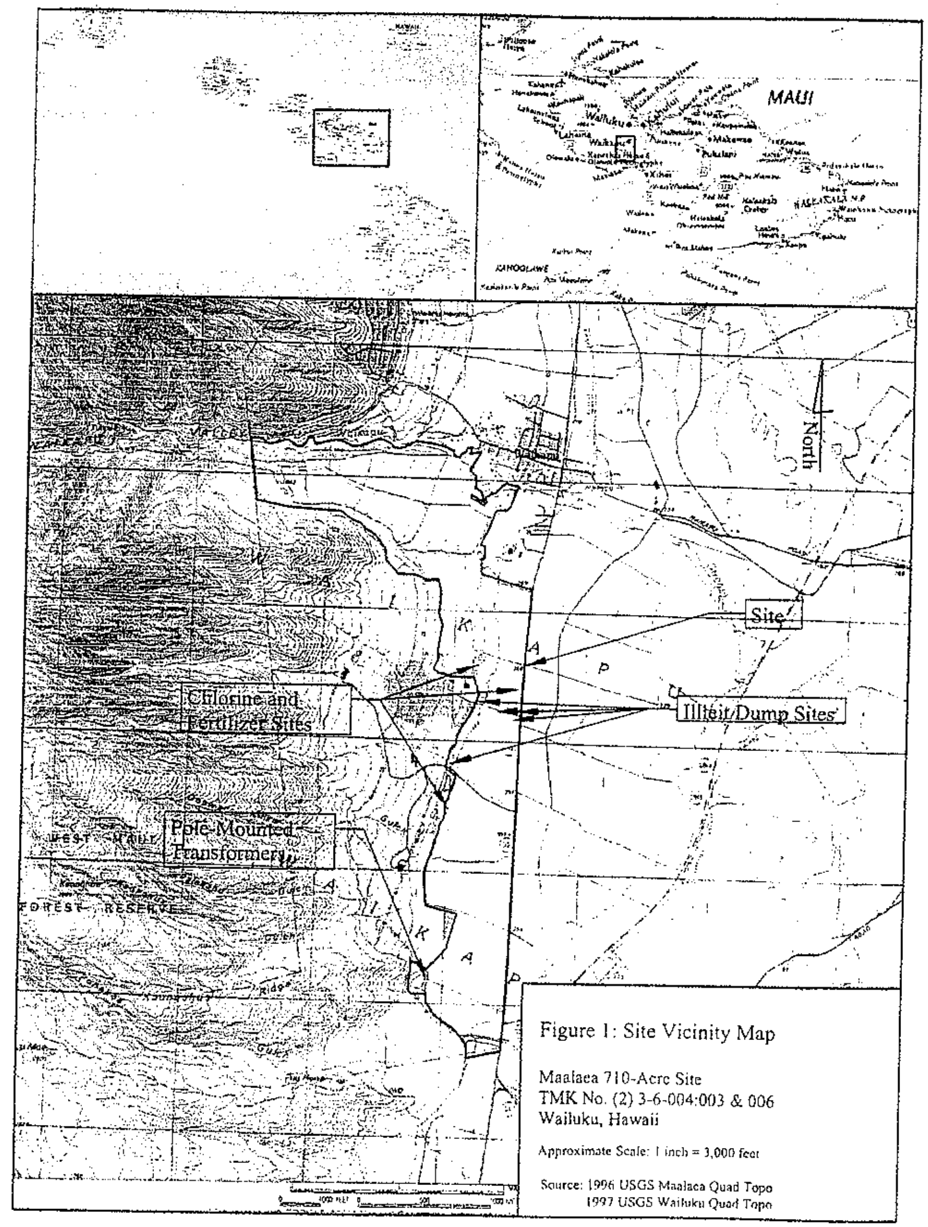


Figure 1: Site Vicinity Map

Maalaea 710-Acre Site
TMK No. (2) 3-6-004:003 & 006
Wailuku, Hawaii

Approximate Scale: 1 inch = 3,000 feet

Source: 1996 USGS Maalaea Quad Topo
1997 USGS Wailuku Quad Topo

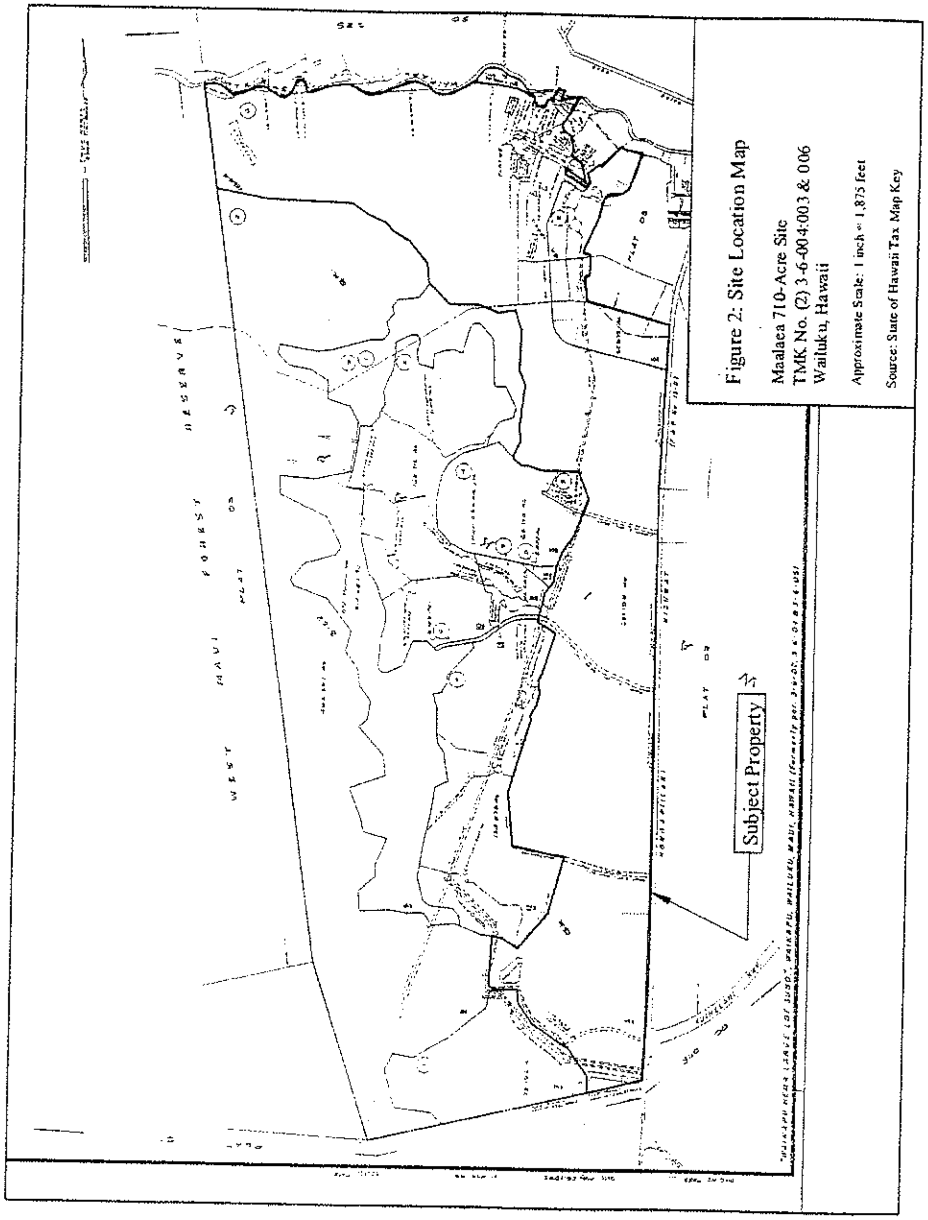


Figure 2: Site Location Map

Maalaea 710-Acre Site
TMK No. (2) 3-6-004:003 & 006
Wailuku, Hawaii

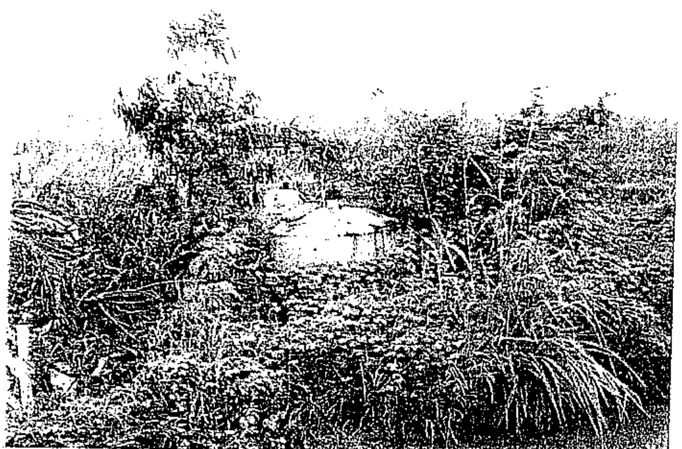
Approximate Scale: 1 inch = 1,875 feet

Source: State of Hawaii Tax Map Key

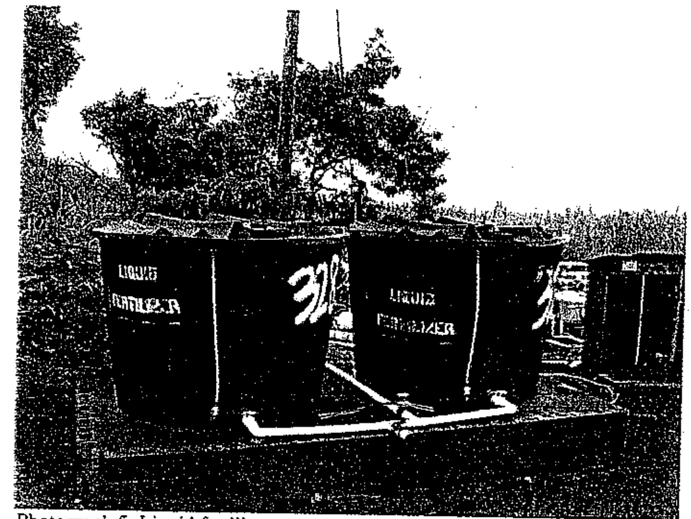
Photograph 1: Southern end of Maalaea 710-acre property, former pineapple cultivation area. Direction: Southeast.

Photograph 2: Illicit dump pile near access road to former quarry off of Honoapiilani Highway. Direction: North.

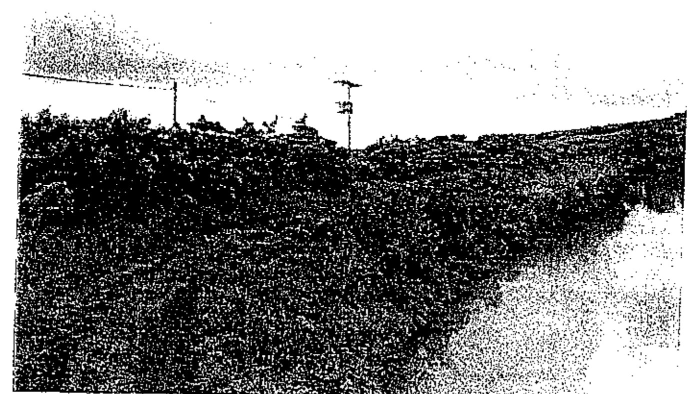
Photograph 3: Chlorine mixing chambers at one of three water treatment areas observed at the site. Direction: Northeast.



Photograph 4: Abandoned mixing chambers at one of three water treatment areas observed at the site. Direction: Southeast.



Photograph 5: Liquid fertilizer storage tanks at one of three water treatment areas observed at the site. Direction: East.



Photograph 6: Three pole-mounted transformers near the earthen reservoir located at the southwestern end of the property. Direction: Southeast.

APPENDIX B

The EDR Radius Map

EDR DataMap®
Area Study

TMK 3-6-04 : 3,6
Wailuku, HI 96793

November 08, 2006

Inquiry number 01787728.3r

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR).

TARGET PROPERTY INFORMATION

ADDRESS

WAILUKU, HI 96793
WAILUKU, HI 96793

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records within the requested search area for the following databases:

FEDERAL RECORDS

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
Delisted NPL	National Priority List Deletions
NPL RECOVERY	Federal Superfund Liens
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	CERCLIS No Further Remedial Action Planned
CORRACTS	Corrective Action Report
RCRA-TSDF	Resource Conservation and Recovery Act Information
RCRA-LQG	Resource Conservation and Recovery Act Information
RCRA-SQG	Resource Conservation and Recovery Act Information
ERNS	Emergency Response Notification System
HMIRS	Hazardous Materials Information Reporting System
US ENG CONTROLS	Engineering Controls Sites List
US INST CONTROL	Sites with Institutional Controls
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
US BROWNFIELDS	A Listing of Brownfields Sites
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
ODI	Open Dump Inventory
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
MINES	Mines Master Index File
RAATS	RCRA Administrative Action Tracking System

EXECUTIVE SUMMARY

STATE AND LOCAL RECORDS

SHWS	Sites List
SWF/LF	Permitted Landfills in the State of Hawaii
SPILLS	Release Notifications
INST CONTROL	Sites with Institutional Controls
VCP	Voluntary Response Program Sites
DRYCLEANERS	Permitted Drycleaner Facility Listing
BROWNFIELDS	Brownfields Sites
AIRS	List of Permitted Facilities

TRIBAL RECORDS

INDIAN RESERV	Indian Reservations
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land
INDIAN UST	Underground Storage Tanks on Indian Land

EDR PROPRIETARY RECORDS

Manufactured Gas Plants... EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL RECORDS

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR, and dated 07/21/2006 has revealed that there is 1 FINDS site within the searched area.

Site	Address	Map ID	Page
MAUI TROPICAL PLANTATION	*1670 HONOAPIILANI HWY*	*1*	*3*

EXECUTIVE SUMMARY

STATE AND LOCAL RECORDS

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Health's Active Leaking Underground Storage Tank Log Listing.

A review of the LUST list, as provided by EDR, and dated 08/11/2006 has revealed that there is 1 LUST site within the searched area.

Site	Address	Map ID	Page
MAUI TROPICAL PLANTATION Facility Status: Site Cleanup Completed	*1670 HONOAPIILANI HWY*	*1*	*3*

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Health's Listing of Underground Storage Tanks.

A review of the UST list, as provided by EDR, and dated 08/11/2006 has revealed that there are 2 UST sites within the searched area.

Site	Address	Map ID	Page
MAUI TROPICAL PLANTATION	1670 HONOAPIILANI HWY	1	3
HAWAIIAN CEMENT - WAIKAPU QUAR	HONOAPIILANI HWY	2	4

EXECUTIVE SUMMARY

Please refer to the end of the findings report for unmapped orphan sites due to poor or inadequate address information.

MAP FINDINGS SUMMARY

Database	Total Plotted
FEDERAL RECORDS	
NPL	0
Proposed NPL	0
Delisted NPL	0
NPL RECOVERY	0
CERCLIS	0
CERC-NFRAP	0
CORRACTS	0
RCRA TSD	0
RCRA Lg. Quan. Gen.	0
RCRA Sm. Quan. Gen.	0
ERNS	0
HMIRS	0
US ENG CONTROLS	0
US INST CONTROL	0
DOD	0
FUDS	0
US BROWNFIELDS	0
CONSENT	0
ROD	0
UMTRA	0
ODI	0
TRIS	0
TSCA	0
FTTS	0
SSTS	0
ICIS	0
PADS	0
MLTS	0
MINES	0
FINDS	1
RAATS	0
STATE AND LOCAL RECORDS	
SHWS	0
State Landfill	0
LUST	1
UST	2
SPILLS	0
INST CONTROL	0
VCP	0
DRYCLEANERS	0
BROWNFIELDS	0
AIRS	0
TRIBAL RECORDS	
INDIAN RESERV	0

MAP FINDINGS SUMMARY

Database	Total Plotted
INDIAN LUST	0
INDIAN UST	0
EDR PROPRIETARY RECORDS	
Manufactured Gas Plants	0

NOTES:

Sites may be listed in more than one database

MAP FINDINGS

Map ID
Direction
Distance
Distance (ft.)Site

		Database(s)	EDR ID Number / EPA ID Number
1	MAUI TROPICAL PLANTATION 1670 HONOAPIILANI HWY WAILUKU, HI 96793	FINDS LUST	1006643720 110014052915

FINDS:
Other Pertinent Environmental Activity Identified at Site

HI-UST (Hawaii - Underground Storage Tank). Hawaii Underground Storage Tank Program regulates underground storage tanks which store petroleum or hazardous substances and offers documents and data products for downloading.

LUST:

Facility ID:	9-503723
Release ID:	010046
Facility Status Date:	2005-08-25 00.00.00
Facility Status:	Site Cleanup Completed
Project Officer:	Takaoa

		Database(s)	EDR ID Number / EPA ID Number
1	MAUI TROPICAL PLANTATION 1670 HONOAPIILANI HWY WAILUKU, HI 96793	UST	U003790355 N/A

UST:

Facility ID:	9-503723
Owner:	MAUI TROPICAL PLANTATION
Owner Address:	1670 HONOAPIILANI HWY
Ownder City,St,Zip:	Wailuku, 96793 96793
Tank ID:	R-2
Installed:	7/25/2001
Tank Status:	**Permanently Out of Use**
Date Closed:	8/1/2001
Tank Capacity:	500
Substance:	Diesel
Pipe Material:	Other
Pipe Other Material:	Not reported
Pipe 2nd Construction:	None

Facility ID:	9-503723
Owner:	MAUI TROPICAL PLANTATION
Owner Address:	1670 HONOAPIILANI HWY
Ownder City,St,Zip:	Wailuku, 96793 96793
Tank ID:	R-1
Installed:	7/25/2001
Tank Status:	**Permanently Out of Use**
Date Closed:	8/1/2001
Tank Capacity:	500
Substance:	Gasoline
Pipe Material:	Other
Pipe Other Material:	Not reported
Pipe 2nd Construction:	None

MAP FINDINGS

Map ID
Direction
Distance
Distance (ft.)Site

		Database(s)	EDR ID Number / EPA ID Number
2	HAWAIIAN CEMENT - WAIKAPU QUARRY HONOAPIILANI HWY WAILUKU, HI 96793	UST	U001236686 N/A

UST:

Facility ID:	9-502529
Owner:	HAWAIIAN CEMENT CO
Owner Address:	P.O. BOX 488 / WAIKAPU QUARRY
Ownder City,St,Zip:	Wailuku, 96793 96793
Tank ID:	R-1
Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	9/13/1991
Tank Capacity:	25000
Substance:	Other
Pipe Material:	Not Listed
Pipe Other Material:	Not reported
Pipe 2nd Construction:	None

Facility ID:	9-502529
Owner:	HAWAIIAN CEMENT CO
Owner Address:	P.O. BOX 488 / WAIKAPU QUARRY
Ownder City,St,Zip:	Wailuku, 96793 96793
Tank ID:	R-2
Installed:	12/30/1968
Tank Status:	**Permanently Out of Use**
Date Closed:	11/20/1991
Tank Capacity:	3000
Substance:	Gasoline
Pipe Material:	Bare Steel
Pipe Other Material:	Not reported
Pipe 2nd Construction:	None

Facility ID:	9-502529
Owner:	HAWAIIAN CEMENT CO
Owner Address:	P.O. BOX 488 / WAIKAPU QUARRY
Ownder City,St,Zip:	Wailuku, 96793 96793
Tank ID:	R-4
Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	3/19/1992
Tank Capacity:	7000
Substance:	Other
Pipe Material:	Not Listed
Pipe Other Material:	Not reported
Pipe 2nd Construction:	None

Facility ID:	9-502529
Owner:	HAWAIIAN CEMENT CO
Owner Address:	P.O. BOX 488 / WAIKAPU QUARRY
Ownder City,St,Zip:	Wailuku, 96793 96793
Tank ID:	R-5
Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	3/19/1992
Tank Capacity:	26000
Substance:	Other
Pipe Material:	Not Listed
Pipe Other Material:	Not reported

MAP FINDINGS

Map ID
Direction
Distance
Distance (ft.)Site

	Database(s)	EDR ID Number / EPA ID Number
HAWAIIAN CEMENT - WAIKAPU QUARRY (Continued)		U001236686

Pipe 2nd Construction: None

Facility ID:	9-502529
Owner:	HAWAIIAN CEMENT CO
Owner Address:	P.O. BOX 488 / WAIKAPU QUARRY
Owner City,St,Zip:	Wailuku, 96793 96793
Tank ID:	R-3
Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	3/19/1992
Tank Capacity:	7000
Substance:	Other
Pipe Material:	Not Listed
Pipe Other Material:	Not reported
Pipe 2nd Construction:	None

Facility ID:	9-502529
Owner:	HAWAIIAN CEMENT CO
Owner Address:	P.O. BOX 488 / WAIKAPU QUARRY
Owner City,St,Zip:	Wailuku, 96793 96793
Tank ID:	R-6
Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	3/19/1992
Tank Capacity:	28000
Substance:	Other
Pipe Material:	Not Listed
Pipe Other Material:	Not reported
Pipe 2nd Construction:	None

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
HANA, MAUI	S106401332	HANA LANDFILL	HANA MAUI	96793	SWF/LF
KAHULUI	1001475719	KANAHA POND EAST	AMALA PLACE	96732	SHWS, CERC-NFRAP
KAHULUI	1006819965	RAINBOW HAULING	AMALA PL	96732	SHWS, FINDS
KAHULUI	1006820295	E & E BLACK CONTRACTORS	AMALA PL	96732	SHWS, FINDS
KAHULUI	S106816558	BIRD BUILDERS	AMALA PL	96732	SHWS
KAHULUI	S106817019	F & M CONTRACTORS	AMALA PL	96732	SHWS
KAHULUI	S106818550	KING'S TOWING	AMALA PL	96732	SHWS
KAHULUI	S106820468	SMILE'S AUTO SPECIALISTS	AMALA PL	96732	SHWS
KAHULUI	S106820652	VECTOR CONTROL BRANCH, MAUI	54 HIGH ST, 641 MUA ST, KAHALE DR / PALAPALA ST	96793	SHWS
KAHULUI	1006818919	MAUI PETROLEUM HOBRON AVENUE	HOBRON AVE	96732	SHWS
KAHULUI	1006820577	HOBRON AVE AREA (KAHULUI)	HOBRON AVE	96732	SHWS, FINDS
KAHULUI	S106817098	FONG CONSTRUCTION	HUKILIKI ST	96732	SHWS
KAHULUI	1006818999	MCC-AUTOMOTIVE TECHNOLOGY BUILDING CONTAMINATION	310 KAAHUMANU AVE	96732	SHWS, FINDS, SPILLS
KAHULUI	S104534290	MAUI PALMS HOTEL UST	150 KAAHUMANU AVE	96732	SHWS
KAHULUI	1006841969	DAVID PICO CESSPOOL DIGGING	OLD HALEAKALA HWY	96732	FINDS, LUST
KAHULUI	U001236769	DAVID PICO CESSPOOL DIGGING	OLD HALEAKALA HWY	96732	UST
KAHULUI	1006820345	A&B DUMP SITE	W PAPA AVE	96732	SHWS, FINDS
KAHULUI	U003222223	PAIA SEWER PUMP STATION	PUNA RD/HANA HWY	96732	UST
KAHULUI	S106819004	MAUI MEAT COMPANY FACILITY (FORMER), UST CLOSURE	601 2ND ST	96732	SHWS, SPILLS
KAHULUI	1006819647	WAIKAPU DUMP-MAUI COUNTY DUMP	WAIKAPU RD	96732	SHWS, FINDS
KALAMAULA	S106818091	KALAMAULA LANDFILL	HOAWA RD	96793	SHWS
KIHEI	U003222170	KIHEI SPS #3 (MENEHUNE SHORES)	N KIHEI RD	96753	UST
KIHEI	U003222168	KIHEI SPS #6 (KIHEI FIRE HOUSE)	N KIHEI RD	96753	UST
KIHEI	1006844053	KIHEI SPS #6 (KIHEI FIRE HOUSE)	N KIHEI RD	96753	FINDS
KIHEI	1006842882	KIHEI SPS #3 (MENEHUNE SHORES)	N KIHEI RD	96753	FINDS
KIHEI	U003155105	KIHEI SPS #5 (EAST WELAKAHAO)	N KIHEI RD	96753	UST
KIHEI	U003222167	KIHEI SPS #4 (YE'S ORCHARD)	N KIHEI RD	96753	UST
KIHEI	1006842431	KIHEI SPS #5 (EAST WELAKAHAO)	N KIHEI RD	96753	FINDS, LUST
KIHEI	1000486449	KAHOOLAWE ISLAND	LAT 20 32' 30', LONG 156 37' 30'	96753	CERCLIS
KIHEI	U001236805	KIHEI WWTP	480 WELEKAHAO RD/PIILANI HWY	96753	LUST, UST
PUUNENE, MAUI	S103763652	CENTRAL MAUI LANDFILL	PUNENE, MAUI	96793	SWF/LF
WAIKAPU	1008230886	VACANT LAND TMK NO (2) 3-8-7:101	KUIHELANI HWY NEAR WAIKO RD	96793	FINDS
WAIKAPU	1008194955	VACANT LAND TMK NO (2) 3-8-7:101	KUIHELANI HWY NEAR WAIKO RD	96793	RCRA-SQG
WAILEA	U003222380	ESTATE OF MARY HELELA	OLD COUNTRY RD	96753	UST
WAILUKU	1006842014	HAWAIIAN CEMENT - WAIKAPU QUARRY	HONOAPIILANI HWY	96793	FINDS, LUST
WAILUKU	1007092114	MAALAEA GENERATING STATION	NORTH KIHEI RD	96793	RCRA-SQG
WAILUKU	1006819707	WAIALE ASH PILE	MAHALANI ST	96793	SHWS, FINDS
WAILUKU	S108008644	Y HATA- MAUI	200 WAIEHU BEACH RD AND KAHULU BEACH RD	96793	SHWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

FEDERAL RECORDS

NPL: National Priority List
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 07/05/2006
Date Data Arrived at EDR: 08/02/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 41

Source: EPA
Telephone: N/A
Last EDR Contact: 11/01/2006
Next Scheduled EDR Contact: 01/29/2007
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

Date of Government Version: 07/05/2006
Date Data Arrived at EDR: 08/02/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 41

Source: EPA
Telephone: N/A
Last EDR Contact: 11/01/2006
Next Scheduled EDR Contact: 01/29/2007
Data Release Frequency: Quarterly

DELISTED NPL: National Priority List Deletions
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 07/05/2006
Date Data Arrived at EDR: 08/02/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 41

Source: EPA
Telephone: N/A
Last EDR Contact: 11/01/2006
Next Scheduled EDR Contact: 01/29/2007
Data Release Frequency: Quarterly

NPL RECOVERY: Federal Superfund Liens
Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: No Update Planned

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 06/19/2006
Date Data Arrived at EDR: 06/22/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 62

Source: EPA
Telephone: 703-603-8960
Last EDR Contact: 09/21/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Quarterly

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 07/17/2006
Date Data Arrived at EDR: 08/02/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 41

Source: EPA
Telephone: 703-603-8960
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Quarterly

CORRACTS: Corrective Action Report
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/15/2006
Date Data Arrived at EDR: 03/17/2006
Date Made Active in Reports: 04/13/2006
Number of Days to Update: 27

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: Quarterly

RCRA: Resource Conservation and Recovery Act Information

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS). The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/13/2006
Date Data Arrived at EDR: 06/28/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 56

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 09/28/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

ERNS: Emergency Response Notification System
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 01/12/2006
Date Made Active in Reports: 02/21/2006
Number of Days to Update: 40

Source: National Response Center, United States Coast Guard
Telephone: 202-260-2342
Last EDR Contact: 10/24/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Annually

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 07/03/2006
Date Data Arrived at EDR: 07/19/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 35

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 10/18/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Annually

US ENG CONTROLS: Engineering Controls Sites List
A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or affect human health.

Date of Government Version: 03/21/2006
Date Data Arrived at EDR: 03/27/2006
Date Made Active in Reports: 05/22/2006
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: 703-603-8905
Last EDR Contact: 09/07/2006
Next Scheduled EDR Contact: 10/02/2006
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls
A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/21/2006
Date Data Arrived at EDR: 03/27/2006
Date Made Active in Reports: 05/22/2006
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: 703-603-8905
Last EDR Contact: 09/07/2006
Next Scheduled EDR Contact: 10/02/2006
Data Release Frequency: Varies

DOD: Department of Defense Sites
This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 02/08/2005
Date Made Active in Reports: 08/04/2005
Number of Days to Update: 177

Source: USGS
Telephone: 703-692-8801
Last EDR Contact: 08/11/2006
Next Scheduled EDR Contact: 11/06/2006
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites
The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 01/19/2006
Date Made Active in Reports: 02/21/2006
Number of Days to Update: 33

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Varies

US BROWNFIELDS: A Listing of Brownfields Sites
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 07/10/2006
Date Data Arrived at EDR: 07/13/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 55

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 09/11/2006
Next Scheduled EDR Contact: 12/11/2006
Data Release Frequency: Semi-Annually

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/14/2004
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 04/25/2005
Number of Days to Update: 69

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 10/23/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Varies

ROD: Records Of Decision
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 07/10/2006
Date Data Arrived at EDR: 07/21/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 47

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 11/04/2005
Date Data Arrived at EDR: 11/28/2005
Date Made Active in Reports: 01/30/2006
Number of Days to Update: 63

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Varies

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 07/20/2006
Date Data Arrived at EDR: 07/21/2006
Date Made Active in Reports: 08/22/2006
Number of Days to Update: 32

Source: EPA
Telephone: 202-564-6064
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Quarterly

TRIS: Toxic Chemical Release Inventory System
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 06/22/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 62

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 09/22/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/30/2006
Number of Days to Update: 46

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 10/18/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/14/2006
Date Data Arrived at EDR: 07/18/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 50

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

Date of Government Version: 07/14/2006
Date Data Arrived at EDR: 07/18/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 50

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Quarterly

SSTS: Section 7 Tracking Systems
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 05/11/2006
Date Made Active in Reports: 05/22/2006
Number of Days to Update: 11

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 11/07/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 02/13/2006
Date Data Arrived at EDR: 04/21/2006
Date Made Active in Reports: 05/11/2006
Number of Days to Update: 20

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 07/17/2006
Next Scheduled EDR Contact: 10/16/2006
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/07/2006
Date Data Arrived at EDR: 08/09/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 28

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 08/09/2006
Next Scheduled EDR Contact: 11/06/2006
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/10/2006
Date Data Arrived at EDR: 07/20/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 48

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Quarterly

MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/16/2006
Date Data Arrived at EDR: 06/28/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 56

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 09/27/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: Semi-Annually

FINDS: Facility Index System/Facility Registry System
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/21/2006
Date Data Arrived at EDR: 07/25/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 43

Source: EPA
Telephone: N/A
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2003
Date Data Arrived at EDR: 06/17/2005
Date Made Active in Reports: 08/04/2005
Number of Days to Update: 48

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 10/20/2006
Next Scheduled EDR Contact: 12/11/2006
Data Release Frequency: Biennially

STATE AND LOCAL RECORDS

SHWS: Sites List
Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 07/24/2006
Date Data Arrived at EDR: 07/27/2006
Date Made Active in Reports: 08/30/2006
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/22/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Semi-Annually

SWF/LF: Permitted Landfills in the State of Hawaii
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/19/2004
Date Data Arrived at EDR: 05/20/2004
Date Made Active in Reports: 06/22/2004
Number of Days to Update: 33

Source: Department of Health
Telephone: 808-586-4245
Last EDR Contact: 10/24/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Varies

LUST: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 08/11/2006
Date Data Arrived at EDR: 09/14/2006
Date Made Active in Reports: 09/30/2006
Number of Days to Update: 16

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 09/26/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: Semi-Annually

UST: Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 08/11/2006
Date Data Arrived at EDR: 09/14/2006
Date Made Active in Reports: 09/20/2006
Number of Days to Update: 37

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 09/26/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: Semi-Annually

SPILLS: Release Notifications
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 07/24/2006
Date Data Arrived at EDR: 07/27/2006
Date Made Active in Reports: 08/30/2006
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/22/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Varies

INST CONTROL: Sites with Institutional Controls
Voluntary Remediation Program and Brownfields sites with institutional controls in place.

Date of Government Version: 07/24/2006
Date Data Arrived at EDR: 07/27/2006
Date Made Active in Reports: 08/30/2006
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/22/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Varies

VCP: Voluntary Response Program Sites

Date of Government Version: 07/24/2006
Date Data Arrived at EDR: 07/27/2006
Date Made Active in Reports: 08/30/2006
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/22/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Varies

DRYCLEANERS: Permitted Drycleaner Facility Listing
A listing of permitted drycleaner facilities in the state.

Date of Government Version: 09/07/2006
Date Data Arrived at EDR: 09/08/2006
Date Made Active in Reports: 10/13/2006
Number of Days to Update: 35

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 10/30/2006
Next Scheduled EDR Contact: 01/29/2007
Data Release Frequency: Varies

BROWNFIELDS: Brownfields Sites

Date of Government Version: 07/24/2006
Date Data Arrived at EDR: 07/27/2006
Date Made Active in Reports: 08/30/2006
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/22/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Varies

AIRS: List of Permitted Facilities
A listing of permitted facilities in the state

Date of Government Version: 09/07/2006
Date Data Arrived at EDR: 09/08/2006
Date Made Active in Reports: 10/13/2006
Number of Days to Update: 35

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 10/30/2006
Next Scheduled EDR Contact: 01/29/2007
Data Release Frequency: Varies

TRIBAL RECORDS

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 02/08/2005
Date Made Active in Reports: 08/04/2005
Number of Days to Update: 177

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 08/11/2006
Next Scheduled EDR Contact: 11/06/2006
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 06/08/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 06/28/2006
Number of Days to Update: 19

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 01/04/2005
Date Data Arrived at EDR: 01/21/2005
Date Made Active in Reports: 02/28/2005
Number of Days to Update: 38

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 06/06/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 07/28/2006
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 06/08/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 07/28/2006
Number of Days to Update: 49

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 06/01/2006
Date Data Arrived at EDR: 06/23/2006
Date Made Active in Reports: 08/02/2006
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 06/01/2006
Date Data Arrived at EDR: 07/10/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 64

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Minnesota, Mississippi and North Carolina.

Date of Government Version: 01/01/2006
Date Data Arrived at EDR: 02/27/2006
Date Made Active in Reports: 03/28/2006
Number of Days to Update: 29

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Semi-Annually

INDIAN UST R4: Underground Storage Tanks on Indian Land

Date of Government Version: 01/01/2006
Date Data Arrived at EDR: 02/27/2006
Date Made Active in Reports: 03/28/2006
Number of Days to Update: 29

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land

Date of Government Version: 06/01/2006
Date Data Arrived at EDR: 07/10/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 64

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

Date of Government Version: 12/02/2004
Date Data Arrived at EDR: 12/29/2004
Date Made Active in Reports: 02/04/2005
Number of Days to Update: 37

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

Date of Government Version: 06/06/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 07/28/2006
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land

Date of Government Version: 06/08/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 07/28/2006
Number of Days to Update: 49

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land
A listing of underground storage tank locations on Indian Land.

Date of Government Version: 06/09/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 06/30/2006
Number of Days to Update: 21

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

Date of Government Version: 06/30/2006
Date Data Arrived at EDR: 07/03/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 65

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Semi-Annually

INDIAN UST R9: Underground Storage Tanks on Indian Land

Date of Government Version: 06/01/2006
Date Data Arrived at EDR: 06/23/2006
Date Made Active in Reports: 08/02/2006
Number of Days to Update: 40

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

EDR PROPRIETARY RECORDS

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

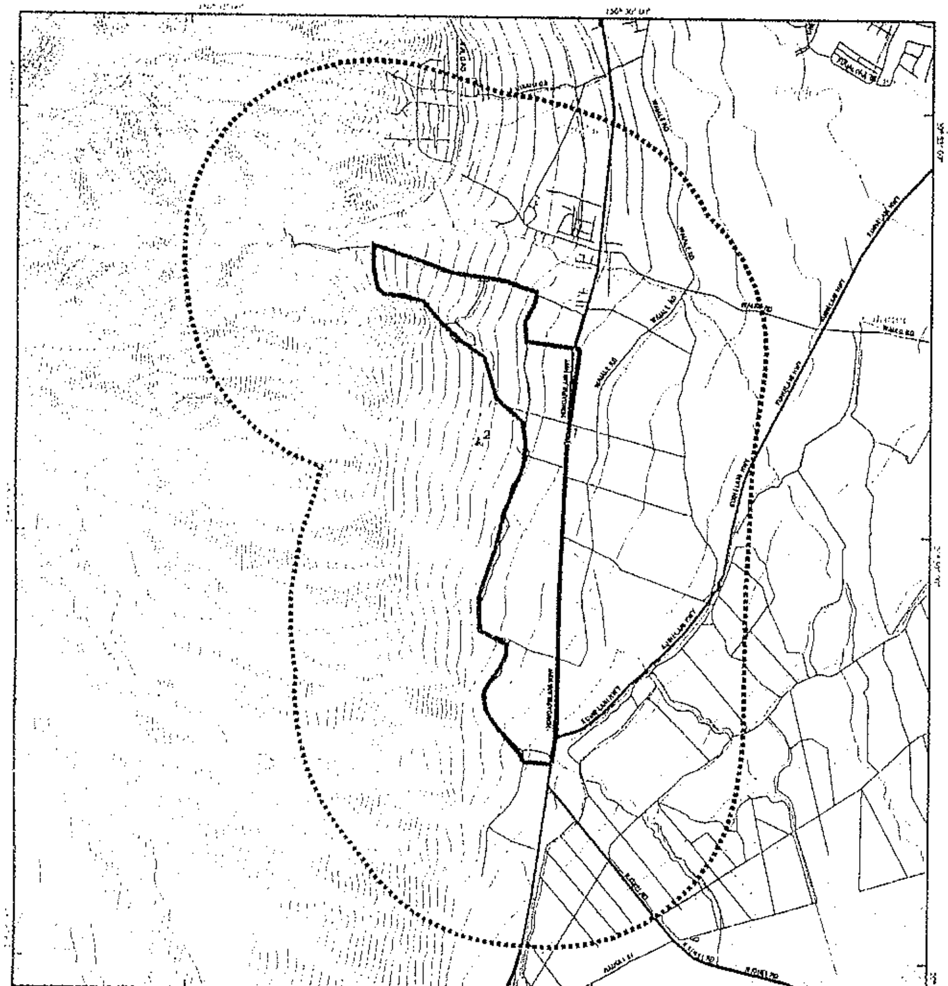
AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.
Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.
Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.
Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

STREET AND ADDRESS INFORMATION



EDR DataMap ® ~Area Study

EDR® Environmental Data Resources Inc

TMK 3-6-04 : 3,6

Listed Sites
Earthquake Epicenters (Richter 5 or greater)
Search Boundary
Roads
Major Roads
Waterways
Railroads
Contour Lines
Pipelines
Powerlines
Fault Lines
Water
Superfund Sites
Federal DOD Sites
Indian Reservations BIA
100-Yr Flood Zones
National Wetland Inventory

N

0 1/4 1/2

Scale in Miles

EDR Site Report™

HAWAIIAN CEMENT - WAIKAPU QUARRY
HONOAPIILANI HWY
WAILUKU, HI 96793

Inquiry Number:

December 12, 2006

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

TABLE OF CONTENTS

The EDR-Site Report™ is a comprehensive presentation of government filings on a facility identified in a search of over 4 million government records from more than 600 federal, state and local environmental databases. The report is divided into three sections:

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY / AREA	FACILITY 1 HAWAIIAN CEMENT - WAIKAPU QUARRY HONOAPIILANI HWY WAILUKU, HI 96793 EDR ID #1006842014 EPA #110014034035
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	YES - p4
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	YES - p5
Facility is listed in a county/local unique database (LOCAL)	YES - p6
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	3

SECTION 2: FACILITY DETAIL REPORTS

WASTE MANAGEMENT

Facility has reported leaking underground storage tank incidents

DATABASE: Leaking Petroleum Storage Tank Database (LUST)

HAWAIIAN CEMENT - WAIKAPU QUARRY
HONOAPIILANI HWY
WAILUKU, HI 96793
EDR ID #1006842014

LUST:

Facility ID:	9-502529
Release ID:	950015
Facility Status Date:	1995-05-16 00:00:00
Facility Status:	Site Cleanup Completed
Project Officer:	Brewer

MULTIMEDIA

Facility is listed in EPA's index system

DATABASE: Facility Index System (FINDS)

HAWAIIAN CEMENT - WAIKAPU QUARRY
HONOAPIILANI HWY
WAILUKU, HI 96793
EDR ID #1006842014

This site is listed in the Federal FINDS database. The FINDS database may contain references to records from government databases included elsewhere in the report.
Please note the FINDS database may also contain references to out of date records formerly associated with the site.

Registry ID:	110014034035
Facility Name:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Facility Address:	HONOAPIILANI HWY WAILUKU, HI 96793
Facility County:	MAUI
EPA Region:	09
Fed. Gov. Facility:	No
Indian Tribal Land:	Not reported

EPA Records Indicate Facility is Listed in:
HI-UST (Hawaii - Underground Storage Tank). Hawaii Underground Storage Tank Program regulates underground storage tanks which store petroleum or hazardous substances and offers documents and data products for downloading.

Prg. Sys. ID:	9-502529
Supplemental Interest:	Not reported
Facility SIC Codes:	Not reported
Facility NAICS Codes:	Not reported

Alternative name: HAWAIIAN CEMENT - WAIKAPU QUARRY

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

HAWAIIAN CEMENT - WAIKAPU QUARRY
HONOAPIILANI HWY
WAILUKU, HI 96793
EDR ID #1006842014

Database:
HI FINANCIAL ASSURANCE:

edr_fname:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Tank Status Desc:	Permanently Out of Use
Alt Facility ID:	9-502529
Street Address:	HONOAPIILANI HWY
Insurance:	F
Risk Retention Group:	F
Surety Bond:	F
Guarantee:	F
Letter of Credit:	F
State Fund:	F
Trust Fund:	F
Other Finance:	F

edr_fname:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Tank Status Desc:	Permanently Out of Use
Alt Facility ID:	9-502529
Street Address:	HONOAPIILANI HWY
Insurance:	F
Risk Retention Group:	F
Surety Bond:	F
Guarantee:	F
Letter of Credit:	F
State Fund:	F
Trust Fund:	F
Other Finance:	F

edr_fname:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Tank Status Desc:	Permanently Out of Use
Alt Facility ID:	9-502529
Street Address:	HONOAPIILANI HWY
Insurance:	F
Risk Retention Group:	F
Surety Bond:	F
Guarantee:	F
Letter of Credit:	F
State Fund:	F
Trust Fund:	F
Other Finance:	F

edr_fname:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Tank Status Desc:	Permanently Out of Use
Alt Facility ID:	9-502529
Street Address:	HONOAPIILANI HWY
Insurance:	F
Risk Retention Group:	F
Surety Bond:	F
Guarantee:	F
Letter of Credit:	F
State Fund:	F
Trust Fund:	F
Other Finance:	F

edr_fname:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Tank Status Desc:	Permanently Out of Use
Alt Facility ID:	9-502529
Street Address:	HONOAPIILANI HWY
Insurance:	F
Risk Retention Group:	F
Surety Bond:	F
Guarantee:	F
Letter of Credit:	F
State Fund:	F
Trust Fund:	F
Other Finance:	F

edr_fname:	HAWAIIAN CEMENT - WAIKAPU QUARRY
Tank Status Desc:	Permanently Out of Use

SECTION 2: FACILITY DETAIL REPORTS
...Continued...

Alt Facility ID:	9-502529
Street Address:	HONOAPIILANI HWY
Insurance:	F
Risk Retention Group:	F
Surety Bond:	F
Guarantee:	F
Letter of Credit:	F
State Fund:	F
Trust Fund:	F
Other Finance:	F

SECTION 3: DATABASES SEARCHED AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

WASTE MANAGEMENT

RCRA: Resource Conservation and Recovery Act Information
Source: EPA
Telephone: 800-424-9346
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS). The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/13/2006 — Date of Last EDR Contact: 12/08/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 02/19/2007

BRS: Biennial Reporting System
Source: EPA/NTIS
Telephone: 800-424-9346
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2003 — Date of Last EDR Contact: 10/20/2006
Database Release Frequency: Biennially — Date of Next Scheduled Update: 12/11/2006

RAATS: RCRA Administrative Action Tracking System
Source: EPA
Telephone: 202-564-4104
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995 — Date of Last EDR Contact: 12/04/2006
Database Release Frequency: No Update Planned — Date of Next Scheduled Update: 03/05/2007

CORRACTS: Corrective Action Report
Source: EPA
Telephone: 800-424-9346
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/15/2006 — Date of Last EDR Contact: 12/04/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 03/05/2007

PADS: PCB Activity Database System
Source: EPA
Telephone: 202-566-0500
PCB Activity Database. PADS identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/07/2006 — Date of Last EDR Contact: 11/29/2006
Database Release Frequency: Annually — Date of Next Scheduled Update: 02/05/2007

MLTS: Material Licensing Tracking System
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/10/2006
Database Release Frequency: Quarterly
Date of Last EDR Contact: 10/02/2006
Date of Next Scheduled Update: 01/01/2007

HI UST: Underground Storage Tank Database
Source: Department of Health
Telephone: 808-586-4228
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 08/11/2006
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 09/26/2006
Date of Next Scheduled Update: 12/25/2006

HI LUST: Leaking Underground Storage Tank Database
Source: Department of Health
Telephone: 808-586-4228
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 08/11/2006
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 09/26/2006
Date of Next Scheduled Update: 12/25/2006

ERNS: Emergency Response Notification System
Source: National Response Center, United States Coast Guard
Telephone: 202-260-2342
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2005
Database Release Frequency: Annually
Date of Last EDR Contact: 10/24/2006
Date of Next Scheduled Update: 01/22/2007

HMIRS: Hazardous Materials Information Reporting System
Source: U.S. Department of Transportation
Telephone: 202-366-4555
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 08/01/2006
Database Release Frequency: Annually
Date of Last EDR Contact: 10/16/2006
Date of Next Scheduled Update: 01/15/2007

WASTE DISPOSAL

NPL: National Priority List
Source: EPA
Telephone: Not reported
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 09/27/2006
Date Made Active at EDR: 11/22/2006
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 11/01/2006
Elapsed ASTM Days: 21
Date of Last EDR Contact: 11/01/2006

Proposed NPL: Proposed National Priority List Sites
Source: EPA
Telephone: Not reported

Date of Government Version: 09/27/2006
Date Made Active at EDR: 11/22/2006
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 11/01/2006
Elapsed ASTM Days: 21
Date of Last EDR Contact: 11/01/2006

DELISTED NPL: National Priority List Deletions
Source: EPA
Telephone: Not reported
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 09/27/2006
Date Made Active at EDR: 11/22/2006
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 11/01/2006
Elapsed ASTM Days: 21
Date of Last EDR Contact: 11/01/2006

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
Source: EPA
Telephone: 703-603-8960
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 08/09/2006
Date Made Active at EDR: 11/22/2006
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 09/21/2006
Elapsed ASTM Days: 62
Date of Last EDR Contact: 09/21/2006

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Source: EPA
Telephone: 703-603-8960
Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 10/10/2006
Database Release Frequency: Quarterly
Date of Last EDR Contact: 09/18/2006
Date of Next Scheduled Update: 12/18/2006

ROD: Records Of Decision
Source: EPA
Telephone: 703-416-0223
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 07/10/2006
Database Release Frequency: Annually
Date of Last EDR Contact: 10/02/2006
Date of Next Scheduled Update: 01/01/2007

NPL RECOVERY: Federal Superfund Liens
Source: EPA
Telephone: 202-564-4267
Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Made Active at EDR: 03/30/1994
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 02/02/1994
Elapsed ASTM Days: 56
Date of Last EDR Contact: 11/17/2006

HI SHWS: Sites List
Source: Department of Health
Telephone: 808-586-4249
Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 07/24/2006
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI SWF/LF: Permitted Landfills in the State of Hawaii
Source: Department of Health
Telephone: 808-586-4245
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/19/2004 — Date of Last EDR Contact: 10/24/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 01/22/2007

MULTIMEDIA

TRIS: Toxic Chemical Release Inventory System
Source: EPA
Telephone: 202-566-0250
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2004 — Date of Last EDR Contact: 09/22/2006
Database Release Frequency: Annually — Date of Next Scheduled Update: 12/18/2006

SSTS: Section 7 Tracking Systems
Source: EPA
Telephone: 202-564-4203
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2004 — Date of Last EDR Contact: 11/07/2006
Database Release Frequency: Annually — Date of Next Scheduled Update: 01/15/2007

TSCA: Toxic Substances Control Act
Source: EPA
Telephone: 202-260-5521
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002 — Date of Last EDR Contact: 10/16/2006
Database Release Frequency: N/A — Date of Next Scheduled Update: 01/15/2007

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 10/19/2006 — Date of Last EDR Contact: 09/18/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 12/18/2006

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA
Telephone: 202-566-1667

Date of Government Version: 10/19/2006 — Date of Last EDR Contact: 09/18/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 12/18/2006

FINDS: Facility Index System/Facility Registry System
Source: EPA
Telephone: Not reported
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/21/2006 — Date of Last EDR Contact: 10/02/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 01/01/2007

RMP: Risk Management Plans
Source: Environmental Protection Agency
Telephone: 202-564-8600
When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 06/01/2006 — Date of Last EDR Contact: 11/17/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 02/19/2007

STORMWATER: Storm Water General Permits
Source: Environmental Protection Agency
Telephone: 202-564-0746
A listing of all facilities with Storm Water General Permits.

Date of Government Version: 06/02/2005 — Date of Last EDR Contact: 11/28/2006
Database Release Frequency: Quarterly — Date of Next Scheduled Update: 01/01/2007

US ENG CONTROLS: Engineering Controls Sites List
Source: Environmental Protection Agency
Telephone: 703-603-8905
A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or affect human health.

Date of Government Version: 03/21/2006 — Date of Last EDR Contact: 09/07/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 10/02/2006

US INST CONTROL: Sites with Institutional Controls
Source: Environmental Protection Agency
Telephone: 703-603-8905
A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/21/2006 — Date of Last EDR Contact: 09/07/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 10/02/2006

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
Source: EPA Region 1
Telephone: 617-918-1313
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 09/07/2006 — Date of Last EDR Contact: 11/17/2006
Database Release Frequency: Varies — Date of Next Scheduled Update: 02/19/2007

SECTION 3: DATABASES SEARCHED AND UPDATE DATES

...Continued...

HI SPILLS: Release Notifications
Source: Department of Health
Telephone: 808-586-4249
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 07/24/2006
Database Release Frequency: Varies

Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI INST CONTROL: Sites with Institutional Controls
Source: Department of Health
Telephone: 808-586-4249
Voluntary Remediation Program and Brownfields sites with institutional controls in place.

Date of Government Version: 07/24/2006
Database Release Frequency: Varies

Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI VCP: Voluntary Response Program Sites
Source: Department of Health
Telephone: 808-586-4249

Date of Government Version: 07/24/2006
Database Release Frequency: Varies

Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI DRYCLEANERS: Permitted Drycleaner Facility Listing
Source: Department of Health
Telephone: 808-586-4200
A listing of permitted drycleaner facilities in the state.

Date of Government Version: 09/07/2006
Database Release Frequency: Varies

Date of Last EDR Contact: 10/30/2006
Date of Next Scheduled Update: 01/29/2007

HI BROWNFIELDS: Brownfields Sites
Source: Department of Health
Telephone: 808-586-4249

Date of Government Version: 07/24/2006
Database Release Frequency: Varies

Date of Last EDR Contact: 09/22/2006
Date of Next Scheduled Update: 12/18/2006

HI AIRS: List of Permitted Facilities
Source: Department of Health
Telephone: 808-586-4200
A listing of permitted facilities in the state

Date of Government Version: 09/07/2006
Database Release Frequency: Varies

Date of Last EDR Contact: 10/30/2006
Date of Next Scheduled Update: 01/29/2007

POTENTIAL SUPERFUND LIABILITY

PRP: Potentially Responsible Parties
Source: EPA
Telephone: 202-564-6064
A listing of verified Potentially Responsible Parties

Date of Government Version: 10/07/2006
Database Release Frequency: Quarterly

Date of Last EDR Contact: 10/02/2006
Date of Next Scheduled Update: 01/01/2007

EDR Environmental Data Resources Inc

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Sanborn® Map Report

Ship To: Roger Aoki
Element Environmental ,
95-1038 Kihene Street
Mililani, HI 96789

Customer Project: na
80130848RU 808-864-3952

Order Date: 11/1/2006 **Completion Date:** 11/2/2006
Inquiry #: 1787728.1S
P.O. #: na
Site Name: TMK 3-6-04/3 6
Address: TMK 3-6-04&3 6
City/State: Wailuku, HI 96793
Cross Streets:

This document reports that the largest and most complete collection of Sanborn fire insurance maps has been reviewed based on client supplied information, and fire insurance maps depicting the target property at the specified address were not identified.

NO COVERAGE

EDR Historical Topographic Map Report

TMK 3-6-04/3,6
TMK 3-6-04/3,6
Wailuku, HI 96793

Inquiry Number: 1787728.2

November 02, 2006

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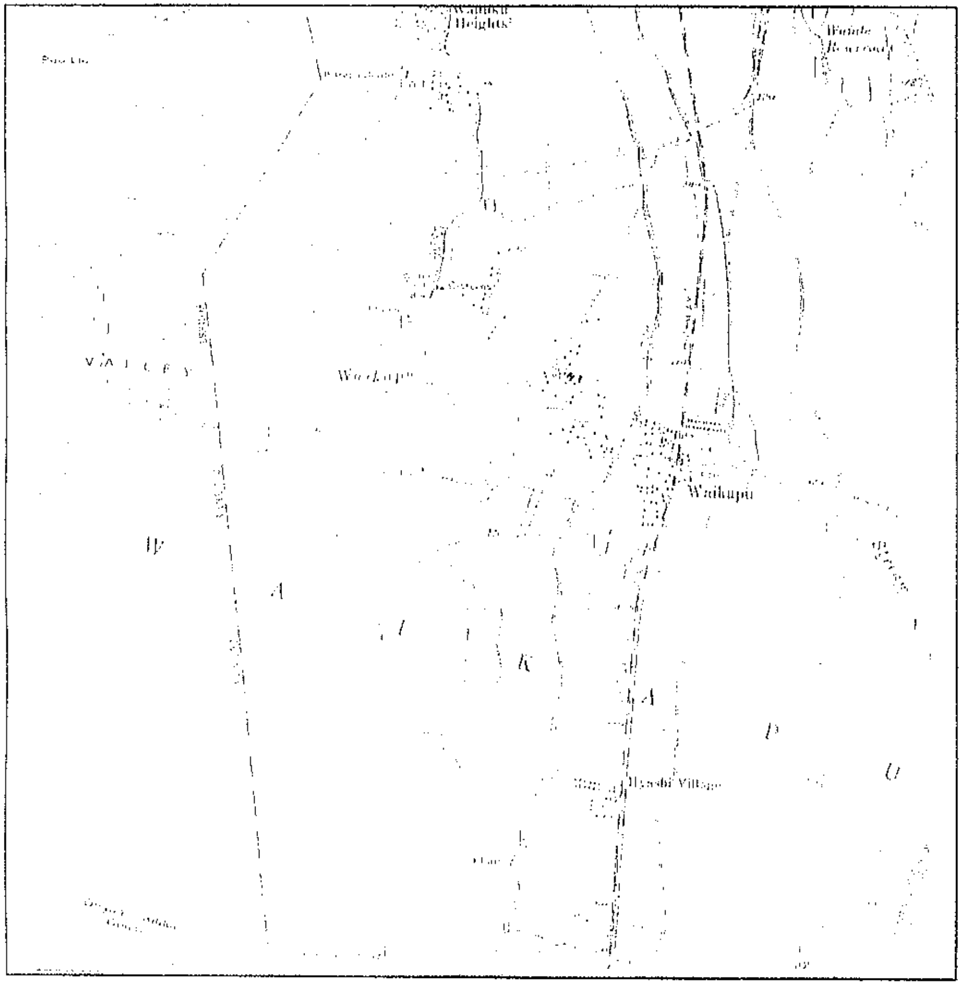
EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

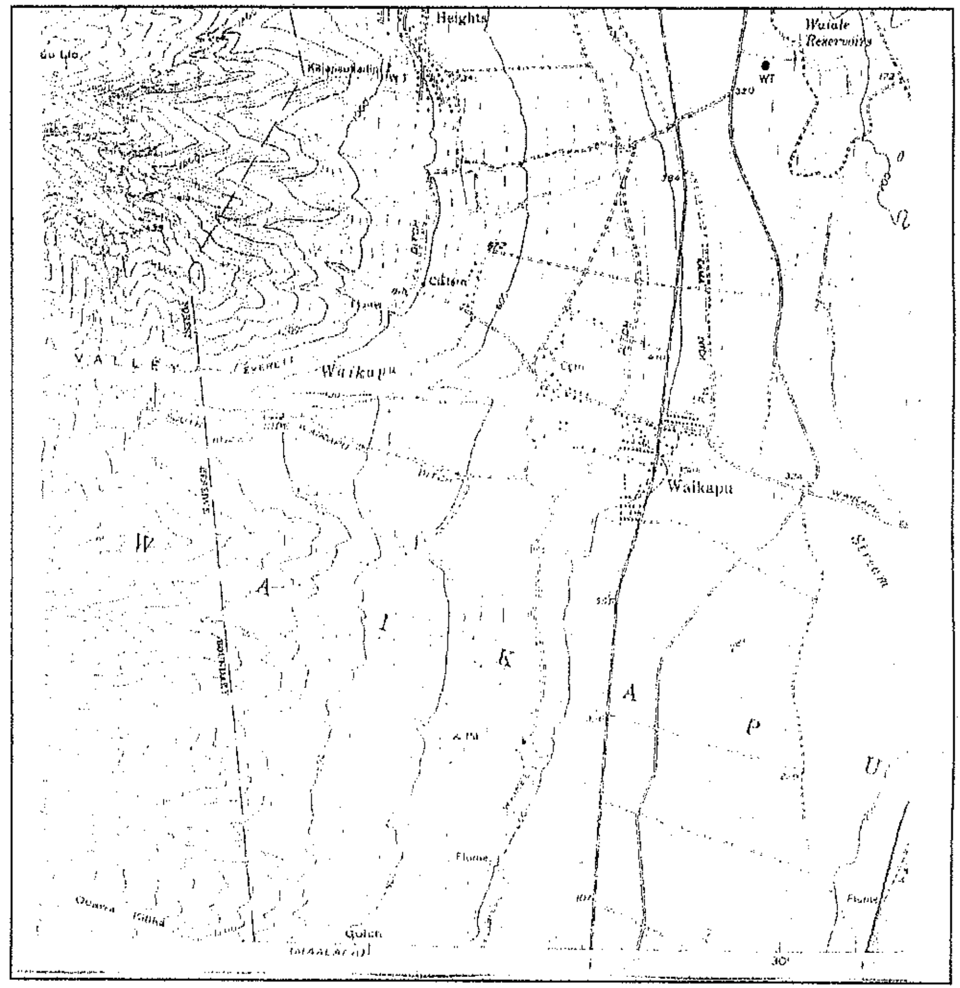
Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Historical Topographic Map



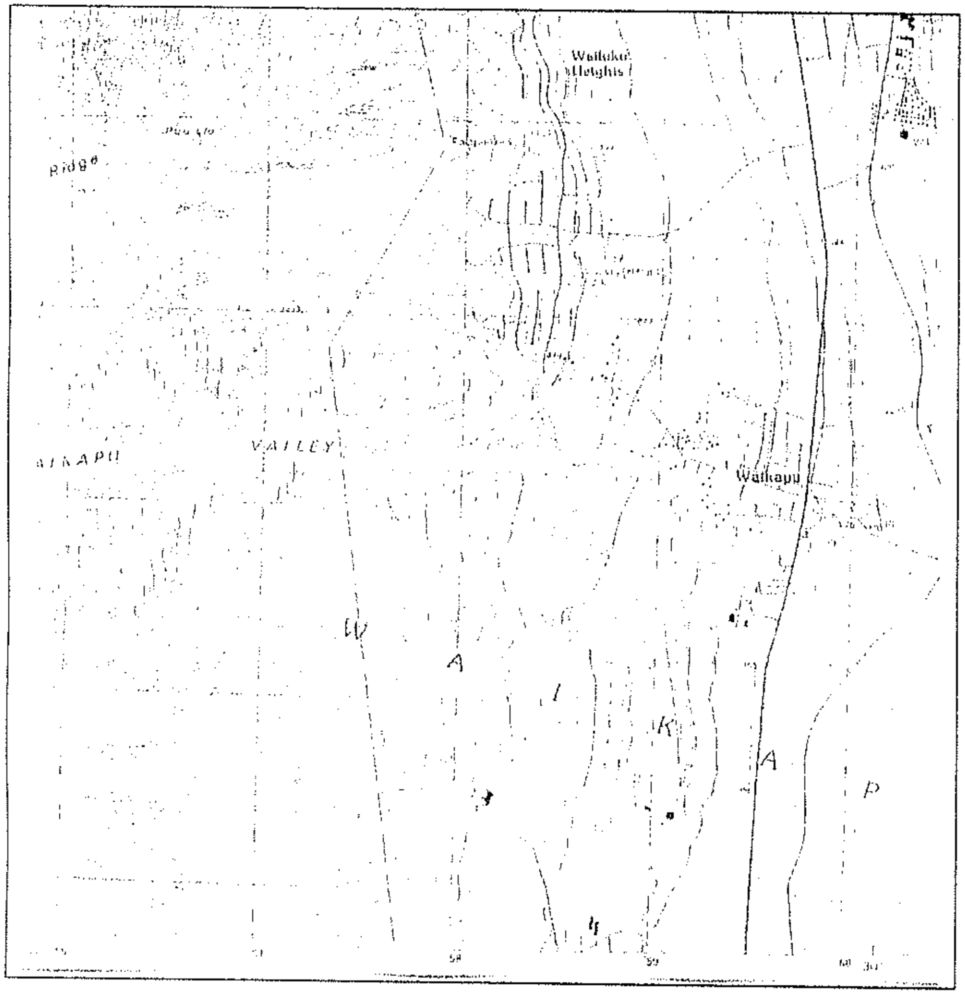
N ↑	TARGET QUAD NAME: Wailuku, HI MAP YEAR: 1955 SERIES: 7.5 SCALE: 1:24,000	SITE NAME: TMK 3-6-04/3,6 ADDRESS: TMK 3-6-04/3,6 Wailuku, HI 96793 LAT/LONG: /	CLIENT: Element Environmental , LLC CONTACT: Roger Aoki INQUIRY#: 1787728.2 RESEARCH DATE: 11/02/2006

Historical Topographic Map



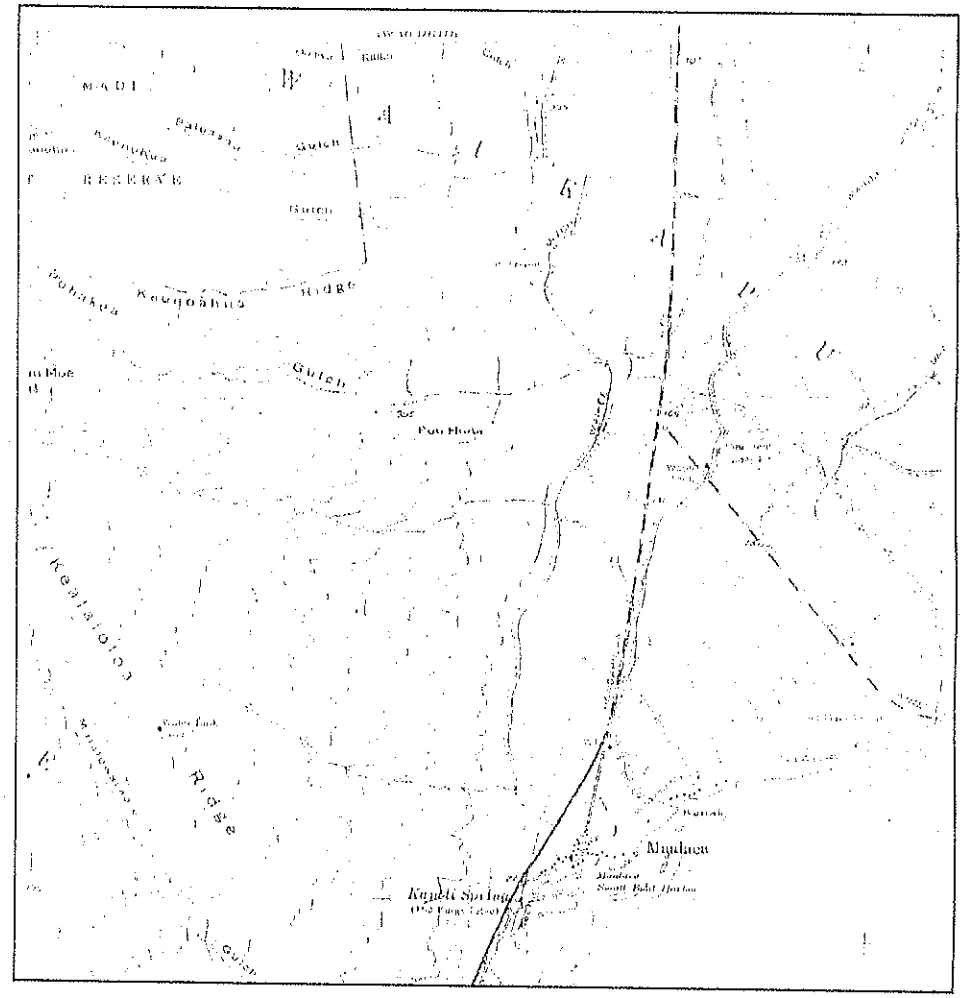
N ↑	TARGET QUAD NAME: Wailuku, HI MAP YEAR: 1983 SERIES: 7.5 SCALE: 1:24,000	SITE NAME: TMK 3-6-04/3,6 ADDRESS: TMK 3-6-04/3,6 Wailuku, HI 96793 LAT/LONG: /	CLIENT: Element Environmental , LLC CONTACT: Roger Aoki INQUIRY#: 1787728.2 RESEARCH DATE: 11/02/2006

Historical Topographic Map



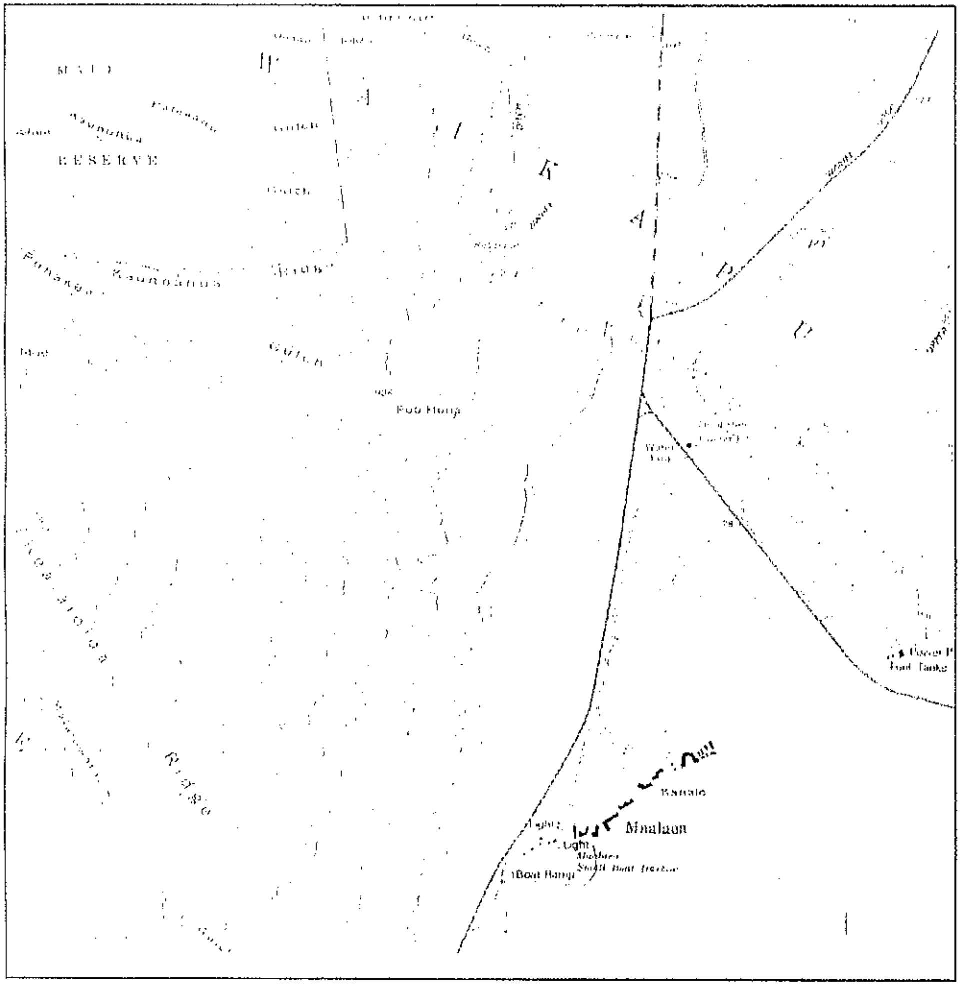
N	TARGET QUAD NAME: Wailuku, HI MAP YEAR: 1997 SERIES: 7.5 SCALE: 1:24,000	SITE NAME: TMK 3-6-04/3,6 ADDRESS: TMK 3-6-04/3,6 Wailuku, HI 96793 LAT/LONG: /	CLIENT: Element Environmental, LLC CONTACT: Roger Aoki INQUIRY#: 1787728.2 RESEARCH DATE: 11/02/2006

Historical Topographic Map



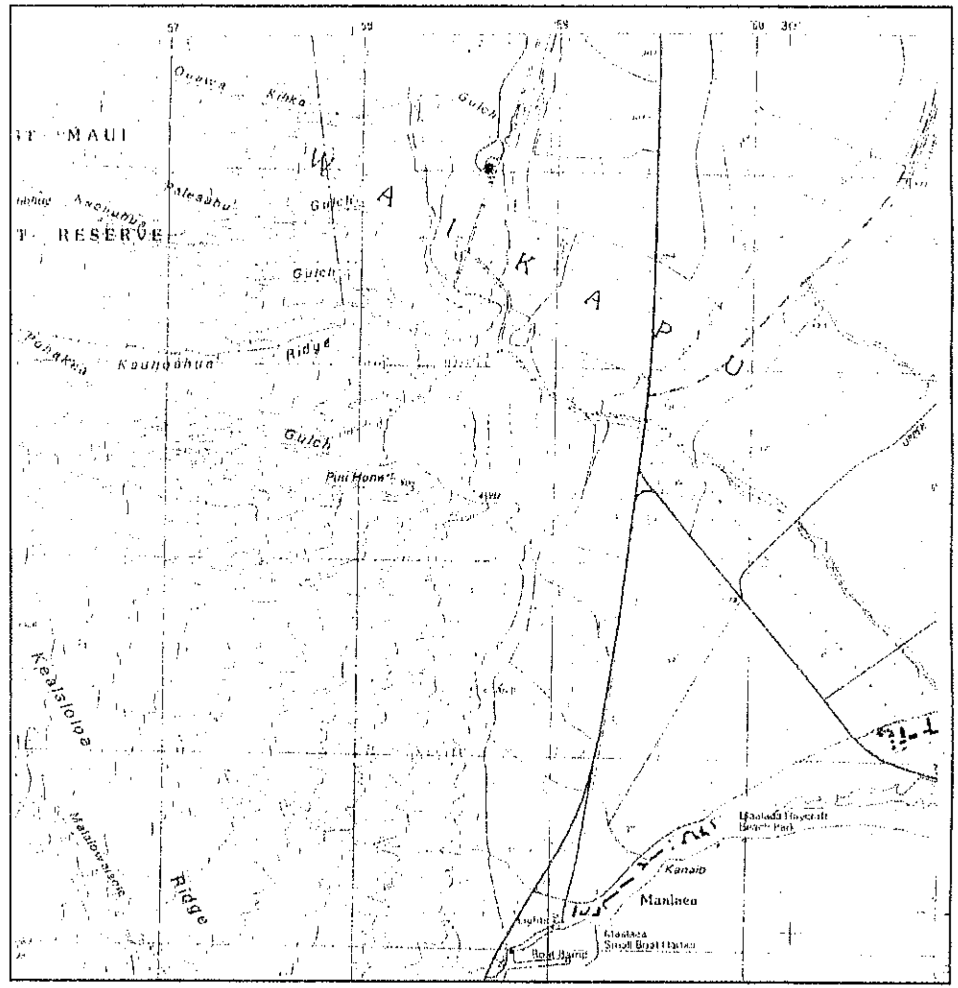
N	ADJOINING QUAD NAME: Maalaea, HI MAP YEAR: 1954 SERIES: 7.5 SCALE: 1:24,000	SITE NAME: TMK 3-6-04/3,6 ADDRESS: TMK 3-6-04/3,6 Wailuku, HI 96793 LAT/LONG: /	CLIENT: Element Environmental, LLC CONTACT: Roger Aoki INQUIRY#: 1787728.2 RESEARCH DATE: 11/02/2006

Historical Topographic Map



N	ADJOINING QUAD NAME: Maalaea, HI MAP YEAR: 1983 SERIES: 7.5 SCALE: 1:24,000	SITE NAME: TMK 3-6-04/3,6 ADDRESS: TMK 3-6-04/3,6 Wailuku, HI 96793 LAT/LONG: /	CLIENT: Element Environmental , LLC CONTACT: Roger Aoki INQUIRY#: 1787728.2 RESEARCH DATE: 11/02/2006

Historical Topographic Map



N	ADJOINING QUAD NAME: Maalaea, HI MAP YEAR: 1996 SERIES: 7.5 SCALE: 1:24,000	SITE NAME: TMK 3-6-04/3,6 ADDRESS: TMK 3-6-04/3,6 Wailuku, HI 96793 LAT/LONG: /	CLIENT: Element Environmental , LLC CONTACT: Roger Aoki INQUIRY#: 1787728.2 RESEARCH DATE: 11/02/2006

APPENDIX C

User Questionnaire

Site Evaluation Questionnaire

1. Date of Inquiry: November 2, 2006

2. Facility or Project Name: Maalaea Properties: Maalaea Mauka, 710-acre site and 909-acre site.

3. Facility Address: TMK (2) 3-6-001 Parcel 016; (2) 3-6-004 Parcels 3 and 6; (2) 3-6-002 Parcels 1 and 3 in Wailuku, Maui, Hawaii

4. Describe activities that occur on the Subject Property: Agriculture: former sugar cane and pineapple, cattle grazing.

5. Name, title, address, and phone number of the person conducting the interview: Roger Aoki, Element Environmental LLC, Senior Environmental Engineer, (808) 479-3881

6a. Name and Title of Person Interviewed: Steven J. Kikuchi	6b. Telephone number: 209-481-8778
7a. How many years has the person being interviewed been familiar with the site: 3 years	7b. What is his or her association with the site: Partner of Maalaea Properties, Owner

8a. Are there individuals who have greater knowledge of the Subject Property that are available for interview? Yes.	8b. If so, please provide names and telephone numbers: Mr. Avery Chumbley, President of Wailuku Agribusiness, former owner of the site. Mr. Alex Franco, Manager of Maui Cattle Company, user of the site.
9a. Is the Subject Property or any adjoining property currently used, or has it been used in the past, for an industrial or manufacturing use? No	9b. If so, please provide a description of those activities below: N/A

10a. What is the source of Potable Water at the Subject Property? The Waihee Flume. Also one water well within 710-acre site. Water resources are maintained by Wailuku Agribusiness	10b. How is sewerage provided to the Subject Property (e.g., city, private)? None	10c. How is electricity provided to the Subject Property (electric company, private)? None
10d. Is there any gas service provided to the Subject Property? If so, who provides the service? None	10e. If water is provided by well, has the well been designated as contaminated by any governmental or health agency? No	

10f. Are there backflow preventers associated with the water system at the Subject Property? No

11a. Does the facility generate or store, or has it ever generated or stored hazardous wastes? No.	11b. If so, where are, or were, the hazardous wastes generated and/or stored? How are these wastes disposed of? N/A
12a. Does the Subject Property generate, use, or store hazardous materials including pesticides, lead-acid batteries, paints, medical wastes, etc.? No.	12b. If so, where are these materials generated, used, and/or stored? N/A
13a. Does the Subject Property generate, use, or store petroleum products, including petroleum stored in pipelines? No	13b. If so, where are the petroleum products generated, used, and/or stored on site? N/A
14a. Have there ever been any on-site accumulation points for wastes? No	14b. If so, where have they been? N/A
15a. Has there been dirt fill brought on to the site? No If so, did the material originate from a contaminated site or unknown origin? N/A	15b. If contaminated soil or soil from an unknown origin has been used as fill material, where was it placed? N/A

16a. Are there currently, or have there been, any pits, ponds, or lagoons on the property or adjacent properties that have been used in connection with waste treatment or waste disposal (i.e. trash burning, pits, collection basins, etc.)? No.	16b. If so, where are, or were, they located? N/A	16c. Are there any permits associated with these facilities (NPDES, solid waste, RCRA)? N/A
17. Are there, or were there, any of the following on the Subject Property?	If so, where are, or were, they located?	Are there any chemical releases associated with these items or activities?
a. Aboveground storage tanks No	N/A	N/A
b. Underground storage tanks No	"	
c. Oil-separators No	"	
d. Septic tanks No	"	
e. Waste piles No	"	
f. Polychlorinated biphenyl (PCB)-containing equipment (including transformers, electrical equipment, hydraulic equipment, etc.) No		

g. Outdoor material storage areas No		
h. Painting and/or sandblasting operations No		
i. Drums or drum storage No		
j. Landfills No		
k. Wells (including monitoring wells, injection wells, water wells, etc.) One groundwater well	Near southwestern reservoir at 710-site	No
l. Lead based paints No		
m. Suspected asbestos containing materials No		
n. Buried objects No		
o. Pesticides and/or herbicides No		
p. Medical or biological wastes No		
q. Ordnance No		
r. Radioactive materials No		
s. Mixed wastes No		
t. Wash facilities No		
u. Radon No		
v. Heavy metals No		

18a. Are there any deteriorated painted surfaces on the Subject Property? No	18b. If so, where are these surface located? N/A
19a. Are there any stained sinks or floor drains? No	19b. If so, where are they located? N/A
20a. Is there any evidence of chemical spills or releases on the Subject Property? No	N/A
21a. Is there any evidence of improper disposal of solid or hazardous waste at the Subject Property? No	21b. If so, where are these wastes located? N/A
22a. Is there any evidence of any discolored soil on the Subject Property? No	22b. If so, where are these soils located? N/A
23a. Is there any evidence of any stressed or unseasonably dead vegetation on the Subject Property? No	23b. If so, where was the dead or stressed vegetation observed? N/A
24a. Are there any noxious odors associated with the Subject Property? No	24b. If so, where were the noxious odors observed? N/A

25a. Are there any sensitive receptors including protected or endangered natural resources at the Subject Property? No	25b. If so, what are they? N/A
26a. Are there any cultural resources at the Subject Property? Yes.	26b. If so, what are they? There is a burial site and various other archeological sites as documented in the Archeological Inventory Survey by Cultural Surveys Hawaii (Robins et al) as revised January 2000
27a. Are there any surface water bodies at the Subject Property? Two reservoirs and one flume– One reservoir located at the top (northwestern end) of the view plane of the 710-acre site.	27b. If so, where are they located? The second reservoir is located near the located at the southwestern end of the 710-acre site. Both reservoirs are associates with agricultural irrigation.
28. Are there any air permits currently or planned to be in use at the Subject Property? No	29. What is the estimated depth to groundwater at the Subject Property? Unknown
30a. Are there any areas on site that have been identified as requiring on-going monitoring or additional investigation by the USEPA, HDOH, or other agency including installation restoration program sites and/or areas of concern and environmental compliance sites that have not been issued a NFRAP or a letter of concurrence regarding no further action (e.g., sites that are still considered open and require additional work)? No	30b. If so, where are they located and what is the nature of the monitoring/investigation? N/A
31. Are there any Environmental Liens or activity and use limitations on the Subject Property? No	
32. Do you have any specialized knowledge, related to environmental issues of the Subject Property? No.	
33. Do you any additional commonly known or reasonable ascertainable information, related to environmental issues of the Subject Property? No.	
34. Do you know of any valuation reduction for environmental issues of the Subject Property? No	
35. What is the reason for performing the Phase I ESA? Confirm that no hazardous materials or disposal exist.	

C. BREWER AND COMPANY, LIMITED
Real Estate and Corporate Development

FACSIMILE TRANSMITTAL SHEET

TO: Roger Aoki		FROM: Avery B. Chumbley, Executive Vice President	
COMPANY:		DATE: 10-31-06	
FAX NUMBER: 624-3181		TOTAL NO. OF PAGES (INCLUDING COVER)	
PHONE NUMBER:		COPY TO:	
RE: Maui Property - Maalaea Minka			

☐ URGENT ☐ FOR REVIEW/COMMENT ☐ PLEASE CALL ☐ PLEASE HANDLE ☐ FOR YOUR FILES

NOTES/COMMENTS:

Aloha Roger

here is the response to

the questions —

Avery

P.O. BOX 1826
PAPAIKOU, HAWAII 96781-1826
TEL: (808) 964-8434 / FAX: (808) 964-8426
EMAIL: cbc@aloha.net

Site Evaluation Questionnaire

1. Date of Inquiry: October 31, 2006		
2. Facility or Project Name: Maalaea Properties Phase I Environmental Site Assessment		
3. Facility Address: TMK 3-6-01 Parcel 18; 3-6-02 Parcels 1 and 3; 3-6-04 Parcels 3 and 6		
4. Describe activities that occur on the Subject Property:		
5. Name, title, address, and phone number of the person conducting the interview: Roger Aoki, Senior Environmental Engineer, Element Environmental, (808) 479-3881		
6a. Name and Title of Person Interviewed: AVERY B. CHUMBLEY		6b. Telephone number 244-7079
7a. How many years has the person being interviewed been familiar with the site: 24 YEARS		7b. What is his or her association with the site: President of Co.
8a. Are there individuals who have greater knowledge of the Subject Property that are available for interview? YES	8b. If so, please provide names and telephone numbers: CLAYTON SUZUKI 250-4370	
9a. Is the Subject Property or any adjoining property currently used, or has it been used in the past, for an industrial or manufacturing use? NO	9b. If so, please provide a description of those activities below: N/A	
10a. What is the source of Potable Water at the Subject Property? NONE	10b. How is sewerage provided to the Subject Property (e.g., city, private)? NONE	10c. How is electricity provided to the Subject Property (electric company, private)? MECO
10d. Is there any gas service provided to the Subject Property? If so, who provides the service? NONE	10e. If water is provided by well, has the well been designated as contaminated by any governmental or health agency? N/A	
10f. Are there backflow preventers associated with the water system at the Subject Property? N/A		
11a. Does the facility generate or store, or has it ever generated or stored hazardous wastes? NONE	11b. If so, where are, or were, the hazardous wastes generated and/or stored? How are these wastes disposed of? N/A	

12a. Does the Subject Property generate, use, or store hazardous materials including pesticides, lead-acid batteries, paints, medical wastes, etc.? AG CHEMICALS	12b. If so, where are these materials generated, used, and/or stored? OFF SITE
13a. Does the Subject Property generate, use, or store petroleum products, including petroleum stored in pipelines? NONE	13b. If so, where are the petroleum products generated, used, and/or stored on site? N/A
14a. Have there ever been any on-site accumulation points for wastes? NONE	14b. If so, where have they been?. N/A
15a. Has there been dirt fill brought on to the site? If so, did the material originate from a contaminated site or unknown origin? NONE	15b. If contaminated soil or soil from an unknown origin has been used as fill material, where was it placed? N/A

16a. Are there currently, or have there been, any pits, ponds, or lagoons on the property or adjacent properties that have been used in connection with waste treatment or waste disposal (i.e. trash burning, pits, collection basins, etc.)? NONE	16b. If so, where are, or were, they located? N/A	16c. Are there any permits associated with these facilities (NPDES, solid waste, RCRA)? N/A
17. Are there, or were there, any of the following on the Subject Property?	If so, where are, or were, they located?	Are there any chemical releases associated with these items or activities?
a. Aboveground storage tanks NO		
b. Underground storage tanks. NO		
c. Oil-separators NO		
d. Septic tanks NO		
e. Waste piles NO		N/A
f. Polychlorinated biphenyl (PCB)-containing equipment (including transformers, electrical equipment, hydraulic equipment, etc.) NO		
g. Outdoor material storage areas NO		
h. Painting and/or sandblasting operations NO		
i. Drums or drum storage NO		
j. landfills NO		

k. Wells (including monitoring wells, injection wells, water wells, etc.)		
l. Lead based paints	NO	
m. Suspected asbestos containing materials	NO	
n. Buried objects	NO	
o. Pesticides and/or herbicides	NO	
p. Medical or biological wastes	YES	SUGAR / PINEAPPLE ue
q. Ordnance	NO	
r. Radioactive materials	NO	
s. Mixed wastes	NO	
t. Wash facilities	NO	
u. Radon	NO	
v. Heavy metals	NO	

18a. Are there any deteriorated painted surfaces on the Subject Property? NO	18b. If so, where are these surface located?
19a. Are there any stained sinks or floor drains? NO	19b. If so, where are they located?
20a. Is there any evidence of chemical spills or releases on the Subject Property? NONE	20b. If so, where were the releases observed?
21a. Is there any evidence of improper disposal of solid or hazardous waste at the Subject Property? NO	21b. If so, where are these wastes located?
22a. Is there any evidence of any discolored soil on the Subject Property? NO	22b. If so, where are these soils located?
23a. Is there any evidence of any stressed or unseasonably dead vegetation on the Subject Property? NO	23b. If so, where was the dead or stressed vegetation observed?
24a. Are there any noxious odors associated with the Subject Property? NONE	24b. If so, where were the noxious odors observed?
25a. Are there any sensitive receptors including protected or endangered natural resources at the Subject Property? NONE	25b. If so, what are they?
26a. Are there any cultural resources at the Subject Property? NO	26b. If so, what are they?
27a. Are there any surface water bodies at the Subject Property? NO	27b. If so, where are they located?

28. Are there any air permits currently or planned to be in use at the Subject Property? NO	29. What is the estimated depth to groundwater at the Subject Property?
30a. Are there any areas on site that have been identified as requiring on-going monitoring or additional investigation by the USEPA, HDOH, or other agency including installation restoration program sites and/or areas of concern and environmental compliance sites that have not been issued a NFRAP or a letter of concurrence regarding no further action (e.g., sites that are still considered open and require additional work)? NO	30b. If so, where are they located and what is the nature of the monitoring/investigation?

WAILUKU WATER CO.
WAIKAPU ~ IAO ~ WAIEHU ~ WAIHEE
Na Wai Eha

November 1, 2006

To: Avery Chumbley
From: Clayton Suzuki

Subject: Waikapu to Maalaea Fields

The following chemicals may have been used during the cultivation of sugarcane in the Waikapu to Maalaea Fields.

Active Ingredient:	Brand Name:
Atrazine	Aatrex Nine-O
Ametryn	Evik 80W
2, 4-D	Formula 40
Diuron	Karmex DF
Glyphosate	Roundup
Metribuzin	Sinbar
Hexazinone	Velpar
Glyphosate	Polado

The following fertilizers were used in the cultivation of sugarcane.

Nitrogen
Potassium
Phosphorus
Calcium carbonate

The following chemicals may have been used during the cultivation of pineapple in the Waikapu to Maalaea fields.

Aliette	Ethrel
Amdro	Evik
Diazinon	Hyvar X
Karmex (Diuron)	Velpar DF
Roundup (non crop area)	Atrazine
Fruitone	Nemcur 3

The following fertilizers were used in the cultivation of pineapple.

Nitrogen	Sulfate of Potash
Iron Sulfate	Magnesium Sulfate
Zinc Sulfate	Sulfate of Amonia
Phosic Acid	

255 EAST WAIKO ROAD • WAILUKU, MAUI, HAWAII 96793-9355 • TELEPHONE (808) 244-9570 • FACSIMILE (808) 242-7068

APPENDIX D

Historical Research Documentation

MAUI COUNTY PARCEL HISTORY (TT102) FOR:
TMK: 3-6-004-003-0000

PAGE:1

07/13/1998 --
INSTR-DESC:AMENDMENT OF ESMT
INSTR_NO:9800101152
TRANS NO:59086
INSTR-DATE:07/01/1998
REC-DATE:07/13/1998
ACK/EFF DATE:07/13/1998

AREA:657.1950 ACRES
WAILUKU AGRIBUSINESS CO INC "GRANTOR"
MAUI ELECTRIC COMPANY LIMITED "GRANTEE"
GRANTOR AND GRANTEE AMEND ESMT GRANT, DOCS 95-1279 & 95-1612
80 TO DELETE
EXH "A" & SUBSTITUTE EXH "A" ATTACHED.
ESMT C ELECTRICAL TRANSMISSION POR GR 3152 62,877 SF
DES
F/D: SUBJ TO ELEC TRANSMISSION ESMT "C" (62,877 SF) IN FAVO
R OF MAUI
ELEC CO LTD

GROUP# NAME F TC %-OWNER TITLE-DESC
2 0011 WAILUKU AGRIBUSINESS CO INC

12/13/1995 --
INSTR-DESC:UTILITY ESMT
INSTR_NO:9500161279
TRANS NO:59085
INSTR-DATE:11/01/1995
REC-DATE:12/13/1995
ACK/EFF DATE:12/13/1995

AREA:657.1920 ACRES
FROM: WAILUKU AGRIBUSINESS CO INC
TO: MAUI ELECTRIC COMPANY LIMITED
GRANTOR GRANT UNTO GRANTEE A PERPETUAL RIGHT & ESMT TO CONST
RUCT,
MAINTAIN & OPERATE POLE, WIRE LINES & UNDERGROUND POWER LINE
S FOR THE
TRANSMISSION OF ELECTRICITY FOR LIGHT, POWER & COMMUNICATION
, OVER,
ACROSS & UNDER PARCEL SHOWN ON MAP ATTACHED AS EXH "A". TOG
ETHER WITH
RIGHT OF INGRESS & EGRESS.
ESMT C 62,678 SF
TMB NOTE: ESMT NOT SHOWN; NO DES.
F/D: SUBJ TO ELEC TRANS LINE ESMT "C" IN FAVOR OF MAUI ELE
CO LTD

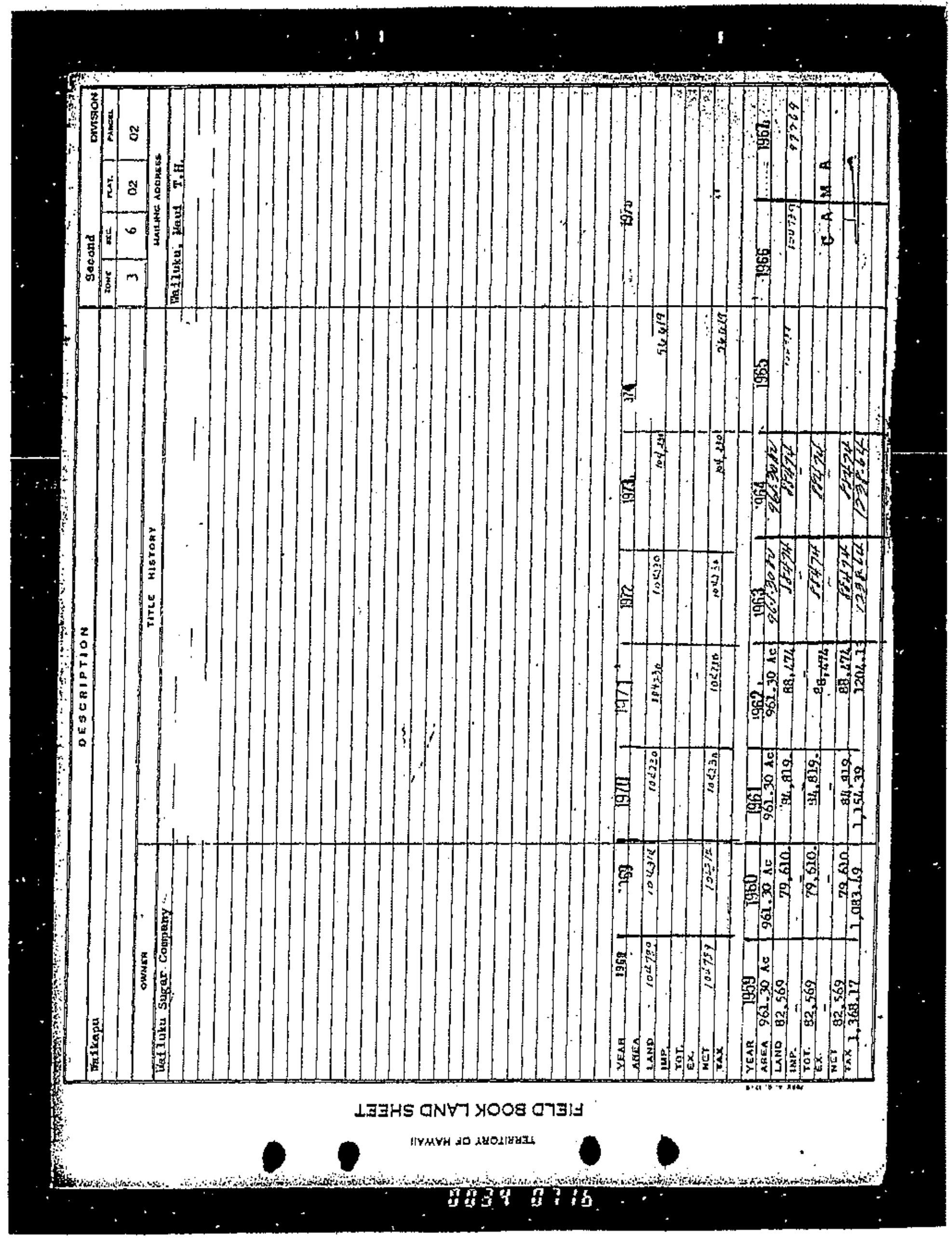
GROUP# NAME F TC %-OWNER TITLE-DESC
2 0011 WAILUKU AGRIBUSINESS CO INC

08/04/1992 --
INSTR-DESC:MAP/R WAIKAPU HEMA LARGE LOT SUBD
INSTR_NO:0000000000
TRANS NO:59084
INSTR-DATE:02/24/1993
ACK/EFF DATE:08/04/1992

AREA:657.1920 ACRES
FROM: 3602-2 657.192 AC LOT 6
F/D: PICK UP: LOT 6

GROUP# NAME F TC %-OWNER TITLE-DESC
2 0011 WAILUKU AGRIBUSINESS CO INC

------------------SEE HISTORY SHEET FOR MORE INFORMATION------------------



MAUI COUNTY PARCEL HISTORY (TT102) FOR:
TMK: 3-6-004-006-0000

06/16/1992 --
INSTR-DESC:ORDER GRANTING PLAINTIFFS EX PARTE MOTIO
INSTR_NO:9200095607
TRANS NO:59099
INSTR-DATE:01/01/1900
REC-DATE:06/16/1992
ACK/EFF DATE:06/16/1992

AREA:52.9760 ACRES STATE-CONV-TAX: $ 0.00
ACK: 6/12/92
ORDER GRANTING PLAINTIFF'S EX PARTE MOTION FOR JUDGMENT BY D
EFAULT AND
JUDGMENT CIVIL NO 92-0270(3) 2ND CIRCUIT COURT
IT IS HEREBY ORDERED, ADJUDGED AND DECREED THAT PLAINTIFF, W
AILUKU
AGRIBUSINESS CO INC IS THE OWNER IN FEE SIMPLE OF THE REAL P
ROPERTY
DESCRIBED IN EXHIBIT A ANNEXED HERETO
F/D: KEYED ONLY - CLEAR TITLE

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	WAILUKU AGRIBUSINESS CO INC				

04/06/1992 --
INSTR-DESC:JUDGEMENT
INSTR_NO:9200050491
TRANS NO:59098
INSTR-DATE:01/01/1900
REC-DATE:04/06/1992
ACK/EFF DATE:04/06/1992

AREA:52.9760 ACRES STATE-CONV-TAX: $ 0.00
ACK: 4/2/92
ORDER GRANTING PLAINTIFF'S EX PARTE MOTION FOR DEFAULT JUDGM
ENT AND
JUDGMENT 2ND CIRCUIT COURT CIVIL NO 92-0071(1)
WAILUKU AGRIBUSINESS CO INC, PLAINTIFF, VS KANEAE, HEIRS AND
ASSIGNS,
AND ALL WHOM IT MAY CONCERN, DEFENDANTS.

IT IS HEREBY ORDERED, ADJUDGED AND DECREED THAT PLAINTIFF, W
AILUKU
AGRIBUSINESS CO INC, IS THE OWNER IN FEE SIMPLE OF THE REAL
PROPERTY
DESCRIBED IN EXHIBIT A
F/D: KEYED ONLY - CLEAR TITLE

11/13/1990 --
INSTR-DESC:RECONVEYANCE DEED
INSTR_NO:9000174768
TRANS NO:59097
INSTR-DATE:08/22/1990
REC-DATE:11/13/1990
ACK/EFF DATE:11/13/1990

AREA:52.9760 ACRES STATE-CONV-TAX: $ 0.00
FROM: THE HAWAII TROPICAL PLANTATION
TO: WAILUKU AGRIBUSINESS CO INC
3604-06: LOT 2 52.976 AC SUBJ/ES

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	WAILUKU AGRIBUSINESS CO INC				

10/07/1987 --

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	WAILUKU SUGAR COMPANY				OVER 42.316 A+-
2 0021	HAWAII TROPICAL PLANTATION				OVER 10.660 A+-

------------------SEE HISTORY SHEET FOR MORE INFORMATION------------------

COUNTY OF MAUI
PROPERTY TAX DIVISION

LAND APPRAISAL CARD

Tax Key				HPR Unit No.	Pitt Code	Neighborhood Code
2	5	Plat	Parcel			
3	6	004	006	0000	520	3655

DESCRIPTION
Grant 1844
Por lot 2

OWNER
WAILUKU SUGAR CO (over 42.816 Ac±)
THE HAWAII TROPICAL PLANTATION
(over 10.660 Ac±)

TITLE HISTORY
TMB M-79 1984 R/S New for 1985 from 3604-2

NET AREA
52.976 Ac

C A M A

0034 0795

REQUEST TO ACCESS A GOVERNMENT RECORD

DATE: October 31, 2006

TO: Hazard Evaluation & Emergency Response Office (Fax: 586-7537)

FROM: Roger Aoki
Element Environmental, LLC
62-180 Emerson Road
Haleiwa, HI 96712
Tel: 479-3881 (cell)
Fax: 637-0001
Email: raoki@e2hi.com

Although you are not required to provide any personal information, you should provide enough information to allow the agency to contact you about this request. The processing of this request may be stopped if the agency is unable to contact you. Therefore, please provide any information that will allow the agency to contact you (name or alias, telephone or fax number, mailing address, e-mail address, etc.).

I WOULD LIKE THE FOLLOWING GOVERNMENT RECORD

Describe the government record as specifically as possible so that it can be located. Try to provide a record name, subject matter, date, location, purpose, or name of persons to whom the record refers, or other information that could help the agency identify the record. A complete and accurate description of the government record you request will prevent delays in locating the record. Attach a second page if needed.

Maalaea Property located at Honoapiilani Highway, Wailuku, Maui, Hawaii 96793

TMK (2) 3-6-004:003 and 006

I WOULD LIKE : (please check one or more of the options below)

x To inspect the government record.

☐ A copy of the government record: (Please check one of the options below.) See the back of this page for information about fees that you may be required to pay for agency services to process your record request.

Note: Copying and transmission charges may also apply to certain options.

- ☐ Pick up at agency (date and time):
- ☐ Mail
- ☐ Fax (toll free and only if available)
- ☐ Other, if available (please specify):

☐ If the agency maintains the records in a form other than paper, please advise in which format you would prefer to have the record.

x Electronic ☐Audio ☐Other (please specify):,

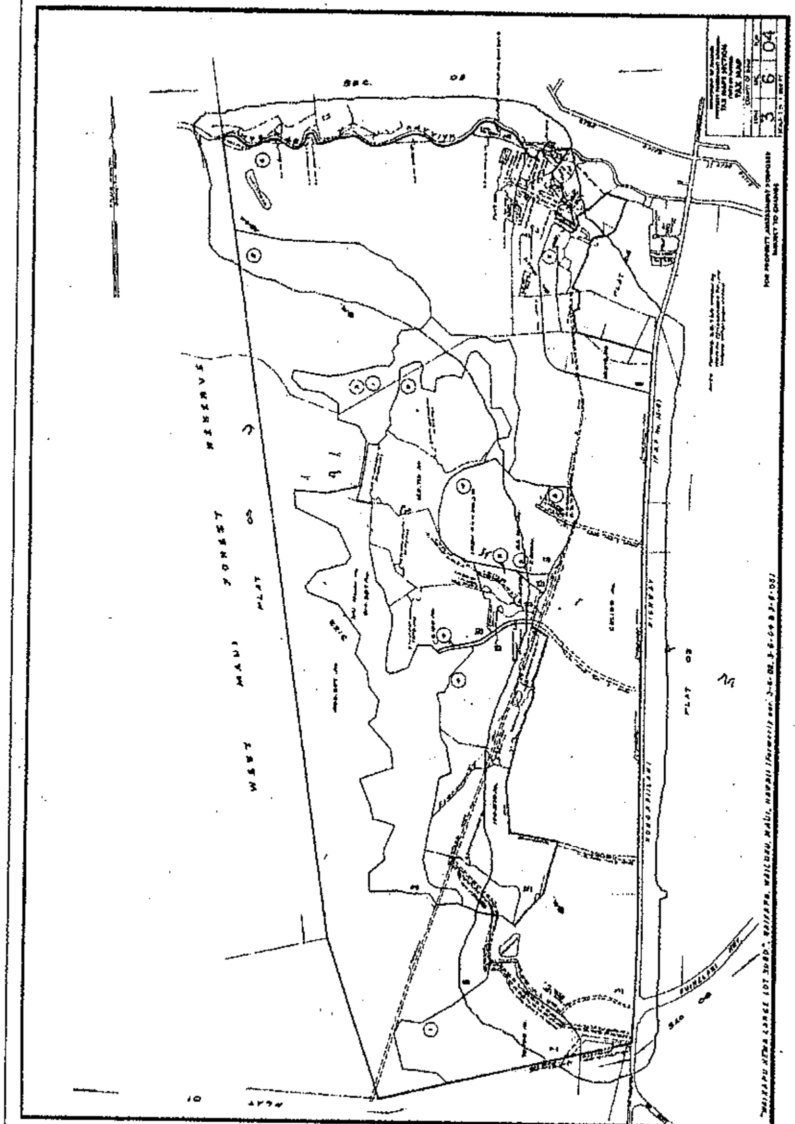
☐ Check this box if you are attaching a request for waiver of fees in the public interest (see waiver information on back).

SEE BACK FOR IMPORTANT INFORMATION

OFFICIAL USE ONLY:

Office Manager

Date



element environmental llc
environmental engineering water resources

October 31, 2006

Department of Fire Control
Assistant Chief's Office
200 Dairy Road
Kahului, HI 96732

Subject: Request for Records on Reported Hazardous Material Spill Events

To Whom It May Concern:

Element Environmental, LLC (E2) is engaged in a Phase I Environmental Site Assessment for the TMK 3-6-004 Parcels 003 and 006 Property located along Honoapiilani Highway, Wailuku, Hawaii 96793. A map showing the site location is attached with this request.

The site assessment includes the identification of facilities on the site or adjacent to it which use or generate hazardous substances on their premises. It is our understanding that the Maui County Department of Fire Control has maintained files containing such information. We would be interested in any information regarding unauthorized hazardous material spills/releases, violations (including safety violations), or aboveground tank registrations for any facility located at or within a ¼ mile radius of the subject property. If no such records exist, a negative response would be appreciated. The information will be used in a Phase I – Environmental Site Assessment. It would be greatly appreciated if you could respond as soon as possible.

Should you have further questions, please do not hesitate to contact me at (808) 479-3881 (cell).

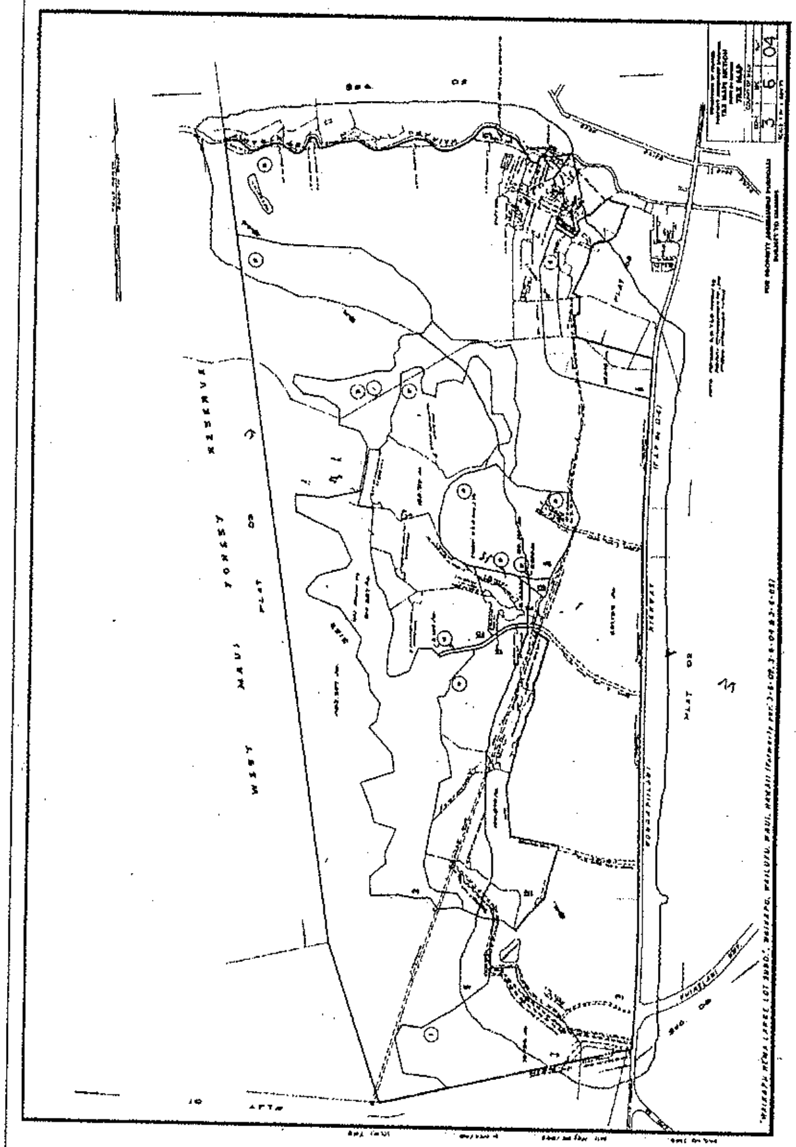
Sincerely:
Element Environmental, LLC

Roger Aoki

Roger C. Aoki, P.E.
Senior Environmental Engineer

Enclosure

62-180 Emerson Road, Haleiwa Hawaii 96712 tel: (808) 637-1200 fax: (808) 637-0001 email: raoki@hawaii.rr.com



element environmental llc
environmental engineering water resources

October 31, 2006

Maui County Local Emergency Planning Committee
200 Dairy Road
Kahului, HI 96732

Attention: Mr. Scott Kekuewa

Subject: Request for Tier 2 Reports

Dear Mr. Kekuewa:

Element Environmental, LLC (E2) is conducting an environmental site assessment project for the TMK 3-6-004 Parcels 003 and 006 Property located along Honoapiilani Highway, Wailuku, Hawaii 96793. A map showing the site location is attached with this request.

The site assessment includes the identification of facilities on the site or adjacent to it which store, use, or generate hazardous materials/substances on their premises. It is our understanding that the Maui County Local Emergency Planning Committee (LEPC) has maintained Tier 2 Reports under the Superfund Amendments and Reauthorization Act (SARA) Title III containing such information. We would be interested in receiving Tier 2 Reports for any such property or facility. If no such records exist, a negative response would be appreciated. The information will be used in a Phase I – Environmental Site Assessment.

Should you have any questions or need more information, please do not hesitate to contact me at (808) 479-3881.

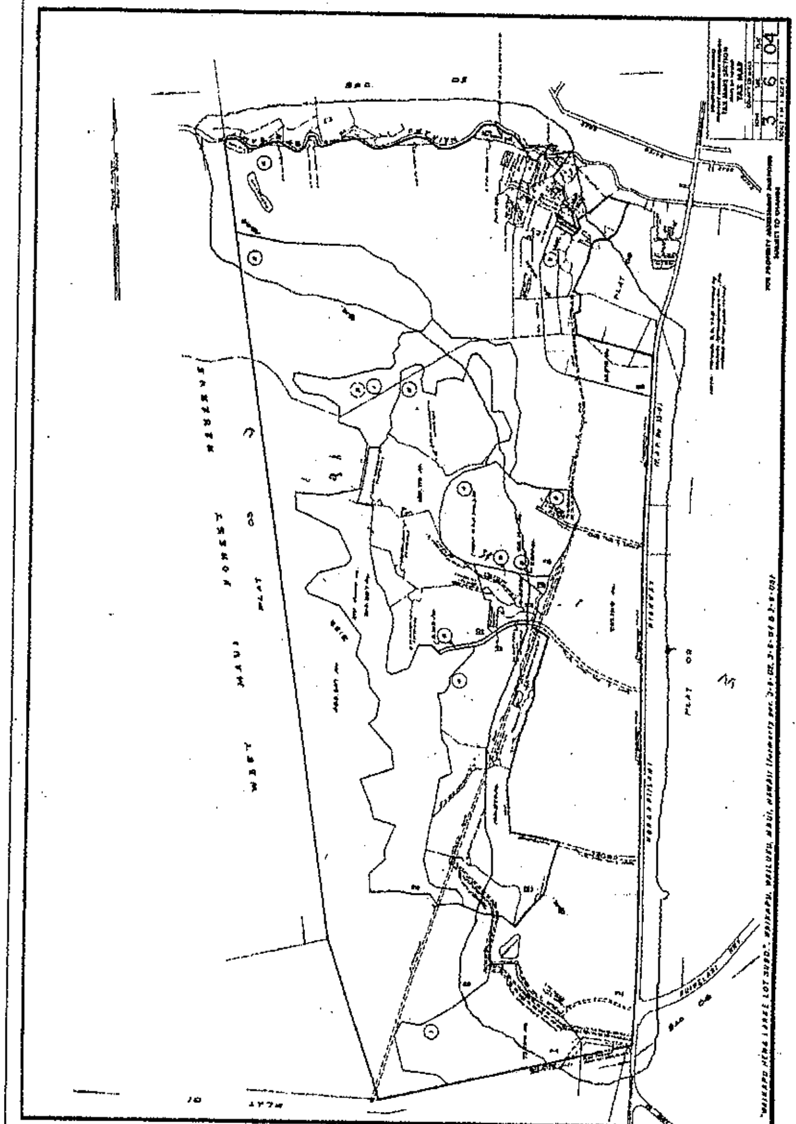
Your help and prompt response is greatly appreciated.

Sincerely:
Element Environmental, LLC

Roger Aoki

Roger C. Aoki, P.E.
Senior Environmental Engineer

62-180 Emerson Road, Haleiwa, Hawaii 96712 tel: (808) 637-1200 fax: (808) 637-0001 email: raoki@hawaii.rr.com



APPENDIX E

Qualifications of the Environmental Professionals

Roger C. Aoki, P.E.
Senior Environmental Engineer

BACKGROUND:

EDUCATION
Masters of Science in Civil (Environmental) Engineering – Purdue University, 1995
B.S., Civil Engineering - University of Hawaii at Manoa, 1994

PROFESSIONAL REGISTRATIONS
Licensed Professional Engineer – Civil (Hawaii 2000), Certificate No. 10019-C

SPECIALIZED TRAINING
OSHA 40-hour Initial HAZWOPER Training and Current 8-hour Refresher
Hazardous Waste Site Supervisor Training
First Aid and CPR Training

SUMMARY OF EXPERIENCE

Mr. Aoki is has over ten years (10) of experience in the environmental consulting industry. He has over five (5) years of project management experience and has managed Federal Indefinite Delivery, Indefinite Quantity Contracts and environmental consulting/engineering design contracts.

Mr. Aoki has been involved in a wide range of environmental investigation and engineering projects dealing with water, wastewater, petroleum contamination, solid waste, and hazardous waste. His professional experience has included work on projects in Hawaii and Guam. Mr. Aoki's areas of expertise consist of environmental investigations, environmental baseline surveys, regulatory compliance, remedial design, storm water planning, and wastewater engineering. He has prepared risk-based corrective action reports on sites contaminated with petroleum-related compounds, polychlorinated biphenyls (PCBs) and heavy metals, is experienced in preparing work plans, project management plans, sampling and analysis plans, site safety and health plans, and reports for soil and groundwater investigation projects.

Keehi Place Pump Station Evaluation, State of Hawaii Department of Transportation: Engineer assisting with the evaluation of the existing pump station and determining a rational service population estimate to generate projected wastewater flows to allow for planning of future wastewater facility infrastructure.

3/01 – 7/06
Project Engineer and Project Manager with Environet, Inc.

Waimanalo Wastewater Treatment Plant Improvements, State of Hawaii Department of Land and Natural Resources: At Engineer assisting in the design of a new secondary treatment system. Responsibilities included calculations for tank and equipment sizing, hydraulic calculations, mechanical process design including equipment selection, and design and layout of the dissolved air floatation thickener process units and equipment. Mr. Aoki also assisted with the preparation of construction plans and specifications.

Environmental Assessments: Project Manager for the preparation of several Environmental Assessments for the private clients, City and County of Honolulu, State of Hawaii, and US Army Corps of Engineers. The Environmental Assessments supported wide ranging developments and rehabilitation

work including sewer line replacement, new housing developments, and flood control improvements.

Remedial Action Operations/Long Term Monitoring Contract N62742-01-D-1805. Served as the Project Manager for all 19 Contract Task Orders (CTOs) during the 5 years of the contract.

Environmental Engineering Services Contract N62742-02-D-1801. Served as the Project Manager for 10 of the 30 CTOs during 4 years of the contract. Served as the primary Technical Program Manager for the Environmental Baseline Surveys, Findings of Suitability to Lease/Transfer CTOs.

Environmental Technical Services Contract N62742-04-D-1863. Served as the Project Manager for all three Contract Task Orders (CTOs) during the one-and-a-half years of the contract.

Site Investigation at Building 15-46A at the Former Naval Air Station, Agana in Tiyan, Guam. Served as the Project Manager for a site investigation to evaluate an illicit sewer system that was historically used for waste oil disposal. Work tasks included conducting a site reconnaissance to identify the sewer system, field sampling to evaluate the nature and extent of contamination, and data evaluation and reporting to promote an expedited site closure.

Groundwater Monitoring at the Former Agana Power Plant in Mongmong, Guam. Served as the Project Manager to assess the quality of groundwater at the former Agana Power Plant. The results were compared to drinking water and EPA Region 9 tap water criteria to assess the quality of groundwater for the on-going Remedial Investigation of the site. Work tasks included installing two groundwater wells, conducting two rounds of groundwater sampling at six wells; having the sample analyzed by several analytical methods; developing trends from historic data; and comparing the results to current regulatory standards.

Maintenance and Groundwater Monitoring at Former Naval Air Station (NAS), Barbers Point, Oahu, Hawaii. Served as the Project Manager to assess the quality of groundwater beneath the former NAS Barbers Point. The results were compared to drinking water criteria to assess the quality of groundwater for property transfer. Data were also compared to State of Hawaii Water Quality Standards for surface water to determine potential risk via transport to the Pacific Ocean. Work tasks included conducting a groundwater sampling at 21 wells; having the sample analyzed by over 20 analytical methods; developing trends from historic data; and comparing the results to current regulatory standards.

Long-Term Maintenance and Monitoring at the Construction Battalion Landfill in South Finegayan, Guam. Served as the Project Manager to conduct landfill gas monitoring at three landfill gas vents and collected two landfill gas samples to determine the volatile organic compound constituents. Six settlement monuments located atop the cap were surveyed to determine settlement of the cap. Vegetation was cleared on the landfill cap and drainage swales.

Phytoremediation of PCB-Contaminated Soils at Haiku Valley. Served as Project Engineer for the phytoremediation project. Preliminary laboratory screening trials and data search were conducted prior to the field study. A pilot-scale phytoremediation demonstration system was performed in the field with the selected processes in combination with the selected plants. The field study evaluated contaminant removal efficiency of the selected phytoremediation system and design issues such as plant growth, microbial populations in the rhizosphere, soil contaminant levels, phytotoxicity, and rooting depth.

Phytoremediation at the Former Open Burn/Open Detonation (OB/OD) Unit at the Makua Military Reservation. Served as Project Engineer for the phytoremediation project. The project consisted of a greenhouse study to be conducted at the University of Hawaii College of Tropical Agriculture and Human Resources (CTAHR). The purpose of the greenhouse screening trials was to identify candidate plant species for phytoremediation. Approximately six to ten different plant species were screened for their effectiveness in bioaccumulating/biodegrading the contaminants of concern. The greenhouse study also determined planting requirements, fertilization levels, soil characterization and applicable amendment requirements, irrigation needs, and any other requirements for enhancing plant propagation in the Makua OB/OD soils based on the existing contaminant concentrations. The goal of the field study is to apply the results obtained in the greenhouse study in an actual field setting.

Kapalama Incinerator Cleanup. Served as Project Manager. Provided the following services for the removal of hazardous (brick and ash) and non-hazardous (lead-contaminated soil) wastes from the former Kapalama incinerator: prepared a site health and safety plan; prepared a project work plan; prepared a sampling and analysis plan; prepared construction plans and specifications; provided oversight of the cleanup; and reviewed manifests and other cleanup documentation.

RCRA Corrective Action of Solid Waste Management Units, Areas of Interest and Various Bunkers, Johnston Island Phase II. Participated in the site characterization, remedial design, removal action, confirmation testing, and final report writing for remedial work conducted at a number of solid waste management units located on Johnston Atoll. A total of 1,000 tons of hazardous and non-hazardous contaminated soil was being excavated and disposed off-island. Environmental Chemical Corporation (ECC) a subconsultant, assisted Environet on Johnston Island with the excavation and packaging of the contaminated soil/materials for shipment to U.S. Ecology's landfill in Nevada.

4/96 – 3/01
Staff Engineer and Project Engineer with Earth Tech

Site Summary Report (SSR), Pearl Harbor Naval Complex (PHNC), Oahu, Hawaii. Environmental Project Engineer for an environmental site evaluation of existing and past activities with potential hazardous substance or waste releases throughout PHNC. This project involved the review of historical records at various government agencies including PACDIV, the Hawaii Department of Health, and the USEPA, regarding the use, storage, disposal, and release of hazardous materials and wastes at PHNC. The assessment also included a review of site and hydrogeologic characteristics, (based on topographic maps, aerial photographs, previous site characterization reports, and other documents) and a site reconnaissance of Navy property. An electronic database associated with a GIS was developed to manage the large volume of data collected.

PCB Removal Actions at Transformer Substations, NAS Barbers Point. Primary author for an engineering evaluation/cost analysis (EE/CA) that involved analyzing 16 removal action technologies, estimating costs for recommended remediation alternatives, researching and evaluating various federal and state statutes and regulations for Applicable or Relevant and Appropriate Requirements (ARARs) for a non-time critical removal action for PCB-contaminated soils and concrete. Supervised the site reconnaissance and field sampling teams. Estimated removal action costs using Remediation Action Cost Engineering and Requirements (RACER). Oversaw PCB removal activities. Primary author for the Remediation Verification Report and Record of Decision closure documents.

Stormwater Pollution Control Plan (SWPCP) Updates, Naval Station and Naval Magazine, Pearl Harbor, Oahu, Hawaii. Evaluated Naval Station facilities at the PHNC and Naval Magazine facilities at Naval Magazine Lualualei Headquarters Branch and West Loch Branch. Facilities were investigated to identify the practices used to reduce the pollutants in storm water discharges associated with industrial activities and to assure compliance with their respective National Pollutants Discharge Elimination System (NPDES) permits. Facility assessments determined the types and quantities of significant materials stored, and their utilization. Best management practices to prevent non-stormwater discharges were then proposed for implementation.

Petroleum, Oils, and Lubricants (POL) Remediation Study, Honolulu Harbor, Hawaii. Conducted an environmental site assessment of Piers 16 through 38. Although the site assessment looked at hazardous materials in general, the project focused on the presence and use of petroleum products in the area. Reviewed historical records at various government agencies, including the Hawaii Department of Health, the Hawaii Department of Transportation, and the U.S. Coast Guard, regarding the use and storage of hazardous materials. Assisted with the development of an electronic database associated with a GIS to manage the large volume of data collected.

09/92 – 01/95
Student Aide and Engineer's Aide with R.M. Towill Corporation

Drainage Structure Design, Ewa Villages Municipal Golf Course, City & County of Honolulu, Ewa, Oahu, Hawaii. Assisted in the design of drainage structures for the municipal golf course in Ewa. Used hydraulic computer programs to determine drainage flow rates and water surface elevations during flood events for the design of a spillway, golf cart underpasses, and drainage retention basins and culverts.

Villages of Kapolei Master Plan. Assisted registered civil engineers and planners with design of storm drain, sewer, and water distribution systems for the Villages of Kapolei Master Plan. Prepared preliminary design of the stormwater drainage system with the capability of managing various flood events. Determined peak, average, and fire flow requirements of the sewer and water systems for residential and commercial land use areas with varying population densities.

element environmental llc
environmental engineering · water resources

Ryan S. W. Yamauchi, P.E.
President
Senior Environmental Engineer

BACKGROUND:

EDUCATION
Masters of Science in Civil (Environmental) Engineering (1995) - University of California at Berkeley
Bachelor of Science in Civil Engineering (1994) - University of Hawaii at Manoa

PROFESSIONAL REGISTRATIONS
Licensed Professional Engineer – Civil (Hawaii 1998), Certificate No. 9566-C
Registered Environmental Assessor-California-2003

SPECIALIZED TRAINING
OSHA 40-hour Initial HAZWOPER Training and Current 8-hour Refresher
Hazardous Waste Site Supervisor Training
First Aid and CPR Training

Mr. Yamauchi is the Responsible Corporate Officer for Element Environmental, LLC. He has one year of experience as a Chief Executive Officer and five years of experience as a Program/Project manager. He has over twelve years (12) of experience in the environmental consulting industry. He has over six (6) years of project management experience and has managed Federal Indefinite Delivery, Indefinite Quantity Contracts and environmental consulting/engineering design contracts. He is customer-focused and performance-driven.

Mr. Yamauchi has been involved in a wide range of environmental investigation and engineering projects dealing with water, wastewater, petroleum contamination, solid waste, and hazardous waste. His professional experience has included work on projects in Hawaii, Guam, Korea and the Pacific Islands. Mr. Yamauchi's areas of expertise consist of environmental investigations, remedial design and engineering, groundwater modeling, storm water planning, and wastewater engineering. He has prepared risk-based corrective action reports on sites contaminated with polychlorinated biphenyls (PCBs) and heavy metals, is experienced in preparing work plans, project management plans, sampling and analysis plans, site safety and health plans, and final reports for soil, groundwater and sediment investigation projects.

Mr. Yamauchi has also completed several large storm water and wastewater engineering design projects and studies. He has also performed and managed water and wastewater treatment design, wastewater reuse, sewer collection system preventive maintenance, and sewage spill response procedure development projects. He is an active member of the American Water Works Association and the Water Environment Federation.

SPECIFIC PROJECT EXPERIENCE:

Environmental Management Program, State of Hawaii, Department of Transportation, Highways Division: Project Manager for the development of a comprehensive Environmental Management Program (EMP). The program components included: completion of Storm Water Pollution Control Plans (SWPCPs) for the eight Oahu maintenance baseyards, development of training materials for storm water awareness, SWPCP elements, and construction BMPs; development of a training plan for the Chemical Application BMP Program Plan; and development of a Hazard Communication Program, Hazardous Waste Management Program, Solid Waste Management Program, Petroleum, Oil and Lubricant

Management Program, and Facility Maintenance Program. The EMP targeted maintenance operations and maintenance baseyards statewide.

Sand Island Wastewater Treatment Plant Site Assessment and Remedial Design, City and County of Honolulu: Project Manager for the site investigation and Toxic Substances Control Act (TSCA) cleanup of contaminated soil. Responsibilities included overall project management, coordination of subconsultants, development of the technical approach for all environmental investigations and the remedial design, and negotiating with the USEPA Region 9 and the State Department of Health (DOH) for all investigative and remedial activities. Supervised the preparation of the Phase I Environmental Site Assessment (ESA). Conducted and prepared the Phase II ESA, the Human Health Risk Assessment, the TSCA Notification Remediation Report, and the Soil Management Plan. Prepared construction plans and specifications and a construction cost estimate for the TSCA remediation. Performed services during construction including oversight and review of the TSCA cleanup. Coordinated all of the investigation and cleanup work for the two ongoing construction projects. Negotiated with the USEPA Region 9 and the State DOH throughout the duration of the project to allow construction to proceed concurrently with the investigation and cleanup. A follow- on remedial design including the completion of construction documents for the reuse of remaining low level PCB contaminated soil was completed for 76,000 cubic yards of stockpiled soil. Mr. Yamauchi served as the senior design engineer and designed a geofabric retaining wall system to contain the contaminated soil, which allowed for immediate future use of the site as a construction staging area.

Miscellaneous Public Building Facilities Improvements at Ewa Sugar Mill, City and County of Honolulu, Department of Design and Construction: Project Engineer for the remediation project involving preparation of construction documents including plans, specifications, and cost estimates. Other work included an asbestos and lead paint survey and hazardous waste/material survey. Responsibilities included: management of all environmental sampling and analysis work, conducting soil and groundwater sampling and analysis, performance of a magnetometer survey for underground storage tanks and pipelines, preparation of all environmental reports, preparation of construction plans and specifications for the soil removal and soil capping, and negotiating with the Hawaii State Department of Health (DOH) to obtain approval of the remediation plan. Reviewed contractor's work plan, waste manifests and confirmation sampling results during construction. Reviewed and approved closure report, and obtained DOH acceptance of soil removal action and soil cap construction. Due to immediate exposure risks, Mr. Yamauchi also managed the sampling, analysis, removal, and disposal of on-site solid waste/hazardous waste surface debris.

Waimanalo Wastewater Treatment Plant Improvements, State of Hawaii Department of Land and Natural Resources: Project Engineer for the design of a new secondary treatment system. Responsibilities included secondary biological process calculations for tank and equipment sizing, hydraulic calculations for plant hydraulics, mechanical process design including equipment selection, design and layout of new site piping, and development of process control strategies. Process units that Mr. Yamauchi was responsible for included the new anoxic/aerobic tanks, the new equalization basin, the new equalization flow splitter box, the additional effluent sand filters, the new injection wells, and the new dissolved air floatation thickener. Process equipment that Mr. Yamauchi was responsible for included fine air bubble diffusers, coarse air bubble diffusers, process air blowers, mixed liquor internal recycle pumps, return activated sludge pumps, thickened sludge transfer pumps, dissolved air floatation recirculation pumps and pressurization tanks, magnetic flow meters, and ultrasonic flow measuring devices. Prepared plans and specifications for construction, and assisted with the construction cost estimate and construction phasing schedule.

Moanalua and Kalihi Stream Dredging, State of Hawaii Department of Land and Natural Resources: Project Manager for the maintenance dredging sediment sampling and design project. Responsibilities included overall project management including coordinating subconsultants, development and execution of the sediment sampling plans, preparation of the sediment sampling results and alternatives analysis report, and management and coordination of the environmental assessment (EA) and hydrographic survey. As part of the sediment sampling and analysis report, Mr. Yamauchi researched the alternatives for disposal of the sediment.

Inflow and Infiltration Study at Schofield Barracks, Wheeler Army Airfield, and Helemano Military Reservation: Project Manager for this inflow and infiltration (I&I) study. Responsibilities included overall project management; coordination of subconsultants, preparation of the work plan and site safety and health plan, supervision and coordination of the smoke testing, CCTV inspections, manhole inspections, and minor construction repairs, and preparation of the preliminary engineering analysis of the recommended I&I construction repairs, including analysis of repair alternatives and development of construction cost estimates.

Saipan Lagoon Aquatic Ecosystem Restoration Study, Saipan, U.S. Army Corps of Engineers – Honolulu Engineering District: Project Engineer for this study to identify potential restoration alternatives for the nearshore lagoon environment. Responsibilities included calculation of stormwater runoff volumes using rainfall frequency intensity curves and preliminary engineering design of two stormwater conveyance and treatment system alternatives. Completed preliminary engineering design, including sizing and layout of conveyance structures and infiltration basins, and cost estimates for construction.

RCRA Corrective Action of Solid Waste Management Units, Areas of Interest, and Various Bunkers on Johnston Atoll, U.S. Army Corps of Engineers – Honolulu Engineering District: Project Engineer for the excavation and removal of contaminated soils from a number of former SWMU and AOI on Johnston Island. Assisted with preparation of the remediation work plan and site safety and health plan. Performed confirmation sample management and coordinated shipment of confirmation samples from Hawaii to the mainland laboratory. Assisted in the preparation of post-remediation excavation and sampling drawings.

Jonathan Springs Well Granulated Activated Carbon Treatment Unit Design, Honolulu Board of Water Supply: Project Manager for the preliminary sizing and design of the new granular activated carbon (GAC) treatment facility. This was the first project within Hawaii to utilize GAC technology for the removal of dieldrin and chlordane. Responsibilities included overall project management, coordination of subconsultants, and preparation of the preliminary design. Performed preliminary sizing calculations for the GAC unit, and the backwash settling tank and filter units. Prepared the preliminary layout of the GAC facilities and the construction cost estimate.

Collection System Maintenance Spill Response Procedures Manual, City and County of Honolulu: Project Engineer for the development of standardized spill response procedures for the City. Wrote a Spill Response Procedures Manual for the handling of wastewater spills in the collection system.

PUBLICATIONS:

S.R. Spengler, W. Freeman, D.W. Schlack, and R.S. Yamauchi. 1997. Exploring Electronic Project Data Management Alternatives for Environmental Projects. Paper presented at 1998 Pacific Basin Conference on Hazardous Waste, East-West Center, Program on Environment.

S.R. Spengler, R.S.W. Yamauchi, B.M.B. Pabingwit, and R. Babcock. 1999. Evaluating the Environmental Impact from Injection of Treated Wastewater in a Coastal Aquifer. Paper presented at ModelCARE'99 Conference, Zurich, Switzerland, September 20-23, 1999.

APPENDIX D-1.

Phase II Environmental Site Assessment Report

Phase II Environmental Site Assessment Screening Report

Maalaea Mauka
TMK (2) 3-6-001:018
Maalaea, Maui, Hawaii

Prepared for:

M&E Pacific, Inc.
841 Bishop Street, Suite 1900
Honolulu, Hawaii 96813

Prepared by:

element environmental llc
environmental · engineering · water resources
62-180 Emerson Road
Haleiwa, Hawaii 96712

August 2007

Executive Summary

Element Environmental, LLC completed a Screening Phase II Environmental Site Assessment (ESA) of the Maalaea Mauka property identified as TMK: (2) 3-6-001: parcel 018 located in Maui, Hawaii. A Phase I ESA prepared for the property in November 2006 identified historical agricultural use at the site. The purpose of this Screening Phase II ESA was to evaluate if residual levels of pesticides and herbicides resulting from historic agricultural use are present in surface soils. In addition, an area where fourteen 55-gallon unmarked drums were identified in the Phase I ESA was investigated to determine if a release from the drums had occurred. The results of this screening will be used to determine if additional characterization and remediation with regard to the planned future residential development is necessary to protect human health and the environment.

In line with current State of Hawaii Department of Health (HDOH) published guidance documents, the Screening Phase II ESA was completed on "neighborhood-size" decision units utilizing a multi-increment sampling approach. The 260-acre site was divided into eight decision units approximately 32.5 acres in size with one multi-increment surface soil sample collected from each unit. The multi-increment samples were analyzed for pesticide and herbicide constituents that may have been applied to the property.

The results of the multi-increment sampling analyses indicate that residual pesticides and herbicides are not present at significant levels in the surface soils at the site. The majority of the pesticide and herbicide analytes were not detected in the multi-increment samples. The heavy metal arsenic was detected in all of the multi-increment samples. The arsenic levels detected were within range of natural occurring levels (i.e. background levels) found in soils throughout Hawaii. According to HDOH guidance, residential sites that contain arsenic within background levels do not require further action or restrictions on land use.

Two discrete samples were also collected from beneath the area where fourteen 55-gallon drums were observed during the Phase I ESA. The two samples were analyzed for a full suite of analytes to determine if a significant release had occurred in the area. The analytical results did not indicate that a significant release had occurred from the drums. One of the two samples contained a low level of total petroleum hydrocarbons-residual range organics. The level detected was well below the HDOH Environmental Action Level (EAL). The majority of the remaining analytes were not detected with the exception of metals, which were detected at levels below the HDOH EALs and U.S. Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goals or within naturally occurring background levels. Based on these sample results and the fact that the drums were removed and disposed, no further action is recommended for the drum area at this time.

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FIGURES

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List of Acronyms

AL	Anatek Labs
AR	applicable requirements
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
C	Celsius
COC	Chain-of-Custody
COPC	Contaminants of Potential Concern
DQO	data quality objectives
E2	Element Environmental, LLC
EAL	Environmental Action Level
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
GPS	global positioning system
HDOH	State of Hawaii Department of Health
HDPE	High Density Polyethylene
HEER	Office of Hazard Evaluation and Emergency Response
LCS	laboratory control sample
MDL	method detection limit
mg/kg	milligrams per kilogram
MRL	method reporting limit
MS	matrix spike
MSD	matrix spike duplicate
msl	mean sea level
PCB	polychlorinated biphenyl
PPE	personal protective equipment
PQL	practical quantitation limit
PRG	Preliminary Remediation Goal
QA	quality assurance
QA/QC	quality assurance/quality control
RPD	relative percent difference
RSD	relative standard deviation
SOW	scope of work

STL	Severn Trent Laboratories
SVOC	semi-volatile organic compound
TA-Honolulu	Test America-Honolulu
TPH-diesel	total petroleum hydrocarbons-diesel range
TPH-gas	total petroleum hydrocarbons-gasoline range
TPR-rro	total petroleum hydrocarbons-residual range organics
USGS	U.S. Geological Survey
VOC	volatile organic compound

Section 1 Introduction

This Phase II Environmental Site Assessment (ESA) Screening Report presents the work procedures, methods, and results from the Screening Phase II ESA conducted by Element Environmental, LLC (E2) for the Maalaea Mauka property located in Maui, Hawaii. A Phase I ESA prepared for the property in November 2006 identified historical agricultural use at the site. This Screening Phase II ESA was conducted to determine if residual levels of pesticides and herbicides are present in surface soils at the site.

This Phase II ESA Screening Report has been prepared for M&E Pacific, Inc. in accordance with E2's fee proposal dated February 20, 2007.

1.1 Purpose and Objectives

The purpose of this Screening Phase II ESA was to evaluate if residual levels of pesticides and herbicides resulting from historic agricultural use at the site are present in surface soils. In addition, an area where fourteen 55-gallon unmarked drums were identified in the Phase I ESA was investigated to determine if a release from the drums had occurred. The results of this screening will be used to determine if additional characterization and remediation with regard to the planned future development is necessary to protect human health and the environment.

1.2 Report Organization

Details of the investigation are presented in the following sections of this Phase II ESA Screening Report. The report is organized as follows:

Section 1:	Introduction
Section 2:	Site Description and Background
Section 3:	Field Investigation and Sample Collection
Section 4:	Sample Analytical Results
Section 5:	Summary and Recommendations
Appendix A:	Potentially Applied Pesticides and Herbicides
Appendix B:	Laboratory Analytical Results
Appendix C:	Project Photographs

Section 2 Site Background

2.1 Site Location and Description

The project site consists of one parcel of developed land located in West Maui between Waikapu and Maalaea along the western side of Honoapiilani Highway (Figure 2-1). The property consists of approximately 259.885 acres of land designated as Tax Map Key (TMK): (2) 3-6-001: parcel 018.

Honoapiilani Highway runs along the eastern and southern boundary of the site. A dirt road off of Honoapiilani Highway runs along the northern and western perimeter of the site. A weather station is also present along the southwestern perimeter; however, it could not be determined if the station is located within or outside of the property boundary.

The site is currently occupied by the Maui Cattle Company, which utilizes the site for cattle pastures. Maui Cattle Company has installed wire fences throughout the property to control grazing patterns of the cattle. Maui Cattle Company also has a cattle pen and storage area near the center of the property. Entrance to the cattle pen can be made via a dirt road and locked gate located along Honoapiilani Highway.

The state land use designation for the property is Agricultural (County of Maui, 2007). The southern end of the property is located in a State Special Management Area (County of Maui, 2007). A portion of the southern end of the property is also located within the Federal Emergency Management Agency 500 year flood plain (County of Maui, 2007).

2.2 Physiography

2.2.1 Climate

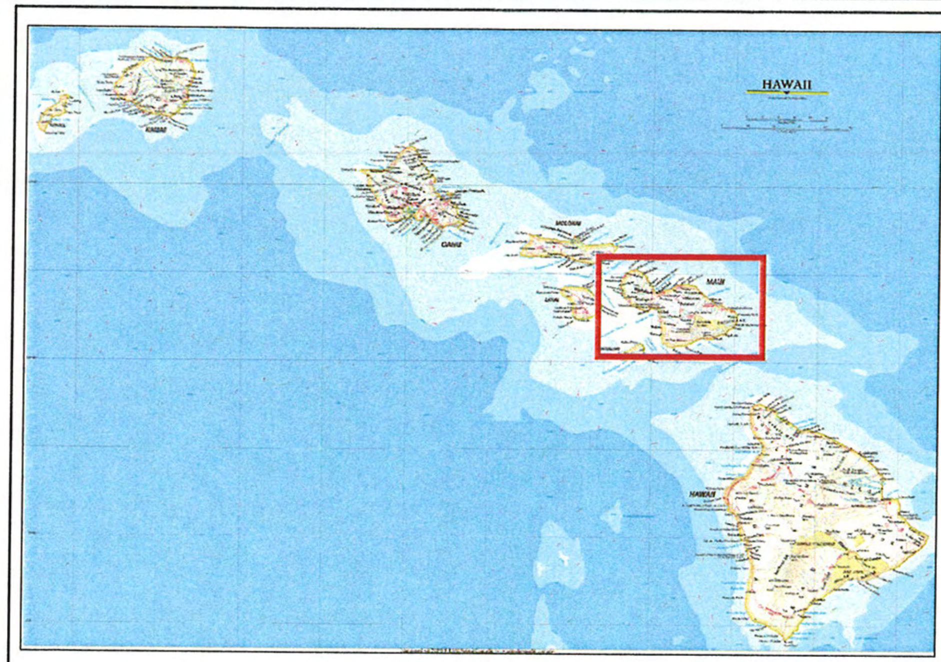
According to Giambelluca et al. (1986), the mean monthly temperatures in Maui range from 70° to 84° Fahrenheit. The average annual rainfall at the site is approximately 20 inches per year (Giambelluca et al., 1986).

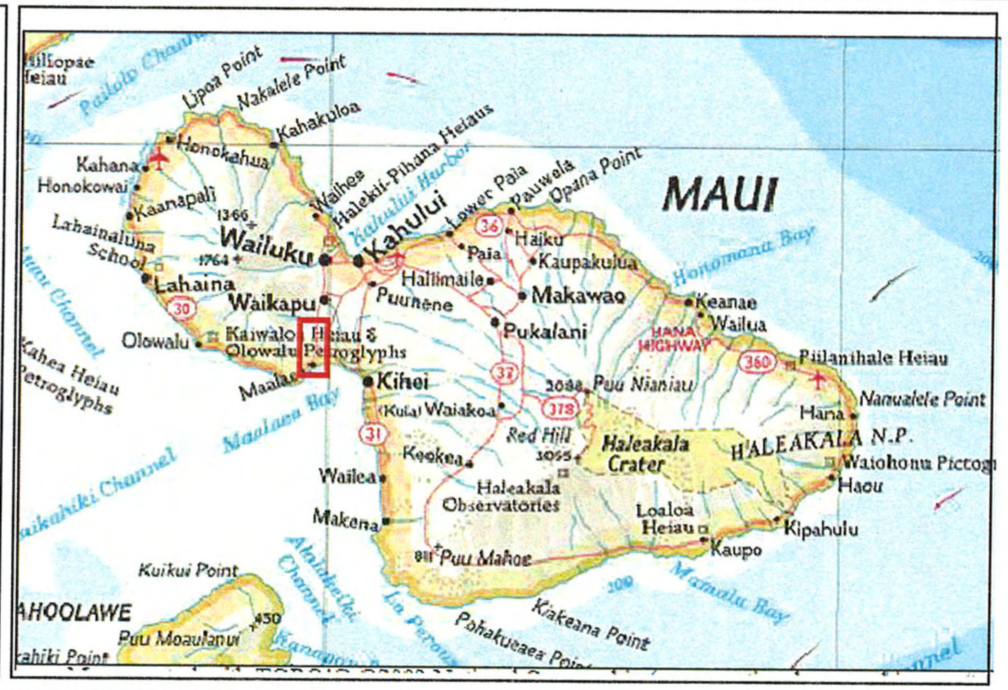
2.2.2 Geology

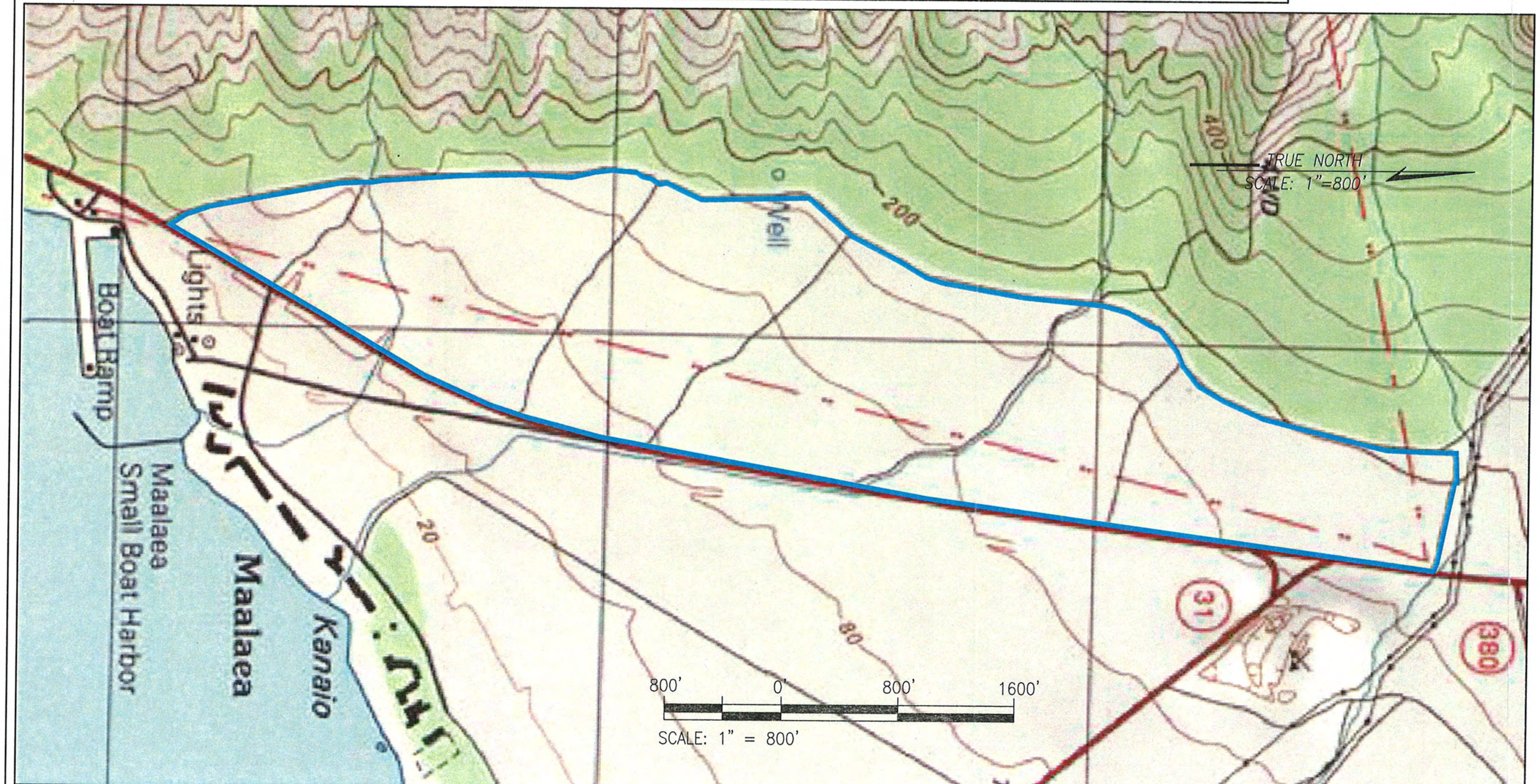
The project site is located along the eastern base of the West Maui Mountains.

According to the U. S. Soil Conservation Service (Foote et al., 1972), the predominant soil types located in the site vicinity are:

> Pulelu cobbly loam – well drained and excessively drained, medium textured, moderately textured, and coarse-textured soils on alluvial fans and in basins on the island of Maui.
>
> Stony alluvial land – moderately well drained, moderately coarse textured soils with moderate infiltration rates.







LEGEND:

SITE BOUNDARY

element environmental llc
environmental · engineering · water resources

PROJECT TITLE:
MAALAEA MAUKA PHASE II ESA SCREENING
MAALAEA , MAUI, HAWAII

FIGURE TITLE:
MAALAEA MAUKA
PROJECT LOCATION MAP

DATE: AUGUST 10, 2007

FIGURE NO.: 2-1

2.2.3 Hydrogeology

The project site is located within the Waikapu Aquifer System of the Wailuku Aquifer Sector (Mink and Lau, 1990). Two aquifers are located beneath the site, an upper aquifer that occurs in sedimentary (alluvial) deposits and a lower (deeper) aquifer that occurs in horizontally extensive lavas. Both aquifers are basal, where freshwater is in contact with seawater. The upper aquifer is unconfined, where the water table is the upper surface of the saturated aquifer; and the lower aquifer is confined by impermeable or poorly permeable formations (the sedimentary deposits) with the top of the saturated aquifer below the surface of the groundwater (Mink and Lau, 1990).

The upper aquifer has the potential to be used, is not a drinking water source or ecologically important, has a moderate salinity (1,000 to 5,000 milligrams per liter of chloride), is replaceable, and is moderately vulnerable to contamination. The lower aquifer has the potential to be used, is not a drinking water source or ecologically important, has a moderate salinity (1,000 to 5,000 milligrams per liter of chloride), is replaceable, and has a low vulnerability to contamination.

Based on regional topography, regional groundwater flow direction is expected to be south-southeast towards the ocean. The nearest drinking water supply wells are located over one mile from subject property to the northwest (Element, 2006). There are five wells registered with the State Department of Land and Natural Resources within a one mile radius of the property. Three wells are being used for irrigation, one well may be used for drinking water for future residential development, and one well does not have a listed use.

2.2.4 Surface Water

The closest surface water body to the site is the Maalaea Small Boat Harbor, which is approximately 500 feet south of the southern end of the site, and is contiguous with the Pacific Ocean. The location of the Maalaea Small Boat Harbor in relation to the site is shown on Figure 2-1. There is also an earthen reservoir located approximately 1,000 feet northwest of the site.

Storm water runoff appears that it would flow into swales and gullies to the south-southwest of the site towards Honoapiilani Highway and Maalaea Harbor.

2.3 Site History

The Phase I ESA completed in November 2006 identified that the property has been historically used for agricultural purposes, specifically sugarcane cultivation, from at least 1950 to the mid 1990s. In an interview conducted during the Phase I ESA, Mr. Avery Chumbley of Wailuku Agribusiness (former user of the property) indicated that pesticides and herbicides were applied to the property as part of the normal agricultural operations. A list of potential pesticides and herbicides that may have been applied to the site was provided by Mr. Chumbley and is included in Appendix A (Element, 2006).

The site is currently occupied by the Maui Cattle Company, which utilizes the site for cattle pastures. Maui Cattle Company has installed wire fences throughout the property to control grazing patterns of the cattle. Maui Cattle Company also has a cattle pen and storage area near the center of the property.

During the Phase I ESA site reconnaissance, fourteen unmarked 55-gallon High Density Polyethylene (HDPE) drums were observed along the dirt road bordering the southwestern

end of the property. Twelve (12) of the drums were partially full with an unknown liquid at the time of the field inspection. Two of the drums were damaged and empty, indicating a potential release. In an interview with Mr. Alex Franco, Manager of Maui Cattle Company, Mr. Franco noted that the drums were present prior to their use of the property over a year ago. Mr. Franco believes that the drums may have been left by one of the farmers that were previously utilizing the property. In a follow-up request for additional information, Mr. Chumbley of Wailuku Agribusiness, indicated that the drums must have been left by a former lessee. Mr. Chumbley planned to have the drums removed by November 17, 2006 (Element, 2006).

Section 3 Field Investigation and Sample Collection

3.1 Sampling Approach

3.1.1 Multi-Increment Sampling

The primary objective of this project was to resolve the following Decision Statement: Determine whether residual levels of pesticides and herbicides resulting from historic agricultural use at the site are present in surface soils, and if present, determine if additional characterization and remediation with regard to the planned future residential development is necessary to protect human health and the environment.

In order to resolve the Decision Statement, E2 determined that an appropriate amount of data would be required. Therefore, a multi-increment sampling strategy was designed to screen the entire 260 acre site. Multi-increment sampling is a method employed to obtain representative samples that exhibit average concentrations of the material being sampled and that account for the variability of concentrations within that particular material. Such a method was developed to provide accurate (closeness of the sample value to its actual value) and precise (closeness of repeated sample values, or repeatability) data.

The multi-increment sampling strategy follows the State of Hawaii Department of Health (HDOH) Hazard Evaluation and Emergency Response Office (HEER) technical report, entitled "Pesticides in Former Agricultural Lands and Related Areas – Updates on Investigation and Assessment" dated May 11, 2007. The sampling strategy employed for this project follows the "neighborhood-size" decision unit approach as outlined in the "Initial Screening of Agricultural Lands" section of the technical report.

The neighborhood size approach breaks down the project site into neighborhood-size decision units on the order of ten acres. The technical report recommends that the size and shape of individual decision units should be determined with respect to soil type, topography, past crop use, proposed redevelopment, etc. Areas suspected of higher levels of contamination (e.g. former pesticide mixing areas, storage areas, plantation camps, rail lines, etc.) are recommended to be investigated separately (HDOH, 2007). For the Maalaea Mauka project site, the site soils and past crop use across the site is relatively uniform and no areas suspected of higher levels of contamination were identified in the Phase I ESA, with the exception of the area with the 14 drums. Therefore, the 260 acre site was divided into eight neighborhood-size decision units on the order of 32.5 acres in area.

Per the technical report, one multi-increment sample was collected from each decision unit. For quality assurance purposes, one decision unit was sampled in triplicate. The field sampling methodology is described in the sections to follow.

3.1.2 Multi-Increment Sample Analyses

The technical report recommends that each multi-increment sample be tested for the full suite of pesticides that may have been used in the past. Based on the list of pesticides and herbicides provided by Mr. Chumbley, the multi-increment samples were analyzed for the following constituents:

- Arsenic and Lead (Method: SW 846);

- Semi-volatile Organic Compounds (Method: GC/MS and 8270C);
- Chlorinated Herbicides (Method: EPA 8151A);
- Organochlorine Pesticides (Method: EPA 8081A);
- Carbamates (Method: EPA 8321A);
- Volatile Organic Compounds (i.e. Fumigants) (Method: EPA 8260B); and
- Polychlorinated Biphenyls (Method: EPA 8082).

The technical report also recommends sampling for dioxins, which may remain in soils even though the parent pesticide has degraded below levels of concern (HDOH, 2007). However, due to the expense of the analysis and the screening nature of this investigation, dioxins were not analyzed as part of this investigation.

3.1.3 Discrete Sampling

During the Phase I ESA site reconnaissance, fourteen unmarked 55-gallon HDPE drums were identified along the dirt road bordering the southwestern end of the property. Twelve (12) of the drums were partially full with an unknown liquid at the time of the field inspection. Two of the drums were damaged and empty, indicating a potential release. In an interview with Mr. Alex Franco, Manager of Maui Cattle Company, Mr. Franco noted that the drums were present prior to their use of the property over a year ago. Mr. Franco believes that the drums may have been left by one of the farmers that were previously utilizing the property. In a follow-up request for additional information, Mr. Chumbley of Wailuku Agribusiness, indicated that the drums must have been left by a former lessee (Element, 2006). Based on the potential for a release from the drums, the area surrounding the drums was separated from the multi-increment decision units and sampled discretely. Two discrete samples were collected from the surface soil directly beneath the drums.

3.1.4 Discrete Sample Analyses

Due to the unknown nature of the drum contents, the discrete surface soil samples collected from the drum area were analyzed for the following complete suite of analytes:

- Total Petroleum Hydrocarbons – gasoline range (Method: EPA 8015M/8260B)
- Total Petroleum Hydrocarbons – diesel range and residual range organics (Method: EPA 8015M)
- RCRA 8 Metals (Method: SW 846)
- Volatile Organic Compounds (Method: EPA 8260B)
- Semi-volatile Organic Compounds (Method: GC/MS)
- Chlorinated Herbicides (Method: EPA 8151A)
- Organochlorine Pesticides (Method: EPA 8081A)
- Polychlorinated Biphenyls (Method: EPA 8082)

3.2 Sample Collection

3.2.1 Decision Unit Establishment

The eight neighborhood size decision units were established at the site utilizing a hand held global positioning system (GPS) unit. Latitude and longitude coordinates of the decision unit boundary corners were obtained from the United States Geological Survey (USGS) Topographic Quadrangle mapping program. The hand held GPS unit was used to locate the boundary corners of the decision units in the field and survey flagging was used to mark these corners. The eight decision units were numbered from 1 to 8 from south to north (Figure 3-1).

3.2.2 Multi-Increment Sample Collection

One multi-increment sample was collected from each of the decision units with one decision unit sampled in triplicate. Per the HDOH technical report, each multi-increment sample consisted of 30 to 50 increments of soil. Each increment was collected approximately 6 inches below the ground surface using dedicated plastic scoop(s) and consisted of approximately 50 grams of soil. The increments were placed into Ziploc bags for shipment to the laboratory and the bags were labeled with the project name, sample identification, and the date/time of sample collection. Prior to handling any soil, E2 personnel donned a new pair of disposable nitrile gloves. New plastic scoops were used to collect each multi-increment sample. Sieving of the samples was not conducted in the field, but rather at the laboratory.

Per the HDOH technical report, the increments were collected in a stratified-random manner by sampling up and down adjacent rows. The increments within a decision unit were physically combined into one sample. The adjacent sampling rows were spaced approximately 160 to 175 feet apart to provide coverage across the entire decision unit. The increment sample locations across several rows in each decision unit were recorded using a hand held GPS unit such that the spatial coverage could be verified by mapping the coordinate locations (Figure 3-2). No suspect areas (i.e. dumping sites, waste pits, etc.) were observed during the multi-increment sampling across the decision units.

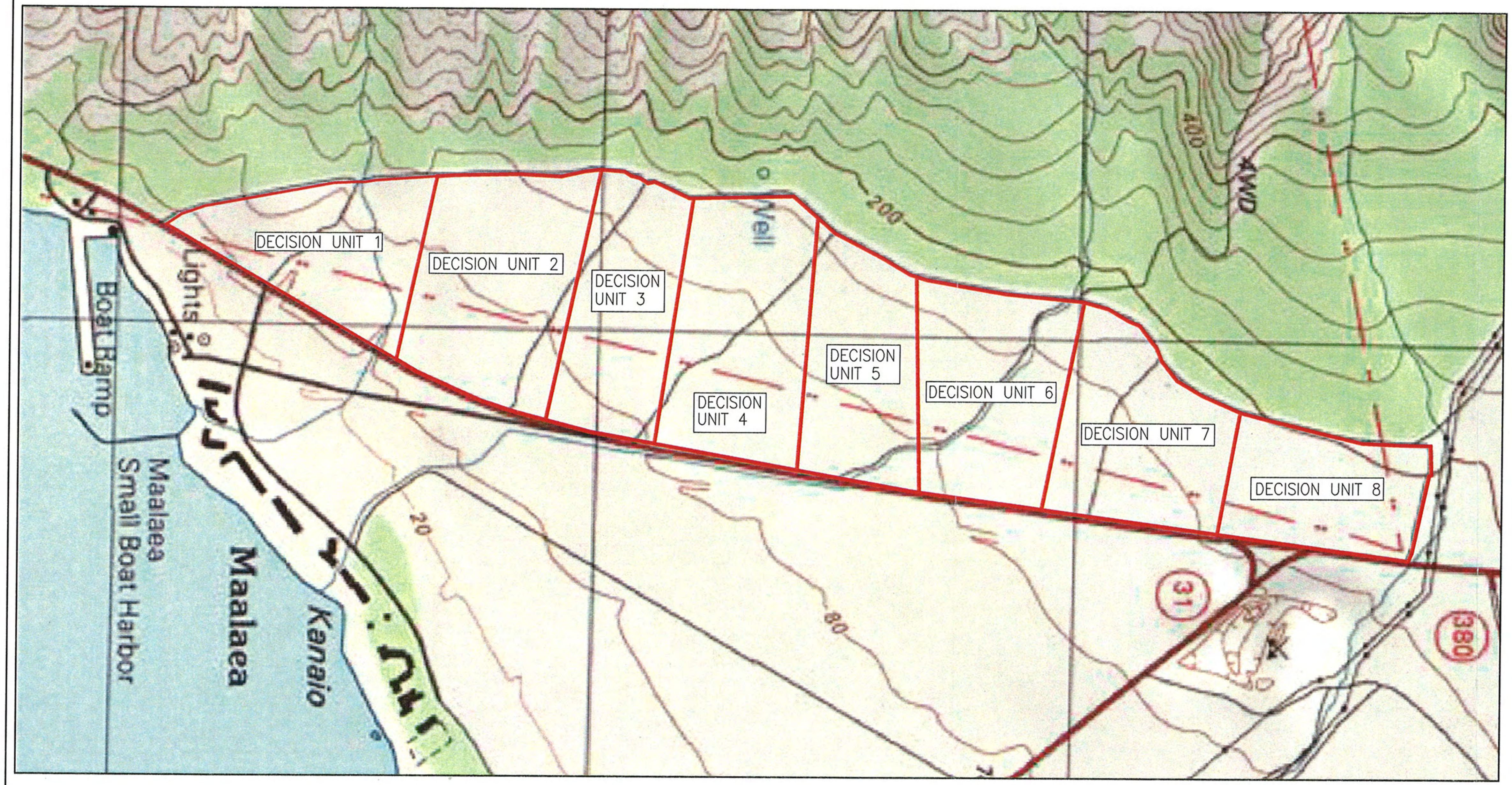
Based on consultation with HEER, discrete sampling for volatile organic compound (VOC) analysis was completed rather than utilizing multi-increment sampling techniques. Discrete VOC samples were collected in the middle of each decision unit at a depth of 18 inches below ground surface (bgs) (Figure 3-2).

A summary of the multi-increment samples collected is presented in Table 3-1 below.

TRUE NORTH
SCALE: 1"=800'

LEGEND:

DECISION UNIT BOUNDARY



800' 0' 800' 1600'
SCALE: 1" = 800'

element environmental llc
environmental · engineering · water resources

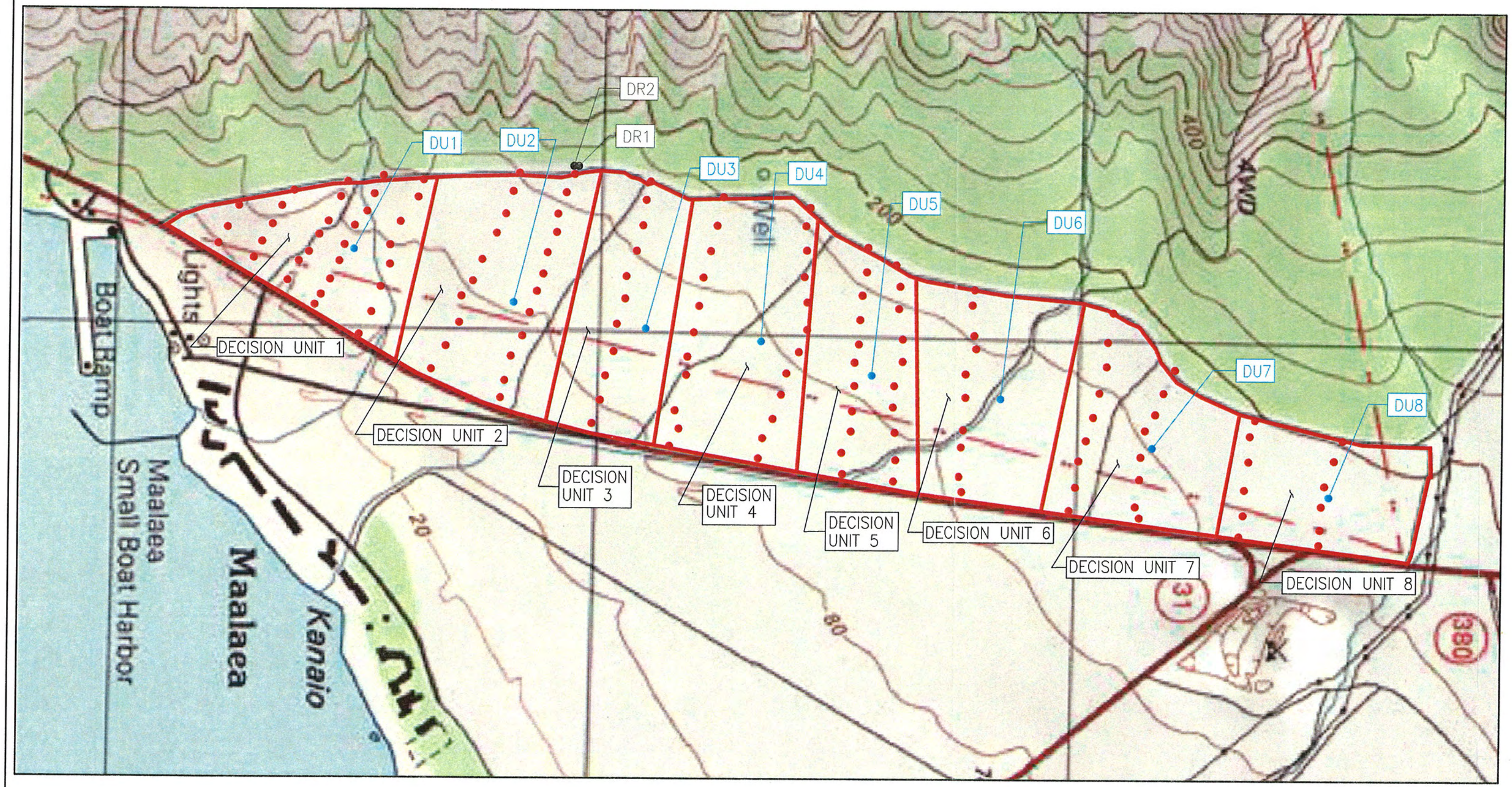
PROJECT TITLE:
MAALAEA MAUKA PHASE II ESA SCREENING
MAALAEA, MAUI, HAWAII

FIGURE TITLE:
MAALAEA MAUKA
DECISION UNITS

DATE: AUGUST 10, 2007

FIGURE NO.: 3-1

TRUE NORTH
SCALE: 1"=800'



LEGEND:

DECISION UNIT BOUNDARY

GPS SAMPLE LOCATIONS

MULTI-INCREMENTAL GPS SAMPLE LOCATION

DU1 VOC GPS SAMPLE LOCATION

DR1 FORMER DRUM GPS SAMPLE LOCATION

800' 0' 800' 1600'

SCALE: 1" = 800'

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PROJECT TITLE:
MAALAEA MAUKA PHASE II ESA SCREENING
MAALAEA, MAUI, HAWAII

FIGURE TITLE:
MAALAEA MAUKA
GPS SAMPLE LOCATIONS

DATE: AUGUST 10, 2007

FIGURE NO.: 3-2

Table 3-1
Multi-Increment Sample Summary

Sample Identification	Decision Unit	Number of Increments
DU1	1	34
DU2	2	51
DU3	3	55
DU4	4	57
DU5	5	54
DU6	6	48
DU7	7	49
DU8	8	40
DU9	1	32
DU10	1	31

3.2.3 Discrete Sample Collection

The 14 drums observed during the Phase I ESA had been properly removed from the site by Wailuku Agribusiness prior to commencement of this field investigation. The area where the drums were observed was located by hand held GPS and verified against photos taken during the Phase I ESA (Figure 3-2). Stressed vegetation and staining was not observed in the area. Two surface soil samples were collected from beneath the former drum locations. The two samples were collected using dedicated plastic scoops and placed into pre-cleaned laboratory jars. The samples were collected approximately 6 inches bgs (18 inches for VOC analysis). The sample jars were labeled with the project name, sample identification, and the date/time of sample collection.

3.2.4 Sample Shipment

All soil samples were chilled immediately upon sample collection. The samples were hand delivered to the analytical laboratory, Test America (TA-Honolulu), on Oahu under proper Chain of Custody procedures. TA-Honolulu processed the samples and completed the majority of the analyses. Sub-samples were sent to their sister laboratories, Severn Trent Laboratories (STL) in Seattle and Anatek Labs (AL) in Idaho, for certain analyses (Chlorinated Herbicides and Organochlorine Pesticides at STL and Carbamates and subset Semi-volatile Organic Compounds at AL).

Section 4 Soil Sampling Results

4.1 Data Evaluation Criteria

The primary objective of this Screening Phase II ESA is to determine if residual levels of pesticides and herbicides are present in site surface soils, and if present, whether the levels warrant further characterization and remediation when considering the planned future land use change from agricultural to residential. Therefore, the soil sample analytical results for this Screening Phase II ESA are compared to the current HDOH Environmental Action Levels (EALs) for sites where groundwater is a current or potential source of drinking water and a surface water body is less than 150 meters from the site (HDOH, 2006) and the U.S. Environmental Protection Agency (EPA) Region 9 Residential Preliminary Remediation Goals (PRGs) (EPA, 2004). In addition, arsenic levels are also compared to the soil action levels presented in the HDOH HEER technical report entitled "Soil Action Levels and Categories for Bioaccessible Arsenic" dated August 7, 2006.

4.2 Sample Results

4.2.1 Multi-increment Sample Results

A total of ten multi-increment samples were collected during this investigation: one from Decision Units 2 through 7 and three from Decision Unit 1. The laboratory analytical results are presented in Table 4-1. Some analytical results within the table are reported as "ND", which indicates that a specific analyte was "not detected" at or above the method reporting limits as shown on the laboratory reports. Concentrations detected above the reporting limit are shown in "bold" font. Detected concentrations that are below the HDOH EALs and EPA Region 9 Residential PRGs are highlighted in light blue. Detected concentrations that are above either the HDOH EALs or EPA Region 9 Residential PRGs are highlighted in orange. Several analytes do not have established EALs or PRGs and are identified on the tables by "NS", which indicates that "no standard" has been established. The complete laboratory reports are provided in Appendix B.

The analytical results indicate that VOCs, semi-volatile organic compounds (SVOCs), chlorinated herbicides, organochlorine pesticides, carbamates, and polychlorinated biphenyls (PCBs) were not detected in any of the multi-increment samples. Lead was detected in two of the ten multi-increment samples at concentrations much lower than the HDOH EAL and EPA Region 9 PRG.

Arsenic was detected in all ten multi-increment samples. The range of concentrations detected was 2.82 mg/kg to 3.98 mg/kg. These arsenic levels are below the HDOH EAL of 20 mg/kg, but above the EPA Region 9 Residential PRG of 0.39 mg/kg. Based on the HDOH HEER technical report for bioaccessible arsenic, concentrations of total arsenic less than or equal to 20 mg/kg are within range of natural occurring levels (i.e. background levels) found in soils throughout Hawaii (HDOH, 2006b). According to Table 1 in the HDOH HEER technical report, residential sites with concentrations of arsenic less than or equal to 20 mg/kg do not require further action or restrictions on land use.

Table 4-1
Laboratory Analytical Results
Multi-increment Samples

Analyte	DU1 Sample Result (mg/kg)	DU1 Reporting Limit (mg/kg)	DU2 Sample Result (mg/kg)	DU2 Reporting Limit (mg/kg)	DU3 Sample Result (mg/kg)	DU3 Reporting Limit (mg/kg)	DU4 Sample Result (mg/kg)	DU4 Reporting Limit (mg/kg)	DU5 Sample Result (mg/kg)	DU5 Reporting Limit (mg/kg)	DU6 Sample Result (mg/kg)	DU6 Reporting Limit (mg/kg)	DU7 Sample Result (mg/kg)	DU7 Reporting Limit (mg/kg)	DU8 Sample Result (mg/kg)	DU8 Reporting Limit (mg/kg)	DU9 Sample Result (mg/kg)	DU9 Reporting Limit (mg/kg)	DU10 Sample Result (mg/kg)	DU10 Reporting Limit (mg/kg)	HDOH Residential EAL (mg/kg)	EPA Region 9 Residential PRG (mg/kg)
TOTAL METALS (SW 846)																						
Arsenic	3.04	0.962	2.94	0.952	3.98	0.98	3.64	0.98	3.33	0.952	3.58	0.943	3.1	0.971	3.41	0.971	2.82	0.935	2.89	0.943	20	0.39
Lead	ND	1.92	5.19	1.9	1.97	1.96	ND	1.96	ND	1.9	ND	1.89	ND	1.94	ND	1.94	ND	1.87	ND	1.89	200	400
SEMIVOLATILE ORGANICS (GC/MS)																						
1,2,4,5-Tetrachlorobenzene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	18
1,2,4-Trichlorobenzene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	1.6	62
1,2-Dichlorobenzene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	1.1	600
1,3-Dichlorobenzene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	7.4	530
1,4-Dichlorobenzene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.065	34
1-Chloronaphthalene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
1-Naphthylamine	ND	0.617	ND	0.658	ND	0.658	ND	0.641	ND	0.635	ND	0.658	ND	0.637	ND	0.633	ND	0.641	ND	0.633	NS	NS
2,3,4,6-Tetrachlorophenol	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.4	1,800
2,4,5-Trichlorophenol	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.18	6,100
2,4,6-Trichlorophenol	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	1.2	6.1
2,4-Dichlorophenol	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.3	180
2,4-Dimethylphenol	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.73	1,200
2,4-Dinitrophenol	ND	1.59	ND	1.69	ND	1.69	ND	1.65	ND	1.63	ND	1.69	ND	1.64	ND	1.63	ND	1.65	ND	1.63	0.21	120
2,4-Dinitrotoluene	ND	0.617	ND	0.658	ND	0.658	ND	0.641	ND	0.635	ND	0.658	ND	0.637	ND	0.633	ND	0.641	ND	0.633	0.25	NS
2,6-Dichlorophenol	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.3	NS
2,6-Dinitrotoluene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.42	120
2-Chloronaphthalene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
2-Chlorophenol	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.012	63
2-Methylnaphthalene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.25	NS
2-Methylphenol (o-Cresol)	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	3,100
2-Naphthylamine	ND	0.617	ND	0.658	ND	0.658	ND	0.641	ND	0.635	ND	0.658	ND	0.637	ND	0.633	ND	0.641	ND	0.633	NS	NS
2-Nitroaniline	ND	1.59	ND	1.69	ND	1.69	ND	1.65	ND	1.63	ND	1.69	ND	1.64	ND	1.63	ND	1.65	ND	1.63	NS	180
2-Nitrophenol	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
2-Picoline	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
3,3-Dichlorobenzidine	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.04	1.1
3-Methylcholanthrene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
3-Nitroaniline	ND	1.59	ND	1.69	ND	1.69	ND	1.65	ND	1.63	ND	1.69	ND	1.64	ND	1.63	ND	1.65	ND	1.63	NS	18
4,6-Dinitro-2-methylphenol	ND	1.59	ND	1.69	ND	1.69	ND	1.65	ND	1.63	ND	1.69	ND	1.64	ND	1.63	ND	1.65	ND	1.63	NS	NS
4-Aminobiphenyl	ND	0.617	ND	0.658	ND	0.658	ND	0.641	ND	0.635	ND	0.658	ND	0.637	ND	0.633	ND	0.641	ND	0.633	NS	NS
4-Bromophenyl phenyl ether	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
4-Chloro-3-methylphenol	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
4-Chloroaniline	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
4-Chlorophenyl phenyl ether	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.053	240
4-Methylphenol (p-Cresol)	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
4-Nitroaniline	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	310
4-Nitrophenol	ND	1.59	ND	1.69	ND	1.69	ND	1.65	ND	1.63	ND	1.69	ND	1.64	ND	1.63	ND	1.65	ND	1.63	NS	23
7,12-Dimethylbenz (a) anthracene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
a,a-Dimethylphenethylamine	ND	1.59	ND	1.69	ND	1.69	ND	1.65	ND	1.63	ND	1.69	ND	1.64	ND	1.63	ND	1.65	ND	1.63	NS	NS
Acenaphthene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.035	61
Acenaphthylene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	16	NS
Acetophenone	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	13	NS
Aniline	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
Anthracene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	85
Azobenzene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	2.8	22,000
Benzidine	ND	1.59	ND	1.69	ND	1.69	ND	1.65	ND	1.63	ND	1.69	ND	1.64	ND	1.63	ND	1.65	ND	1.63	NS	4.4
Benzo (a) anthracene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	0.0021
Benzo (a) pyrene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	6.2	NS
Benzo (b) fluoranthene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.62	0.062
Benzo (g,h,i) perylene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	6.2	0.61

Table 4-1
Laboratory Analytical Results
Multi-increment Samples

Analyte	Sample Number																				HDOH Residential EAL (mg/kg)	EPA Region 9 Residential PRG (mg/kg)
	DU1		DU2		DU3		DU4		DU5		DU6		DU7		DU8		DU9		DU10			
	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)		
Benzo (k) fluoranthene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	37	6.2
Benzoic acid	ND	1.59	ND	1.69	ND	1.69	ND	1.65	ND	1.63	ND	1.69	ND	1.64	ND	1.63	ND	1.65	ND	1.63	NS	100,000
Benzyl alcohol	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	18,000
Bis(2-chloroethoxy)methane	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
Bis(2-chloroethyl)ether	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.00012	0.22
Bis(2-chloroisopropyl) ether	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.003	2.9
Bis(2-ethylhexyl)phthalate (DEHP)	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	35	35
Butyl benzyl phthalate	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	12,000
Chrysene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	23	62
Dibenz (a,j) acridine	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
Dibenzo (a,h) anthtracene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.62	0.062
Dibenzofuran	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	150
Diethylphthalate	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.035	49,000
Dimethylphthalate	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.035	100,000
Dimethylaminoazobenzene	ND	0.617	ND	0.658	ND	0.658	ND	0.641	ND	0.635	ND	0.658	ND	0.637	ND	0.633	ND	0.641	ND	0.633	NS	NS
Di-n-butyl phthalate	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
Di-n-octyl phthalate	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	2,400
Ethyl Methanesulfonate	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
Fluoranthene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	40	2,300
Fluorene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	8.9	2,700
Hexachlorobenzene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.3	0.3
Hexachlorobutadiene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	4.3	6.2
Hexachlorocyclopentadiene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	370
Hexachloroethane	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	16	35
Indeno (1,2,3-cd) pyrene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	6.2	0.62
Isophorone	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.69	510
Methyl Methanesulfonate	ND	0.617	ND	0.658	ND	0.658	ND	0.641	ND	0.635	ND	0.658	ND	0.637	ND	0.633	ND	0.641	ND	0.633	NS	NS
Naphthalene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	1.2	56
Nitrobenzene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.037	20
N-Nitrosodimethylamine	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	0.022
N-Nitrosodi-n-butylamine	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	0.024
N-Nitrosodi-n-propylamine	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	0.069
N-Nitrosodiphenylamine	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	99
N-Nitrosopiperidine	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
Pentachloronitrobenzene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	1.9
Pentachlorophenol	ND	1.59	ND	1.69	ND	1.69	ND	1.65	ND	1.63	ND	1.69	ND	1.64	ND	1.63	ND	1.65	ND	1.63	3	NS
Phenacetin	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	NS
Phenanthrene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	11	NS
Phenol	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	0.076	18,000
Pronamide	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	4,600
Pyrene	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	85	2,300
Pyridine	ND	0.308	ND	0.329	ND	0.329	ND	0.320	ND	0.317	ND	0.329	ND	0.318	ND	0.316	ND	0.320	ND	0.316	NS	61
CHLORINATED HERBICIDES (EPA 8151A)																						
Dalapon	ND	0.0083	ND	0.0082	ND	0.0082	ND	0.0081	ND	0.0081	ND	0.0082	ND	0.0083	ND	0.0078	ND	0.0083	ND	0.0080	0.091	1,800
4-Nitrophenol	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0032	ND	0.0033	ND	0.0033	ND	0.0031	ND	0.0033	ND	0.0032	NS	NS
Dicamba	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0032	ND	0.0033	ND	0.0033	ND	0.0031	ND	0.0033	ND	0.0032	NS	1,800
MCPP	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0032	ND	0.0033	ND	0.0033	ND	0.0031	ND	0.0033	ND	0.0032	NS	NS
MCPA	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0032	ND	0.0033	ND	0.0033	ND	0.0031	ND	0.0033	ND	0.0032	NS	NS
Dichlorprop	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0032	ND	0.0033	ND	0.0033	ND	0.0031	ND	0.0033	ND	0.0032	NS	NS
2,4-D	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0032	ND	0.0033	ND	0.0033	ND	0.0031	ND	0.0033	ND	0.0032	2.7	690
Pentachlorophenol	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0032	ND	0.0033	ND	0.0033	ND	0.0031	ND	0.0033	ND	0.0032	3.0	3.0
Silvex (2,4,5-TP)	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0032	ND	0.0033	ND	0.0033	ND	0.0031	ND	0.0033	ND	0.0032	0.67	490
2,4,5-T	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0032	ND	0.0033	ND	0.0033	ND	0.0031	ND	0.0033	ND	0.0032	NS	610

Table 4-1
Laboratory Analytical Results
Multi-increment Samples

Analyte	DU1 Sample Result (mg/kg)	DU1 Reporting Limit (mg/kg)	DU2 Sample Result (mg/kg)	DU2 Reporting Limit (mg/kg)	DU3 Sample Result (mg/kg)	DU3 Reporting Limit (mg/kg)	DU4 Sample Result (mg/kg)	DU4 Reporting Limit (mg/kg)	DU5 Sample Result (mg/kg)	DU5 Reporting Limit (mg/kg)	DU6 Sample Result (mg/kg)	DU6 Reporting Limit (mg/kg)	DU7 Sample Result (mg/kg)	DU7 Reporting Limit (mg/kg)	DU8 Sample Result (mg/kg)	DU8 Reporting Limit (mg/kg)	DU9 Sample Result (mg/kg)	DU9 Reporting Limit (mg/kg)	DU10 Sample Result (mg/kg)	DU10 Reporting Limit (mg/kg)	HDOH Residential EAL (mg/kg)	EPA Region 9 Residential PRG (mg/kg)
Dinoseb	ND	0.0083	ND	0.0082	ND	0.0082	ND	0.0081	ND	0.0081	ND	0.0082	ND	0.0083	ND	0.0078	ND	0.0083	ND	0.0080	NS	61
2,4-DB	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0033	ND	0.0032	ND	0.0033	ND	0.0033	ND	0.0031	ND	0.0033	ND	0.0032	NS	490
ORGANOCHLORINE PESTICIDES (EPA 8081A)																						
Aldrin	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00064	ND	0.00067	ND	0.00065	ND	0.00065	ND	0.00066	0.029	0.029
alpha-BHC	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00064	ND	0.00067	ND	0.00065	ND	0.00065	ND	0.00066	NS	0.09
beta-BHC	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00064	ND	0.00067	ND	0.00065	ND	0.00065	ND	0.00066	NS	0.32
delta-BHC	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00064	ND	0.00067	ND	0.00065	ND	0.00065	ND	0.00066	NS	NS
gamma-BHC (Lindane)	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00064	ND	0.00067	ND	0.00065	ND	0.00065	ND	0.00066	0.049	0.44
4,4'-DDD	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	2.4	2.4
4,4'-DDE	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	2.4	1.7
4,4'-DDT	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	1.7	1.7
Dieldrin	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	0.0023	0.03
Endosulfan I	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00064	ND	0.00067	ND	0.00065	ND	0.00065	ND	0.00066	0.0046	370
Endosulfan II	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	NS	NS
Endosulfan sulfate	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	NS	NS
Endrin	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	0.00065	18
Endrin aldehyde	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	NS	NS
Heptachlor	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00064	ND	0.00067	ND	0.00065	ND	0.00065	ND	0.00066	0.013	0.11
Heptachlor epoxide	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00064	ND	0.00067	ND	0.00065	ND	0.00065	ND	0.00066	0.014	0.053
Methoxychlor	ND	0.0065	ND	0.0065	ND	0.0065	ND	0.0065	ND	0.0065	ND	0.0064	ND	0.0067	ND	0.0065	ND	0.0065	ND	0.0066	19	310
Endrin ketone	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	ND	0.0013	NS	NS
Toxaphene	ND	0.065	ND	0.065	ND	0.065	ND	0.065	ND	0.065	ND	0.064	ND	0.067	ND	0.065	ND	0.065	ND	0.066	0.00042	0.44
alpha-Chlordane	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00064	ND	0.00067	ND	0.00065	ND	0.00065	ND	0.00066	1.6	1.6
gamma-Chlordane	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00065	ND	0.00064	ND	0.00067	ND	0.00065	ND	0.00065	ND	0.00066	1.6	1.6
POLYCHLORINATED BIPHENYLS (EPA 8082)																						
Aroclor 1016	ND	0.0321	ND	0.0322	ND	0.0315	ND	0.0331	ND	0.0323	ND	0.0326	ND	0.0330	ND	0.0318	ND	0.0310	ND	0.0324	1.1	3.9
Aroclor 1221	ND	0.0641	ND	0.0643	ND	0.0631	ND	0.0662	ND	0.0645	ND	0.0651	ND	0.0660	ND	0.0637	ND	0.0619	ND	0.0647	1.1	NS
Aroclor 1232	ND	0.0321	ND	0.0322	ND	0.0315	ND	0.0331	ND	0.0323	ND	0.0326	ND	0.0330	ND	0.0318	ND	0.0310	ND	0.0324	1.1	NS
Aroclor 1242	ND	0.0321	ND	0.0322	ND	0.0315	ND	0.0331	ND	0.0323	ND	0.0326	ND	0.0330	ND	0.0318	ND	0.0310	ND	0.0324	1.1	NS
Aroclor 1248	ND	0.0321	ND	0.0322	ND	0.0315	ND	0.0331	ND	0.0323	ND	0.0326	ND	0.0330	ND	0.0318	ND	0.0310	ND	0.0324	1.1	NS
Aroclor 1254	ND	0.0321	ND	0.0322	ND	0.0315	ND	0.0331	ND	0.0323	ND	0.0326	ND	0.0330	ND	0.0318	ND	0.0310	ND	0.0324	1.1	0.22
Aroclor 1260	ND	0.0321	ND	0.0322	ND	0.0315	ND	0.0331	ND	0.0323	ND	0.0326	ND	0.0330	ND	0.0318	ND	0.0310	ND	0.0324	1.1	NS
VOLATILE ORGANIC COMPOUNDS (EPA 8260B)																						
1,1,1-Trichloroethane	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	7.8	1,200
1,1,2,2-Tetrachloroethane	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	0.00099	0.41
1,1,2-Trichloroethane	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	0.026	0.73
1,1-Dichloroethane	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	1.9	510
1,1-Dichloroethylene	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	1.2	120
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	0.0009	0.46
1,2-Dibromoethane (EDB)	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	0.000052	0.032
1,2-Dichlorobenzene	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	1.1	600
1,2-Dichloroethane (EDC)	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	0.0011	0.28
1,2-Dichloropropane	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	0.021	0.34
1,3-Dichlorobenzene	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	7.4	530
1,4-Dichlorobenzene	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	0.065	3.4
Bromodichloromethane	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	0.0034	0.82
Bromoform (tribromomethane)	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	2.2	62
Bromomethane (methyl bromide)	ND	0.0988	ND	0.0977	ND	0.0998	ND	0.100	ND	0.0998	ND	0.0998	ND	0.0992	ND	0.100	NA	-	NA	-	0.34	3.9
Carbon Tetrachloride	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	0.027	0.25
Chlorobenzene	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	1.5	150
Chlorodibromomethane	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	NS	340

Table 4-1
Laboratory Analytical Results
Multi-increment Samples

Analyte	Sample Number																				HDOH Residential EAL (mg/kg)	EPA Region 9 Residential PRG (mg/kg)
	DU1		DU2		DU3		DU4		DU5		DU6		DU7		DU8		DU9		DU10			
	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)		
Chloroethane	ND	0.0494	ND	0.0488	ND	0.0499	ND	0.0500	ND	0.0499	ND	0.0499	ND	0.0496	ND	0.0501	NA	-	NA	-	0.27	3.0
Chloroform	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	0.018	0.22
Chloromethane (methyl chloride)	ND	0.0494	ND	0.0488	ND	0.0499	ND	0.0500	ND	0.0499	ND	0.0499	ND	0.0496	ND	0.0501	NA	-	NA	-	16	47
cis-1,2-Dichloroethylene	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	2.2	43
cis-1,3-Dichloropropene	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	NS	NS
Dichlorodifluoromethane	ND	0.0494	ND	0.0488	ND	0.0499	ND	0.0500	ND	0.0499	ND	0.0499	ND	0.0496	ND	0.0501	NA	-	NA	-	NS	94
Methylene Chloride	ND	0.0494	ND	0.0488	ND	0.0499	ND	0.0500	ND	0.0499	ND	0.0499	ND	0.0496	ND	0.0501	NA	-	NA	-	0.067	9.1
Tetrachloroethylene (PCE)	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	0.069	0.48
trans-1,2-Dichloroethylene	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	6.7	69
1,3-Dichloropropene	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	0.046	0.78
Trichloroethylene (TCE)	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	0.036	0.053
Trichlorofluoromethane	ND	0.00988	ND	0.00977	ND	0.00998	ND	0.0100	ND	0.00998	ND	0.00998	ND	0.00992	ND	0.0100	NA	-	NA	-	NS	390
Vinyl chloride	ND	0.0494	ND	0.0488	ND	0.0499	ND	0.0500	ND	0.0499	ND	0.0499	ND	0.0496	ND	0.0501	NA	-	NA	-	0.02	0.079
SEMI-VOLATILE ORGANIC COMPOUNDS (EPA 8270C)																						
Ametryne	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	1.1	550
Atrazine	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	0.11	2.2
Diazinon	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	NS	55
Fenamiphos	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	NS	15
Hexazinone	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	120	2,000
Metribuzin	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.05	NS	1,500
CARBAMATES (EPA 8321A)																						
Diuron	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	1.4	120
Oxamyl	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	NS	1,500

Notes:
ND - Sample not dectected above laboratory reporting limit.
NS - No standard set for analyte.
NA - Sample not analyzed for that analyte.
Detected concentrations below EALs and PRGs are indicated in **bold** and highlighted light blue.
Detected concentrations above either EALs or PRGs are indicated in **bold** and highlighted orange.

4.2.2 Discrete Sample Results

Two discrete surface soil samples were collected from the area where 14 drums were identified in the Phase I ESA. The laboratory analytical results for these two samples are summarized in Table 4-2. The complete laboratory analytical reports are provided in Appendix B.

The analytical results indicate that total petroleum hydrocarbons-gasoline range (TPH-gas); total petroleum hydrocarbons-diesel range (TPH-diesel); benzene, toluene, ethylbenzene, and xylene (BTEX); VOCs; SVOCs; chlorinated herbicides; organochlorine pesticides; and PCBs were not detected in either sample. One sample, Drum-2, did contain total petroleum hydrocarbons-residual range organics (TPH-rro) at a concentration of 21.9 mg/kg, well below the HDOH EAL of 500 mg/kg.

The metals barium, cadmium, chromium, and lead were detected in both samples. Mercury was also detected in sample Drum-2. The detected metal concentrations were all below the HDOH EALs and EPA Region 9 PRGs except for chromium in sample Drum-1. Chromium was detected at a concentration of 240 mg/kg in sample Drum-1, slightly above the EAL and PRG of 210 mg/kg. However, this concentration of chromium represents a human health cancer risk of 1.1×10^{-6}, which is within EPA's acceptable human health cancer risk range of 1×10^{-6} to 1×10^{-4}.

4.2.3 Quality Control Samples

Decision Unit 1 was sampled in triplicate for quality assurance / quality control (QA/QC) purposes. Arsenic was the only analyte detected in these three multi-increment samples. The arsenic concentrations in these three samples, DU1, DU9, and DU10 were 3.04 mg/kg, 2.82 mg/kg, and 2.89 mg/kg, respectively. The relative percent difference (RPD) of these samples ranges from 5 to 7.5 percent. This low RPD range represents a high precision in the field sampling methodology.

Laboratory QA/QC procedures employed for this project were standard laboratory QA/QC procedures which included using standard EPA test methods, and analyzing one or more of the following: method blanks, laboratory control spikes, matrix spikes, matrix spike duplicates, laboratory control samples and sample duplicates. QA/QC results and QA/QC case narratives are included in the attached laboratory reports. According to TA-Honolulu, the laboratory QA/QC analysis met quality assurance objectives with the exceptions noted in the case narratives. Due to logistical issues regarding sample preparation and shipment to the mainland, the organochlorine pesticide analyses were extracted outside of recommended hold times and were flagged as estimated. Considering that organochlorine pesticides are semi-volatile and very persistent in the environment, the organochlorine pesticide sample results are considered useable for screening purposes.

Table 4-2
Laboratory Analytical Results
Discrete Samples from Drum Area

Analyte	Sample Number				HDOH Residential EAL (mg/kg)	EPA Region 9 Residential PRG (mg/kg)
	Drum 1		Drum 2			
	Sample Result (mg/kg)	Reporting Limit (mg/kg)	Sample Result (mg/kg)	Reporting Limit (mg/kg)		
EXTRACTABLE PETROLEUM HYDROCARBONS (EPA 8015M)						
DRO	ND	6.55	ND	6.66	500	NS
RRO	ND	19.7	21.9	20.0	500	NS
GASOLINE RANGE ORGANICS / BTEX (EPA 8015M/8260B)						
GRO	ND	0.495	ND	0.488	100	NS
Benzene	ND	0.00198	ND	0.00195	0.22	0.64
Ethylbenzene	ND	0.00198	ND	0.00195	3.3	400
m,p-xylene	ND	0.00396	ND	0.00391	2.3 (total)	270 (total)
o-Xylene	ND	0.00198	ND	0.00195	2.3 (total)	270 (total)
Toluene	ND	0.00198	ND	0.00195	2.9	520
TOTAL METALS (SW 846)						
Arsenic	ND	4.50	ND	4.55	20	0.39
Barium	107	9.01	95.3	9.09	750	5,400
Cadmium	3.88	1.8	2.26	1.82	12	37
Chromium	240	4.5	171	4.55	210	210
Lead	60.8	9.01	124	9.09	200	400
Mercury	ND	0.0192	0.0511	0.0181	10	23
Selenium	ND	9.01	ND	9.09	10	390
Silver	ND	4.50	ND	4.55	20	390
SEMIVOLATILE ORGANICS (GC/MS)						
1,2,4,5-Tetrachlorobenzene	ND	0.320	ND	0.322	NS	18
1,2,4-Trichlorobenzene	ND	0.320	ND	0.322	1.6	62
1,2-Dichlorobenzene	ND	0.320	ND	0.322	1.1	600
1,3-Dichlorobenzene	ND	0.320	ND	0.322	7.4	530
1,4-Dichlorobenzene	ND	0.320	ND	0.322	0.065	34
1-Chloronaphthalene	ND	0.320	ND	0.322	NS	NS
1-Naphthylamine	ND	0.641	ND	0.645	NS	NS
2,3,4,6-Tetrachlorophenol	ND	0.320	ND	0.322	0.4	1,800
2,4,5-Trichlorophenol	ND	0.320	ND	0.322	0.18	6,100
2,4,6-Trichlorophenol	ND	0.320	ND	0.322	1.2	6.1
2,4-Dichlorophenol	ND	0.320	ND	0.322	0.3	180
2,4-Dimethylphenol	ND	0.320	ND	0.322	0.73	1,200
2,4-Dinitrophenol	ND	1.65	ND	1.66	0.21	120
2,4-Dinitrotoluene	ND	0.641	ND	0.645	0.25	NS
2,6-Dichlorophenol	ND	0.320	ND	0.322	0.3	NS
2,6-Dinitrotoluene	ND	0.320	ND	0.322	0.42	120
2-Chloronaphthalene	ND	0.320	ND	0.322	NS	NS
2-Chlorophenol	ND	0.320	ND	0.322	0.012	63
2-Methylnaphthalene	ND	0.320	ND	0.322	0.25	NS
2-Methylphenol (o-Cresol)	ND	0.320	ND	0.322	NS	3,100
2-Naphthylamine	ND	0.641	ND	0.645	NS	NS
2-Nitroaniline	ND	1.65	ND	1.66	NS	180
2-Nitrophenol	ND	0.320	ND	0.322	NS	NS
2-Picoline	ND	0.320	ND	0.322	NS	NS
3,3-Dichlorobenzidine	ND	0.320	ND	0.322	0.04	1.1
3-Methylcholanthrene	ND	0.320	ND	0.322	NS	NS
3-Nitroaniline	ND	1.65	ND	1.66	NS	18
4,6-Dinitro-2-methylphenol	ND	1.65	ND	1.66	NS	NS
4-Aminobiphenyl	ND	0.641	ND	0.645	NS	NS

Table 4-2
Laboratory Analytical Results
Discrete Samples from Drum Area

Analyte	Drum 1 Sample Result (mg/kg)	Drum 1 Reporting Limit (mg/kg)	Drum 2 Sample Result (mg/kg)	Drum 2 Reporting Limit (mg/kg)	HDOH Residential EAL (mg/kg)	EPA Region 9 Residential PRG (mg/kg)
4-Bromophenyl phenyl ether	ND	0.320	ND	0.322	NS	NS
4-Chloro-3-methylphenol	ND	0.320	ND	0.322	NS	NS
4-Chloroaniline	ND	0.320	ND	0.322	0.053	240
4-Chlorophenyl phenyl ether	ND	0.320	ND	0.322	NS	NS
4-Methylphenol (p-Cresol)	ND	0.320	ND	0.322	NS	310
4-Nitroaniline	ND	0.320	ND	0.322	NS	23
4-Nitrophenol	ND	1.65	ND	1.66	NS	NS
7,12-Dimethylbenz (a) anthracene	ND	0.320	ND	0.322	NS	NS
a,a-Dimethylphenethylamine	ND	1.65	ND	1.66	0.035	61
Acenaphthene	ND	0.320	ND	0.322	16	NS
Acenaphthylene	ND	0.320	ND	0.322	13	NS
Acetophenone	ND	0.320	ND	0.322	NS	NS
Aniline	ND	0.320	ND	0.322	NS	85
Anthracene	ND	0.320	ND	0.322	2.8	22,000
Azobenzene	ND	0.320	ND	0.322	NS	4.4
Benzidine	ND	1.65	ND	1.66	NS	0.0021
Benzo (a) anthracene	ND	0.320	ND	0.322	6.2	NS
Benzo (a) pyrene	ND	0.320	ND	0.322	0.62	0.062
Benzo (b) fluoranthene	ND	0.320	ND	0.322	6.2	0.61
Benzo (g,h,i) perylene	ND	0.320	ND	0.322	27	NS
Benzo (k) fluoranthene	ND	0.320	ND	0.322	37	6.2
Benzoic acid	ND	1.65	ND	1.66	NS	100,000
Benzyl alcohol	ND	0.320	ND	0.322	NS	18,000
Bis(2-chloroethoxy)methane	ND	0.320	ND	0.322	NS	NS
Bis(2-chloroethyl)ether	ND	0.320	ND	0.322	0.00012	0.22
Bis(2-chloroisopropyl) ether	ND	0.320	ND	0.322	0.003	2.9
Bis(2-ethylhexyl)phthalate (DEHP)	ND	0.320	ND	0.322	35	35
Butyl benzyl phthalate	ND	0.320	ND	0.322	NS	12,000
Chrysene	ND	0.320	ND	0.322	23	62
Dibenz (a,j) acridine	ND	0.320	ND	0.322	NS	NS
Dibenzo (a,h) anthtracene	ND	0.320	ND	0.322	0.62	0.062
Dibenzofuran	ND	0.320	ND	0.322	NS	150
Diethylphthalate	ND	0.320	ND	0.322	0.035	49,000
Dimethylphthalate	ND	0.320	ND	0.322	0.035	100,000
Dimethylaminoazobenzene	ND	0.641	ND	0.645	NS	NS
Di-n-butyl phthalate	ND	0.320	ND	0.322	NS	NS
Di-n-octyl phthalate	ND	0.320	ND	0.322	NS	2,400
Ethyl Methanesulfonate	ND	0.320	ND	0.322	NS	NS
Fluoranthene	ND	0.320	ND	0.322	40	2,300
Fluorene	ND	0.320	ND	0.322	8.9	2,700
Hexachlorobenzene	ND	0.320	ND	0.322	0.3	0.3
Hexachlorobutadiene	ND	0.320	ND	0.322	4.3	6.2
Hexachlorocyclopentadiene	ND	0.320	ND	0.322	NS	370
Hexachloroethane	ND	0.320	ND	0.322	16	35
Indeno (1,2,3-cd) pyrene	ND	0.320	ND	0.322	6.2	0.62
Isophorone	ND	0.320	ND	0.322	0.69	510
Methyl Methanesulfonate	ND	0.641	ND	0.645	NS	NS
Naphthalene	ND	0.320	ND	0.322	1.2	56
Nitrobenzene	ND	0.320	ND	0.322	0.037	20
N-Nitrosodimethylamine	ND	0.320	ND	0.322	NS	0.022
N-Nitrosodi-n-butylamine	ND	0.320	ND	0.322	NS	0.024
N-Nitrosodi-n-propylamine	ND	0.320	ND	0.322	NS	0.069

Table 4-2
Laboratory Analytical Results
Discrete Samples from Drum Area

Analyte	Drum 1 Sample Result (mg/kg)	Drum 1 Reporting Limit (mg/kg)	Drum 2 Sample Result (mg/kg)	Drum 2 Reporting Limit (mg/kg)	HDOH Residential EAL (mg/kg)	EPA Region 9 Residential PRG (mg/kg)
N-Nitrosodiphenylamine	ND	0.320	ND	0.322	NS	99
N-Nitrosopiperidine	ND	0.320	ND	0.322	NS	NS
Pentachloronitrobenzene	ND	0.320	ND	0.322	NS	1.9
Pentachlorophenol	ND	1.65	ND	1.66	3	NS
Phenacetin	ND	0.320	ND	0.322	NS	NS
Phenanthrene	ND	0.320	ND	0.322	11	NS
Phenol	ND	0.320	ND	0.322	0.076	18,000
Pronamide	ND	0.320	ND	0.322	NS	4,600
Pyrene	ND	0.320	ND	0.322	85	2,300
Pyridine	ND	0.320	ND	0.322	NS	61
CHLORINATED HERBICIDES (EPA 8151A)						
Dalapon	ND	0.0083	ND	0.0083	0.091	1,800
4-Nitrophenol	ND	0.0033	ND	0.0033	NS	NS
Dicamba	ND	0.0033	ND	0.0033	NS	1,800
MCPP	ND	0.0033	ND	0.0033	NS	NS
MCPA	ND	0.0033	ND	0.0033	NS	NS
Dichlorprop	ND	0.0033	ND	0.0033	NS	NS
2,4-D	ND	0.0033	ND	0.0033	2.7	690
Pentachlorophenol	ND	0.0033	ND	0.0033	3.0	3.0
Silvex (2,4,5-TP)	ND	0.0033	ND	0.0033	0.67	490
2,4,5-T	ND	0.0033	ND	0.0033	NS	610
Dinoseb	ND	0.0083	ND	0.0083	NS	61
2,4-DB	ND	0.0033	ND	0.0033	NS	490
ORGANOCHLORINE PESTICIDES (EPA 8081A)						
Aldrin	ND	0.00066	ND	0.00064	0.029	0.029
alpha-BHC	ND	0.00066	ND	0.00064	NS	0.09
beta-BHC	ND	0.00066	ND	0.00064	NS	0.32
delta-BHC	ND	0.00066	ND	0.00064	NS	NS
gamma-BHC (Lindane)	ND	0.00066	ND	0.00064	0.049	0.44
4,4'-DDD	ND	0.0013	ND	0.0013	2.4	2.4
4,4'-DDE	ND	0.0013	ND	0.0013	2.4	1.7
4,4'-DDT	ND	0.0013	ND	0.0013	1.7	1.7
Dieldrin	ND	0.0013	ND	0.0013	0.0023	0.03
Endosulfan I	ND	0.00066	ND	0.00064	0.0046	370
Endosulfan II	ND	0.0013	ND	0.0013	NS	NS
Endosulfan sulfate	ND	0.0013	ND	0.0013	NS	NS
Endrin	ND	0.0013	ND	0.0013	0.00065	18
Endrin aldehyde	ND	0.0013	ND	0.0013	NS	NS
Heptachlor	ND	0.00066	ND	0.00064	0.013	0.11
Heptachlor epoxide	ND	0.00066	ND	0.00064	0.014	0.053
Methoxychlor	ND	0.0066	ND	0.0064	19	310
Endrin ketone	ND	0.0013	ND	0.0013	NS	NS
Toxaphene	ND	0.066	ND	0.064	0.00042	0.44
alpha-Chlordane	ND	0.00066	ND	0.00064	1.6	1.6
gamma-Chlordane	ND	0.00066	ND	0.00064	1.6	1.6

Table 4-2
Laboratory Analytical Results
Discrete Samples from Drum Area

Analyte	Drum 1 Sample Result (mg/kg)	Drum 1 Reporting Limit (mg/kg)	Drum 2 Sample Result (mg/kg)	Drum 2 Reporting Limit (mg/kg)	HDOH Residential EAL (mg/kg)	EPA Region 9 Residential PRG (mg/kg)
POLYCHLORINATED BIPHENYLS (EPA 8082)						
Aroclor 1016	ND	0.0330	ND	0.0333	1.1	3.9
Aroclor 1221	ND	0.0660	ND	0.0667	1.1	NS
Aroclor 1232	ND	0.0330	ND	0.0333	1.1	NS
Aroclor 1242	ND	0.0330	ND	0.0333	1.1	NS
Aroclor 1248	ND	0.0330	ND	0.0333	1.1	NS
Aroclor 1254	ND	0.0330	ND	0.0333	1.1	0.22
Aroclor 1260	ND	0.0330	ND	0.0333	1.1	NS
VOLATILE ORGANIC COMPOUNDS (EPA 8260B)						
1,1,1-Trichloroethane	ND	0.00990	ND	0.00977	7.8	1,200
1,1,2,2-Tetrachloroethane	ND	0.00990	ND	0.00977	0.00099	0.41
1,1,2-Trichloroethane	ND	0.00990	ND	0.00977	0.026	0.73
1,1-Dichloroethane	ND	0.00990	ND	0.00977	1.9	510
1,1-Dichloroethylene	ND	0.00990	ND	0.00977	1.2	120
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.00990	ND	0.00977	0.0009	0.46
1,2-Dibromoethane (EDB)	ND	0.00990	ND	0.00977	0.000052	0.032
1,2-Dichlorobenzene	ND	0.00990	ND	0.00977	1.1	600
1,2-Dichloroethane (EDC)	ND	0.00990	ND	0.00977	0.0011	0.28
1,2-Dichloropropane	ND	0.00990	ND	0.00977	0.021	0.34
1,3-Dichlorobenzene	ND	0.00990	ND	0.00977	7.4	530
1,4-Dichlorobenzene	ND	0.00990	ND	0.00977	0.065	3.4
Bromodichloromethane	ND	0.00990	ND	0.00977	0.0034	0.82
Bromoform (tribromomethane)	ND	0.00990	ND	0.00977	2.2	62
Bromomethane (methyl bromide)	ND	0.0990	ND	0.0977	0.34	3.9
Carbon Tetrachloride	ND	0.00990	ND	0.00977	0.027	0.25
Chlorobenzene	ND	0.00990	ND	0.00977	1.5	150
Chlorodibromomethane	ND	0.00990	ND	0.00977	NS	340
Chloroethane	ND	0.0495	ND	0.0488	0.27	3.0
Chloroform	ND	0.00990	ND	0.00977	0.018	0.22
Chloromethane (methyl chloride)	ND	0.0495	ND	0.0488	16	47
cis-1,2-Dichloroethylene	ND	0.00990	ND	0.00977	2.2	43
cis-1,3-Dichloropropene	ND	0.00990	ND	0.00977	NS	NS
Dichlorodifluoromethane	ND	0.0495	ND	0.0488	NS	94
Methylene Chloride	ND	0.0495	ND	0.0488	0.067	9.1
Tetrachloroethylene (PCE)	ND	0.00990	ND	0.00977	0.069	0.48
trans-1,2-Dichloroethylene	ND	0.00990	ND	0.00977	6.7	69
1,3-Dichloropropene	ND	0.00990	ND	0.00977	0.046	0.78
Trichloroethylene (TCE)	ND	0.00990	ND	0.00977	0.036	0.053
Trichlorofluoromethane	ND	0.00990	ND	0.00977	NS	390
Vinyl chloride	ND	0.0495	ND	0.0488	0.02	0.079

Notes:
ND - Sample not dectected above laboratory reporting limit.
NS - No standard set for analyte.
NA - Sample not analyzed for that analyte.
Detected concentrations below EALs and PRGs are indicated in **bold** and highlighted light blue.
Detected concentrations above either EALs or PRGs are indicated in **bold** and highlighted orange.

Section 5 Summary of Findings

E2 completed a Screening Phase II ESA of the Maalaea Mauka property identified as TMK: (2) 3-6-001: parcel 018 located in Maui, Hawaii. The purpose of this Screening Phase II ESA was to evaluate if residual levels of pesticides and herbicides resulting from historic agricultural use at the site are present in surface soils. In addition, an area where fourteen 55-gallon unmarked drums were identified in the Phase I ESA was investigated to determine if a release from the drums had occurred.

Per the HDOH HEER technical report for investigation and assessment of former agricultural lands, the screening was completed on "neighborhood-size" decision units utilizing a multi-increment sampling approach. The 260-acre site was divided into eight decision units approximately 32.5 acres in size with one multi-increment surface soil sample collected from each unit. The multi-increment samples were analyzed for pesticide and herbicide constituents that may have been applied to the property.

The results of the multi-increment sampling analyses indicate that residual pesticides and herbicides are not present at significant levels in the surface soils at the site. Arsenic was detected in all of the multi-increment samples. The levels detected were within range of natural occurring levels (i.e. background levels) found in soils throughout Hawaii. According to HDOH guidance, residential sites that contain arsenic within background levels do not require further action or restrictions on land use.

Two discrete samples were also collected from beneath the area where fourteen 55-gallon drums were observed during the Phase I ESA. The two samples were analyzed for a full suite of analytes to determine if a significant release had occurred in the area. The analytical results did not indicate that a significant release had occurred from the drums. One of the two samples contained a low level of TPH-rro. The level detected was well below the HDOH EAL. The majority of the remaining analytes were not detected with the exception of metals, which were detected below the HDOH EALs and EPA Region 9 PRGs or within naturally occurring background levels. Based on these sample results and the fact that the drums were removed and disposed, no further action is recommended for the drum area at this time.

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WAILUKU WATER CO.
WAIKAPU IAO WAIEHU WAIHEE
Na Wai Eha

November 1, 2006

To: Avery Chumbley
From: Clayton Suzuki

Subject: Waikapu to Maalaea Fields

The following chemicals may have been used during the cultivation of sugarcane in the Waikapu to Maalaea Fields.

Active Ingredient:	Brand Name:
Atrazine	Aatrex Nine-O
Ametryn	Evik 80W
2, 4-D	Formula 40
Diuron	Karmex DF
Glyphosate	Roundup
Metribuzin	Sinbar
Hexazinone	Velpar
Glyphosate	Polado

The following fertilizers were used in the cultivation of sugarcane.

- Nitrogen
- Potassium
- Phosphorus
- Calcium carbonate

The following chemicals may have been used during the cultivation of pineapple in the Waikapu to Maalaea fields.

Aliette	Ethrel
Amdro	Evik
Diazinon	Hyvar X
Karmex (Diuron)	Velpar DF
Roundup (non crop area)	Atrazine
Fruitone	Nemcur 3

The following fertilizers were used in the cultivation of pineapple.

Nitrogen	Sulfate of Potash
Iron Sulfate	Magnesium Sulfate
Zinc Sulfate	Sulfate of Amonia
Phosic Acid	

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August 08, 2007

LABORATORY REPORT

Client:
Element Environmental LLC
62-180 Emerson Rd,
Haleiwa, HI 96712
Attn: Matt Neal

Work Order: HQG0016
Project Name: Maalea
Project Number: Maalaea Phase II ESA
Date Received: 07/02/07

The results listed within this Laboratory Report pertain only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a wet weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the sole use of TestAmerica and its client. This report shall not be reproduced, except in full, without written permission from TestAmerica.

Reproduction of this analytical report is permitted only in its entirety. This report shall not be reproduced except in full without the written approval of the laboratory.

TestAmerica Analytical Testing Corporation certifies that the analytical results contained herein apply only to the specific sample(s) analyzed.

The Chain(s) of Custody, 2 pages, are included and are an integral part of this report. This entire report was reviewed and approved for release.

If you have any questions relating to this analytical report, please contact your Laboratory Project Manager at 1-(808)486-5227

CASE NARRATIVE:
This report has been revised to include BTEX for sample IDs Drum 1 and Drum 2.

Client Samples IDs DU1 through DU10 contained in this report were prepared by Incremental subsampling in accordance with the EPA/600/R-03/027 Guidance Document.

8270C (Modified) and 8321A analyses were performed by Anatek Labs, Inc. Please find Anatek Labs, Inc. report attached.

8081A and 8151A analyses were performed by STL-Seattle. Please find STL-Seattle report attached.

Samples were received into laboratory at a temperature of 0 °C.

NELAC states that samples which require thermal preservation shall be considered acceptable if the arrival temperature is within 2 degrees C of the required temperature or the method specified range. For samples with a temperature requirement of 4 degrees C, an arrival temperature from 0 degrees C to 6 degrees C meets specifications. Samples that are delivered to the laboratory on the same day that they are collected may not meet these criteria. In these cases, the samples are considered acceptable if there is evidence that the chilling process has begun, such as arrival on ice.

The reported results were obtained in compliance with the 2003 NELAC standards unless otherwise noted.

Approved By:

Jamie L Slade
Project Manager

NELAC Certification # E87907

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Element Environmental LLC
62-180 Emerson Rd.
Haleiwa, HI 96712
Matt Neal

Work Order: HQG0016
Project: Maalea
Project Number: Maalaea Phase II ESA

Received: 07/02/07
Reported: 08/08/07 09:34

SAMPLE IDENTIFICATION	LAB NUMBER	COLLECTION DATE AND TIME
DU1	HQG0016-01	06/29/07 16:45
DU2	HQG0016-02	06/28/07 13:30
DU3	HQG0016-03	06/28/07 15:51
DU4	HQG0016-04	06/28/07 16:30
DU5	HQG0016-05	06/28/07 16:50
DU6	HQG0016-06	06/29/07 10:10
DU7	HQG0016-07	06/29/07 11:10
DU8	HQG0016-08	06/29/07 12:10
DU9	HQG0016-09	06/29/07 14:10
DU10	HQG0016-10	06/29/07 15:10
DU1-VOC	HQG0016-11	06/29/07 16:30
DU2-VOC	HQG0016-12	06/29/07 15:55
DU3-VOC	HQG0016-13	06/29/07 15:23
DU4-VOC	HQG0016-14	06/29/07 14:53
DU5-VOC	HQG0016-15	06/29/07 14:26
DU6-VOC	HQG0016-16	06/29/07 13:53
DU7-VOC	HQG0016-17	06/29/07 13:25
DU8-VOC	HQG0016-18	06/29/07 12:33
Drum1	HQG0016-19	06/29/07 19:07
Drum2	HQG0016-20	06/29/07 19:07

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34	

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-01 (DU1 - Solid/Soil)						Sampled: 06/29/07 16:45		Recvd: 07/02/07 12:35	
Polychlorinated Biphenyls by EPA Method 8082									
Aroclor 1016	ND	C-01	mg/kg	0.0321	1	07/07/07 02:22	07/05/07	7G05005	SW8082
Aroclor 1221	ND	C-01	"	0.0641	"	"	"	"	"
Aroclor 1232	ND	C-01	"	0.0321	"	"	"	"	"
Aroclor 1242	ND	C-01	"	0.0321	"	"	"	"	"
Aroclor 1248	ND	C-01	"	0.0321	"	"	"	"	"
Aroclor 1254	ND	C-01	"	0.0321	"	"	"	"	"
Aroclor 1260	ND	C-01	"	0.0321	"	"	"	"	"
Surr: Decachlorobiphenyl (24-154%)	*110 %*	*C-01*				"	"	"	"
Semivolatile Organics by GC/MS									
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	0.308	1	07/27/07 01:00	07/11/07	7G11004	SW8270C
1,2,4-Trichlorobenzene	ND		"	0.308	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.308	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.308	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.308	"	"	"	"	"
1-Chloronaphthalene	ND		"	0.308	"	"	"	"	"
1-Naphthylamine	ND		"	0.617	"	"	"	"	"
2,3,4,6-Tetrachlorophenol	ND		"	0.308	"	"	"	"	"
2,4,5-Trichlorophenol	ND		"	0.308	"	"	"	"	"
2,4,6-Trichlorophenol	ND		"	0.308	"	"	"	"	"
2,4-Dichlorophenol	ND		"	0.308	"	"	"	"	"
2,4-Dimethylphenol	ND		"	0.308	"	"	"	"	"
2,4-Dinitrophenol	ND		"	1.59	"	"	"	"	"
2,4-Dinitrotoluene	ND		"	0.617	"	"	"	"	"
2,6-Dichlorophenol	ND		"	0.308	"	"	"	"	"
2,6-Dinitrotoluene	ND		"	0.308	"	"	"	"	"
2-Chloronaphthalene	ND		"	0.308	"	"	"	"	"
2-Chlorophenol	ND		"	0.308	"	"	"	"	"
2-Methylnaphthalene	ND		"	0.308	"	"	"	"	"
2-Methylphenol (o-Cresol)	ND		"	0.308	"	"	"	"	"
2-Naphthylamine	ND		"	0.617	"	"	"	"	"
2-Nitroaniline	ND		"	1.59	"	"	"	"	"
2-Nitrophenol	ND		"	0.308	"	"	"	"	"
2-Picoline	ND		"	0.308	"	"	"	"	"
3,3'-Dichlorobenzidine	ND		"	0.308	"	"	"	"	"
3-Methylcholanthrene	ND		"	0.308	"	"	"	"	"
3-Nitroaniline	ND		"	1.59	"	"	"	"	"
4,6-Dinitro-2-methylphenol	ND		"	1.59	"	"	"	"	"
4-Aminobiphenyl	ND		"	0.617	"	"	"	"	"
4-Bromophenyl phenyl ether	ND		"	0.308	"	"	"	"	"
4-Chloro-3-methylphenol	ND		"	0.308	"	"	"	"	"
4-Chloroaniline	ND		"	0.308	"	"	"	"	"
4-Chlorophenyl phenyl ether	ND		"	0.308	"	"	"	"	"
4-Methylphenol (p-Cresol)	ND		"	0.308	"	"	"	"	"
4-Nitroaniline	ND		"	0.308	"	"	"	"	"
4-Nitrophenol	ND		"	1.59	"	"	"	"	"
7,12-Dimethylbenz (a) anthracene	ND		"	0.308	"	"	"	"	"
a,a-Dimethylphenethylamine	ND		"	1.59	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34	

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-01 (DU1 - Solid/Soil) - cont.						Sampled: 06/29/07 16:45		Recvd: 07/02/07 12:35	
Semivolatile Organics by GC/MS - cont.									
Acenaphthene	ND		"	0.308	"	"	"	"	"
Acenaphthylene	ND		"	0.308	"	"	"	"	"
Acetophenone	ND		"	0.308	"	"	"	"	"
Aniline	ND		"	0.308	"	"	"	"	"
Anthracene	ND		"	0.308	"	"	"	"	"
Azobenzene	ND		"	0.308	"	"	"	"	"
Benzidine	ND		"	1.59	"	"	"	"	"
Benzo (a) anthracene	ND		"	0.308	"	"	"	"	"
Benzo (a) pyrene	ND		"	0.308	"	"	"	"	"
Benzo (b) fluoranthene	ND		"	0.308	"	"	"	"	"
Benzo (g,h,i) perylene	ND		"	0.308	"	"	"	"	"
Benzo (k) fluoranthene	ND		"	0.308	"	"	"	"	"
Benzoic acid	ND		"	1.59	"	"	"	"	"
Benzyl alcohol	ND		"	0.308	"	"	"	"	"
Bis(2-chloroethoxy)methane	ND		"	0.308	"	"	"	"	"
Bis(2-chloroethyl)ether	ND		"	0.308	"	"	"	"	"
Bis(2-chloroisopropyl) ether	ND		"	0.308	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	ND		"	0.308	"	"	"	"	"
Butyl benzyl phthalate	ND		"	0.308	"	"	"	"	"
Chrysene	ND		"	0.308	"	"	"	"	"
Dibenz (a,j) acridine	ND		"	0.308	"	"	"	"	"
Dibenzo (a,h) anthracene	ND		"	0.308	"	"	"	"	"
Dibenzofuran	ND		"	0.308	"	"	"	"	"
Diethyl phthalate	ND		"	0.308	"	"	"	"	"
Dimethyl phthalate	ND		"	0.308	"	"	"	"	"
Dimethylaminoazobenzene	ND		"	0.617	"	"	"	"	"
Di-n-butyl phthalate	ND		"	0.308	"	"	"	"	"
Di-n-octyl phthalate	ND		"	0.308	"	"	"	"	"
Ethyl Methanesulfonate	ND		"	0.308	"	"	"	"	"
Fluoranthene	ND		"	0.308	"	"	"	"	"
Fluorene	ND		"	0.308	"	"	"	"	"
Hexachlorobenzene	ND		"	0.308	"	"	"	"	"
Hexachlorobutadiene	ND		"	0.308	"	"	"	"	"
Hexachlorocyclopentadiene	ND		"	0.308	"	"	"	"	"
Hexachloroethane	ND		"	0.308	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND		"	0.308	"	"	"	"	"
Isophorone	ND		"	0.308	"	"	"	"	"
Methyl Methanesulfonate	ND		"	0.617	"	"	"	"	"
Naphthalene	ND		"	0.308	"	"	"	"	"
Nitrobenzene	ND		"	0.308	"	"	"	"	"
N-Nitrosodimethylamine	ND		"	0.308	"	"	"	"	"
N-Nitrosodi-n-butylamine	ND		"	0.308	"	"	"	"	"
N-Nitrosodi-n-propylamine	ND		"	0.308	"	"	"	"	"
N-Nitrosodiphenylamine	ND		"	0.308	"	"	"	"	"
N-Nitrosopiperidine	ND		"	0.308	"	"	"	"	"
Pentachloronitrobenzene	ND		"	0.308	"	"	"	"	"
Pentachlorophenol	ND		"	1.59	"	"	"	"	"

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-01 (DU1 - Solid/Soil) - cont.						Sampled: 06/29/07 16:45		Recvd: 07/02/07 12:35	
Semivolatile Organics by GC/MS - cont.									
Phenacetin	ND		"	0.308	"	"	"	"	"
Phenanthrene	ND		"	0.308	"	"	"	"	"
Phenol	ND		"	0.308	"	"	"	"	"
Pronamide	ND		"	0.308	"	"	"	"	"
Pyrene	ND		"	0.308	"	"	"	"	"
Pyridine	ND		"	0.308	"	"	"	"	"
Surr: 2,4,6-Tribromophenol (51.6-114%)	*66 %*					"	"	"	"
Surr: 2-Fluorobiphenyl (43.9-108%)	*65 %*					"	"	"	"
Surr: 2-Fluorophenol (39.4-103%)	*44 %*					"	"	"	"
Surr: Nitrobenzene-d5 (37.2-107%)	*60 %*					"	"	"	"
Surr: Phenol-d6 (49.6-105%)	*47 %*	Z				"	"	"	"
Surr: Terphenyl-d14 (45.7-133%)	*83 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Arsenic	3.04		mg/kg	0.962	1	07/20/07 12:54	07/10/07	7G10005	SW6010B
Lead	ND		"	1.92	"	"	"	"	"
Sample ID: HQG0016-02 (DU2 - Solid/Soil)						Sampled: 06/28/07 13:30		Recvd: 07/02/07 12:35	
Polychlorinated Biphenyls by EPA Method 8082									
Aroclor 1016	ND	C-01	mg/kg	0.0322	1	07/07/07 02:49	07/05/07	7G05005	SW8082
Aroclor 1221	ND	C-01	"	0.0643	"	"	"	"	"
Aroclor 1232	ND	C-01	"	0.0322	"	"	"	"	"
Aroclor 1242	ND	C-01	"	0.0322	"	"	"	"	"
Aroclor 1248	ND	C-01	"	0.0322	"	"	"	"	"
Aroclor 1254	ND	C-01	"	0.0322	"	"	"	"	"
Aroclor 1260	ND	C-01	"	0.0322	"	"	"	"	"
Surr: Decachlorobiphenyl (24-154%)	*106 %*	*C-01*				"	"	"	"
Semivolatile Organics by GC/MS									
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	0.329	1	07/27/07 01:47	07/11/07	7G11004	SW8270C
1,2,4-Trichlorobenzene	ND		"	0.329	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.329	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.329	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.329	"	"	"	"	"
1-Chloronaphthalene	ND		"	0.329	"	"	"	"	"
1-Naphthylamine	ND		"	0.658	"	"	"	"	"
2,3,4,6-Tetrachlorophenol	ND		"	0.329	"	"	"	"	"
2,4,5-Trichlorophenol	ND		"	0.329	"	"	"	"	"
2,4,6-Trichlorophenol	ND		"	0.329	"	"	"	"	"
2,4-Dichlorophenol	ND		"	0.329	"	"	"	"	"
2,4-Dimethylphenol	ND		"	0.329	"	"	"	"	"
2,4-Dinitrophenol	ND		"	1.69	"	"	"	"	"
2,4-Dinitrotoluene	ND		"	0.658	"	"	"	"	"
2,6-Dichlorophenol	ND		"	0.329	"	"	"	"	"
2,6-Dinitrotoluene	ND		"	0.329	"	"	"	"	"
2-Chloronaphthalene	ND		"	0.329	"	"	"	"	"
2-Chlorophenol	ND		"	0.329	"	"	"	"	"
2-Methylnaphthalene	ND		"	0.329	"	"	"	"	"

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-02 (DU2 - Solid/Soil) - cont.						Sampled: 06/28/07 13:30		Recvd: 07/02/07 12:35	
Semivolatile Organics by GC/MS - cont.									
2-Methylphenol (o-Cresol)	ND		"	0.329	"	"	"	"	"
2-Naphthylamine	ND		"	0.658	"	"	"	"	"
2-Nitroaniline	ND		"	1.69	"	"	"	"	"
2-Nitrophenol	ND		"	0.329	"	"	"	"	"
2-Picoline	ND		"	0.329	"	"	"	"	"
3,3'-Dichlorobenzidine	ND		"	0.329	"	"	"	"	"
3-Methylcholanthrene	ND		"	0.329	"	"	"	"	"
3-Nitroaniline	ND		"	1.69	"	"	"	"	"
4,6-Dinitro-2-methylphenol	ND		"	1.69	"	"	"	"	"
4-Aminobiphenyl	ND		"	0.658	"	"	"	"	"
4-Bromophenyl phenyl ether	ND		"	0.329	"	"	"	"	"
4-Chloro-3-methylphenol	ND		"	0.329	"	"	"	"	"
4-Chloroaniline	ND		"	0.329	"	"	"	"	"
4-Chlorophenyl phenyl ether	ND		"	0.329	"	"	"	"	"
4-Methylphenol (p-Cresol)	ND		"	0.329	"	"	"	"	"
4-Nitroaniline	ND		"	0.329	"	"	"	"	"
4-Nitrophenol	ND		"	1.69	"	"	"	"	"
7,12-Dimethylbenz (a) anthracene	ND		"	0.329	"	"	"	"	"
a,a-Dimethylphenethylamine	ND		"	1.69	"	"	"	"	"
Acenaphthene	ND		"	0.329	"	"	"	"	"
Acenaphthylene	ND		"	0.329	"	"	"	"	"
Acetophenone	ND		"	0.329	"	"	"	"	"
Aniline	ND		"	0.329	"	"	"	"	"
Anthracene	ND		"	0.329	"	"	"	"	"
Azobenzene	ND		"	0.329	"	"	"	"	"
Benzidine	ND		"	1.69	"	"	"	"	"
Benzo (a) anthracene	ND		"	0.329	"	"	"	"	"
Benzo (a) pyrene	ND		"	0.329	"	"	"	"	"
Benzo (b) fluoranthene	ND		"	0.329	"	"	"	"	"
Benzo (g,h,i) perylene	ND		"	0.329	"	"	"	"	"
Benzo (k) fluoranthene	ND		"	0.329	"	"	"	"	"
Benzoic acid	ND		"	1.69	"	"	"	"	"
Benzyl alcohol	ND		"	0.329	"	"	"	"	"
Bis(2-chloroethoxy)methane	ND		"	0.329	"	"	"	"	"
Bis(2-chloroethyl)ether	ND		"	0.329	"	"	"	"	"
Bis(2-chloroisopropyl) ether	ND		"	0.329	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	ND		"	0.329	"	"	"	"	"
Butyl benzyl phthalate	ND		"	0.329	"	"	"	"	"
Chrysene	ND		"	0.329	"	"	"	"	"
Dibenz (a,j) acridine	ND		"	0.329	"	"	"	"	"
Dibenzo (a,h) anthracene	ND		"	0.329	"	"	"	"	"
Dibenzofuran	ND		"	0.329	"	"	"	"	"
Diethyl phthalate	ND		"	0.329	"	"	"	"	"
Dimethyl phthalate	ND		"	0.329	"	"	"	"	"
Dimethylaminoazobenzene	ND		"	0.658	"	"	"	"	"
Di-n-butyl phthalate	ND		"	0.329	"	"	"	"	"
Di-n-octyl phthalate	ND		"	0.329	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-02 (DU2 - Solid/Soil) - cont.						Sampled: 06/28/07 13:30		Recvd: 07/02/07 12:35	
Semivolatile Organics by GC/MS - cont.									
Ethyl Methanesulfonate	ND		"	0.329	"	"	"	"	"
Fluoranthene	ND		"	0.329	"	"	"	"	"
Fluorene	ND		"	0.329	"	"	"	"	"
Hexachlorobenzene	ND		"	0.329	"	"	"	"	"
Hexachlorobutadiene	ND		"	0.329	"	"	"	"	"
Hexachlorocyclopentadiene	ND		"	0.329	"	"	"	"	"
Hexachloroethane	ND		"	0.329	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND		"	0.329	"	"	"	"	"
Isophorone	ND		"	0.329	"	"	"	"	"
Methyl Methanesulfonate	ND		"	0.658	"	"	"	"	"
Naphthalene	ND		"	0.329	"	"	"	"	"
Nitrobenzene	ND		"	0.329	"	"	"	"	"
N-Nitrosodimethylamine	ND		"	0.329	"	"	"	"	"
N-Nitrosodi-n-butylamine	ND		"	0.329	"	"	"	"	"
N-Nitrosodi-n-propylamine	ND		"	0.329	"	"	"	"	"
N-Nitrosodiphenylamine	ND		"	0.329	"	"	"	"	"
N-Nitrosopiperidine	ND		"	0.329	"	"	"	"	"
Pentachloronitrobenzene	ND		"	0.329	"	"	"	"	"
Pentachlorophenol	ND		"	1.69	"	"	"	"	"
Phenacetin	ND		"	0.329	"	"	"	"	"
Phenanthrene	ND		"	0.329	"	"	"	"	"
Phenol	ND		"	0.329	"	"	"	"	"
Pronamide	ND		"	0.329	"	"	"	"	"
Pyrene	ND		"	0.329	"	"	"	"	"
Pyridine	ND		"	0.329	"	"	"	"	"
Surr: 2,4,6-Tribromophenol (52.6-114%)	74 %					"	"	"	"
Surr: 2-Fluorobiphenyl (45.9-108%)	74 %					"	"	"	"
Surr: 2-Fluorophenol (39.4-103%)	56 %					"	"	"	"
Surr: Nitrobenzene-d5 (37.2-107%)	71 %					"	"	"	"
Surr: Phenol-d6 (49.6-105%)	55 %					"	"	"	"
Surr: Terphenyl-d14 (45.7-133%)	92 %					"	"	"	"
Total Metals by SW 846 Series Methods									
Arsenic	2.94		mg/kg	0.952	1	07/20/07 12:58	07/10/07	7G10003	SW6010B
Lead	5.19		"	1.90	"	"	"	"	"

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THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-03 (DU3 - Solid/Soil)						Sampled: 06/28/07 15:51		Recvd: 07/02/07 12:35	
Polychlorinated Biphenyls by EPA Method 8082									
Aroclor 1016	ND	C-01	mg/kg	0.0315	1	07/07/07 03:17	07/05/07	7G05005	SW8082
Aroclor 1221	ND	C-01	"	0.0631	"	"	"	"	"
Aroclor 1232	ND	C-01	"	0.0315	"	"	"	"	"
Aroclor 1242	ND	C-01	"	0.0315	"	"	"	"	"
Aroclor 1248	ND	C-01	"	0.0315	"	"	"	"	"
Aroclor 1254	ND	C-01	"	0.0315	"	"	"	"	"
Aroclor 1260	ND	C-01	"	0.0315	"	"	"	"	"
Surr: Decachlorobiphenyl (24-154%)	111 %	C-01				"	"	"	"
Semivolatile Organics by GC/MS									
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	0.329	1	07/27/07 02:33	07/11/07	7G11004	SW8270C
1,2,4-Trichlorobenzene	ND		"	0.329	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.329	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.329	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.329	"	"	"	"	"
1-Chloronaphthalene	ND		"	0.329	"	"	"	"	"
1-Naphthylamine	ND		"	0.658	"	"	"	"	"
2,3,4,6-Tetrachlorophenol	ND		"	0.329	"	"	"	"	"
2,4,5-Trichlorophenol	ND		"	0.329	"	"	"	"	"
2,4,6-Trichlorophenol	ND		"	0.329	"	"	"	"	"
2,4-Dichlorophenol	ND		"	0.329	"	"	"	"	"
2,4-Dimethylphenol	ND		"	0.329	"	"	"	"	"
2,4-Dinitrophenol	ND		"	1.69	"	"	"	"	"
2,4-Dinitrotoluene	ND		"	0.658	"	"	"	"	"
2,6-Dichlorophenol	ND		"	0.329	"	"	"	"	"
2,6-Dinitrotoluene	ND		"	0.329	"	"	"	"	"
2-Chloronaphthalene	ND		"	0.329	"	"	"	"	"
2-Chlorophenol	ND		"	0.329	"	"	"	"	"
2-Methylnaphthalene	ND		"	0.329	"	"	"	"	"
2-Methylphenol (o-Cresol)	ND		"	0.329	"	"	"	"	"
2-Naphthylamine	ND		"	0.658	"	"	"	"	"
2-Nitroaniline	ND		"	1.69	"	"	"	"	"
2-Nitrophenol	ND		"	0.329	"	"	"	"	"
2-Picoline	ND		"	0.329	"	"	"	"	"
3,3'-Dichlorobenzidine	ND		"	0.329	"	"	"	"	"
3-Methylcholanthrene	ND		"	0.329	"	"	"	"	"
3-Nitroaniline	ND		"	1.69	"	"	"	"	"
4,6-Dinitro-2-methylphenol	ND		"	1.69	"	"	"	"	"
4-Aminobiphenyl	ND		"	0.658	"	"	"	"	"
4-Bromophenyl phenyl ether	ND		"	0.329	"	"	"	"	"
4-Chloro-3-methylphenol	ND		"	0.329	"	"	"	"	"
4-Chloroaniline	ND		"	0.329	"	"	"	"	"
4-Chlorophenyl phenyl ether	ND		"	0.329	"	"	"	"	"
4-Methylphenol (p-Cresol)	ND		"	0.329	"	"	"	"	"
4-Nitroaniline	ND		"	0.329	"	"	"	"	"
4-Nitrophenol	ND		"	1.69	"	"	"	"	"
7,12-Dimethylbenz (a) anthracene	ND		"	0.329	"	"	"	"	"
a,a-Dimethylphenethylamine	ND		"	1.69	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-03 (DU3 - Solid/Soil) - cont.					Sampled: 06/28/07 15:51		Recvd: 07/02/07 12:35		
Semivolatile Organics by GC/MS - cont.									
Acenaphthene	ND		"	0.329	"	"	"	"	"
Acenaphthylene	ND		"	0.329	"	"	"	"	"
Acetophenone	ND		"	0.329	"	"	"	"	"
Aniline	ND		"	0.329	"	"	"	"	"
Anthracene	ND		"	0.329	"	"	"	"	"
Azobenzene	ND		"	0.329	"	"	"	"	"
Benzidine	ND		"	1.69	"	"	"	"	"
Benzo (a) anthracene	ND		"	0.329	"	"	"	"	"
Benzo (a) pyrene	ND		"	0.329	"	"	"	"	"
Benzo (b) fluoranthene	ND		"	0.329	"	"	"	"	"
Benzo (g,h,i) perylene	ND		"	0.329	"	"	"	"	"
Benzo (k) fluoranthene	ND		"	0.329	"	"	"	"	"
Benzoic acid	ND		"	1.69	"	"	"	"	"
Benzyl alcohol	ND		"	0.329	"	"	"	"	"
Bis(2-chloroethoxy)methane	ND		"	0.329	"	"	"	"	"
Bis(2-chloroethyl)ether	ND		"	0.329	"	"	"	"	"
Bis(2-chloroisopropyl) ether	ND		"	0.329	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	ND		"	0.329	"	"	"	"	"
Butyl benzyl phthalate	ND		"	0.329	"	"	"	"	"
Chrysene	ND		"	0.329	"	"	"	"	"
Dibenz (a,j) acridine	ND		"	0.329	"	"	"	"	"
Dibenzo (a,h) anthracene	ND		"	0.329	"	"	"	"	"
Dibenzofuran	ND		"	0.329	"	"	"	"	"
Diethyl phthalate	ND		"	0.329	"	"	"	"	"
Dimethyl phthalate	ND		"	0.329	"	"	"	"	"
Dimethylaminoazobenzene	ND		"	0.658	"	"	"	"	"
Di-n-butyl phthalate	ND		"	0.329	"	"	"	"	"
Di-n-octyl phthalate	ND		"	0.329	"	"	"	"	"
Ethyl Methanesulfonate	ND		"	0.329	"	"	"	"	"
Fluoranthene	ND		"	0.329	"	"	"	"	"
Fluorene	ND		"	0.329	"	"	"	"	"
Hexachlorobenzene	ND		"	0.329	"	"	"	"	"
Hexachlorobutadiene	ND		"	0.329	"	"	"	"	"
Hexachlorocyclopentadiene	ND		"	0.329	"	"	"	"	"
Hexachloroethane	ND		"	0.329	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND		"	0.329	"	"	"	"	"
Isophorone	ND		"	0.329	"	"	"	"	"
Methyl Methanesulfonate	ND		"	0.658	"	"	"	"	"
Naphthalene	ND		"	0.329	"	"	"	"	"
Nitrobenzene	ND		"	0.329	"	"	"	"	"
N-Nitrosodimethylamine	ND		"	0.329	"	"	"	"	"
N-Nitrosodi-n-butylamine	ND		"	0.329	"	"	"	"	"
N-Nitrosodi-n-propylamine	ND		"	0.329	"	"	"	"	"
N-Nitrosodiphenylamine	ND		"	0.329	"	"	"	"	"
N-Nitrosopiperidine	ND		"	0.329	"	"	"	"	"
Pentachloronitrobenzene	ND		"	0.329	"	"	"	"	"
Pentachlorophenol	ND		"	1.69	"	"	"	"	"

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99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-03 (DU3 - Solid/Soil) - cont.					Sampled: 06/28/07 15:51		Recvd: 07/02/07 12:35		
Semivolatile Organics by GC/MS - cont.									
Phenacetin	ND		"	0.329	"	"	"	"	"
Phenanthrene	ND		"	0.329	"	"	"	"	"
Phenol	ND		"	0.329	"	"	"	"	"
Pronamide	ND		"	0.329	"	"	"	"	"
Pyrene	ND		"	0.329	"	"	"	"	"
Pyridine	ND		"	0.329	"	"	"	"	"
Surr: 2,4,6-Tribromophenol (32.6-114%)	*67 %*					"	"	"	"
Surr: 2-Fluorobiphenyl (43.9-108%)	*78 %*					"	"	"	"
Surr: 2-Fluorophenol (39.4-103%)	*50 %*					"	"	"	"
Surr: Nitrobenzene-d5 (37.3-107%)	*74 %*					"	"	"	"
Surr: Phenol-d6 (49.6-103%)	*58 %*					"	"	"	"
Surr: Terphenyl-d14 (45.7-133%)	*92 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Arsenic	3.98		mg/kg	0.980	1	07/20/07 13:02	07/10/07	7G10005	SW6010B
Lead	1.97		"	1.96	"	"	"	"	"
Sample ID: HQG0016-04 (DU4 - Solid/Soil)					Sampled: 06/28/07 16:30		Recvd: 07/02/07 12:35		
Polychlorinated Biphenyls by EPA Method 8082									
Aroclor 1016	ND	C-01	mg/kg	0.0331	1	07/07/07 04:13	07/05/07	7G05005	SW8082
Aroclor 1221	ND	C-01	"	0.0662	"	"	"	"	"
Aroclor 1232	ND	C-01	"	0.0331	"	"	"	"	"
Aroclor 1242	ND	C-01	"	0.0331	"	"	"	"	"
Aroclor 1248	ND	C-01	"	0.0331	"	"	"	"	"
Aroclor 1254	ND	C-01	"	0.0331	"	"	"	"	"
Aroclor 1260	ND	C-01	"	0.0331	"	"	"	"	"
Surr: Decachlorobiphenyl (24-154%)	*113 %*	*C-01*				"	"	"	"
Semivolatile Organics by GC/MS									
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	0.320	1	07/27/07 03:19	07/11/07	7G11004	SW8270C
1,2,4-Trichlorobenzene	ND		"	0.320	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.320	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.320	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.320	"	"	"	"	"
1-Chloronaphthalene	ND		"	0.320	"	"	"	"	"
1-Naphthylamine	ND		"	0.641	"	"	"	"	"
2,3,4,6-Tetrachlorophenol	ND		"	0.320	"	"	"	"	"
2,4,5-Trichlorophenol	ND		"	0.320	"	"	"	"	"
2,4,6-Trichlorophenol	ND		"	0.320	"	"	"	"	"
2,4-Dichlorophenol	ND		"	0.320	"	"	"	"	"
2,4-Dimethylphenol	ND		"	0.320	"	"	"	"	"
2,4-Dinitrophenol	ND		"	1.65	"	"	"	"	"
2,4-Dinitrotoluene	ND		"	0.641	"	"	"	"	"
2,6-Dichlorophenol	ND		"	0.320	"	"	"	"	"
2,6-Dinitrotoluene	ND		"	0.320	"	"	"	"	"
2-Chloronaphthalene	ND		"	0.320	"	"	"	"	"
2-Chlorophenol	ND		"	0.320	"	"	"	"	"
2-Methylnaphthalene	ND		"	0.320	"	"	"	"	"

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Element Environmental LLC
62-180 Emerson Rd.
Haleiwa, HI 96712
Matt Neal

Work Order: HQG0016
Project: Maalea
Project Number: Maalaea Phase II ESA

Received: 07/02/07
Reported: 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-04 (DU4 - Solid/Soil) - cont.						**Sampled: 06/28/07 16:30**		**Recvd: 07/02/07 12:35**	
Semivolatile Organics by GC/MS - cont.									
2-Methylphenol (o-Cresol)	ND		"	0.320	"	"	"	"	"
2-Naphthylamine	ND		"	0.641	"	"	"	"	"
2-Nitroaniline	ND		"	1.65	"	"	"	"	"
2-Nitrophenol	ND		"	0.320	"	"	"	"	"
2-Picoline	ND		"	0.320	"	"	"	"	"
3,3'-Dichlorobenzidine	ND		"	0.320	"	"	"	"	"
3-Methylcholanthrene	ND		"	0.320	"	"	"	"	"
3-Nitroaniline	ND		"	1.65	"	"	"	"	"
4,6-Dinitro-2-methylphenol	ND		"	1.65	"	"	"	"	"
4-Aminobiphenyl	ND		"	0.641	"	"	"	"	"
4-Bromophenyl phenyl ether	ND		"	0.320	"	"	"	"	"
4-Chloro-3-methylphenol	ND		"	0.320	"	"	"	"	"
4-Chloroaniline	ND		"	0.320	"	"	"	"	"
4-Chlorophenyl phenyl ether	ND		"	0.320	"	"	"	"	"
4-Methylphenol (p-Cresol)	ND		"	0.320	"	"	"	"	"
4-Nitroaniline	ND		"	0.320	"	"	"	"	"
4-Nitrophenol	ND		"	1.65	"	"	"	"	"
7,12-Dimethylbenz (a) anthracene	ND		"	0.320	"	"	"	"	"
a,a-Dimethylphenethylamine	ND		"	1.65	"	"	"	"	"
Acenaphthene	ND		"	0.320	"	"	"	"	"
Acenaphthylene	ND		"	0.320	"	"	"	"	"
Acetophenone	ND		"	0.320	"	"	"	"	"
Aniline	ND		"	0.320	"	"	"	"	"
Anthracene	ND		"	0.320	"	"	"	"	"
Azobenzene	ND		"	0.320	"	"	"	"	"
Benzidine	ND		"	1.65	"	"	"	"	"
Benzo (a) anthracene	ND		"	0.320	"	"	"	"	"
Benzo (a) pyrene	ND		"	0.320	"	"	"	"	"
Benzo (b) fluoranthene	ND		"	0.320	"	"	"	"	"
Benzo (g,h,i) perylene	ND		"	0.320	"	"	"	"	"
Benzo (k) fluoranthene	ND		"	0.320	"	"	"	"	"
Benzoic acid	ND		"	1.65	"	"	"	"	"
Benzyl alcohol	ND		"	0.320	"	"	"	"	"
Bis(2-chloroethoxy)methane	ND		"	0.320	"	"	"	"	"
Bis(2-chloroethyl)ether	ND		"	0.320	"	"	"	"	"
Bis(2-chloroisopropyl) ether	ND		"	0.320	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	ND		"	0.320	"	"	"	"	"
Butyl benzyl phthalate	ND		"	0.320	"	"	"	"	"
Chrysene	ND		"	0.320	"	"	"	"	"
Dibenz (a,j) acridine	ND		"	0.320	"	"	"	"	"
Dibenzo (a,h) anthracene	ND		"	0.320	"	"	"	"	"
Dibenzofuran	ND		"	0.320	"	"	"	"	"
Diethyl phthalate	ND		"	0.320	"	"	"	"	"
Dimethyl phthalate	ND		"	0.320	"	"	"	"	"
Dimethylaminoazobenzene	ND		"	0.641	"	"	"	"	"
Di-n-butyl phthalate	ND		"	0.320	"	"	"	"	"
Di-n-octyl phthalate	ND		"	0.320	"	"	"	"	"

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Element Environmental LLC
62-180 Emerson Rd.
Haleiwa, HI 96712
Matt Neal

Work Order: HQG0016
Project: Maalea
Project Number: Maalaea Phase II ESA

Received: 07/02/07
Reported: 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-04 (DU4 - Solid/Soil) - cont.						**Sampled: 06/28/07 16:30**		**Recvd: 07/02/07 12:35**	
Semivolatile Organics by GC/MS - cont.									
Ethyl Methanesulfonate	ND		"	0.320	"	"	"	"	"
Fluoranthene	ND		"	0.320	"	"	"	"	"
Fluorene	ND		"	0.320	"	"	"	"	"
Hexachlorobenzene	ND		"	0.320	"	"	"	"	"
Hexachlorobutadiene	ND		"	0.320	"	"	"	"	"
Hexachlorocyclopentadiene	ND		"	0.320	"	"	"	"	"
Hexachloroethane	ND		"	0.320	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND		"	0.320	"	"	"	"	"
Isophorone	ND		"	0.320	"	"	"	"	"
Methyl Methanesulfonate	ND		"	0.641	"	"	"	"	"
Naphthalene	ND		"	0.320	"	"	"	"	"
Nitrobenzene	ND		"	0.320	"	"	"	"	"
N-Nitrosodimethylamine	ND		"	0.320	"	"	"	"	"
N-Nitrosodi-n-butylamine	ND		"	0.320	"	"	"	"	"
N-Nitrosodi-n-propylamine	ND		"	0.320	"	"	"	"	"
N-Nitrosodiphenylamine	ND		"	0.320	"	"	"	"	"
N-Nitrosopiperidine	ND		"	0.320	"	"	"	"	"
Pentachloronitrobenzene	ND		"	0.320	"	"	"	"	"
Pentachlorophenol	ND		"	1.65	"	"	"	"	"
Phenacetin	ND		"	0.320	"	"	"	"	"
Phenanthrene	ND		"	0.320	"	"	"	"	"
Phenol	ND		"	0.320	"	"	"	"	"
Pronamide	ND		"	0.320	"	"	"	"	"
Pyrene	ND		"	0.320	"	"	"	"	"
Pyridine	ND		"	0.320	"	"	"	"	"
Surr: 2,4,6-Tribromophenol (52.6-114%)	*63 %*					"	"	"	"
Surr: 2-Fluorobiphenyl (45.9-108%)	*70 %*					"	"	"	"
Surr: 2-Fluorophenol (39.4-101%)	*43 %*					"	"	"	"
Surr: Nitrobenzene-d5 (37.2-107%)	*63 %*					"	"	"	"
Surr: Phenol-d6 (49.6-105%)	*46 %*	Z				"	"	"	"
Surr: Terphenyl-d14 (45.7-131%)	*89 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Arsenic	3.64		mg/kg	0.980	1	07/20/07 13:06	07/10/07	7G10005	SW6010B
Lead	ND		"	1.96	"	"	"	"	"

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99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC
62-180 Emerson Rd.
Haleiwa, HI 96712
Matt Neal

Work Order: HQG0016
Project: Maalea
Project Number: Maalaea Phase II ESA

Received: 07/02/07
Reported: 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-05 (DU5 - Solid/Soil)						Sampled: 06/28/07 16:50		Recvd: 07/02/07 12:35	
Polychlorinated Biphenyls by EPA Method 8082									
Aroclor 1016	ND	C-01	mg/kg	0.0323	1	07/07/07 04:41	07/05/07	7G05005	SW8082
Aroclor 1221	ND	C-01	"	0.0645	"	"	"	"	"
Aroclor 1232	ND	C-01	"	0.0323	"	"	"	"	"
Aroclor 1242	ND	C-01	"	0.0323	"	"	"	"	"
Aroclor 1248	ND	C-01	"	0.0323	"	"	"	"	"
Aroclor 1254	ND	C-01	"	0.0323	"	"	"	"	"
Aroclor 1260	ND	C-01	"	0.0323	"	"	"	"	"
Surr: Decachlorobiphenyl (24-154%)	*114 %*	*C-01*				"	"	"	"
Semivolatile Organics by GC/MS									
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	0.317	1	07/27/07 04:05	07/11/07	7G11004	SW8270C
1,2,4-Trichlorobenzene	ND		"	0.317	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.317	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.317	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.317	"	"	"	"	"
1-Chloronaphthalene	ND		"	0.317	"	"	"	"	"
1-Naphthylamine	ND		"	0.635	"	"	"	"	"
2,3,4,6-Tetrachlorophenol	ND		"	0.317	"	"	"	"	"
2,4,5-Trichlorophenol	ND		"	0.317	"	"	"	"	"
2,4,6-Trichlorophenol	ND		"	0.317	"	"	"	"	"
2,4-Dichlorophenol	ND		"	0.317	"	"	"	"	"
2,4-Dimethylphenol	ND		"	0.317	"	"	"	"	"
2,4-Dinitrophenol	ND		"	1.63	"	"	"	"	"
2,4-Dinitrotoluene	ND		"	0.635	"	"	"	"	"
2,6-Dichlorophenol	ND		"	0.317	"	"	"	"	"
2,6-Dinitrotoluene	ND		"	0.317	"	"	"	"	"
2-Chloronaphthalene	ND		"	0.317	"	"	"	"	"
2-Chlorophenol	ND		"	0.317	"	"	"	"	"
2-Methylnaphthalene	ND		"	0.317	"	"	"	"	"
2-Methylphenol (o-Cresol)	ND		"	0.317	"	"	"	"	"
2-Naphthylamine	ND		"	0.635	"	"	"	"	"
2-Nitroaniline	ND		"	1.63	"	"	"	"	"
2-Nitrophenol	ND		"	0.317	"	"	"	"	"
2-Picoline	ND		"	0.317	"	"	"	"	"
3,3'-Dichlorobenzidine	ND		"	0.317	"	"	"	"	"
3-Methylcholanthrene	ND		"	0.317	"	"	"	"	"
3-Nitroaniline	ND		"	1.63	"	"	"	"	"
4,6-Dinitro-2-methylphenol	ND		"	1.63	"	"	"	"	"
4-Aminobiphenyl	ND		"	0.635	"	"	"	"	"
4-Bromophenyl phenyl ether	ND		"	0.317	"	"	"	"	"
4-Chloro-3-methylphenol	ND		"	0.317	"	"	"	"	"
4-Chloroaniline	ND		"	0.317	"	"	"	"	"
4-Chlorophenyl phenyl ether	ND		"	0.317	"	"	"	"	"
4-Methylphenol (p-Cresol)	ND		"	0.317	"	"	"	"	"
4-Nitroaniline	ND		"	0.317	"	"	"	"	"
4-Nitrophenol	ND		"	1.63	"	"	"	"	"
7,12-Dimethylbenz (a) anthracene	ND		"	0.317	"	"	"	"	"
a,a-Dimethylphenethylamine	ND		"	1.63	"	"	"	"	"

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Element Environmental LLC
62-180 Emerson Rd.
Haleiwa, HI 96712
Matt Neal

Work Order: HQG0016
Project: Maalea
Project Number: Maalaea Phase II ESA

Received: 07/02/07
Reported: 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-05 (DU5 - Solid/Soil) - cont.						Sampled: 06/28/07 16:50		Recvd: 07/02/07 12:35	
Semivolatile Organics by GC/MS - cont.									
Acenaphthene	ND		"	0.317	"	"	"	"	"
Acenaphthylene	ND		"	0.317	"	"	"	"	"
Acetophenone	ND		"	0.317	"	"	"	"	"
Aniline	ND		"	0.317	"	"	"	"	"
Anthracene	ND		"	0.317	"	"	"	"	"
Azobenzene	ND		"	0.317	"	"	"	"	"
Benzidine	ND		"	1.63	"	"	"	"	"
Benzo (a) anthracene	ND		"	0.317	"	"	"	"	"
Benzo (a) pyrene	ND		"	0.317	"	"	"	"	"
Benzo (b) fluoranthene	ND		"	0.317	"	"	"	"	"
Benzo (g,h,i) perylene	ND		"	0.317	"	"	"	"	"
Benzo (k) fluoranthene	ND		"	0.317	"	"	"	"	"
Benzoic acid	ND		"	1.63	"	"	"	"	"
Benzyl alcohol	ND		"	0.317	"	"	"	"	"
Bis(2-chloroethoxy)methane	ND		"	0.317	"	"	"	"	"
Bis(2-chloroethyl)ether	ND		"	0.317	"	"	"	"	"
Bis(2-chloroisopropyl) ether	ND		"	0.317	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	ND		"	0.317	"	"	"	"	"
Butyl benzyl phthalate	ND		"	0.317	"	"	"	"	"
Chrysene	ND		"	0.317	"	"	"	"	"
Dibenz (a,j) acridine	ND		"	0.317	"	"	"	"	"
Dibenzo (a,h) anthracene	ND		"	0.317	"	"	"	"	"
Dibenzofuran	ND		"	0.317	"	"	"	"	"
Diethyl phthalate	ND		"	0.317	"	"	"	"	"
Dimethyl phthalate	ND		"	0.317	"	"	"	"	"
Dimethylaminoazobenzene	ND		"	0.635	"	"	"	"	"
Di-n-butyl phthalate	ND		"	0.317	"	"	"	"	"
Di-n-octyl phthalate	ND		"	0.317	"	"	"	"	"
Ethyl Methanesulfonate	ND		"	0.317	"	"	"	"	"
Fluoranthene	ND		"	0.317	"	"	"	"	"
Fluorene	ND		"	0.317	"	"	"	"	"
Hexachlorobenzene	ND		"	0.317	"	"	"	"	"
Hexachlorobutadiene	ND		"	0.317	"	"	"	"	"
Hexachlorocyclopentadiene	ND		"	0.317	"	"	"	"	"
Hexachloroethane	ND		"	0.317	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND		"	0.317	"	"	"	"	"
Isophorone	ND		"	0.317	"	"	"	"	"
Methyl Methanesulfonate	ND		"	0.635	"	"	"	"	"
Naphthalene	ND		"	0.317	"	"	"	"	"
Nitrobenzene	ND		"	0.317	"	"	"	"	"
N-Nitrosodimethylamine	ND		"	0.317	"	"	"	"	"
N-Nitrosodi-n-butylamine	ND		"	0.317	"	"	"	"	"
N-Nitrosodi-n-propylamine	ND		"	0.317	"	"	"	"	"
N-Nitrosodiphenylamine	ND		"	0.317	"	"	"	"	"
N-Nitrosopiperidine	ND		"	0.317	"	"	"	"	"
Pentachloronitrobenzene	ND		"	0.317	"	"	"	"	"
Pentachlorophenol	ND		"	1.63	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-05 (DU5 - Solid/Soil) - cont.						Sampled: 06/28/07 16:50		Recvd: 07/02/07 12:35	
Semivolatile Organics by GC/MS - cont.									
Phenacetin	ND		"	0.317	"	"	"	"	"
Phenanthrene	ND		"	0.317	"	"	"	"	"
Phenol	ND		"	0.317	"	"	"	"	"
Pronamide	ND		"	0.317	"	"	"	"	"
Pyrene	ND		"	0.317	"	"	"	"	"
Pyridine	ND		"	0.317	"	"	"	"	"
Surr: 2,4,6-Tribromophenol (52.6-114%)	*70 %*					"	"	"	"
Surr: 2-Fluorobiphenyl (45.9-108%)	*69 %*					"	"	"	"
Surr: 2-Fluorophenol (39.4-103%)	*48 %*					"	"	"	"
Surr: Nitrobenzene-d5 (37.2-107%)	*65 %*					"	"	"	"
Surr: Phenol-d6 (49.6-105%)	*48 %*	Z				"	"	"	"
Surr: Terphenyl-d14 (45.7-133%)	*93 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Arsenic	3.33		mg/kg	0.952	1	07/20/07 13:10	07/10/07	7G10005	SW6010B
Lead	ND		"	1.90	"	"	"	"	"
Sample ID: HQG0016-06 (DU6 - Solid/Soil)						Sampled: 06/29/07 10:10		Recvd: 07/02/07 12:35	
Polychlorinated Biphenyls by EPA Method 8082									
Aroclor 1016	ND	C-01	mg/kg	0.0326	1	07/07/07 05:08	07/05/07	7G05005	SW8082
Aroclor 1221	ND	C-01	"	0.0651	"	"	"	"	"
Aroclor 1232	ND	C-01	"	0.0326	"	"	"	"	"
Aroclor 1242	ND	C-01	"	0.0326	"	"	"	"	"
Aroclor 1248	ND	C-01	"	0.0326	"	"	"	"	"
Aroclor 1254	ND	C-01	"	0.0326	"	"	"	"	"
Aroclor 1260	ND	C-01	"	0.0326	"	"	"	"	"
Surr: Decachlorobiphenyl (24-154%)	*111 %*	*C-01*				"	"	"	"
Semivolatile Organics by GC/MS									
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	0.329	1	07/27/07 09:24	07/11/07	7G11004	SW8270C
1,2,4-Trichlorobenzene	ND		"	0.329	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.329	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.329	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.329	"	"	"	"	"
1-Chloronaphthalene	ND		"	0.329	"	"	"	"	"
1-Naphthylamine	ND		"	0.658	"	"	"	"	"
2,3,4,6-Tetrachlorophenol	ND		"	0.329	"	"	"	"	"
2,4,5-Trichlorophenol	ND		"	0.329	"	"	"	"	"
2,4,6-Trichlorophenol	ND		"	0.329	"	"	"	"	"
2,4-Dichlorophenol	ND		"	0.329	"	"	"	"	"
2,4-Dimethylphenol	ND		"	0.329	"	"	"	"	"
2,4-Dinitrophenol	ND		"	1.69	"	"	"	"	"
2,4-Dinitrotoluene	ND		"	0.658	"	"	"	"	"
2,6-Dichlorophenol	ND		"	0.329	"	"	"	"	"
2,6-Dinitrotoluene	ND		"	0.329	"	"	"	"	"
2-Chloronaphthalene	ND		"	0.329	"	"	"	"	"
2-Chlorophenol	ND		"	0.329	"	"	"	"	"
2-Methylnaphthalene	ND		"	0.329	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-06 (DU6 - Solid/Soil) - cont.						Sampled: 06/29/07 10:10		Recvd: 07/02/07 12:35	
Semivolatile Organics by GC/MS - cont.									
2-Methylphenol (o-Cresol)	ND		"	0.329	"	"	"	"	"
2-Naphthylamine	ND		"	0.658	"	"	"	"	"
2-Nitroaniline	ND		"	1.69	"	"	"	"	"
2-Nitrophenol	ND		"	0.329	"	"	"	"	"
2-Picoline	ND		"	0.329	"	"	"	"	"
3,3'-Dichlorobenzidine	ND		"	0.329	"	"	"	"	"
3-Methylcholanthrene	ND		"	0.329	"	"	"	"	"
3-Nitroaniline	ND		"	1.69	"	"	"	"	"
4,6-Dinitro-2-methylphenol	ND		"	1.69	"	"	"	"	"
4-Aminobiphenyl	ND		"	0.658	"	"	"	"	"
4-Bromophenyl phenyl ether	ND		"	0.329	"	"	"	"	"
4-Chloro-3-methylphenol	ND		"	0.329	"	"	"	"	"
4-Chloroaniline	ND		"	0.329	"	"	"	"	"
4-Chlorophenyl phenyl ether	ND		"	0.329	"	"	"	"	"
4-Methylphenol (p-Cresol)	ND		"	0.329	"	"	"	"	"
4-Nitroaniline	ND		"	0.329	"	"	"	"	"
4-Nitrophenol	ND		"	1.69	"	"	"	"	"
7,12-Dimethylbenz (a) anthracene	ND		"	0.329	"	"	"	"	"
a,a-Dimethylphenethylamine	ND		"	1.69	"	"	"	"	"
Acenaphthene	ND		"	0.329	"	"	"	"	"
Acenaphthylene	ND		"	0.329	"	"	"	"	"
Acetophenone	ND		"	0.329	"	"	"	"	"
Aniline	ND		"	0.329	"	"	"	"	"
Anthracene	ND		"	0.329	"	"	"	"	"
Azobenzene	ND		"	0.329	"	"	"	"	"
Benzidine	ND		"	1.69	"	"	"	"	"
Benzo (a) anthracene	ND		"	0.329	"	"	"	"	"
Benzo (a) pyrene	ND		"	0.329	"	"	"	"	"
Benzo (b) fluoranthene	ND		"	0.329	"	"	"	"	"
Benzo (g,h,i) perylene	ND		"	0.329	"	"	"	"	"
Benzo (k) fluoranthene	ND		"	0.329	"	"	"	"	"
Benzoic acid	ND		"	1.69	"	"	"	"	"
Benzyl alcohol	ND		"	0.329	"	"	"	"	"
Bis(2-chloroethoxy)methane	ND		"	0.329	"	"	"	"	"
Bis(2-chloroethyl)ether	ND		"	0.329	"	"	"	"	"
Bis(2-chloroisopropyl) ether	ND		"	0.329	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	ND		"	0.329	"	"	"	"	"
Butyl benzyl phthalate	ND		"	0.329	"	"	"	"	"
Chrysene	ND		"	0.329	"	"	"	"	"
Dibenz (a,j) acridine	ND		"	0.329	"	"	"	"	"
Dibenzo (a,h) anthracene	ND		"	0.329	"	"	"	"	"
Dibenzofuran	ND		"	0.329	"	"	"	"	"
Diethyl phthalate	ND		"	0.329	"	"	"	"	"
Dimethyl phthalate	ND		"	0.329	"	"	"	"	"
Dimethylaminoazobenzene	ND		"	0.658	"	"	"	"	"
Di-n-butyl phthalate	ND		"	0.329	"	"	"	"	"
Di-n-octyl phthalate	ND		"	0.329	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-06 (DU6 - Solid/Soil) - cont.					Sampled: 06/29/07 10:10		Recvd: 07/02/07 12:35		
Semivolatile Organics by GC/MS - cont.									
Ethyl Methanesulfonate	ND		"	0.329	"	"	"	"	"
Fluoranthene	ND		"	0.329	"	"	"	"	"
Fluorene	ND		"	0.329	"	"	"	"	"
Hexachlorobenzene	ND		"	0.329	"	"	"	"	"
Hexachlorobutadiene	ND		"	0.329	"	"	"	"	"
Hexachlorocyclopentadiene	ND		"	0.329	"	"	"	"	"
Hexachloroethane	ND		"	0.329	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND		"	0.329	"	"	"	"	"
Isophorone	ND		"	0.329	"	"	"	"	"
Methyl Methanesulfonate	ND		"	0.658	"	"	"	"	"
Naphthalene	ND		"	0.329	"	"	"	"	"
Nitrobenzene	ND		"	0.329	"	"	"	"	"
N-Nitrosodimethylamine	ND		"	0.329	"	"	"	"	"
N-Nitrosodi-n-butylamine	ND		"	0.329	"	"	"	"	"
N-Nitrosodi-n-propylamine	ND		"	0.329	"	"	"	"	"
N-Nitrosodiphenylamine	ND		"	0.329	"	"	"	"	"
N-Nitrosopiperidine	ND		"	0.329	"	"	"	"	"
Pentachloronitrobenzene	ND		"	0.329	"	"	"	"	"
Pentachlorophenol	ND		"	1.69	"	"	"	"	"
Phenacetin	ND		"	0.329	"	"	"	"	"
Phenanthrene	ND		"	0.329	"	"	"	"	"
Phenol	ND		"	0.329	"	"	"	"	"
Pronamide	ND		"	0.329	"	"	"	"	"
Pyrene	ND		"	0.329	"	"	"	"	"
Pyridine	ND		"	0.329	"	"	"	"	"
Surr: 2,4,6-Tribromophenol (32.6-114%)	*65 %*					"	"	"	"
Surr: 2-Fluorobiphenyl (45.9-108%)	*73 %*					"	"	"	"
Surr: 2-Fluorophenol (39.4-103%)	*49 %*					"	"	"	"
Surr: Nitrobenzene-d5 (37.2-107%)	*69 %*					"	"	"	"
Surr: Phenol-d6 (49.6-105%)	*53 %*					"	"	"	"
Surr: Terphenyl-d14 (45.7-133%)	*91 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Arsenic	3.58		mg/kg	0.943	1	07/20/07 13:14	07/10/07	7G10005	SW6010B
Lead	ND		"	1.89	"	"	"	"	"

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THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-07 (DU7 - Solid/Soil)					Sampled: 06/29/07 11:10		Recvd: 07/02/07 12:35		
Polychlorinated Biphenyls by EPA Method 8082									
Aroclor 1016	ND	C-01	mg/kg	0.0330	1	07/07/07 05:36	07/05/07	7G05005	SW8082
Aroclor 1221	ND	C-01	"	0.0660	"	"	"	"	"
Aroclor 1232	ND	C-01	"	0.0330	"	"	"	"	"
Aroclor 1242	ND	C-01	"	0.0330	"	"	"	"	"
Aroclor 1248	ND	C-01	"	0.0330	"	"	"	"	"
Aroclor 1254	ND	C-01	"	0.0330	"	"	"	"	"
Aroclor 1260	ND	C-01	"	0.0330	"	"	"	"	"
Surr: Decachlorobiphenyl (24-154%)	*113 %*	*C-01*				"	"	"	"
Semivolatile Organics by GC/MS									
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	0.318	1	07/27/07 10:10	07/11/07	7G11004	SW8270C
1,2,4-Trichlorobenzene	ND		"	0.318	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.318	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.318	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.318	"	"	"	"	"
1-Chloronaphthalene	ND		"	0.318	"	"	"	"	"
1-Naphthylamine	ND		"	0.637	"	"	"	"	"
2,3,4,6-Tetrachlorophenol	ND		"	0.318	"	"	"	"	"
2,4,5-Trichlorophenol	ND		"	0.318	"	"	"	"	"
2,4,6-Trichlorophenol	ND		"	0.318	"	"	"	"	"
2,4-Dichlorophenol	ND		"	0.318	"	"	"	"	"
2,4-Dimethylphenol	ND		"	0.318	"	"	"	"	"
2,4-Dinitrophenol	ND		"	1.64	"	"	"	"	"
2,4-Dinitrotoluene	ND		"	0.637	"	"	"	"	"
2,6-Dichlorophenol	ND		"	0.318	"	"	"	"	"
2,6-Dinitrotoluene	ND		"	0.318	"	"	"	"	"
2-Chloronaphthalene	ND		"	0.318	"	"	"	"	"
2-Chlorophenol	ND		"	0.318	"	"	"	"	"
2-Methylnaphthalene	ND		"	0.318	"	"	"	"	"
2-Methylphenol (o-Cresol)	ND		"	0.318	"	"	"	"	"
2-Naphthylamine	ND		"	0.637	"	"	"	"	"
2-Nitroaniline	ND		"	1.64	"	"	"	"	"
2-Nitrophenol	ND		"	0.318	"	"	"	"	"
2-Picoline	ND		"	0.318	"	"	"	"	"
3,3'-Dichlorobenzidine	ND		"	0.318	"	"	"	"	"
3-Methylcholanthrene	ND		"	0.318	"	"	"	"	"
3-Nitroaniline	ND		"	1.64	"	"	"	"	"
4,6-Dinitro-2-methylphenol	ND		"	1.64	"	"	"	"	"
4-Aminobiphenyl	ND		"	0.637	"	"	"	"	"
4-Bromophenyl phenyl ether	ND		"	0.318	"	"	"	"	"
4-Chloro-3-methylphenol	ND		"	0.318	"	"	"	"	"
4-Chloroaniline	ND		"	0.318	"	"	"	"	"
4-Chlorophenyl phenyl ether	ND		"	0.318	"	"	"	"	"
4-Methylphenol (p-Cresol)	ND		"	0.318	"	"	"	"	"
4-Nitroaniline	ND		"	0.318	"	"	"	"	"
4-Nitrophenol	ND		"	1.64	"	"	"	"	"
7,12-Dimethylbenz (a) anthracene	ND		"	0.318	"	"	"	"	"
a,a-Dimethylphenethylamine	ND		"	1.64	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-07 (DU7 - Solid/Soil) - cont.					Sampled: 06/29/07 11:10		Recvd: 07/02/07 12:35		
Semivolatile Organics by GC/MS - cont.									
Acenaphthene	ND		"	0.318	"	"	"	"	"
Acenaphthylene	ND		"	0.318	"	"	"	"	"
Acetophenone	ND		"	0.318	"	"	"	"	"
Aniline	ND		"	0.318	"	"	"	"	"
Anthracene	ND		"	0.318	"	"	"	"	"
Azobenzene	ND		"	0.318	"	"	"	"	"
Benzidine	ND		"	1.64	"	"	"	"	"
Benzo (a) anthracene	ND		"	0.318	"	"	"	"	"
Benzo (a) pyrene	ND		"	0.318	"	"	"	"	"
Benzo (b) fluoranthene	ND		"	0.318	"	"	"	"	"
Benzo (g,h,i) perylene	ND		"	0.318	"	"	"	"	"
Benzo (k) fluoranthene	ND		"	0.318	"	"	"	"	"
Benzoic acid	ND		"	1.64	"	"	"	"	"
Benzyl alcohol	ND		"	0.318	"	"	"	"	"
Bis(2-chloroethoxy)methane	ND		"	0.318	"	"	"	"	"
Bis(2-chloroethyl)ether	ND		"	0.318	"	"	"	"	"
Bis(2-chloroisopropyl) ether	ND		"	0.318	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	ND		"	0.318	"	"	"	"	"
Butyl benzyl phthalate	ND		"	0.318	"	"	"	"	"
Chrysene	ND		"	0.318	"	"	"	"	"
Dibenz (a,j) acridine	ND		"	0.318	"	"	"	"	"
Dibenzo (a,h) anthracene	ND		"	0.318	"	"	"	"	"
Dibenzofuran	ND		"	0.318	"	"	"	"	"
Diethyl phthalate	ND		"	0.318	"	"	"	"	"
Dimethyl phthalate	ND		"	0.318	"	"	"	"	"
Dimethylaminoazobenzene	ND		"	0.637	"	"	"	"	"
Di-n-butyl phthalate	ND		"	0.318	"	"	"	"	"
Di-n-octyl phthalate	ND		"	0.318	"	"	"	"	"
Ethyl Methanesulfonate	ND		"	0.318	"	"	"	"	"
Fluoranthene	ND		"	0.318	"	"	"	"	"
Fluorene	ND		"	0.318	"	"	"	"	"
Hexachlorobenzene	ND		"	0.318	"	"	"	"	"
Hexachlorobutadiene	ND		"	0.318	"	"	"	"	"
Hexachlorocyclopentadiene	ND		"	0.318	"	"	"	"	"
Hexachloroethane	ND		"	0.318	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND		"	0.318	"	"	"	"	"
Isophorone	ND		"	0.318	"	"	"	"	"
Methyl Methanesulfonate	ND		"	0.637	"	"	"	"	"
Naphthalene	ND		"	0.318	"	"	"	"	"
Nitrobenzene	ND		"	0.318	"	"	"	"	"
N-Nitrosodimethylamine	ND		"	0.318	"	"	"	"	"
N-Nitrosodi-n-butylamine	ND		"	0.318	"	"	"	"	"
N-Nitrosodi-n-propylamine	ND		"	0.318	"	"	"	"	"
N-Nitrosodiphenylamine	ND		"	0.318	"	"	"	"	"
N-Nitrosopiperidine	ND		"	0.318	"	"	"	"	"
Pentachloronitrobenzene	ND		"	0.318	"	"	"	"	"
Pentachlorophenol	ND		"	1.64	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-07 (DU7 - Solid/Soil) - cont.					Sampled: 06/29/07 11:10		Recvd: 07/02/07 12:35		
Semivolatile Organics by GC/MS - cont.									
Phenacetin	ND		"	0.318	"	"	"	"	"
Phenanthrene	ND		"	0.318	"	"	"	"	"
Phenol	ND		"	0.318	"	"	"	"	"
Pronamide	ND		"	0.318	"	"	"	"	"
Pyrene	ND		"	0.318	"	"	"	"	"
Pyridine	ND		"	0.318	"	"	"	"	"
Surr: 2,4,6-Tribromophenol (52.6-114%)	*75 %*					"	"	"	"
Surr: 2-Fluorobiphenyl (45.9-108%)	*72 %*					"	"	"	"
Surr: 2-Fluorophenol (39.4-103%)	*50 %*					"	"	"	"
Surr: Nitrobenzene-d5 (37.2-107%)	*61 %*					"	"	"	"
Surr: Phenol-d6 (49.6-105%)	*62 %*					"	"	"	"
Surr: Terphenyl-d14 (45.7-133%)	*87 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Arsenic	3.10		mg/kg	0.971	1	07/20/07 13:18	07/10/07	7G10005	SW6010B
Lead	ND		"	1.94	"	"	"	"	"
Sample ID: HQG0016-08 (DU8 - Solid/Soil)					Sampled: 06/29/07 12:10		Recvd: 07/02/07 12:35		
Polychlorinated Biphenyls by EPA Method 8082									
Aroclor 1016	ND	C-01	mg/kg	0.0318	1	07/07/07 06:04	07/05/07	7G05005	SW8082
Aroclor 1221	ND	C-01	"	0.0637	"	"	"	"	"
Aroclor 1232	ND	C-01	"	0.0318	"	"	"	"	"
Aroclor 1242	ND	C-01	"	0.0318	"	"	"	"	"
Aroclor 1248	ND	C-01	"	0.0318	"	"	"	"	"
Aroclor 1254	ND	C-01	"	0.0318	"	"	"	"	"
Aroclor 1260	ND	C-01	"	0.0318	"	"	"	"	"
Surr: Decachlorobiphenyl (24-154%)	*116 %*	*C-01*				"	"	"	"
Semivolatile Organics by GC/MS									
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	0.316	1	07/27/07 10:55	07/11/07	7G11004	SW8270C
1,2,4-Trichlorobenzene	ND		"	0.316	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.316	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.316	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.316	"	"	"	"	"
1-Chloronaphthalene	ND		"	0.316	"	"	"	"	"
1-Naphthylamine	ND		"	0.633	"	"	"	"	"
2,3,4,6-Tetrachlorophenol	ND		"	0.316	"	"	"	"	"
2,4,5-Trichlorophenol	ND		"	0.316	"	"	"	"	"
2,4,6-Trichlorophenol	ND		"	0.316	"	"	"	"	"
2,4-Dichlorophenol	ND		"	0.316	"	"	"	"	"
2,4-Dimethylphenol	ND		"	0.316	"	"	"	"	"
2,4-Dinitrophenol	ND		"	1.63	"	"	"	"	"
2,4-Dinitrotoluene	ND		"	0.633	"	"	"	"	"
2,6-Dichlorophenol	ND		"	0.316	"	"	"	"	"
2,6-Dinitrotoluene	ND		"	0.316	"	"	"	"	"
2-Chloronaphthalene	ND		"	0.316	"	"	"	"	"
2-Chlorophenol	ND		"	0.316	"	"	"	"	"
2-Methylnaphthalene	ND		"	0.316	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-08 (DU8 - Solid/Soil) - cont.					Sampled: 06/29/07 12:10		Recvd: 07/02/07 12:35		
Semivolatile Organics by GC/MS - cont.									
2-Methylphenol (o-Cresol)	ND		"	0.316	"	"	"	"	"
2-Naphthylamine	ND		"	0.633	"	"	"	"	"
2-Nitroaniline	ND		"	1.63	"	"	"	"	"
2-Nitrophenol	ND		"	0.316	"	"	"	"	"
2-Picoline	ND		"	0.316	"	"	"	"	"
3,3'-Dichlorobenzidine	ND		"	0.316	"	"	"	"	"
3-Methylcholanthrene	ND		"	0.316	"	"	"	"	"
3-Nitroaniline	ND		"	1.63	"	"	"	"	"
4,6-Dinitro-2-methylphenol	ND		"	1.63	"	"	"	"	"
4-Aminobiphenyl	ND		"	0.633	"	"	"	"	"
4-Bromophenyl phenyl ether	ND		"	0.316	"	"	"	"	"
4-Chloro-3-methylphenol	ND		"	0.316	"	"	"	"	"
4-Chloroaniline	ND		"	0.316	"	"	"	"	"
4-Chlorophenyl phenyl ether	ND		"	0.316	"	"	"	"	"
4-Methylphenol (p-Cresol)	ND		"	0.316	"	"	"	"	"
4-Nitroaniline	ND		"	0.316	"	"	"	"	"
4-Nitrophenol	ND		"	1.63	"	"	"	"	"
7,12-Dimethylbenz (a) anthracene	ND		"	0.316	"	"	"	"	"
a,a-Dimethylphenethylamine	ND		"	1.63	"	"	"	"	"
Acenaphthene	ND		"	0.316	"	"	"	"	"
Acenaphthylene	ND		"	0.316	"	"	"	"	"
Acetophenone	ND		"	0.316	"	"	"	"	"
Aniline	ND		"	0.316	"	"	"	"	"
Anthracene	ND		"	0.316	"	"	"	"	"
Azobenzene	ND		"	0.316	"	"	"	"	"
Benzidine	ND		"	1.63	"	"	"	"	"
Benzo (a) anthracene	ND		"	0.316	"	"	"	"	"
Benzo (a) pyrene	ND		"	0.316	"	"	"	"	"
Benzo (b) fluoranthene	ND		"	0.316	"	"	"	"	"
Benzo (g,h,i) perylene	ND		"	0.316	"	"	"	"	"
Benzo (k) fluoranthene	ND		"	0.316	"	"	"	"	"
Benzoic acid	ND		"	1.63	"	"	"	"	"
Benzyl alcohol	ND		"	0.316	"	"	"	"	"
Bis(2-chloroethoxy)methane	ND		"	0.316	"	"	"	"	"
Bis(2-chloroethyl)ether	ND		"	0.316	"	"	"	"	"
Bis(2-chloroisopropyl) ether	ND		"	0.316	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	ND		"	0.316	"	"	"	"	"
Butyl benzyl phthalate	ND		"	0.316	"	"	"	"	"
Chrysene	ND		"	0.316	"	"	"	"	"
Dibenz (a,j) acridine	ND		"	0.316	"	"	"	"	"
Dibenzo (a,h) anthracene	ND		"	0.316	"	"	"	"	"
Dibenzofuran	ND		"	0.316	"	"	"	"	"
Diethyl phthalate	ND		"	0.316	"	"	"	"	"
Dimethyl phthalate	ND		"	0.316	"	"	"	"	"
Dimethylaminoazobenzene	ND		"	0.633	"	"	"	"	"
Di-n-butyl phthalate	ND		"	0.316	"	"	"	"	"
Di-n-octyl phthalate	ND		"	0.316	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-08 (DU8 - Solid/Soil) - cont.					Sampled: 06/29/07 12:10		Recvd: 07/02/07 12:35		
Semivolatile Organics by GC/MS - cont.									
Ethyl Methanesulfonate	ND		"	0.316	"	"	"	"	"
Fluoranthene	ND		"	0.316	"	"	"	"	"
Fluorene	ND		"	0.316	"	"	"	"	"
Hexachlorobenzene	ND		"	0.316	"	"	"	"	"
Hexachlorobutadiene	ND		"	0.316	"	"	"	"	"
Hexachlorocyclopentadiene	ND		"	0.316	"	"	"	"	"
Hexachloroethane	ND		"	0.316	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND		"	0.316	"	"	"	"	"
Isophorone	ND		"	0.316	"	"	"	"	"
Methyl Methanesulfonate	ND		"	0.633	"	"	"	"	"
Naphthalene	ND		"	0.316	"	"	"	"	"
Nitrobenzene	ND		"	0.316	"	"	"	"	"
N-Nitrosodimethylamine	ND		"	0.316	"	"	"	"	"
N-Nitrosodi-n-butylamine	ND		"	0.316	"	"	"	"	"
N-Nitrosodi-n-propylamine	ND		"	0.316	"	"	"	"	"
N-Nitrosodiphenylamine	ND		"	0.316	"	"	"	"	"
N-Nitrosopiperidine	ND		"	0.316	"	"	"	"	"
Pentachloronitrobenzene	ND		"	0.316	"	"	"	"	"
Pentachlorophenol	ND		"	1.63	"	"	"	"	"
Phenacetin	ND		"	0.316	"	"	"	"	"
Phenanthrene	ND		"	0.316	"	"	"	"	"
Phenol	ND		"	0.316	"	"	"	"	"
Pronamide	ND		"	0.316	"	"	"	"	"
Pyrene	ND		"	0.316	"	"	"	"	"
Pyridine	ND		"	0.316	"	"	"	"	"
Surr: 2,4,6-Tribromophenol (32.6-114%)	*70 %*					"	"	"	"
Surr: 2-Fluorobiphenyl (43.9-108%)	*63 %*					"	"	"	"
Surr: 2-Fluorophenol (39.4-103%)	*42 %*					"	"	"	"
Surr: Nitrobenzene-d5 (37.2-107%)	*37 %*					"	"	"	"
Surr: Phenol-d6 (49.6-105%)	*46 %*	Z				"	"	"	"
Surr: Terphenyl-d14 (45.7-135%)	*86 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Arsenic	3.41		mg/kg	0.971	1	07/20/07 13:21	07/10/07	7G10005	SW6010B
Lead	ND		"	1.94	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34	

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-09 (DU9 - Solid/Soil)					**Sampled: 06/29/07 14:10**		**Recvd: 07/02/07 12:35**		
Polychlorinated Biphenyls by EPA Method 8082									
Aroclor 1016	ND	C-01	mg/kg	0.0310	1	07/07/07 06:32	07/05/07	7G05005	SW8082
Aroclor 1221	ND	C-01	"	0.0619	"	"	"	"	"
Aroclor 1232	ND	C-01	"	0.0310	"	"	"	"	"
Aroclor 1242	ND	C-01	"	0.0310	"	"	"	"	"
Aroclor 1248	ND	C-01	"	0.0310	"	"	"	"	"
Aroclor 1254	ND	C-01	"	0.0310	"	"	"	"	"
Aroclor 1260	ND	C-01	"	0.0310	"	"	"	"	"
Surr: Decachlorobiphenyl (24-154%)	*109 %*	*C-01*				"	"	"	"
Semivolatile Organics by GC/MS									
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	0.320	1	07/27/07 11:41	07/11/07	7G11004	SW8270C
1,2,4-Trichlorobenzene	ND		"	0.320	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.320	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.320	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.320	"	"	"	"	"
1-Chloronaphthalene	ND		"	0.320	"	"	"	"	"
1-Naphthylamine	ND		"	0.641	"	"	"	"	"
2,3,4,6-Tetrachlorophenol	ND		"	0.320	"	"	"	"	"
2,4,5-Trichlorophenol	ND		"	0.320	"	"	"	"	"
2,4,6-Trichlorophenol	ND		"	0.320	"	"	"	"	"
2,4-Dichlorophenol	ND		"	0.320	"	"	"	"	"
2,4-Dimethylphenol	ND		"	0.320	"	"	"	"	"
2,4-Dinitrophenol	ND		"	1.65	"	"	"	"	"
2,4-Dinitrotoluene	ND		"	0.641	"	"	"	"	"
2,6-Dichlorophenol	ND		"	0.320	"	"	"	"	"
2,6-Dinitrotoluene	ND		"	0.320	"	"	"	"	"
2-Chloronaphthalene	ND		"	0.320	"	"	"	"	"
2-Chlorophenol	ND		"	0.320	"	"	"	"	"
2-Methylnaphthalene	ND		"	0.320	"	"	"	"	"
2-Methylphenol (o-Cresol)	ND		"	0.320	"	"	"	"	"
2-Naphthylamine	ND		"	0.641	"	"	"	"	"
2-Nitroaniline	ND		"	1.65	"	"	"	"	"
2-Nitrophenol	ND		"	0.320	"	"	"	"	"
2-Picoline	ND		"	0.320	"	"	"	"	"
3,3'-Dichlorobenzidine	ND		"	0.320	"	"	"	"	"
3-Methylcholanthrene	ND		"	0.320	"	"	"	"	"
3-Nitroaniline	ND		"	1.65	"	"	"	"	"
4,6-Dinitro-2-methylphenol	ND		"	1.65	"	"	"	"	"
4-Aminobiphenyl	ND		"	0.641	"	"	"	"	"
4-Bromophenyl phenyl ether	ND		"	0.320	"	"	"	"	"
4-Chloro-3-methylphenol	ND		"	0.320	"	"	"	"	"
4-Chloroaniline	ND		"	0.320	"	"	"	"	"
4-Chlorophenyl phenyl ether	ND		"	0.320	"	"	"	"	"
4-Methylphenol (p-Cresol)	ND		"	0.320	"	"	"	"	"
4-Nitroaniline	ND		"	0.320	"	"	"	"	"
4-Nitrophenol	ND		"	1.65	"	"	"	"	"
7,12-Dimethylbenz (a) anthracene	ND		"	0.320	"	"	"	"	"
a,a-Dimethylphenethylamine	ND		"	1.65	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34	

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-09 (DU9 - Solid/Soil) - cont.					**Sampled: 06/29/07 14:10**		**Recvd: 07/02/07 12:35**		
Semivolatile Organics by GC/MS - cont.									
Acenaphthene	ND		"	0.320	"	"	"	"	"
Acenaphthylene	ND		"	0.320	"	"	"	"	"
Acetophenone	ND		"	0.320	"	"	"	"	"
Aniline	ND		"	0.320	"	"	"	"	"
Anthracene	ND		"	0.320	"	"	"	"	"
Azobenzene	ND		"	0.320	"	"	"	"	"
Benzidine	ND		"	1.65	"	"	"	"	"
Benzo (a) anthracene	ND		"	0.320	"	"	"	"	"
Benzo (a) pyrene	ND		"	0.320	"	"	"	"	"
Benzo (b) fluoranthene	ND		"	0.320	"	"	"	"	"
Benzo (g,h,i) perylene	ND		"	0.320	"	"	"	"	"
Benzo (k) fluoranthene	ND		"	0.320	"	"	"	"	"
Benzoic acid	ND		"	1.65	"	"	"	"	"
Benzyl alcohol	ND		"	0.320	"	"	"	"	"
Bis(2-chloroethoxy)methane	ND		"	0.320	"	"	"	"	"
Bis(2-chloroethyl)ether	ND		"	0.320	"	"	"	"	"
Bis(2-chloroisopropyl) ether	ND		"	0.320	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	ND		"	0.320	"	"	"	"	"
Butyl benzyl phthalate	ND		"	0.320	"	"	"	"	"
Chrysene	ND		"	0.320	"	"	"	"	"
Dibenz (a,j) acridine	ND		"	0.320	"	"	"	"	"
Dibenzo (a,h) anthracene	ND		"	0.320	"	"	"	"	"
Dibenzofuran	ND		"	0.320	"	"	"	"	"
Diethyl phthalate	ND		"	0.320	"	"	"	"	"
Dimethyl phthalate	ND		"	0.320	"	"	"	"	"
Dimethylaminoazobenzene	ND		"	0.641	"	"	"	"	"
Di-n-butyl phthalate	ND		"	0.320	"	"	"	"	"
Di-n-octyl phthalate	ND		"	0.320	"	"	"	"	"
Ethyl Methanesulfonate	ND		"	0.320	"	"	"	"	"
Fluoranthene	ND		"	0.320	"	"	"	"	"
Fluorene	ND		"	0.320	"	"	"	"	"
Hexachlorobenzene	ND		"	0.320	"	"	"	"	"
Hexachlorobutadiene	ND		"	0.320	"	"	"	"	"
Hexachlorocyclopentadiene	ND		"	0.320	"	"	"	"	"
Hexachloroethane	ND		"	0.320	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND		"	0.320	"	"	"	"	"
Isophorone	ND		"	0.320	"	"	"	"	"
Methyl Methanesulfonate	ND		"	0.641	"	"	"	"	"
Naphthalene	ND		"	0.320	"	"	"	"	"
Nitrobenzene	ND		"	0.320	"	"	"	"	"
N-Nitrosodimethylamine	ND		"	0.320	"	"	"	"	"
N-Nitrosodi-n-butylamine	ND		"	0.320	"	"	"	"	"
N-Nitrosodi-n-propylamine	ND		"	0.320	"	"	"	"	"
N-Nitrosodiphenylamine	ND		"	0.320	"	"	"	"	"
N-Nitrosopiperidine	ND		"	0.320	"	"	"	"	"
Pentachloronitrobenzene	ND		"	0.320	"	"	"	"	"
Pentachlorophenol	ND		"	1.65	"	"	"	"	"

Element Environmental LLC
62-180 Emerson Rd.
Haleiwa, HI 96712
Matt Neal

Work Order: HQG0016
Project: Maalea
Project Number: Maalaea Phase II ESA
Received: 07/02/07
Reported: 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-09 (DU9 - Solid/Soil) - cont.					Sampled: 06/29/07 14:10		Recvd: 07/02/07 12:35		
Semivolatile Organics by GC/MS - cont.									
Phenacetin	ND		"	0.320	"	"	"	"	"
Phenanthrene	ND		"	0.320	"	"	"	"	"
Phenol	ND		"	0.320	"	"	"	"	"
Pronamide	ND		"	0.320	"	"	"	"	"
Pyrene	ND		"	0.320	"	"	"	"	"
Pyridine	ND		"	0.320	"	"	"	"	"
Surr: 2,4,6-Tribromophenol (52.6-114%)	*67 %*					"	"	"	"
Surr: 2-Fluorobiphenyl (45.9-108%)	*81 %*					"	"	"	"
Surr: 2-Fluorophenol (39.4-103%)	*51 %*					"	"	"	"
Surr: Nitrobenzene-d5 (37.2-107%)	*78 %*					"	"	"	"
Surr: Phenol-d6 (49.6-105%)	*53 %*					"	"	"	"
Surr: Terphenyl-d14 (45.7-133%)	*99 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Arsenic	2.82		mg/kg	0.935	1	07/20/07 13:25	07/10/07	7G10005	SW6010B
Lead	ND		"	1.87	"	"	"	"	"
Sample ID: HQG0016-10 (DU10 - Solid/Soil)					Sampled: 06/29/07 15:10		Recvd: 07/02/07 12:35		
Polychlorinated Biphenyls by EPA Method 8082									
Aroclor 1016	ND	C-01	mg/kg	0.0324	1	07/07/07 00:30	07/05/07	7G05005	SW8082
Aroclor 1221	ND	C-01	"	0.0647	"	"	"	"	"
Aroclor 1232	ND	C-01	"	0.0324	"	"	"	"	"
Aroclor 1242	ND	C-01	"	0.0324	"	"	"	"	"
Aroclor 1248	ND	C-01	"	0.0324	"	"	"	"	"
Aroclor 1254	ND	C-01	"	0.0324	"	"	"	"	"
Aroclor 1260	ND	C-01	"	0.0324	"	"	"	"	"
Surr: Decachlorobiphenyl (24-154%)	*111 %*	*C-01*				"	"	"	"
Semivolatile Organics by GC/MS									
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	0.316	1	07/27/07 12:27	07/11/07	7G11004	SW8270C
1,2,4-Trichlorobenzene	ND		"	0.316	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.316	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.316	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.316	"	"	"	"	"
1-Chloronaphthalene	ND		"	0.316	"	"	"	"	"
1-Naphthylamine	ND		"	0.633	"	"	"	"	"
2,3,4,6-Tetrachlorophenol	ND		"	0.316	"	"	"	"	"
2,4,5-Trichlorophenol	ND		"	0.316	"	"	"	"	"
2,4,6-Trichlorophenol	ND		"	0.316	"	"	"	"	"
2,4-Dichlorophenol	ND		"	0.316	"	"	"	"	"
2,4-Dimethylphenol	ND		"	0.316	"	"	"	"	"
2,4-Dinitrophenol	ND		"	1.63	"	"	"	"	"
2,4-Dinitrotoluene	ND		"	0.633	"	"	"	"	"
2,6-Dichlorophenol	ND		"	0.316	"	"	"	"	"
2,6-Dinitrotoluene	ND		"	0.316	"	"	"	"	"
2-Chloronaphthalene	ND		"	0.316	"	"	"	"	"
2-Chlorophenol	ND		"	0.316	"	"	"	"	"
2-Methylnaphthalene	ND		"	0.316	"	"	"	"	"

Element Environmental LLC
62-180 Emerson Rd.
Haleiwa, HI 96712
Matt Neal

Work Order: HQG0016
Project: Maalea
Project Number: Maalaea Phase II ESA
Received: 07/02/07
Reported: 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-10 (DU10 - Solid/Soil) - cont.					Sampled: 06/29/07 15:10		Recvd: 07/02/07 12:35		
Semivolatile Organics by GC/MS - cont.									
2-Methylphenol (o-Cresol)	ND		"	0.316	"	"	"	"	"
2-Naphthylamine	ND		"	0.633	"	"	"	"	"
2-Nitroaniline	ND		"	1.63	"	"	"	"	"
2-Nitrophenol	ND		"	0.316	"	"	"	"	"
2-Picoline	ND		"	0.316	"	"	"	"	"
3,3'-Dichlorobenzidine	ND		"	0.316	"	"	"	"	"
3-Methylcholanthrene	ND		"	0.316	"	"	"	"	"
3-Nitroaniline	ND		"	1.63	"	"	"	"	"
4,6-Dinitro-2-methylphenol	ND		"	1.63	"	"	"	"	"
4-Aminobiphenyl	ND		"	0.633	"	"	"	"	"
4-Bromophenyl phenyl ether	ND		"	0.316	"	"	"	"	"
4-Chloro-3-methylphenol	ND		"	0.316	"	"	"	"	"
4-Chloroaniline	ND		"	0.316	"	"	"	"	"
4-Chlorophenyl phenyl ether	ND		"	0.316	"	"	"	"	"
4-Methylphenol (p-Cresol)	ND		"	0.316	"	"	"	"	"
4-Nitroaniline	ND		"	0.316	"	"	"	"	"
4-Nitrophenol	ND		"	1.63	"	"	"	"	"
7,12-Dimethylbenz (a) anthracene	ND		"	0.316	"	"	"	"	"
a,a-Dimethylphenethylamine	ND		"	1.63	"	"	"	"	"
Acenaphthene	ND		"	0.316	"	"	"	"	"
Acenaphthylene	ND		"	0.316	"	"	"	"	"
Acetophenone	ND		"	0.316	"	"	"	"	"
Aniline	ND		"	0.316	"	"	"	"	"
Anthracene	ND		"	0.316	"	"	"	"	"
Azobenzene	ND		"	0.316	"	"	"	"	"
Benzidine	ND		"	1.63	"	"	"	"	"
Benzo (a) anthracene	ND		"	0.316	"	"	"	"	"
Benzo (a) pyrene	ND		"	0.316	"	"	"	"	"
Benzo (b) fluoranthene	ND		"	0.316	"	"	"	"	"
Benzo (g,h,i) perylene	ND		"	0.316	"	"	"	"	"
Benzo (k) fluoranthene	ND		"	0.316	"	"	"	"	"
Benzoic acid	ND		"	1.63	"	"	"	"	"
Benzyl alcohol	ND		"	0.316	"	"	"	"	"
Bis(2-chloroethoxy)methane	ND		"	0.316	"	"	"	"	"
Bis(2-chloroethyl)ether	ND		"	0.316	"	"	"	"	"
Bis(2-chloroisopropyl) ether	ND		"	0.316	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	ND		"	0.316	"	"	"	"	"
Butyl benzyl phthalate	ND		"	0.316	"	"	"	"	"
Chrysene	ND		"	0.316	"	"	"	"	"
Dibenz (a,j) acridine	ND		"	0.316	"	"	"	"	"
Dibenzo (a,h) anthracene	ND		"	0.316	"	"	"	"	"
Dibenzofuran	ND		"	0.316	"	"	"	"	"
Diethyl phthalate	ND		"	0.316	"	"	"	"	"
Dimethyl phthalate	ND		"	0.316	"	"	"	"	"
Dimethylaminoazobenzene	ND		"	0.633	"	"	"	"	"
Di-n-butyl phthalate	ND		"	0.316	"	"	"	"	"
Di-n-octyl phthalate	ND		"	0.316	"	"	"	"	"

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Element Environmental LLC	Work Order:	HQG0016		Received:	07/02/07
62-180 Emerson Rd.				Reported:	08/08/07 09:34
Haleiwa, HI 96712	Project:	Maalea			
Matt Neal	Project Number:	Maalaea Phase II ESA			

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-10 (DU10 - Solid/Soil) - cont.					Sampled: 06/29/07 15:10		Recvd: 07/02/07 12:35		
Semivolatile Organics by GC/MS - cont.									
Ethyl Methanesulfonate	ND		"	0.316	"	"	"	"	"
Fluoranthene	ND		"	0.316	"	"	"	"	"
Fluorene	ND		"	0.316	"	"	"	"	"
Hexachlorobenzene	ND		"	0.316	"	"	"	"	"
Hexachlorobutadiene	ND		"	0.316	"	"	"	"	"
Hexachlorocyclopentadiene	ND		"	0.316	"	"	"	"	"
Hexachloroethane	ND		"	0.316	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND		"	0.316	"	"	"	"	"
Isophorone	ND		"	0.316	"	"	"	"	"
Methyl Methanesulfonate	ND		"	0.633	"	"	"	"	"
Naphthalene	ND		"	0.316	"	"	"	"	"
Nitrobenzene	ND		"	0.316	"	"	"	"	"
N-Nitrosodimethylamine	ND		"	0.316	"	"	"	"	"
N-Nitrosodi-n-butylamine	ND		"	0.316	"	"	"	"	"
N-Nitrosodi-n-propylamine	ND		"	0.316	"	"	"	"	"
N-Nitrosodiphenylamine	ND		"	0.316	"	"	"	"	"
N-Nitrosopiperidine	ND		"	0.316	"	"	"	"	"
Pentachloronitrobenzene	ND		"	0.316	"	"	"	"	"
Pentachlorophenol	ND		"	1.63	"	"	"	"	"
Phenacetin	ND		"	0.316	"	"	"	"	"
Phenanthrene	ND		"	0.316	"	"	"	"	"
Phenol	ND		"	0.316	"	"	"	"	"
Pronamide	ND		"	0.316	"	"	"	"	"
Pyrene	ND		"	0.316	"	"	"	"	"
Pyridine	ND		"	0.316	"	"	"	"	"
Surr: 2,4,6-Tribromophenol (53.6-114%)	*70 %*					"	"	"	"
Surr: 2-Fluorobiphenyl (45.9-108%)	*73 %*					"	"	"	"
Surr: 2-Fluorophenol (39.4-103%)	*46 %*					"	"	"	"
Surr: Nitrobenzene-d5 (37.2-107%)	*71 %*					"	"	"	"
Surr: Phenol-d6 (49.6-105%)	*53 %*					"	"	"	"
Surr: Terphenyl-d14 (45.7-133%)	*97 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Arsenic	2.89		mg/kg	0.943	1	07/10/07 13:41	07/10/07	7G10005	SW6010B
Lead	ND		"	1.89	"	"	"	"	"

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99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC	Work Order:	HQG0016		Received:	07/02/07
62-180 Emerson Rd.				Reported:	08/08/07 09:34
Haleiwa, HI 96712	Project:	Maalea			
Matt Neal	Project Number:	Maalaea Phase II ESA			

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-11 (DU1-VOC - Solid/Soil)					Sampled: 06/29/07 16:30		Recvd: 07/02/07 12:35		
Volatile Organic Compounds by EPA 8260B									
1,1,1-Trichloroethane	ND		mg/kg	0.00988	1	07/12/07 00:42	07/11/07	7G12011	SW8260B
1,1,2,2-Tetrachloroethane	ND		"	0.00988	"	"	"	"	"
1,1,2-Trichloroethane	ND		"	0.00988	"	"	"	"	"
1,1-Dichloroethane	ND		"	0.00988	"	"	"	"	"
1,1-Dichloroethene	ND		"	0.00988	"	"	"	"	"
1,2-Dibromo-3-chloropropane	ND		"	0.00988	"	"	"	"	"
1,2-Dibromoethane (EDB)	ND		"	0.00988	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.00988	"	"	"	"	"
1,2-Dichloroethane	ND		"	0.00988	"	"	"	"	"
1,2-Dichloropropane	ND		"	0.00988	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.00988	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.00988	"	"	"	"	"
Bromodichloromethane	ND		"	0.00988	"	"	"	"	"
Bromoform	ND		"	0.00988	"	"	"	"	"
Bromomethane	ND		"	0.0988	"	"	"	"	"
Carbon Tetrachloride	ND		"	0.00988	"	"	"	"	"
Chlorobenzene	ND		"	0.00988	"	"	"	"	"
Chlorodibromomethane	ND		"	0.00988	"	"	"	"	"
Chloroethane	ND		"	0.0494	"	"	"	"	"
Chloroform	ND		"	0.00988	"	"	"	"	"
Chloromethane	ND		"	0.0494	"	"	"	"	"
cis-1,2-Dichloroethene	ND		"	0.00988	"	"	"	"	"
cis-1,3-Dichloropropene	ND		"	0.00988	"	"	"	"	"
Dichlorodifluoromethane	ND		"	0.0494	"	"	"	"	"
Methylene Chloride	ND		"	0.0494	"	"	"	"	"
Tetrachloroethene	ND		"	0.00988	"	"	"	"	"
trans-1,2-Dichloroethene	ND		"	0.00988	"	"	"	"	"
trans-1,3-Dichloropropene	ND		"	0.00988	"	"	"	"	"
Trichloroethene	ND		"	0.00988	"	"	"	"	"
Trichlorofluoromethane	ND		"	0.00988	"	"	"	"	"
Vinyl chloride	ND		"	0.0494	"	"	"	"	"
Surr: 1,2-Dichloroethane-d4 (58.3-156%)	*109 %*					"	"	"	"
Surr: 4-Bromofluorobenzene (72.1-138%)	*133 %*					"	"	"	"
Surr: Dibromofluoromethane (65.2-149%)	*104 %*					"	"	"	"
Surr: Toluene-d8 (70.5-145%)	*122 %*					"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-12 (DU2-VOC - Solid/Soil)					**Sampled: 06/29/07 15:55**		**Recvd: 07/02/07 12:35**		
Volatile Organic Compounds by EPA 8260B									
1,1,1-Trichloroethane	ND		mg/kg	0.00977	1	07/12/07 01:09	07/11/07	7G12011	SW8260B
1,1,2,2-Tetrachloroethane	ND		"	0.00977	"	"	"	"	"
1,1,2-Trichloroethane	ND		"	0.00977	"	"	"	"	"
1,1-Dichloroethane	ND		"	0.00977	"	"	"	"	"
1,1-Dichloroethene	ND		"	0.00977	"	"	"	"	"
1,2-Dibromo-3-chloropropane	ND		"	0.00977	"	"	"	"	"
1,2-Dibromoethane (EDB)	ND		"	0.00977	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.00977	"	"	"	"	"
1,2-Dichloroethane	ND		"	0.00977	"	"	"	"	"
1,2-Dichloropropane	ND		"	0.00977	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.00977	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.00977	"	"	"	"	"
Bromodichloromethane	ND		"	0.00977	"	"	"	"	"
Bromoform	ND		"	0.00977	"	"	"	"	"
Bromomethane	ND		"	0.0977	"	"	"	"	"
Carbon Tetrachloride	ND		"	0.00977	"	"	"	"	"
Chlorobenzene	ND		"	0.00977	"	"	"	"	"
Chlorodibromomethane	ND		"	0.00977	"	"	"	"	"
Chloroethane	ND		"	0.0488	"	"	"	"	"
Chloroform	ND		"	0.00977	"	"	"	"	"
Chloromethane	ND		"	0.0488	"	"	"	"	"
cis-1,2-Dichloroethene	ND		"	0.00977	"	"	"	"	"
cis-1,3-Dichloropropene	ND		"	0.00977	"	"	"	"	"
Dichlorodifluoromethane	ND		"	0.0488	"	"	"	"	"
Methylene Chloride	ND		"	0.0488	"	"	"	"	"
Tetrachloroethene	ND		"	0.00977	"	"	"	"	"
trans-1,2-Dichloroethene	ND		"	0.00977	"	"	"	"	"
trans-1,3-Dichloropropene	ND		"	0.00977	"	"	"	"	"
Trichloroethene	ND		"	0.00977	"	"	"	"	"
Trichlorofluoromethane	ND		"	0.00977	"	"	"	"	"
Vinyl chloride	ND		"	0.0488	"	"	"	"	"
Surr: 1,2-Dichloroethane-d4 (58.3-156%)	*113 %*					"	"	"	"
Surr: 4-Bromofluorobenzene (72.1-156%)	*149 %*					"	"	"	"
Surr: Dibromofluoromethane (63.2-149%)	*109 %*					"	"	"	"
Surr: Toluene-d8 (70.3-145%)	*132 %*					"	"	"	"

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THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-13 (DU3-VOC - Solid/Soil)					**Sampled: 06/29/07 15:23**		**Recvd: 07/02/07 12:35**		
Volatile Organic Compounds by EPA 8260B									
1,1,1-Trichloroethane	ND		mg/kg	0.00998	1	07/12/07 02:02	07/11/07	7G12011	SW8260B
1,1,2,2-Tetrachloroethane	ND		"	0.00998	"	"	"	"	"
1,1,2-Trichloroethane	ND		"	0.00998	"	"	"	"	"
1,1-Dichloroethane	ND		"	0.00998	"	"	"	"	"
1,1-Dichloroethene	ND		"	0.00998	"	"	"	"	"
1,2-Dibromo-3-chloropropane	ND		"	0.00998	"	"	"	"	"
1,2-Dibromoethane (EDB)	ND		"	0.00998	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.00998	"	"	"	"	"
1,2-Dichloroethane	ND		"	0.00998	"	"	"	"	"
1,2-Dichloropropane	ND		"	0.00998	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.00998	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.00998	"	"	"	"	"
Bromodichloromethane	ND		"	0.00998	"	"	"	"	"
Bromoform	ND		"	0.00998	"	"	"	"	"
Bromomethane	ND		"	0.0998	"	"	"	"	"
Carbon Tetrachloride	ND		"	0.00998	"	"	"	"	"
Chlorobenzene	ND		"	0.00998	"	"	"	"	"
Chlorodibromomethane	ND		"	0.00998	"	"	"	"	"
Chloroethane	ND		"	0.0499	"	"	"	"	"
Chloroform	ND		"	0.00998	"	"	"	"	"
Chloromethane	ND		"	0.0499	"	"	"	"	"
cis-1,2-Dichloroethene	ND		"	0.00998	"	"	"	"	"
cis-1,3-Dichloropropene	ND		"	0.00998	"	"	"	"	"
Dichlorodifluoromethane	ND		"	0.0499	"	"	"	"	"
Methylene Chloride	ND		"	0.0499	"	"	"	"	"
Tetrachloroethene	ND		"	0.00998	"	"	"	"	"
trans-1,2-Dichloroethene	ND		"	0.00998	"	"	"	"	"
trans-1,3-Dichloropropene	ND		"	0.00998	"	"	"	"	"
Trichloroethene	ND		"	0.00998	"	"	"	"	"
Trichlorofluoromethane	ND		"	0.00998	"	"	"	"	"
Vinyl chloride	ND		"	0.0499	"	"	"	"	"
Surr: 1,2-Dichloroethane-d4 (58.3-156%)	*114 %*					"	"	"	"
Surr: 4-Bromofluorobenzene (72.1-156%)	*143 %*					"	"	"	"
Surr: Dibromofluoromethane (63.2-149%)	*109 %*					"	"	"	"
Surr: Toluene-d8 (70.3-145%)	*133 %*					"	"	"	"

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99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-14 (DU4-VOC - Solid/Soil)						Sampled: 06/29/07 14:53		Recvd: 07/02/07 12:35	
Volatile Organic Compounds by EPA 8260B									
1,1,1-Trichloroethane	ND		mg/kg	0.0100	1	07/12/07 02:29	07/11/07	7G12011	SW8260B
1,1,2,2-Tetrachloroethane	ND		"	0.0100	"	"	"	"	"
1,1,2-Trichloroethane	ND		"	0.0100	"	"	"	"	"
1,1-Dichloroethane	ND		"	0.0100	"	"	"	"	"
1,1-Dichloroethene	ND		"	0.0100	"	"	"	"	"
1,2-Dibromo-3-chloropropane	ND		"	0.0100	"	"	"	"	"
1,2-Dibromoethane (EDB)	ND		"	0.0100	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.0100	"	"	"	"	"
1,2-Dichloroethane	ND		"	0.0100	"	"	"	"	"
1,2-Dichloropropane	ND		"	0.0100	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.0100	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.0100	"	"	"	"	"
Bromodichloromethane	ND		"	0.0100	"	"	"	"	"
Bromoform	ND		"	0.0100	"	"	"	"	"
Bromomethane	ND		"	0.100	"	"	"	"	"
Carbon Tetrachloride	ND		"	0.0100	"	"	"	"	"
Chlorobenzene	ND		"	0.0100	"	"	"	"	"
Chlorodibromomethane	ND		"	0.0100	"	"	"	"	"
Chloroethane	ND		"	0.0500	"	"	"	"	"
Chloroform	ND		"	0.0100	"	"	"	"	"
Chloromethane	ND		"	0.0500	"	"	"	"	"
cis-1,2-Dichloroethene	ND		"	0.0100	"	"	"	"	"
cis-1,3-Dichloropropene	ND		"	0.0100	"	"	"	"	"
Dichlorodifluoromethane	ND		"	0.0500	"	"	"	"	"
Methylene Chloride	ND		"	0.0500	"	"	"	"	"
Tetrachloroethene	ND		"	0.0100	"	"	"	"	"
trans-1,2-Dichloroethene	ND		"	0.0100	"	"	"	"	"
trans-1,3-Dichloropropene	ND		"	0.0100	"	"	"	"	"
Trichloroethene	ND		"	0.0100	"	"	"	"	"
Trichlorofluoromethane	ND		"	0.0100	"	"	"	"	"
Vinyl chloride	ND		"	0.0500	"	"	"	"	"
Surr: 1,2-Dichloroethane-d4 (58.3-156%)	*113 %*					"	"	"	"
Surr: 4-Bromofluorobenzene (72.1-156%)	*134 %*					"	"	"	"
Surr: Dibromofluoromethane (63.2-149%)	*110 %*					"	"	"	"
Surr: Toluene-d8 (70.5-145%)	*125 %*					"	"	"	"

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99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-15 (DU5-VOC - Solid/Soil)						Sampled: 06/29/07 14:26		Recvd: 07/02/07 12:35	
Volatile Organic Compounds by EPA 8260B									
1,1,1-Trichloroethane	ND		mg/kg	0.00998	1	07/12/07 04:16	07/11/07	7G12011	SW8260B
1,1,2,2-Tetrachloroethane	ND		"	0.00998	"	"	"	"	"
1,1,2-Trichloroethane	ND		"	0.00998	"	"	"	"	"
1,1-Dichloroethane	ND		"	0.00998	"	"	"	"	"
1,1-Dichloroethene	ND		"	0.00998	"	"	"	"	"
1,2-Dibromo-3-chloropropane	ND		"	0.00998	"	"	"	"	"
1,2-Dibromoethane (EDB)	ND		"	0.00998	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.00998	"	"	"	"	"
1,2-Dichloroethane	ND		"	0.00998	"	"	"	"	"
1,2-Dichloropropane	ND		"	0.00998	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.00998	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.00998	"	"	"	"	"
Bromodichloromethane	ND		"	0.00998	"	"	"	"	"
Bromoform	ND		"	0.00998	"	"	"	"	"
Bromomethane	ND		"	0.0998	"	"	"	"	"
Carbon Tetrachloride	ND		"	0.00998	"	"	"	"	"
Chlorobenzene	ND		"	0.00998	"	"	"	"	"
Chlorodibromomethane	ND		"	0.00998	"	"	"	"	"
Chloroethane	ND		"	0.0499	"	"	"	"	"
Chloroform	ND		"	0.00998	"	"	"	"	"
Chloromethane	ND		"	0.0499	"	"	"	"	"
cis-1,2-Dichloroethene	ND		"	0.00998	"	"	"	"	"
cis-1,3-Dichloropropene	ND		"	0.00998	"	"	"	"	"
Dichlorodifluoromethane	ND		"	0.0499	"	"	"	"	"
Methylene Chloride	ND		"	0.0499	"	"	"	"	"
Tetrachloroethene	ND		"	0.00998	"	"	"	"	"
trans-1,2-Dichloroethene	ND		"	0.00998	"	"	"	"	"
trans-1,3-Dichloropropene	ND		"	0.00998	"	"	"	"	"
Trichloroethene	ND		"	0.00998	"	"	"	"	"
Trichlorofluoromethane	ND		"	0.00998	"	"	"	"	"
Vinyl chloride	ND		"	0.0499	"	"	"	"	"
Surr: 1,2-Dichloroethane-d4 (58.3-156%)	*125 %*					"	"	"	"
Surr: 4-Bromofluorobenzene (72.1-156%)	*139 %*					"	"	"	"
Surr: Dibromofluoromethane (63.2-149%)	*112 %*					"	"	"	"
Surr: Toluene-d8 (70.5-145%)	*142 %*					"	"	"	"

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THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC	Work Order: HQG0016	Received:	07/02/07
62-180 Emerson Rd.		Reported:	08/08/07 09:34
Haleiwa, HI 96712	Project: Maalea		
Matt Neal	Project Number: Maalaea Phase II ESA		

ANALYTICAL REPORT

Sample ID: HQG0016-16 (DU6-VOC - Solid/Soil) Sampled: 06/29/07 13:53 Recvd: 07/02/07 12:35

Volatile Organic Compounds by EPA 8260B

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
1,1,1-Trichloroethane	ND		mg/kg	0.00998	1	07/12/07 04:42	07/11/07	7G12011	SW8260B
1,1,2,2-Tetrachloroethane	ND		"	0.00998	"	"	"	"	"
1,1,2-Trichloroethane	ND		"	0.00998	"	"	"	"	"
1,1-Dichloroethane	ND		"	0.00998	"	"	"	"	"
1,1-Dichloroethene	ND		"	0.00998	"	"	"	"	"
1,2-Dibromo-3-chloropropane	ND		"	0.00998	"	"	"	"	"
1,2-Dibromoethane (EDB)	ND		"	0.00998	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.00998	"	"	"	"	"
1,2-Dichloroethane	ND		"	0.00998	"	"	"	"	"
1,2-Dichloropropane	ND		"	0.00998	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.00998	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.00998	"	"	"	"	"
Bromodichloromethane	ND		"	0.00998	"	"	"	"	"
Bromoform	ND		"	0.00998	"	"	"	"	"
Bromomethane	ND		"	0.0998	"	"	"	"	"
Carbon Tetrachloride	ND		"	0.00998	"	"	"	"	"
Chlorobenzene	ND		"	0.00998	"	"	"	"	"
Chlorodibromomethane	ND		"	0.00998	"	"	"	"	"
Chloroethane	ND		"	0.0499	"	"	"	"	"
Chloroform	ND		"	0.00998	"	"	"	"	"
Chloromethane	ND		"	0.0499	"	"	"	"	"
cis-1,2-Dichloroethene	ND		"	0.00998	"	"	"	"	"
cis-1,3-Dichloropropene	ND		"	0.00998	"	"	"	"	"
Dichlorodifluoromethane	ND		"	0.0499	"	"	"	"	"
Methylene Chloride	ND		"	0.0499	"	"	"	"	"
Tetrachloroethene	ND		"	0.00998	"	"	"	"	"
trans-1,2-Dichloroethene	ND		"	0.00998	"	"	"	"	"
trans-1,3-Dichloropropene	ND		"	0.00998	"	"	"	"	"
Trichloroethene	ND		"	0.00998	"	"	"	"	"
Trichlorofluoromethane	ND		"	0.00998	"	"	"	"	"
Vinyl chloride	ND		"	0.0499	"	"	"	"	"
Surr: 1,2-Dichloroethane-d4 (38.1-156%)	*115 %*					"	"	"	"
Surr: 4-Bromofluorobenzene (72.1-156%)	*138 %*					"	"	"	"
Surr: Dibromofluoromethane (63.2-149%)	*104 %*					"	"	"	"
Surr: Toluene-d8 (70.5-145%)	*118 %*					"	"	"	"

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THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC	Work Order: HQG0016	Received:	07/02/07
62-180 Emerson Rd.		Reported:	08/08/07 09:34
Haleiwa, HI 96712	Project: Maalea		
Matt Neal	Project Number: Maalaea Phase II ESA		

ANALYTICAL REPORT

Sample ID: HQG0016-17 (DU7-VOC - Solid/Soil) Sampled: 06/29/07 13:25 Recvd: 07/02/07 12:35

Volatile Organic Compounds by EPA 8260B

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
1,1,1-Trichloroethane	ND		mg/kg	0.00992	1	07/12/07 05:09	07/11/07	7G12011	SW8260B
1,1,2,2-Tetrachloroethane	ND		"	0.00992	"	"	"	"	"
1,1,2-Trichloroethane	ND		"	0.00992	"	"	"	"	"
1,1-Dichloroethane	ND		"	0.00992	"	"	"	"	"
1,1-Dichloroethene	ND		"	0.00992	"	"	"	"	"
1,2-Dibromo-3-chloropropane	ND		"	0.00992	"	"	"	"	"
1,2-Dibromoethane (EDB)	ND		"	0.00992	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.00992	"	"	"	"	"
1,2-Dichloroethane	ND		"	0.00992	"	"	"	"	"
1,2-Dichloropropane	ND		"	0.00992	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.00992	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.00992	"	"	"	"	"
Bromodichloromethane	ND		"	0.00992	"	"	"	"	"
Bromoform	ND		"	0.00992	"	"	"	"	"
Bromomethane	ND		"	0.0992	"	"	"	"	"
Carbon Tetrachloride	ND		"	0.00992	"	"	"	"	"
Chlorobenzene	ND		"	0.00992	"	"	"	"	"
Chlorodibromomethane	ND		"	0.00992	"	"	"	"	"
Chloroethane	ND		"	0.0496	"	"	"	"	"
Chloroform	ND		"	0.00992	"	"	"	"	"
Chloromethane	ND		"	0.0496	"	"	"	"	"
cis-1,2-Dichloroethene	ND		"	0.00992	"	"	"	"	"
cis-1,3-Dichloropropene	ND		"	0.00992	"	"	"	"	"
Dichlorodifluoromethane	ND		"	0.0496	"	"	"	"	"
Methylene Chloride	ND		"	0.0496	"	"	"	"	"
Tetrachloroethene	ND		"	0.00992	"	"	"	"	"
trans-1,2-Dichloroethene	ND		"	0.00992	"	"	"	"	"
trans-1,3-Dichloropropene	ND		"	0.00992	"	"	"	"	"
Trichloroethene	ND		"	0.00992	"	"	"	"	"
Trichlorofluoromethane	ND		"	0.00992	"	"	"	"	"
Vinyl chloride	ND		"	0.0496	"	"	"	"	"
Surr: 1,2-Dichloroethane-d4 (38.1-156%)	*118 %*					"	"	"	"
Surr: 4-Bromofluorobenzene (72.1-156%)	*132 %*					"	"	"	"
Surr: Dibromofluoromethane (63.2-149%)	*111 %*					"	"	"	"
Surr: Toluene-d8 (70.5-145%)	*128 %*					"	"	"	"

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99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34	

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-18 (DU8-VOC - Solid/Soil)					**Sampled: 06/29/07 12:33**		**Recvd: 07/02/07 12:35**		
Volatile Organic Compounds by EPA 8260B									
1,1,1-Trichloroethane	ND		mg/kg	0.0100	1	07/12/07 05:36	07/11/07	7G12011	SW8260B
1,1,2,2-Tetrachloroethane	ND		"	0.0100	"	"	"	"	"
1,1,2-Trichloroethane	ND		"	0.0100	"	"	"	"	"
1,1-Dichloroethane	ND		"	0.0100	"	"	"	"	"
1,1-Dichloroethene	ND		"	0.0100	"	"	"	"	"
1,2-Dibromo-3-chloropropane	ND		"	0.0100	"	"	"	"	"
1,2-Dibromoethane (EDB)	ND		"	0.0100	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.0100	"	"	"	"	"
1,2-Dichloroethane	ND		"	0.0100	"	"	"	"	"
1,2-Dichloropropane	ND		"	0.0100	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.0100	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.0100	"	"	"	"	"
Bromodichloromethane	ND		"	0.0100	"	"	"	"	"
Bromoform	ND		"	0.0100	"	"	"	"	"
Bromomethane	ND		"	0.100	"	"	"	"	"
Carbon Tetrachloride	ND		"	0.0100	"	"	"	"	"
Chlorobenzene	ND		"	0.0100	"	"	"	"	"
Chlorodibromomethane	ND		"	0.0100	"	"	"	"	"
Chloroethane	ND		"	0.0501	"	"	"	"	"
Chloroform	ND		"	0.0100	"	"	"	"	"
Chloromethane	ND		"	0.0501	"	"	"	"	"
cis-1,2-Dichloroethene	ND		"	0.0100	"	"	"	"	"
cis-1,3-Dichloropropene	ND		"	0.0100	"	"	"	"	"
Dichlorodifluoromethane	ND		"	0.0501	"	"	"	"	"
Methylene Chloride	ND		"	0.0501	"	"	"	"	"
Tetrachloroethene	ND		"	0.0100	"	"	"	"	"
trans-1,2-Dichloroethene	ND		"	0.0100	"	"	"	"	"
trans-1,3-Dichloropropene	ND		"	0.0100	"	"	"	"	"
Trichloroethene	ND		"	0.0100	"	"	"	"	"
Trichlorofluoromethane	ND		"	0.0100	"	"	"	"	"
Vinyl chloride	ND		"	0.0501	"	"	"	"	"
Surr: 1,2-Dichloroethane-d4 (58.3-156%)	*113 %*					"	"	"	"
Surr: 4-Bromofluorobenzene (73.1-136%)	*130 %*					"	"	"	"
Surr: Dibromofluoromethane (63.2-149%)	*108 %*					"	"	"	"
Surr: Toluene-d8 (70.5-145%)	*117 %*					"	"	"	"

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99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34	

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-19 (Drum1 - Solid/Soil)					**Sampled: 06/29/07 19:07**		**Recvd: 07/02/07 12:35**		
Extractable Petroleum Hydrocarbons by 8015M									
DRO	ND		mg/kg	6.55	1	07/10/07 11:41	07/06/07	7G06006	SW8015M
RRO	ND		"	19.7	"	"	"	"	"
Surr: o-Terphenyl (34.7-133%)	*74 %*					"	"	"	"
Gasoline Range Organics/BTEX/MTBE by EPA 8015M/8260B									
Benzene	ND		mg/kg	0.00198	1	07/12/07 06:03	07/11/07	7G12011	SW8015B/8260B
Ethylbenzene	ND		"	0.00198	"	"	"	"	"
GRO	ND		"	0.495	"	"	"	"	"
m,p-Xylene	ND		"	0.00396	"	"	"	"	"
o-Xylene	ND		"	0.00198	"	"	"	"	"
Toluene	ND		"	0.00198	"	"	"	"	"
Surr: Toluene-d8 (88.2-117%)	*110 %*	Z3				"	"	"	"
Surr: Toluene-d8 (88.2-117%)	*120 %*	Z3				"	"	"	"
Polychlorinated Biphenyls by EPA Method 8082									
Aroclor 1016	ND	C-01	mg/kg	0.0330	1	07/07/07 07:00	07/05/07	7G05005	SW8082
Aroclor 1221	ND	C-01	"	0.0660	"	"	"	"	"
Aroclor 1232	ND	C-01	"	0.0330	"	"	"	"	"
Aroclor 1242	ND	C-01	"	0.0330	"	"	"	"	"
Aroclor 1248	ND	C-01	"	0.0330	"	"	"	"	"
Aroclor 1254	ND	C-01	"	0.0330	"	"	"	"	"
Aroclor 1260	ND	C-01	"	0.0330	"	"	"	"	"
Surr: Decachlorobiphenyl (24-154%)	*113 %*	*C-01*				"	"	"	"
Semivolatile Organics by GC/MS									
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	0.320	1	07/27/07 13:25	07/11/07	7G11004	SW8270C
1,2,4-Trichlorobenzene	ND		"	0.320	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.320	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.320	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.320	"	"	"	"	"
1-Chloronaphthalene	ND		"	0.320	"	"	"	"	"
1-Naphthylamine	ND		"	0.641	"	"	"	"	"
2,3,4,6-Tetrachlorophenol	ND		"	0.320	"	"	"	"	"
2,4,5-Trichlorophenol	ND		"	0.320	"	"	"	"	"
2,4,6-Trichlorophenol	ND		"	0.320	"	"	"	"	"
2,4-Dichlorophenol	ND		"	0.320	"	"	"	"	"
2,4-Dimethylphenol	ND		"	0.320	"	"	"	"	"
2,4-Dinitrophenol	ND		"	1.65	"	"	"	"	"
2,4-Dinitrotoluene	ND		"	0.641	"	"	"	"	"
2,6-Dichlorophenol	ND		"	0.320	"	"	"	"	"
2,6-Dinitrotoluene	ND		"	0.320	"	"	"	"	"
2-Chloronaphthalene	ND		"	0.320	"	"	"	"	"
2-Chlorophenol	ND		"	0.320	"	"	"	"	"
2-Methylnaphthalene	ND		"	0.320	"	"	"	"	"
2-Methylphenol (o-Cresol)	ND		"	0.320	"	"	"	"	"
2-Naphthylamine	ND		"	0.641	"	"	"	"	"
2-Nitroaniline	ND		"	1.65	"	"	"	"	"
2-Nitrophenol	ND		"	0.320	"	"	"	"	"
2-Picoline	ND		"	0.320	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-19 (Drum1 - Solid/Soil) - cont.					Sampled: 06/29/07 19:07		Recvd: 07/02/07 12:35		
Semivolatile Organics by GC/MS - cont.									
3,3'-Dichlorobenzidine	ND		"	0.320	"	"	"	"	"
3-Methylcholanthrene	ND		"	0.320	"	"	"	"	"
3-Nitroaniline	ND		"	1.65	"	"	"	"	"
4,6-Dinitro-2-methylphenol	ND		"	1.65	"	"	"	"	"
4-Aminobiphenyl	ND		"	0.641	"	"	"	"	"
4-Bromophenyl phenyl ether	ND		"	0.320	"	"	"	"	"
4-Chloro-3-methylphenol	ND		"	0.320	"	"	"	"	"
4-Chloroaniline	ND		"	0.320	"	"	"	"	"
4-Chlorophenyl phenyl ether	ND		"	0.320	"	"	"	"	"
4-Methylphenol (p-Cresol)	ND		"	0.320	"	"	"	"	"
4-Nitroaniline	ND		"	0.320	"	"	"	"	"
4-Nitrophenol	ND		"	1.65	"	"	"	"	"
7,12-Dimethylbenz (a) anthracene	ND		"	0.320	"	"	"	"	"
a,a-Dimethylphenethylamine	ND		"	1.65	"	"	"	"	"
Acenaphthene	ND		"	0.320	"	"	"	"	"
Acenaphthylene	ND		"	0.320	"	"	"	"	"
Acetophenone	ND		"	0.320	"	"	"	"	"
Aniline	ND		"	0.320	"	"	"	"	"
Anthracene	ND		"	0.320	"	"	"	"	"
Azobenzene	ND		"	0.320	"	"	"	"	"
Benzidine	ND		"	1.65	"	"	"	"	"
Benzo (a) anthracene	ND		"	0.320	"	"	"	"	"
Benzo (a) pyrene	ND		"	0.320	"	"	"	"	"
Benzo (b) fluoranthene	ND		"	0.320	"	"	"	"	"
Benzo (g,h,i) perylene	ND		"	0.320	"	"	"	"	"
Benzo (k) fluoranthene	ND		"	0.320	"	"	"	"	"
Benzoic acid	ND		"	1.65	"	"	"	"	"
Benzyl alcohol	ND		"	0.320	"	"	"	"	"
Bis(2-chloroethoxy)methane	ND		"	0.320	"	"	"	"	"
Bis(2-chloroethyl)ether	ND		"	0.320	"	"	"	"	"
Bis(2-chloroisopropyl) ether	ND		"	0.320	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	ND		"	0.320	"	"	"	"	"
Butyl benzyl phthalate	ND		"	0.320	"	"	"	"	"
Chrysene	ND		"	0.320	"	"	"	"	"
Dibenz (a,j) acridine	ND		"	0.320	"	"	"	"	"
Dibenzo (a,h) anthracene	ND		"	0.320	"	"	"	"	"
Dibenzofuran	ND		"	0.320	"	"	"	"	"
Diethyl phthalate	ND		"	0.320	"	"	"	"	"
Dimethyl phthalate	ND		"	0.320	"	"	"	"	"
Dimethylaminoazobenzene	ND		"	0.641	"	"	"	"	"
Di-n-butyl phthalate	ND		"	0.320	"	"	"	"	"
Di-n-octyl phthalate	ND		"	0.320	"	"	"	"	"
Ethyl Methanesulfonate	ND		"	0.320	"	"	"	"	"
Fluoranthene	ND		"	0.320	"	"	"	"	"
Fluorene	ND		"	0.320	"	"	"	"	"
Hexachlorobenzene	ND		"	0.320	"	"	"	"	"
Hexachlorobutadiene	ND		"	0.320	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-19 (Drum1 - Solid/Soil) - cont.					Sampled: 06/29/07 19:07		Recvd: 07/02/07 12:35		
Semivolatile Organics by GC/MS - cont.									
Hexachlorocyclopentadiene	ND		"	0.320	"	"	"	"	"
Hexachloroethane	ND		"	0.320	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND		"	0.320	"	"	"	"	"
Isophorone	ND		"	0.320	"	"	"	"	"
Methyl Methanesulfonate	ND		"	0.641	"	"	"	"	"
Naphthalene	ND		"	0.320	"	"	"	"	"
Nitrobenzene	ND		"	0.320	"	"	"	"	"
N-Nitrosodimethylamine	ND		"	0.320	"	"	"	"	"
N-Nitrosodi-n-butylamine	ND		"	0.320	"	"	"	"	"
N-Nitrosodi-n-propylamine	ND		"	0.320	"	"	"	"	"
N-Nitrosodiphenylamine	ND		"	0.320	"	"	"	"	"
N-Nitrosopiperidine	ND		"	0.320	"	"	"	"	"
Pentachloronitrobenzene	ND		"	0.320	"	"	"	"	"
Pentachlorophenol	ND		"	1.65	"	"	"	"	"
Phenacetin	ND		"	0.320	"	"	"	"	"
Phenanthrene	ND		"	0.320	"	"	"	"	"
Phenol	ND		"	0.320	"	"	"	"	"
Pronamide	ND		"	0.320	"	"	"	"	"
Pyrene	ND		"	0.320	"	"	"	"	"
Pyridine	ND		"	0.320	"	"	"	"	"
Surr: 2,4,6-Tribromophenol (52.6-114%)	*88 %*					"	"	"	"
Surr: 2-Fluorobiphenyl (45.9-108%)	*84 %*					"	"	"	"
Surr: 2-Fluorophenol (39.4-103%)	*73 %*					"	"	"	"
Surr: Nitrobenzene-d5 (37.2-107%)	*88 %*					"	"	"	"
Surr: Phenol-d6 (49.6-103%)	*70 %*					"	"	"	"
Surr: Terphenyl-d14 (45.2-133%)	*107 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Arsenic	ND		mg/kg	4.50	1	07/17/07 14:43	07/16/07	7G16005	SW6010B
Barium	107		"	9.01	"	"	"	"	"
Cadmium	3.88		"	1.80	"	"	"	"	"
Chromium	240		"	4.50	"	"	"	"	"
Lead	60.8		"	9.01	"	"	"	"	"
Mercury	ND		"	0.0192	"	07/11/07 19:04	07/11/07	7G11013	SW7471
Selenium	ND		"	9.01	"	07/17/07 14:43	07/16/07	7G16005	SW6010B
Silver	ND		"	4.50	"	"	"	"	"
Volatile Organic Compounds by EPA 8260B									
1,1,1-Trichloroethane	ND		mg/kg	0.00990	1	07/12/07 06:03	07/11/07	7G12011	SW8260B
1,1,2,2-Tetrachloroethane	ND		"	0.00990	"	"	"	"	"
1,1,2-Trichloroethane	ND		"	0.00990	"	"	"	"	"
1,1-Dichloroethane	ND		"	0.00990	"	"	"	"	"
1,1-Dichloroethene	ND		"	0.00990	"	"	"	"	"
1,2-Dibromo-3-chloropropane	ND		"	0.00990	"	"	"	"	"
1,2-Dibromoethane (EDB)	ND		"	0.00990	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.00990	"	"	"	"	"
1,2-Dichloroethane	ND		"	0.00990	"	"	"	"	"
1,2-Dichloropropane	ND		"	0.00990	"	"	"	"	"

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: Reported:	07/02/07 08/08/07 09:34

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-19 (Drum1 - Solid/Soil) - cont.						Sampled: 06/29/07 19:07		Recvd: 07/02/07 12:35	
Volatile Organic Compounds by EPA 8260B - cont.									
1,3-Dichlorobenzene	ND		"	0.00990	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.00990	"	"	"	"	"
Bromodichloromethane	ND		"	0.00990	"	"	"	"	"
Bromoform	ND		"	0.00990	"	"	"	"	"
Bromomethane	ND		"	0.0990	"	"	"	"	"
Carbon Tetrachloride	ND		"	0.00990	"	"	"	"	"
Chlorobenzene	ND		"	0.00990	"	"	"	"	"
Chlorodibromomethane	ND		"	0.00990	"	"	"	"	"
Chloroethane	ND		"	0.0495	"	"	"	"	"
Chloroform	ND		"	0.00990	"	"	"	"	"
Chloromethane	ND		"	0.0495	"	"	"	"	"
cis-1,2-Dichloroethene	ND		"	0.00990	"	"	"	"	"
cis-1,3-Dichloropropene	ND		"	0.00990	"	"	"	"	"
Dichlorodifluoromethane	ND		"	0.0495	"	"	"	"	"
Methylene Chloride	ND		"	0.0495	"	"	"	"	"
Tetrachloroethene	ND		"	0.00990	"	"	"	"	"
trans-1,2-Dichloroethene	ND		"	0.00990	"	"	"	"	"
trans-1,3-Dichloropropene	ND		"	0.00990	"	"	"	"	"
Trichloroethene	ND		"	0.00990	"	"	"	"	"
Trichlorofluoromethane	ND		"	0.00990	"	"	"	"	"
Vinyl chloride	ND		"	0.0495	"	"	"	"	"
Surr: 1,2-Dichloroethane-d4 (58.3-156%)	*107 %*					"	"	"	"
Surr: 4-Bromofluorobenzene (72.1-136%)	*139 %*					"	"	"	"
Surr: Dibromofluoromethane (63.2-149%)	*103 %*					"	"	"	"
Surr: Toluene-d8 (70.5-145%)	*120 %*					"	"	"	"
Sample ID: HQG0016-20 (Drum2 - Solid/Soil)						Sampled: 06/29/07 19:07		Recvd: 07/02/07 12:35	
Extractable Petroleum Hydrocarbons by 8015M									
DRO	ND		mg/kg	6.66	1	07/10/07 12:00	07/06/07	7G06006	SW8015M
RRO	21.9		"	20.0	"	"	"	"	"
Surr: o-Terphenyl (34.7-135%)	*88 %*					"	"	"	"
Gasoline Range Organics/BTEX/MTBE by EPA 8015M/8260B									
Benzene	ND		mg/kg	0.00195	1	07/12/07 06:29	07/11/07	7G12011	SW8015B/8260B
Ethylbenzene	ND		"	0.00195	"	"	"	"	"
GRO	ND		"	0.488	"	"	"	"	"
m,p-Xylene	ND		"	0.00391	"	"	"	"	"
o-Xylene	ND		"	0.00195	"	"	"	"	"
Toluene	ND		"	0.00195	"	"	"	"	"
Surr: Toluene-d8 (88.2-117%)	*131 %*	Z5				"	"	"	"
Surr: Toluene-d8 (88.2-117%)	*132 %*	Z5				"	"	"	"
Polychlorinated Biphenyls by EPA Method 8082									
Aroclor 1016	ND	C-01	mg/kg	0.0333	1	07/07/07 07:27	07/05/07	7G05005	SW8082
Aroclor 1221	ND	C-01	"	0.0667	"	"	"	"	"
Aroclor 1232	ND	C-01	"	0.0333	"	"	"	"	"
Aroclor 1242	ND	C-01	"	0.0333	"	"	"	"	"
Aroclor 1248	ND	C-01	"	0.0333	"	"	"	"	"

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ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-20 (Drum2 - Solid/Soil) - cont.						Sampled: 06/29/07 19:07		Recvd: 07/02/07 12:35	
Polychlorinated Biphenyls by EPA Method 8082 - cont.									
Aroclor 1254	ND	C-01	"	0.0333	"	"	"	"	"
Aroclor 1260	ND	C-01	"	0.0333	"	"	"	"	"
Surr: Decachlorobiphenyl (24-154%)	*109 %*	*C-01*				"	"	"	"
Semivolatile Organics by GC/MS									
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	0.322	1	07/30/07 09:48	07/11/07	7G11004	SW8270C
1,2,4-Trichlorobenzene	ND		"	0.322	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.322	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.322	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.322	"	"	"	"	"
1-Chloronaphthalene	ND		"	0.322	"	"	"	"	"
1-Naphthylamine	ND		"	0.645	"	"	"	"	"
2,3,4,6-Tetrachlorophenol	ND		"	0.322	"	"	"	"	"
2,4,5-Trichlorophenol	ND		"	0.322	"	"	"	"	"
2,4,6-Trichlorophenol	ND		"	0.322	"	"	"	"	"
2,4-Dichlorophenol	ND		"	0.322	"	"	"	"	"
2,4-Dimethylphenol	ND		"	0.322	"	"	"	"	"
2,4-Dinitrophenol	ND		"	1.66	"	"	"	"	"
2,4-Dinitrotoluene	ND		"	0.645	"	"	"	"	"
2,6-Dichlorophenol	ND		"	0.322	"	"	"	"	"
2,6-Dinitrotoluene	ND		"	0.322	"	"	"	"	"
2-Chloronaphthalene	ND		"	0.322	"	"	"	"	"
2-Chlorophenol	ND		"	0.322	"	"	"	"	"
2-Methylnaphthalene	ND		"	0.322	"	"	"	"	"
2-Methylphenol (o-Cresol)	ND		"	0.322	"	"	"	"	"
2-Naphthylamine	ND		"	0.645	"	"	"	"	"
2-Nitroaniline	ND		"	1.66	"	"	"	"	"
2-Nitrophenol	ND		"	0.322	"	"	"	"	"
2-Picoline	ND		"	0.322	"	"	"	"	"
3,3'-Dichlorobenzidine	ND		"	0.322	"	"	"	"	"
3-Methylcholanthrene	ND		"	0.322	"	"	"	"	"
3-Nitroaniline	ND		"	1.66	"	"	"	"	"
4,6-Dinitro-2-methylphenol	ND		"	1.66	"	"	"	"	"
4-Aminobiphenyl	ND		"	0.645	"	"	"	"	"
4-Bromophenyl phenyl ether	ND		"	0.322	"	"	"	"	"
4-Chloro-3-methylphenol	ND		"	0.322	"	"	"	"	"
4-Chloroaniline	ND		"	0.322	"	"	"	"	"
4-Chlorophenyl phenyl ether	ND		"	0.322	"	"	"	"	"
4-Methylphenol (p-Cresol)	ND		"	0.322	"	"	"	"	"
4-Nitroaniline	ND		"	0.322	"	"	"	"	"
4-Nitrophenol	ND		"	1.66	"	"	"	"	"
7,12-Dimethylbenz (a) anthracene	ND		"	0.322	"	"	"	"	"
a,a-Dimethylphenethylamine	ND		"	1.66	"	"	"	"	"
Acenaphthene	ND		"	0.322	"	"	"	"	"
Acenaphthylene	ND		"	0.322	"	"	"	"	"
Acetophenone	ND		"	0.322	"	"	"	"	"
Aniline	ND		"	0.322	"	"	"	"	"
Anthracene	ND		"	0.322	"	"	"	"	"

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THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC
62-180 Emerson Rd.
Haleiwa, HI 96712
Matt Neal

Work Order: HQG0016
Project: Maalea
Project Number: Maalaea Phase II ESA

Received: 07/02/07
Reported: 08/08/07 09:34

ANALYTICAL REPORT

Sample ID: HQG0016-20 (Drum2 - Solid/Soil) - cont. Sampled: 06/29/07 19:07 Recvd: 07/02/07 12:35

Semivolatile Organics by GC/MS - cont.

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Azobenzene	ND		"	0.322	"	"	"	"	"
Benzidine	ND		"	1.66	"	"	"	"	"
Benzo (a) anthracene	ND		"	0.322	"	"	"	"	"
Benzo (a) pyrene	ND		"	0.322	"	"	"	"	"
Benzo (b) fluoranthene	ND		"	0.322	"	"	"	"	"
Benzo (g,h,i) perylene	ND		"	0.322	"	"	"	"	"
Benzo (k) fluoranthene	ND		"	0.322	"	"	"	"	"
Benzoic acid	ND		"	1.66	"	"	"	"	"
Benzyl alcohol	ND		"	0.322	"	"	"	"	"
Bis(2-chloroethoxy)methane	ND		"	0.322	"	"	"	"	"
Bis(2-chloroethyl)ether	ND		"	0.322	"	"	"	"	"
Bis(2-chloroisopropyl) ether	ND		"	0.322	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	ND		"	0.322	"	"	"	"	"
Butyl benzyl phthalate	ND		"	0.322	"	"	"	"	"
Chrysene	ND		"	0.322	"	"	"	"	"
Dibenz (a,j) acridine	ND		"	0.322	"	"	"	"	"
Dibenzo (a,h) anthracene	ND		"	0.322	"	"	"	"	"
Dibenzofuran	ND		"	0.322	"	"	"	"	"
Diethyl phthalate	ND		"	0.322	"	"	"	"	"
Dimethyl phthalate	ND		"	0.322	"	"	"	"	"
Dimethylaminoazobenzene	ND		"	0.645	"	"	"	"	"
Di-n-butyl phthalate	ND		"	0.322	"	"	"	"	"
Di-n-octyl phthalate	ND		"	0.322	"	"	"	"	"
Ethyl Methanesulfonate	ND		"	0.322	"	"	"	"	"
Fluoranthene	ND		"	0.322	"	"	"	"	"
Fluorene	ND		"	0.322	"	"	"	"	"
Hexachlorobenzene	ND		"	0.322	"	"	"	"	"
Hexachlorobutadiene	ND		"	0.322	"	"	"	"	"
Hexachlorocyclopentadiene	ND		"	0.322	"	"	"	"	"
Hexachloroethane	ND		"	0.322	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND		"	0.322	"	"	"	"	"
Isophorone	ND		"	0.322	"	"	"	"	"
Methyl Methanesulfonate	ND		"	0.645	"	"	"	"	"
Naphthalene	ND		"	0.322	"	"	"	"	"
Nitrobenzene	ND		"	0.322	"	"	"	"	"
N-Nitrosodimethylamine	ND		"	0.322	"	"	"	"	"
N-Nitrosodi-n-butylamine	ND		"	0.322	"	"	"	"	"
N-Nitrosodi-n-propylamine	ND		"	0.322	"	"	"	"	"
N-Nitrosodiphenylamine	ND		"	0.322	"	"	"	"	"
N-Nitrosopiperidine	ND		"	0.322	"	"	"	"	"
Pentachloronitrobenzene	ND		"	0.322	"	"	"	"	"
Pentachlorophenol	ND		"	1.66	"	"	"	"	"
Phenacetin	ND		"	0.322	"	"	"	"	"
Phenanthrene	ND		"	0.322	"	"	"	"	"
Phenol	ND		"	0.322	"	"	"	"	"
Pronamide	ND		"	0.322	"	"	"	"	"
Pyrene	ND		"	0.322	"	"	"	"	"

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Element Environmental LLC
62-180 Emerson Rd.
Haleiwa, HI 96712
Matt Neal

Work Order: HQG0016
Project: Maalea
Project Number: Maalaea Phase II ESA

Received: 07/02/07
Reported: 08/08/07 09:34

ANALYTICAL REPORT

Sample ID: HQG0016-20 (Drum2 - Solid/Soil) - cont. Sampled: 06/29/07 19:07 Recvd: 07/02/07 12:35

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Semivolatile Organics by GC/MS - cont.									
Pyridine	ND		"	0.322	"	"	"	"	"
Surr: 2,4,6-Tribromophenol (32.6-114%)	38 %					"	"	"	"
Surr: 2-Fluorobiphenyl (45.9-108%)	72 %					"	"	"	"
Surr: 2-Fluorophenol (39.4-103%)	54 %					"	"	"	"
Surr: Nitrobenzene-d5 (37.2-107%)	74 %					"	"	"	"
Surr: Phenol-d6 (49.6-105%)	43 %	Z				"	"	"	"
Surr: Terphenyl-d14 (43.7-113%)	107 %					"	"	"	"
Total Metals by SW 846 Series Methods									
Arsenic	ND		mg/kg	4.55	1	07/17/07 14:47	07/16/07	7G16005	SW6010B
Barium	95.3		"	9.09	"	"	"	"	"
Cadmium	2.26		"	1.82	"	"	"	"	"
Chromium	171		"	4.55	"	"	"	"	"
Lead	124		"	9.09	"	"	"	"	"
Mercury	0.0511		"	0.0181	"	07/11/07 19:06	07/11/07	7G11013	SW7471
Selenium	ND		"	9.09	"	07/17/07 14:47	07/16/07	7G16005	SW6010B
Silver	ND		"	4.55	"	"	"	"	"
Volatile Organic Compounds by EPA 8260B									
1,1,1-Trichloroethane	ND		mg/kg	0.00977	1	07/12/07 06:29	07/11/07	7G12011	SW8260B
1,1,2,2-Tetrachloroethane	ND		"	0.00977	"	"	"	"	"
1,1,2-Trichloroethane	ND		"	0.00977	"	"	"	"	"
1,1-Dichloroethane	ND		"	0.00977	"	"	"	"	"
1,1-Dichloroethene	ND		"	0.00977	"	"	"	"	"
1,2-Dibromo-3-chloropropane	ND		"	0.00977	"	"	"	"	"
1,2-Dibromoethane (EDB)	ND		"	0.00977	"	"	"	"	"
1,2-Dichlorobenzene	ND		"	0.00977	"	"	"	"	"
1,2-Dichloroethane	ND		"	0.00977	"	"	"	"	"
1,2-Dichloropropane	ND		"	0.00977	"	"	"	"	"
1,3-Dichlorobenzene	ND		"	0.00977	"	"	"	"	"
1,4-Dichlorobenzene	ND		"	0.00977	"	"	"	"	"
Bromodichloromethane	ND		"	0.00977	"	"	"	"	"
Bromoform	ND		"	0.00977	"	"	"	"	"
Bromomethane	ND		"	0.0977	"	"	"	"	"
Carbon Tetrachloride	ND		"	0.00977	"	"	"	"	"
Chlorobenzene	ND		"	0.00977	"	"	"	"	"
Chlorodibromomethane	ND		"	0.00977	"	"	"	"	"
Chloroethane	ND		"	0.0488	"	"	"	"	"
Chloroform	ND		"	0.00977	"	"	"	"	"
Chloromethane	ND		"	0.0488	"	"	"	"	"
cis-1,2-Dichloroethene	ND		"	0.00977	"	"	"	"	"
cis-1,3-Dichloropropene	ND		"	0.00977	"	"	"	"	"
Dichlorodifluoromethane	ND		"	0.0488	"	"	"	"	"
Methylene Chloride	ND		"	0.0488	"	"	"	"	"
Tetrachloroethene	ND		"	0.00977	"	"	"	"	"
trans-1,2-Dichloroethene	ND		"	0.00977	"	"	"	"	"
trans-1,3-Dichloropropene	ND		"	0.00977	"	"	"	"	"
Trichloroethene	ND		"	0.00977	"	"	"	"	"

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99-193 Aloa Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34	

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dilution	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HQG0016-20 (Drum2 - Solid/Soil) - cont.						Sampled: 06/29/07 19:07		Recvd: 07/02/07 12:35	
Volatile Organic Compounds by EPA 8260B - cont.									
Trichlorofluoromethane	ND		*	0.00977	*	*	*	*	*
Vinyl chloride	ND		*	0.0488	*	*	*	*	*
Surr: 1,2-Dichloroethane-d4 (58.3-156%)	*114 %*					*	*	*	*
Surr: 4-Bromofluorobenzene (72.1-156%)	*131 %*					*	*	*	*
Surr: Dibromofluoromethane (63.2-149%)	*107 %*					*	*	*	*
Surr: Toluene-d8 (70.3-145%)	*132 %*					*	*	*	*

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34

LABORATORY BLANK QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Extractable Petroleum Hydrocarbons by 8015M													
Batch\Seq: 7G06006 Extracted: 07/06/07													
Blank Analyzed: 07/10/2007 (7G06006-BLK1)													
DRO			mg/kg	N/A	6.66	ND							
RRO			mg/kg	N/A	20.0	ND							
Surrogate: o-Terphenyl			mg/kg					*72*		*34.7-135*			
Gasoline Range Organics/BTEX/MTBE by EPA 8015M/8260B													
Batch\Seq: 7G12011 Extracted: 07/11/07													
Blank Analyzed: 07/11/2007 (7G12011-BLK1)													
Benzene			mg/kg	N/A	0.00200	ND							
Ethylbenzene			mg/kg	N/A	0.00200	ND							
GRO			mg/kg	N/A	0.500	ND							
m,p-Xylene			mg/kg	N/A	0.00400	ND							
o-Xylene			mg/kg	N/A	0.00200	ND							
Toluene			mg/kg	N/A	0.00200	ND							
Surrogate: Toluene-d8			mg/kg					*107*		*88.2-117*			
Surrogate: Toluene-d8			mg/kg					*107*		*88.2-117*			
Polychlorinated Biphenyls by EPA Method 8082													
Batch\Seq: 7G05005 Extracted: 07/05/07													
Blank Analyzed: 07/06/2007 (7G05005-BLK1)													
Aroclor 1016			mg/kg	N/A	0.0333	ND							C-01
Aroclor 1221			mg/kg	N/A	0.0667	ND							C-01
Aroclor 1232			mg/kg	N/A	0.0333	ND							C-01
Aroclor 1242			mg/kg	N/A	0.0333	ND							C-01
Aroclor 1248			mg/kg	N/A	0.0333	ND							C-01
Aroclor 1254			mg/kg	N/A	0.0333	ND							C-01
Aroclor 1260			mg/kg	N/A	0.0333	ND							C-01
Aroclor 1262			mg/kg	N/A	0.0333	ND							C-01
Aroclor 1268			mg/kg	N/A	0.0333	ND							C-01
Surrogate: Decachlorobiphenyl			mg/kg					*103*		*24-154*			C-01
Blank Analyzed: 07/09/2007 (7G05005-BLK2)													
Aroclor 1016			mg/kg	N/A	0.0333	ND							C-02,C-01
Aroclor 1221			mg/kg	N/A	0.0667	ND							C-02,C-01
Aroclor 1232			mg/kg	N/A	0.0333	ND							C-02,C-01
Aroclor 1242			mg/kg	N/A	0.0333	ND							C-02,C-01
Aroclor 1248			mg/kg	N/A	0.0333	ND							C-02,C-01
Aroclor 1254			mg/kg	N/A	0.0333	ND							C-02,C-01
Aroclor 1260			mg/kg	N/A	0.0333	ND							C-02,C-01
Aroclor 1262			mg/kg	N/A	0.0333	ND							C-02,C-01
Surrogate: Decachlorobiphenyl			mg/kg					*87*		*24-154*			C-02,C-01
Semivolatile Organics by GC/MS													
Batch\Seq: 7G11004 Extracted: 07/11/07													
Blank Analyzed: 07/26/2007 (7G11004-BLK1)													
1,2,4,5-Tetrachlorobenzene			mg/kg	N/A	0.330	ND							
1,2,4-Trichlorobenzene			mg/kg	N/A	0.330	ND							
1,2-Dichlorobenzene			mg/kg	N/A	0.330	ND							

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34

LABORATORY BLANK QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Semivolatile Organics by GC/MS													
Batch\Seq: 7G11004 Extracted: 07/11/07													
Blank Analyzed: 07/26/2007 (7G11004-BLK1)													
1,3-Dichlorobenzene			mg/kg	N/A	0.330	ND							
1,4-Dichlorobenzene			mg/kg	N/A	0.330	ND							
1-Chloronaphthalene			mg/kg	N/A	0.330	ND							
1-Naphthylamine			mg/kg	N/A	0.660	ND							
2,3,4,6-Tetrachlorophenol			mg/kg	N/A	0.330	ND							
2,4,5-Trichlorophenol			mg/kg	N/A	0.330	ND							
2,4,6-Trichlorophenol			mg/kg	N/A	0.330	ND							
2,4-Dichlorophenol			mg/kg	N/A	0.330	ND							
2,4-Dimethylphenol			mg/kg	N/A	0.330	ND							
2,4-Dinitrophenol			mg/kg	N/A	1.70	ND							
2,4-Dinitrotoluene			mg/kg	N/A	0.660	ND							
2,6-Dichlorophenol			mg/kg	N/A	0.330	ND							
2,6-Dinitrotoluene			mg/kg	N/A	0.330	ND							
2-Chloronaphthalene			mg/kg	N/A	0.330	ND							
2-Chlorophenol			mg/kg	N/A	0.330	ND							
2-Methylnaphthalene			mg/kg	N/A	0.330	ND							
2-Methylphenol (o-Cresol)			mg/kg	N/A	0.330	ND							
2-Naphthylamine			mg/kg	N/A	0.660	ND							
2-Nitroaniline			mg/kg	N/A	1.70	ND							
2-Nitrophenol			mg/kg	N/A	0.330	ND							
2-Picoline			mg/kg	N/A	0.330	ND							
3,3'-Dichlorobenzidine			mg/kg	N/A	0.330	ND							
3-Methylcholanthrene			mg/kg	N/A	0.330	ND							
3-Nitroaniline			mg/kg	N/A	1.70	ND							
4,6-Dinitro-2-methylphenol			mg/kg	N/A	1.70	ND							
4-Aminobiphenyl			mg/kg	N/A	0.660	ND							
4-Bromophenyl phenyl ether			mg/kg	N/A	0.330	ND							
4-Chloro-3-methylphenol			mg/kg	N/A	0.330	ND							
4-Chloroaniline			mg/kg	N/A	0.330	ND							
4-Chlorophenyl phenyl ether			mg/kg	N/A	0.330	ND							
4-Methylphenol (p-Cresol)			mg/kg	N/A	0.330	ND							
4-Nitroaniline			mg/kg	N/A	0.330	ND							
4-Nitrophenol			mg/kg	N/A	1.70	ND							
7,12-Dimethylbenz (a) anthracene			mg/kg	N/A	0.330	ND							
a,a-Dimethylphenethylamine			mg/kg	N/A	1.70	ND							
Acenaphthene			mg/kg	N/A	0.330	ND							
Acenaphthylene			mg/kg	N/A	0.330	ND							
Acetophenone			mg/kg	N/A	0.330	ND							
Aniline			mg/kg	N/A	0.330	ND							
Anthracene			mg/kg	N/A	0.330	ND							
Azobenzene			mg/kg	N/A	0.330	ND							
Benzidine			mg/kg	N/A	1.70	ND							
Benzo (a) anthracene			mg/kg	N/A	0.330	ND							
Benzo (a) pyrene			mg/kg	N/A	0.330	ND							
Benzo (b) fluoranthene			mg/kg	N/A	0.330	ND							
Benzo (g,h,i) perylene			mg/kg	N/A	0.330	ND							

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34

LABORATORY BLANK QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Semivolatile Organics by GC/MS													
Batch\Seq: 7G11004 Extracted: 07/11/07													
Blank Analyzed: 07/26/2007 (7G11004-BLK1)													
Benzo (k) fluoranthene			mg/kg	N/A	0.330	ND							
Benzoic acid			mg/kg	N/A	1.70	ND							
Benzyl alcohol			mg/kg	N/A	0.330	ND							
Bis(2-chloroethoxy)methane			mg/kg	N/A	0.330	ND							
Bis(2-chloroethyl)ether			mg/kg	N/A	0.330	ND							
Bis(2-chloroisopropyl) ether			mg/kg	N/A	0.330	ND							
Bis(2-ethylhexyl)phthalate			mg/kg	N/A	0.330	ND							
Butyl benzyl phthalate			mg/kg	N/A	0.330	ND							
Chrysene			mg/kg	N/A	0.330	ND							
Dibenz (a,j) acridine			mg/kg	N/A	0.330	ND							
Dibenzo (a,h) anthracene			mg/kg	N/A	0.330	ND							
Dibenzofuran			mg/kg	N/A	0.330	ND							
Diethyl phthalate			mg/kg	N/A	0.330	ND							
Dimethyl phthalate			mg/kg	N/A	0.330	ND							
Dimethylaminoazobenzene			mg/kg	N/A	0.660	ND							
Di-n-butyl phthalate			mg/kg	N/A	0.330	ND							
Di-n-octyl phthalate			mg/kg	N/A	0.330	ND							
Ethyl Methanesulfonate			mg/kg	N/A	0.330	ND							
Fluoranthene			mg/kg	N/A	0.330	ND							
Fluorene			mg/kg	N/A	0.330	ND							
Hexachlorobenzene			mg/kg	N/A	0.330	ND							
Hexachlorobutadiene			mg/kg	N/A	0.330	ND							
Hexachlorocyclopentadiene			mg/kg	N/A	0.330	ND							
Hexachloroethane			mg/kg	N/A	0.330	ND							
Indeno (1,2,3-cd) pyrene			mg/kg	N/A	0.330	ND							
Isophorone			mg/kg	N/A	0.330	ND							
Methyl Methanesulfonate			mg/kg	N/A	0.660	ND							
Naphthalene			mg/kg	N/A	0.330	ND							
Nitrobenzene			mg/kg	N/A	0.330	ND							
N-Nitrosodimethylamine			mg/kg	N/A	0.330	ND							
N-Nitrosodi-n-butylamine			mg/kg	N/A	0.330	ND							
N-Nitrosodi-n-propylamine			mg/kg	N/A	0.330	ND							
N-Nitrosodiphenylamine			mg/kg	N/A	0.330	ND							
N-Nitrosopiperidine			mg/kg	N/A	0.330	ND							
Pentachloronitrobenzene			mg/kg	N/A	0.330	ND							
Pentachlorophenol			mg/kg	N/A	1.70	ND							
Phenacetin			mg/kg	N/A	0.330	ND							
Phenanthrene			mg/kg	N/A	0.330	ND							
Phenol			mg/kg	N/A	0.330	ND							
Pronamide			mg/kg	N/A	0.330	ND							
Pyrene			mg/kg	N/A	0.330	ND							
Pyridine			mg/kg	N/A	0.330	ND							
Surrogate: 2,4,6-Tribromophenol			mg/kg					*60*		*32.6-114*			
Surrogate: 2-Fluorobiphenyl			mg/kg					*72*		*45.9-108*			
Surrogate: 2-Fluorophenol			mg/kg					*63*		*39.4-103*			
Surrogate: Nitrobenzene-d5			mg/kg					*73*		*37.2-107*			

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Element Environmental LLC
62-180 Emerson Rd.
Haleiwa, HI 96712
Matt Neal

Work Order: HQG0016
Project: Maalea
Project Number: Maalaea Phase II ESA

Received: 07/02/07
Reported: 08/08/07 09:34

LABORATORY BLANK QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Semivolatile Organics by GC/MS													
Batch\Seq: 7G11004 Extracted: 07/11/07													
Blank Analyzed: 07/26/2007 (7G11004-BLK1)													
Surrogate: Phenol-d6			mg/kg					65		49.6-105			
Surrogate: Terphenyl-d14			mg/kg					94		43.7-131			
Total Metals by SW 846 Series Methods													
Batch\Seq: 7G10005 Extracted: 07/10/07													
Blank Analyzed: 07/20/2007 (7G10005-BLK1)													
Arsenic			mg/kg	N/A	1.00	ND							
Lead			mg/kg	N/A	2.00	ND							
Batch\Seq: 7G11013 Extracted: 07/11/07													
Blank Analyzed: 07/11/2007 (7G11013-BLK1)													
Mercury			mg/kg	N/A	0.0200	ND							
Batch\Seq: 7G16005 Extracted: 07/16/07													
Blank Analyzed: 07/17/2007 (7G16005-BLK1)													
Arsenic			mg/kg	N/A	5.00	ND							
Barium			mg/kg	N/A	10.0	ND							
Cadmium			mg/kg	N/A	2.00	ND							
Chromium			mg/kg	N/A	5.00	ND							
Lead			mg/kg	N/A	10.0	ND							
Selenium			mg/kg	N/A	10.0	ND							
Silver			mg/kg	N/A	5.00	ND							
Volatile Organic Compounds by EPA 8260B													
Batch\Seq: 7G12011 Extracted: 07/11/07													
Blank Analyzed: 07/11/2007 (7G12011-BLK1)													
1,1,1-Trichloroethane			mg/kg	N/A	0.0100	ND							
1,1,2,2-Tetrachloroethane			mg/kg	N/A	0.0100	ND							
1,1,2-Trichloroethane			mg/kg	N/A	0.0100	ND							
1,1-Dichloroethane			mg/kg	N/A	0.0100	ND							
1,1-Dichloroethene			mg/kg	N/A	0.0100	ND							
1,2-Dibromo-3-chloropropane			mg/kg	N/A	0.0100	ND							
1,2-Dibromoethane (EDB)			mg/kg	N/A	0.0100	ND							
1,2-Dichlorobenzene			mg/kg	N/A	0.0100	ND							
1,2-Dichloroethane			mg/kg	N/A	0.0100	ND							
1,2-Dichloropropane			mg/kg	N/A	0.0100	ND							
1,3-Dichlorobenzene			mg/kg	N/A	0.0100	ND							
1,4-Dichlorobenzene			mg/kg	N/A	0.0100	ND							
Bromodichloromethane			mg/kg	N/A	0.0100	ND							
Bromoform			mg/kg	N/A	0.0100	ND							
Bromomethane			mg/kg	N/A	0.100	ND							
Carbon Tetrachloride			mg/kg	N/A	0.0100	ND							
Chlorobenzene			mg/kg	N/A	0.0100	ND							
Chlorodibromomethane			mg/kg	N/A	0.0100	ND							
Chloroethane			mg/kg	N/A	0.0500	ND							
Chloroform			mg/kg	N/A	0.0100	ND							
Chloromethane			mg/kg	N/A	0.0500	ND							

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Element Environmental LLC
62-180 Emerson Rd.
Haleiwa, HI 96712
Matt Neal

Work Order: HQG0016
Project: Maalea
Project Number: Maalaea Phase II ESA

Received: 07/02/07
Reported: 08/08/07 09:34

LABORATORY BLANK QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Volatile Organic Compounds by EPA 8260B													
Batch\Seq: 7G12011 Extracted: 07/11/07													
Blank Analyzed: 07/11/2007 (7G12011-BLK1)													
cis-1,2-Dichloroethene			mg/kg	N/A	0.0100	ND							
cis-1,3-Dichloropropene			mg/kg	N/A	0.0100	ND							
Dichlorodifluoromethane			mg/kg	N/A	0.0500	ND							
Methylene Chloride			mg/kg	N/A	0.0500	ND							
Tetrachloroethene			mg/kg	N/A	0.0100	ND							
trans-1,2-Dichloroethene			mg/kg	N/A	0.0100	ND							
trans-1,3-Dichloropropene			mg/kg	N/A	0.0100	ND							
Trichloroethene			mg/kg	N/A	0.0100	ND							
Trichlorofluoromethane			mg/kg	N/A	0.0100	ND							
Vinyl chloride			mg/kg	N/A	0.0500	ND							
Surrogate: 1,2-Dichloroethane-d4			mg/kg					97		58.1-136			
Surrogate: 4-Bromofluorobenzene			mg/kg					106		72.1-156			
Surrogate: Dibromofluoromethane			mg/kg					96		63.2-149			
Surrogate: Toluene-d8			mg/kg					107		70.5-145			

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Element Environmental LLC	Work Order: HQG0016	Received:	07/02/07
62-180 Emerson Rd.		Reported:	08/08/07 09:34
Haleiwa, HI 96712	Project: Maalea		
Matt Neal	Project Number: Maalaea Phase II ESA		

LABORATORY DUPLICATE QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Polychlorinated Biphenyls by EPA Method 8082												
Batch\Seq: 7G05005 Extracted: 07/05/07												
Duplicate Analyzed: 07/06/2007 (7G05005-DUP1)				QC Source Sample: HQG0016-01								
Aroclor 1016	ND		mg/kg	N/A	0.0319	ND					30	C-01
Aroclor 1221	ND		mg/kg	N/A	0.0639	ND					30	C-01
Aroclor 1232	ND		mg/kg	N/A	0.0319	ND					30	C-01
Aroclor 1242	ND		mg/kg	N/A	0.0319	ND					30	C-01
Aroclor 1248	ND		mg/kg	N/A	0.0319	ND					30	C-01
Aroclor 1254	ND		mg/kg	N/A	0.0319	ND					30	C-01
Aroclor 1260	ND		mg/kg	N/A	0.0319	ND					30	C-01
Aroclor 1262	ND		mg/kg	N/A	0.0319	ND					0	C-01
Aroclor 1268	ND		mg/kg	N/A	0.0319	ND					0	C-01
Surrogate: Decachlorobiphenyl			mg/kg				*111*		*24-154*			C-01
Duplicate Analyzed: 07/06/2007-07/09/2007 (7G05005-DUP2)				QC Source Sample: HQG0009-01								
Aroclor 1016	3.25		mg/kg	N/A	0.645	2.79				15	30	C-01
Aroclor 1221	ND		mg/kg	N/A	1.29	ND					30	C-01
Aroclor 1232	ND		mg/kg	N/A	0.645	ND					30	C-01
Aroclor 1242	ND		mg/kg	N/A	0.645	ND					30	C-01
Aroclor 1248	4.55		mg/kg	N/A	0.645	3.41				29	30	C-01
Aroclor 1254	7.05		mg/kg	N/A	0.645	1.84				117	30	C-01
Aroclor 1260	4.08		mg/kg	N/A	0.645	3.11				27	30	C-01
Aroclor 1262	ND		mg/kg	N/A	0.645	ND					0	C-01
Aroclor 1268	ND		mg/kg	N/A	0.645	ND					0	C-01
Surrogate: Decachlorobiphenyl			mg/kg				*196*		*24-154*			Z1,C-01
Duplicate Analyzed: 07/06/2007-07/09/2007 (7G05005-DUP3)				QC Source Sample: HQG0009-01								
Aroclor 1016	3.25		mg/kg	N/A	0.654	3.32				2	30	C-01
Aroclor 1221	ND		mg/kg	N/A	1.31	ND					30	C-01
Aroclor 1232	ND		mg/kg	N/A	0.654	ND					30	C-01
Aroclor 1242	ND		mg/kg	N/A	0.654	ND					30	C-01
Aroclor 1248	4.55		mg/kg	N/A	0.654	4.58				1	30	C-01
Aroclor 1254	7.05		mg/kg	N/A	0.654	2.78				87	30	C-01
Aroclor 1260	4.08		mg/kg	N/A	0.654	4.01				2	30	C-01
Aroclor 1262	ND		mg/kg	N/A	0.654	ND					0	C-01
Aroclor 1268	ND		mg/kg	N/A	0.654	ND					0	C-01
Surrogate: Decachlorobiphenyl			mg/kg				*271*		*24-154*			C-01,Z1
Semivolatile Organics by GC/MS												
Batch\Seq: 7G11004 Extracted: 07/11/07												
Duplicate Analyzed: 07/26/2007 (7G11004-DUP1)				QC Source Sample: HQG0016-03								
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	N/A	0.308	ND					30	
1,2,4-Trichlorobenzene	ND		mg/kg	N/A	0.308	ND					30	
1,2-Dichlorobenzene	ND		mg/kg	N/A	0.308	ND					30	
1,3-Dichlorobenzene	ND		mg/kg	N/A	0.308	ND					30	
1,4-Dichlorobenzene	ND		mg/kg	N/A	0.308	ND					30	
1-Chloronaphthalene	ND		mg/kg	N/A	0.308	ND					30	
1-Naphthylamine	ND		mg/kg	N/A	0.617	ND					30	
2,3,4,6-Tetrachlorophenol	ND		mg/kg	N/A	0.308	ND					30	
2,4,5-Trichlorophenol	ND		mg/kg	N/A	0.308	ND					30	
2,4,6-Trichlorophenol	ND		mg/kg	N/A	0.308	ND					30	

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Element Environmental LLC	Work Order: HQG0016	Received:	07/02/07
62-180 Emerson Rd.		Reported:	08/08/07 09:34
Haleiwa, HI 96712	Project: Maalea		
Matt Neal	Project Number: Maalaea Phase II ESA		

LABORATORY DUPLICATE QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Semivolatile Organics by GC/MS												
Batch\Seq: 7G11004 Extracted: 07/11/07												
Duplicate Analyzed: 07/26/2007 (7G11004-DUP1)				QC Source Sample: HQG0016-03								
2,4-Dichlorophenol	ND		mg/kg	N/A	0.308	ND					30	
2,4-Dimethylphenol	ND		mg/kg	N/A	0.308	ND					30	
2,4-Dinitrophenol	ND		mg/kg	N/A	1.59	ND					30	
2,4-Dinitrotoluene	ND		mg/kg	N/A	0.617	ND					30	
2,6-Dichlorophenol	ND		mg/kg	N/A	0.308	ND					30	
2,6-Dinitrotoluene	ND		mg/kg	N/A	0.308	ND					30	
2-Chloronaphthalene	ND		mg/kg	N/A	0.308	ND					30	
2-Chlorophenol	ND		mg/kg	N/A	0.308	ND					30	
2-Methylnaphthalene	ND		mg/kg	N/A	0.308	ND					30	
2-Methylphenol (o-Cresol)	ND		mg/kg	N/A	0.308	ND					30	
2-Naphthylamine	ND		mg/kg	N/A	0.617	ND					30	
2-Nitroaniline	ND		mg/kg	N/A	1.59	ND					30	
2-Nitrophenol	ND		mg/kg	N/A	0.308	ND					30	
2-Picoline	ND		mg/kg	N/A	0.308	ND					30	
3,3'-Dichlorobenzidine	ND		mg/kg	N/A	0.308	ND					30	
3-Methylcholanthrene	ND		mg/kg	N/A	0.308	ND					30	
3-Nitroaniline	ND		mg/kg	N/A	1.59	ND					30	
4,6-Dinitro-2-methylphenol	ND		mg/kg	N/A	1.59	ND					30	
4-Aminobiphenyl	ND		mg/kg	N/A	0.617	ND					30	
4-Bromophenyl phenyl ether	ND		mg/kg	N/A	0.308	ND					30	
4-Chloro-3-methylphenol	ND		mg/kg	N/A	0.308	ND					30	
4-Chloroaniline	ND		mg/kg	N/A	0.308	ND					30	
4-Chlorophenyl phenyl ether	ND		mg/kg	N/A	0.308	ND					30	
4-Methylphenol (p-Cresol)	ND		mg/kg	N/A	0.308	ND					30	
4-Nitroaniline	ND		mg/kg	N/A	0.308	ND					30	
4-Nitrophenol	ND		mg/kg	N/A	1.59	ND					30	
7,12-Dimethylbenz (a) anthracene	ND		mg/kg	N/A	0.308	ND					30	
a,a-Dimethylphenethylamine	0.00233		mg/kg	N/A	1.59	ND					30	
Acenaphthene	ND		mg/kg	N/A	0.308	ND					30	
Acenaphthylene	ND		mg/kg	N/A	0.308	ND					30	
Acetophenone	ND		mg/kg	N/A	0.308	ND					30	
Aniline	ND		mg/kg	N/A	0.308	ND					30	
Anthracene	ND		mg/kg	N/A	0.308	ND					30	
Azobenzene	ND		mg/kg	N/A	0.308	ND					30	
Benzidine	ND		mg/kg	N/A	1.59	ND					30	
Benzo (a) anthracene	ND		mg/kg	N/A	0.308	ND					30	
Benzo (a) pyrene	ND		mg/kg	N/A	0.308	ND					30	
Benzo (b) fluoranthene	ND		mg/kg	N/A	0.308	ND					30	
Benzo (g,h,i) perylene	ND		mg/kg	N/A	0.308	ND					30	
Benzo (k) fluoranthene	ND		mg/kg	N/A	0.308	ND					30	
Benzoic acid	ND		mg/kg	N/A	1.59	ND					30	
Benzyl alcohol	ND		mg/kg	N/A	0.308	ND					30	
Bis(2-chloroethoxy)methane	ND		mg/kg	N/A	0.308	ND					30	
Bis(2-chloroethyl)ether	ND		mg/kg	N/A	0.308	ND					30	
Bis(2-chloroisopropyl) ether	ND		mg/kg	N/A	0.308	ND					30	
Bis(2-ethylhexyl)phthalate	ND		mg/kg	N/A	0.308	ND					30	

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34	

LABORATORY DUPLICATE QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Semivolatile Organics by GC/MS												
Batch\Seq: 7G11004 Extracted: 07/11/07												
Duplicate Analyzed: 07/26/2007 (7G11004-DUP1)				QC Source Sample: HQG0016-03								
Butyl benzyl phthalate	ND		mg/kg	N/A	0.308	ND					30	
Chrysene	ND		mg/kg	N/A	0.308	ND					30	
Dibenz (a,j) acridine	ND		mg/kg	N/A	0.308	ND					30	
Dibenzo (a,h) anthracene	ND		mg/kg	N/A	0.308	ND					30	
Dibenzofuran	ND		mg/kg	N/A	0.308	ND					30	
Diethyl phthalate	ND		mg/kg	N/A	0.308	ND					30	
Dimethyl phthalate	ND		mg/kg	N/A	0.308	ND					30	
Dimethylaminoazobenzene	ND		mg/kg	N/A	0.617	ND					30	
Di-n-butyl phthalate	ND		mg/kg	N/A	0.308	ND					30	
Di-n-octyl phthalate	ND		mg/kg	N/A	0.308	ND					30	
Ethyl Methanesulfonate	ND		mg/kg	N/A	0.308	ND					30	
Fluoranthene	ND		mg/kg	N/A	0.308	ND					30	
Fluorene	ND		mg/kg	N/A	0.308	ND					30	
Hexachlorobenzene	ND		mg/kg	N/A	0.308	ND					30	
Hexachlorobutadiene	ND		mg/kg	N/A	0.308	ND					30	
Hexachlorocyclopentadiene	ND		mg/kg	N/A	0.308	ND					30	
Hexachloroethane	ND		mg/kg	N/A	0.308	ND					30	
Indeno (1,2,3-cd) pyrene	ND		mg/kg	N/A	0.308	ND					30	
Isophorone	ND		mg/kg	N/A	0.308	ND					30	
Methyl Methanesulfonate	ND		mg/kg	N/A	0.617	ND					30	
Naphthalene	ND		mg/kg	N/A	0.308	ND					30	
Nitrobenzene	ND		mg/kg	N/A	0.308	ND					30	
N-Nitrosodimethylamine	ND		mg/kg	N/A	0.308	ND					30	
N-Nitrosodi-n-butylamine	ND		mg/kg	N/A	0.308	0.120					30	
N-Nitrosodi-n-propylamine	0.224		mg/kg	N/A	0.308	0.237				5	30	
N-Nitrosodiphenylamine	ND		mg/kg	N/A	0.308	ND					30	
N-Nitrosopiperidine	ND		mg/kg	N/A	0.308	ND					30	
Pentachloronitrobenzene	ND		mg/kg	N/A	0.308	ND					30	
Pentachlorophenol	ND		mg/kg	N/A	1.59	ND					30	
Phenacetin	ND		mg/kg	N/A	0.308	ND					30	
Phenanthrene	ND		mg/kg	N/A	0.308	ND					30	
Phenol	ND		mg/kg	N/A	0.308	ND					30	
Pronamide	ND		mg/kg	N/A	0.308	ND					30	
Pyrene	ND		mg/kg	N/A	0.308	ND					30	
Pyridine	ND		mg/kg	N/A	0.308	ND					30	
Surrogate: 2,4,6-Tribromophenol			mg/kg				*83*		*52.6-114*			
Surrogate: 2-Fluorobiphenyl			mg/kg				*97*		*45.9-108*			
Surrogate: 2-Fluorophenol			mg/kg				*55*		*39.4-103*			
Surrogate: Nitrobenzene-d5			mg/kg				*88*		*37.2-107*			
Surrogate: Phenol-d6			mg/kg				*59*		*49.6-105*			
Surrogate: Terphenyl-d14			mg/kg				*110*		*45.7-133*			

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34

LCS/LCS DUPLICATE QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Extractable Petroleum Hydrocarbons by 8015M													
Batch\Seq: 7G06006 Extracted: 07/06/07													
LCS Analyzed: 07/10/2007 (7G06006-BS1)													
DRO		167	mg/kg	N/A	6.66	145		87		50-107			
Surrogate: o-Terphenyl			mg/kg					*83*		*34.7-135*			
Gasoline Range Organics/BTEX/MTBE by EPA 8015M/8260B													
Batch\Seq: 7G12011 Extracted: 07/11/07													
LCS Analyzed: 07/11/2007 (7G12011-BS1)													
Benzene		0.100	mg/kg	N/A	0.00200	0.108	0.106	108	106	77.9-124	1	30	
Ethylbenzene		0.100	mg/kg	N/A	0.00200	0.106	0.104	106	104	77.1-129	2	30	
m,p-Xylene		0.200	mg/kg	N/A	0.00400	0.209	0.213	105	107	69.7-126	2	30	
o-Xylene		0.100	mg/kg	N/A	0.00200	0.0969	0.0999	97	100	70.3-124	3	30	
Toluene		0.100	mg/kg	N/A	0.00200	0.103	0.102	103	102	77.8-125	1	30	
Surrogate: Toluene-d8			mg/kg					*100*	*99*	*88.3-117*			
LCS Analyzed: 07/11/2007 (7G12011-BS2)													
ORO		4.40	mg/kg	N/A	0.500	4.88	5.19	111	118	70-130	6	30	
Surrogate: Toluene-d8			mg/kg					*103*	*96*	*86.1-111*			
Polychlorinated Biphenyls by EPA Method 8082													
Batch\Seq: 7G05005 Extracted: 07/05/07													
LCS Analyzed: 07/06/2007 (7G05005-BS1)													
Aroclor 1016		0.167	mg/kg	N/A	0.0333	0.171		102		65-128			C-01
Aroclor 1260		0.167	mg/kg	N/A	0.0333	0.176		106		63-130			C-01
Surrogate: Decachlorobiphenyl			mg/kg					*117*		*24-154*			C-01
LCS Analyzed: 07/09/2007 (7G05005-BS2)													
Aroclor 1016		0.167	mg/kg	N/A	0.0333	0.151		90		65-128			C-01,C-02
Aroclor 1260		0.167	mg/kg	N/A	0.0333	0.158		95		63-130			C-01,C-02
Surrogate: Decachlorobiphenyl			mg/kg					*89*		*24-154*			C-01,C-02
Semivolatile Organics by GC/MS													
Batch\Seq: 7G11004 Extracted: 07/11/07													
LCS Analyzed: 07/26/2007 (7G11004-BS1)													
1,2,4,5-Tetrachlorobenzene			mg/kg	N/A	0.330	ND				64.4-103			
1,2,4-Trichlorobenzene		1.67	mg/kg	N/A	0.330	1.25		75		47.9-94.6			
1,2-Dichlorobenzene		1.67	mg/kg	N/A	0.330	1.20		72		48.8-91			
1,3-Dichlorobenzene		1.67	mg/kg	N/A	0.330	1.20		72		49.6-90.1			
1,4-Dichlorobenzene		1.67	mg/kg	N/A	0.330	1.22		73		51.7-88			
1-Naphthylamine			mg/kg	N/A	0.660	ND				26-94.6			
2,3,4,6-Tetrachlorophenol			mg/kg	N/A	0.330	ND				61.1-112			
2,4,5-Trichlorophenol		1.67	mg/kg	N/A	0.330	1.33		80		66.1-108			
2,4,6-Trichlorophenol		1.67	mg/kg	N/A	0.330	1.28		77		59.4-105			
2,4-Dichlorophenol		1.67	mg/kg	N/A	0.330	1.24		75		53.8-98			
2,4-Dimethylphenol		1.67	mg/kg	N/A	0.330	1.07		64		52.6-103			
2,4-Dinitrophenol		1.67	mg/kg	N/A	1.70	1.54		92		36-155			
2,4-Dinitrotoluene		1.67	mg/kg	N/A	0.660	1.42		85		55.5-118			
2,6-Dichlorophenol			mg/kg	N/A	0.330	ND				55.7-98.6			
2,6-Dinitrotoluene		1.67	mg/kg	N/A	0.330	1.41		84		60.9-111			
2-Chloronaphthalene		1.67	mg/kg	N/A	0.330	1.16		70		57.8-98			

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34

LCS/LCS DUPLICATE QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Semivolatile Organics by GC/MS													
Batch\Seq: 7G11004 Extracted: 07/11/07													
LCS Analyzed: 07/26/2007 (7G11004-BS1)													
2-Chlorophenol		1.67	mg/kg	N/A	0.330	1.19		72		54-92.5			
2-Methylnaphthalene		1.67	mg/kg	N/A	0.330	1.27		76		55.9-95.5			
2-Methylphenol (o-Cresol)			mg/kg	N/A	0.330	1.22				59.3-95.2			
2-Naphthylamine			mg/kg	N/A	0.660	ND				1.16-97.7			
2-Nitroaniline		1.67	mg/kg	N/A	1.70	1.43		86		62.5-109			
2-Nitrophenol		1.67	mg/kg	N/A	0.330	1.24		74		54.6-94.9			
2-Picoline			mg/kg	N/A	0.330	ND				4.88-65.6			
3,3'-Dichlorobenzidine			mg/kg	N/A	0.330	ND				51.4-92.7			
3-Methylcholanthrene			mg/kg	N/A	0.330	ND				59.1-108			
3-Nitroaniline		1.67	mg/kg	N/A	1.70	1.26		75		58.9-109			
4,6-Dinitro-2-methylphenol		1.67	mg/kg	N/A	1.70	1.62		97		57.6-125			
4-Aminobiphenyl			mg/kg	N/A	0.660	ND				29.5-85.1			
4-Bromophenyl phenyl ether		1.67	mg/kg	N/A	0.330	1.30		78		64.1-104			
4-Chloro-3-methylphenol		1.67	mg/kg	N/A	0.330	1.41		84		58.8-110			
4-Chloroaniline		1.67	mg/kg	N/A	0.330	0.469		28		49.6-89			L2
4-Chlorophenyl phenyl ether		1.67	mg/kg	N/A	0.330	1.42		85		56-109			
4-Methylphenol (p-Cresol)			mg/kg	N/A	0.330	1.28				38.7-110			
4-Nitroaniline		1.67	mg/kg	N/A	0.330	1.26		75		71.2-113			
4-Nitrophenol		1.67	mg/kg	N/A	1.70	1.46		87		39.7-138			
7,12-Dimethylbenz (a) anthracene			mg/kg	N/A	0.330	ND				55.8-152			
a,a-Dimethylphenethylamine			mg/kg	N/A	1.70	0.0820				-7.04-12.2			
Acenaphthene		1.67	mg/kg	N/A	0.330	1.37		82		64.6-99.2			
Acenaphthylene		1.67	mg/kg	N/A	0.330	1.21		73		58.6-103			
Acetophenone			mg/kg	N/A	0.330	ND				48.8-96.1			
Aniline			mg/kg	N/A	0.330	ND				29.7-92.8			
Anthracene		1.67	mg/kg	N/A	0.330	1.33		80		68.6-104			
Azobenzene		1.67	mg/kg	N/A	0.330	1.32		79		69.5-104			
Benzidine			mg/kg	N/A	1.70	ND				-42.6-66.5			
Benzo (a) anthracene		1.67	mg/kg	N/A	0.330	1.43		86		64.2-107			
Benzo (a) pyrene		1.67	mg/kg	N/A	0.330	2.42		145		61.4-111			L1
Benzo (b) fluoranthene		1.67	mg/kg	N/A	0.330	2.59		156		58.3-119			L1
Benzo (g,h,i) perylene		1.67	mg/kg	N/A	0.330	2.12		127		57.6-102			L1
Benzo (k) fluoranthene		1.67	mg/kg	N/A	0.330	2.97		178		66.3-114			L1
Bis(2-chloroethoxy)methane		1.67	mg/kg	N/A	0.330	1.26		75		60.3-107			
Bis(2-chloroethyl)ether		1.67	mg/kg	N/A	0.330	1.31		78		58.3-86.3			
Bis(2-chloroisopropyl) ether		1.67	mg/kg	N/A	0.330	1.31		79		58.7-89.3			
Bis(2-ethylhexyl)phthalate		1.67	mg/kg	N/A	0.330	1.46		88		56.5-126			
Butyl benzyl phthalate		1.67	mg/kg	N/A	0.330	1.41		85		60.2-120			
Chrysene		1.67	mg/kg	N/A	0.330	1.52		91		64.7-110			
Dibenz (a,j) acridine			mg/kg	N/A	0.330	ND				-2.91-24.8			
Dibenzo (a,h) anthracene		1.67	mg/kg	N/A	0.330	3.49		209		61.4-102			L1
Dibenzofuran		1.67	mg/kg	N/A	0.330	1.34		80		61-104			
Diethyl phthalate		1.67	mg/kg	N/A	0.330	1.44		86		60.2-113			
Dimethyl phthalate		1.67	mg/kg	N/A	0.330	1.40		84		39.6-110			
Dimethylaminoazobenzene			mg/kg	N/A	0.660	ND				59.8-112			
Di-n-butyl phthalate		1.67	mg/kg	N/A	0.330	1.40		84		63.8-117			

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Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34

LCS/LCS DUPLICATE QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Semivolatile Organics by GC/MS													
Batch\Seq: 7G11004 Extracted: 07/11/07													
LCS Analyzed: 07/26/2007 (7G11004-BS1)													
Di-n-octyl phthalate		1.67	mg/kg	N/A	0.330	1.30		78		55.6-120			
Ethyl Methanesulfonate			mg/kg	N/A	0.330	ND				59.5-91.8			
Fluoranthene		1.67	mg/kg	N/A	0.330	1.47		88		64.8-118			
Fluorene		1.67	mg/kg	N/A	0.330	1.42		85		61.4-105			
Hexachlorobenzene		1.67	mg/kg	N/A	0.330	1.44		86		62.9-108			
Hexachlorobutadiene		1.67	mg/kg	N/A	0.330	1.27		76		42.9-97.8			
Hexachlorocyclopentadiene		1.67	mg/kg	N/A	0.330	0.930		56		-14.3-125			
Hexachloroethane		1.67	mg/kg	N/A	0.330	1.24		74		52.2-88.8			
Indeno (1,2,3-cd) pyrene		1.67	mg/kg	N/A	0.330	2.27		136		61.2-102			L1
Isophorone		1.67	mg/kg	N/A	0.330	1.35		81		49.2-90.7			
Methyl Methanesulfonate			mg/kg	N/A	0.660	ND				27.1-140			
Naphthalene		1.67	mg/kg	N/A	0.330	1.20		72		52.4-91.9			
Nitrobenzene		1.67	mg/kg	N/A	0.330	1.31		78		53.2-89			
N-Nitrosodimethylamine		1.67	mg/kg	N/A	0.330	1.27		76		38.3-94.9			
N-Nitrosodi-n-butylamine			mg/kg	N/A	0.330	ND				55.7-104			
N-Nitrosodi-n-propylamine		1.67	mg/kg	N/A	0.330	1.45		87		40.4-119			
N-Nitrosodiphenylamine			mg/kg	N/A	0.330	ND				73.5-112			
N-Nitrosopiperidine			mg/kg	N/A	0.330	ND				53.5-96			
Pentachloronitrobenzene			mg/kg	N/A	0.330	ND				58.7-117			
Pentachlorophenol		1.67	mg/kg	N/A	1.70	1.33		80		63.3-124			
Phenacetin			mg/kg	N/A	0.330	0.0723				60.7-116			
Phenanthrene		1.67	mg/kg	N/A	0.330	1.43		86		75-104			
Phenol		1.67	mg/kg	N/A	0.330	1.14		69		56.5-93.6			
Pronamide			mg/kg	N/A	0.330	ND				67.3-121			
Pyrene		1.67	mg/kg	N/A	0.330	1.39		83		61.2-114			
Pyridine			mg/kg	N/A	0.330	ND				-18-106			
Surrogate: 2,4,6-Tribromophenol			mg/kg					*83*		*57.7-121*			
Surrogate: 2-Fluorobiphenyl			mg/kg					*79*		*51.2-99.2*			
Surrogate: 2-Fluorophenol			mg/kg					*67*		*43.3-92.5*			
Surrogate: Nitrobenzene-d5			mg/kg					*77*		*43.5-94.6*			
Surrogate: Phenol-d6			mg/kg					*73*		*52.3-97*			
Surrogate: Terphenyl-d14			mg/kg					*90*		*58.1-112*			
Total Metals by SW 846 Series Methods													
Batch\Seq: 7G10005 Extracted: 07/10/07													
LCS Analyzed: 07/20/2007 (7G10005-BS1)													
Arsenic		20.0	mg/kg	N/A	1.00	19.5		98		80-120			
Lead		20.0	mg/kg	N/A	2.00	18.5		92		80-120			
Batch\Seq: 7G11013 Extracted: 07/11/07													
LCS Analyzed: 07/11/2007 (7G11013-BS1)													
Mercury		0.333	mg/kg	N/A	0.0200	0.373		112		80-120			
Batch\Seq: 7G16005 Extracted: 07/16/07													
LCS Analyzed: 07/17/2007 (7G16005-BS1)													
Arsenic		100	mg/kg	N/A	5.00	94.1		94		80-120			
Barium		100	mg/kg	N/A	10.0	94.7		95		80-120			
Cadmium		100	mg/kg	N/A	2.00	92.0		92		80-120			

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Element Environmental LLC	Work Order: HQG0016	Received:	07/02/07
62-180 Emerson Rd.		Reported:	08/08/07 09:34
Haleiwa, HI 96712	Project: Maalea		
Matt Neal	Project Number: Maalaea Phase II ESA		

LCS/LCS DUPLICATE QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Total Metals by SW 846 Series Methods													
Batch\Seq: 7G16005 Extracted: 07/16/07													
LCS Analyzed: 07/17/2007 (7G16005-BS1)													
Chromium		100	mg/kg	N/A	5.00	88.8		89		80-120			
Lead		100	mg/kg	N/A	10.0	89.5		89		80-120			
Selenium		100	mg/kg	N/A	10.0	95.2		95		80-120			
Silver		10.0	mg/kg	N/A	5.00	8.52		85		80-120			C2
Volatile Organic Compounds by EPA 8260B													
Batch\Seq: 7G12011 Extracted: 07/11/07													
LCS Analyzed: 07/11/2007 (7G12011-BS1)													
1,1-Dichloroethene		0.100	mg/kg	N/A	0.0100	0.103	0.103	103	103	65.1-127	0	30	
Chlorobenzene		0.100	mg/kg	N/A	0.0100	0.105	0.106	105	106	74.4-119	0	30	
Trichloroethene		0.100	mg/kg	N/A	0.0100	0.106	0.108	106	108	72.9-119	2	30	
Surrogate: 1,2-Dichloroethane-d4			mg/kg					*102*	*104*	*58.3-156*			
Surrogate: 4-Bromofluorobenzene			mg/kg					*100*	*99*	*72.1-156*			
Surrogate: Dibromofluoromethane			mg/kg					*99*	*99*	*63.2-149*			
Surrogate: Toluene-d8			mg/kg					*100*	*99*	*70.5-141*			

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Element Environmental LLC	Work Order: HQG0016	Received:	07/02/07
62-180 Emerson Rd.		Reported:	08/08/07 09:34
Haleiwa, HI 96712	Project: Maalea		
Matt Neal	Project Number: Maalaea Phase II ESA		

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Extractable Petroleum Hydrocarbons by 8015M													
Batch\Seq: 7G06006 Extracted: 07/06/07													
Matrix Spike Analyzed: 07/10/2007 (7G06006-MS1)				QC Source Sample: HQG0016-19									
DRO	ND	164	mg/kg	N/A	6.55	137	144	83	88	50-107	5	30	
Surrogate: o-Terphenyl			mg/kg					*77*	*82*	*34.7-135*			
Gasoline Range Organics/BTEX/MTBE by EPA 8015M/8260B													
Batch\Seq: 7G12011 Extracted: 07/11/07													
Matrix Spike Analyzed: 07/12/2007 (7G12011-MS1)				QC Source Sample: HQG0016-12									
Benzene	ND	0.0998	mg/kg	N/A	0.00200	0.109		109		77.9-124			
Ethylbenzene	ND	0.0998	mg/kg	N/A	0.00200	0.105		106		77.1-129			
m,p-Xylene	ND	0.200	mg/kg	N/A	0.00399	0.198		99		69.7-126			
o-Xylene	ND	0.0998	mg/kg	N/A	0.00200	0.107		107		70.3-124			
Toluene	ND	0.0998	mg/kg	N/A	0.00200	0.122		122		77.8-125			
Surrogate: Toluene-d8			mg/kg					*118*		*88.2-117*			*75*
Polychlorinated Biphenyls by EPA Method 8082													
Batch\Seq: 7G05005 Extracted: 07/05/07													
Matrix Spike Analyzed: 07/06/2007 (7G05005-MS1)				QC Source Sample: HQG0016-10									
Aroclor 1016	ND	0.164	mg/kg	N/A	0.0329	0.172	0.164	105	100	65-128	5	50	C-01
Aroclor 1260	ND	0.164	mg/kg	N/A	0.0329	0.173	0.166	105	101	63-130	4	50	C-01
Surrogate: Decachlorobiphenyl			mg/kg					*110*	*103*	*24-154*			C-01
Semivolatile Organics by GC/MS													
Batch\Seq: 7G11004 Extracted: 07/11/07													
Matrix Spike Analyzed: 07/26/2007 (7G11004-MS1)				QC Source Sample: HQG0016-02									
1,2,4,5-Tetrachlorobenzene	ND		mg/kg	N/A	0.319	ND	ND			64.4-103		30	
1,2,4-Trichlorobenzene	ND	1.61	mg/kg	N/A	0.319	1.19	0.868	74	56	47.9-94.6	31	30	M1
1,2-Dichlorobenzene	ND	1.61	mg/kg	N/A	0.319	1.10	0.800	68	51	48.8-93	31	30	M1
1,3-Dichlorobenzene	ND	1.61	mg/kg	N/A	0.319	1.07	0.772	66	50	49.6-90.1	32	30	M1
1,4-Dichlorobenzene	ND	1.61	mg/kg	N/A	0.319	1.09	0.787	68	51	51.7-88	32	30	M1
1-Chloronaphthalene	ND		mg/kg	N/A	0.319	1.61	1.30			54.6-103	22	30	
1-Naphthylamine	ND		mg/kg	N/A	0.639	ND	ND			76-94.6		30	
2,3,4,6-Tetrachlorophenol	ND		mg/kg	N/A	0.319	ND	ND			61.1-112		30	
2,4,5-Trichlorophenol	ND	1.61	mg/kg	N/A	0.319	1.37	1.22	85	78	66.1-108	12	30	
2,4,6-Trichlorophenol	ND	1.61	mg/kg	N/A	0.319	1.25	1.08	78	69	59.4-105	15	30	
2,4-Dichlorophenol	ND	1.61	mg/kg	N/A	0.319	1.27	0.973	79	62	53.8-98	27	30	
2,4-Dimethylphenol	ND	1.61	mg/kg	N/A	0.319	0.326	0.215	20	14	52.6-103	41	30	M1
2,4-Dinitrophenol	ND	1.61	mg/kg	N/A	1.65	0.691	0.566	43	36	36-155	20	30	
2,4-Dinitrotoluene	ND	1.61	mg/kg	N/A	0.639	1.46	1.34	91	86	55.5-118	9	30	
2,6-Dichlorophenol	ND		mg/kg	N/A	0.319	ND	ND			55.7-98.6		30	
2,6-Dinitrotoluene	ND	1.61	mg/kg	N/A	0.319	1.48	1.35	92	86	60.9-111	10	30	
2-Chloronaphthalene	ND	1.61	mg/kg	N/A	0.319	1.27	1.02	79	65	57.8-98	22	30	
2-Chlorophenol	ND	1.61	mg/kg	N/A	0.319	1.06	0.772	66	50	54-92.5	31	30	M1
2-Methylnaphthalene	ND	1.61	mg/kg	N/A	0.319	1.33	1.02	82	63	55.9-95.5	26	30	
2-Methylphenol (o-Cresol)	ND		mg/kg	N/A	0.319	0.827	0.551			59.3-95.2	40	30	M1
2-Naphthylamine	ND		mg/kg	N/A	0.639	ND	ND			1.16-97.7		30	
2-Nitroaniline	ND	1.61	mg/kg	N/A	1.65	1.49	1.34	93	86	62.5-109	11	30	
2-Nitrophenol	ND	1.61	mg/kg	N/A	0.319	1.20	0.865	75	56	54.6-94.9	33	30	M1

Element Environmental LLC	Work Order: HQG0016		Received: 07/02/07
62-180 Emerson Rd.			Reported: 08/08/07 09:34
Haleiwa, HI 96712	Project: Maalea		
Matt Neal	Project Number: Maalaea Phase II ESA		

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Semivolatile Organics by GC/MS													
Batch\Seq: 7G11004 Extracted: 07/11/07													
Matrix Spike Analyzed: 07/26/2007 (7G11004-MS1)				QC Source Sample: HQG0016-02									
2-Picoline	ND		mg/kg	N/A	0.319	ND	ND			4.88-65.6		30	
3,3'-Dichlorobenzidine	ND		mg/kg	N/A	0.319	ND	ND			51.4-92.7		30	
3-Methylcholanthrene	ND		mg/kg	N/A	0.319	ND	ND			59.1-108		30	
3-Nitroaniline	ND	1.61	mg/kg	N/A	1.65	1.27	1.14	79	73	58.9-109	11	30	
4,6-Dinitro-2-methylphenol	ND	1.61	mg/kg	N/A	1.65	1.36	1.21	84	78	57.6-125	11	30	
4-Aminobiphenyl	ND		mg/kg	N/A	0.639	ND	ND			29.5-85.1		30	
4-Bromophenyl phenyl ether	ND	1.61	mg/kg	N/A	0.319	1.39	1.26	86	81	64.1-104	10	30	
4-Chloro-3-methylphenol	ND	1.61	mg/kg	N/A	0.319	1.32	1.15	82	74	58.8-110	14	30	
4-Chloroaniline	ND	1.61	mg/kg	N/A	0.319	0.731	0.549	45	35	49.6-89	28	30	M1
4-Chlorophenyl phenyl ether	ND	1.61	mg/kg	N/A	0.319	1.49	1.34	92	86	56-109	11	30	
4-Methylphenol (p-Cresol)	ND		mg/kg	N/A	0.319	0.749	0.500			38.7-110	40	30	M1
4-Nitroaniline	ND	1.61	mg/kg	N/A	0.319	1.27	1.14	79	73	71.2-113	11	30	
4-Nitrophenol	ND	1.61	mg/kg	N/A	1.65	1.18	1.05	73	68	39.7-138	11	30	
7,12-Dimethylbenz (a) anthracene	ND		mg/kg	N/A	0.319	ND	ND			55.8-152		30	
a,a-Dimethylphenethylamine	0.00233		mg/kg	N/A	1.65	0.0800	0.0586			-7.04-12.2	31	30	M1
Acenaphthene	ND	1.61	mg/kg	N/A	0.319	1.44	1.25	89	80	64.6-99.2	14	30	
Acenaphthylene	ND	1.61	mg/kg	N/A	0.319	1.33	1.12	82	72	38.6-103	17	30	
Acetophenone	ND		mg/kg	N/A	0.319	ND	ND			48.8-96.1		30	
Aniline	ND		mg/kg	N/A	0.319	ND	ND			29.7-92.8		30	
Anthracene	ND	1.61	mg/kg	N/A	0.319	1.51	1.32	94	85	68.6-104	14	30	
Azobenzene	ND	1.61	mg/kg	N/A	0.319	1.40	1.26	87	81	69.5-104	11	30	
Benzidine	ND		mg/kg	N/A	1.65	ND	ND			-42.6-66.5		30	
Benzo (a) anthracene	ND	1.61	mg/kg	N/A	0.319	1.44	1.39	89	89	64.2-107	4	30	
Benzo (a) pyrene	ND	1.61	mg/kg	N/A	0.319	2.46	2.35	152	151	61.4-111	4	30	M1
Benzo (b) fluoranthene	ND	1.61	mg/kg	N/A	0.319	2.36	2.34	146	150	58.3-119	1	30	M1
Benzo (g,h,i) perylene	ND	1.61	mg/kg	N/A	0.319	2.01	1.79	125	115	57.6-102	12	30	M1
Benzo (k) fluoranthene	ND	1.61	mg/kg	N/A	0.319	2.93	2.82	182	181	66.3-114	4	30	M1
Bis(2-chloroethoxy)methane	ND	1.61	mg/kg	N/A	0.319	1.26	0.918	78	59	60.3-107	31	30	M1
Bis(2-chloroethyl)ether	ND	1.61	mg/kg	N/A	0.319	1.19	0.872	74	56	58.3-86.3	31	30	M1
Bis(2-chloroisopropyl) ether	ND	1.61	mg/kg	N/A	0.319	1.17	0.863	73	55	58.7-89.3	30	30	M1
Bis(2-ethylhexyl)phthalate	ND	1.61	mg/kg	N/A	0.319	1.44	1.40	89	90	56.5-126	3	30	
Butyl benzyl phthalate	ND	1.61	mg/kg	N/A	0.319	1.39	1.35	86	87	60.2-120	3	30	
Chrysene	ND	1.61	mg/kg	N/A	0.319	1.51	1.48	93	95	64.7-110	2	30	
Dibenz (a,j) acridine	ND		mg/kg	N/A	0.319	ND	ND			-2.91-24.8		30	
Dibenzo (a,h) anthracene	ND	1.61	mg/kg	N/A	0.319	3.35	3.05	208	196	61.4-102	9	30	M1
Dibenzofuran	ND	1.61	mg/kg	N/A	0.319	1.44	1.32	89	82	61-104	13	30	
Diethyl phthalate	ND	1.61	mg/kg	N/A	0.319	1.49	1.36	92	87	60.2-113	9	30	
Dimethyl phthalate	ND	1.61	mg/kg	N/A	0.319	1.44	1.31	89	84	59.6-110	10	30	
Dimethylaminoazobenzene	ND		mg/kg	N/A	0.639	ND	ND			59.8-112		30	
Di-n-butyl phthalate	ND	1.61	mg/kg	N/A	0.319	1.55	1.38	96	89	63.8-111	11	30	
Di-n-octyl phthalate	ND	1.61	mg/kg	N/A	0.319	1.33	1.29	83	83	55.6-120	3	30	
Ethyl Methanesulfonate	ND		mg/kg	N/A	0.319	ND	ND			59.5-91.8		30	
Fluoranthene	ND	1.61	mg/kg	N/A	0.319	1.63	1.40	101	90	64.8-118	15	30	
Fluorene	ND	1.61	mg/kg	N/A	0.319	1.49	1.37	93	88	61.4-103	9	30	
Hexachlorobenzene	ND	1.61	mg/kg	N/A	0.319	1.53	1.38	95	88	62.9-108	11	30	
Hexachlorobutadiene	ND	1.61	mg/kg	N/A	0.319	1.19	0.833	74	55	42.9-97.8	32	30	M1

Element Environmental LLC	Work Order: HQG0016		Received: 07/02/07
62-180 Emerson Rd.			Reported: 08/08/07 09:34
Haleiwa, HI 96712	Project: Maalea		
Matt Neal	Project Number: Maalaea Phase II ESA		

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Semivolatile Organics by GC/MS													
Batch\Seq: 7G11004 Extracted: 07/11/07													
Matrix Spike Analyzed: 07/26/2007 (7G11004-MS1)				QC Source Sample: HQG0016-02									
Hexachlorocyclopentadiene	ND	1.61	mg/kg	N/A	0.319	1.06	0.714	66	46	-14.3-125	39	30	M1
Hexachloroethane	ND	1.61	mg/kg	N/A	0.319	1.09	0.777	68	50	52.2-88.8	34	30	M1
Indeno (1,2,3-cd) pyrene	ND	1.61	mg/kg	N/A	0.319	2.17	1.97	135	126	61.2-101	10	30	M1
Isophorone	ND	1.61	mg/kg	N/A	0.319	1.34	1.02	83	66	49.2-90.7	27	30	
Methyl Methanesulfonate	ND		mg/kg	N/A	0.639	ND	ND			27.1-140		30	
Naphthalene	ND	1.61	mg/kg	N/A	0.319	1.16	0.864	72	55	52.4-91.9	30	30	
Nitrobenzene	ND	1.61	mg/kg	N/A	0.319	1.21	0.895	75	57	53.2-89	30	30	
N-Nitrosodimethylamine	ND	1.61	mg/kg	N/A	0.319	1.07	0.783	67	50	38.3-94.9	31	30	M1
N-Nitrosodi-n-butylamine	ND		mg/kg	N/A	0.319	ND	ND			55.7-104		30	
N-Nitrosodi-n-propylamine	0.212	1.61	mg/kg	N/A	0.319	1.41	1.06	75	54	40.4-119	29	30	
N-Nitrosodiphenylamine	ND		mg/kg	N/A	0.319	ND	ND			73.3-112		30	
N-Nitrosopiperidine	ND		mg/kg	N/A	0.319	ND	ND			53.5-96		30	
Pentachloronitrobenzene	ND		mg/kg	N/A	0.319	ND	ND			38.7-117		30	
Pentachlorophenol	ND	1.61	mg/kg	N/A	1.65	0.871	0.714	54	46	63.3-124	20	30	M1
Phenacetin	ND		mg/kg	N/A	0.319	0.0768	0.0701			60.7-116	9	30	
Phenanthrene	ND	1.61	mg/kg	N/A	0.319	1.50	1.35	93	86	75-104	11	30	
Phenol	ND	1.61	mg/kg	N/A	0.319	1.02	0.751	63	48	56.5-93.6	30	30	M1
Pronamide	ND		mg/kg	N/A	0.319	ND	ND			67.3-121		30	
Pyrene	ND	1.61	mg/kg	N/A	0.319	1.34	1.29	83	83	61.2-114	4	30	
Pyridine	ND		mg/kg	N/A	0.319	ND	ND			-18-106		30	
Surrogate: 2,4,6-Tribromophenol			mg/kg					*84*	*77*	*57.7-121*			
Surrogate: 2-Fluorobiphenyl			mg/kg					*89*	*73*	*51.3-99.2*			
Surrogate: 2-Fluorophenol			mg/kg					*37*	*41*	*45.1-92.5*			Z
Surrogate: Nitrobenzene-d5			mg/kg					*76*	*59*	*43.5-94.6*			
Surrogate: Phenol-d6			mg/kg					*67*	*52*	*52.3-97*			Z
Surrogate: Terphenyl-d14			mg/kg					*89*	*89*	*58.1-112*			
Total Metals by SW 846 Series Methods													
Batch\Seq: 7G10005 Extracted: 07/10/07													
Matrix Spike Analyzed: 07/10/2007 (7G10005-MS1)				QC Source Sample: HQG0016-10									
Arsenic	2.89	18.7	mg/kg	N/A	0.935	3.25	4.24	2	7	80-120	26	20	M1
Lead	ND	18.7	mg/kg	N/A	1.87	9.62	12.3	51	62	80-120	25	20	M1,R3
Batch\Seq: 7G11013 Extracted: 07/11/07													
Matrix Spike Analyzed: 07/11/2007 (7G11013-MS1)				QC Source Sample: HQG0033-01									
Mercury	76.4	0.241	mg/kg	N/A	7.22	66.8	86.8	-3970	3100	75-125	26	20	MHA
Batch\Seq: 7G16005 Extracted: 07/16/07													
Matrix Spike Analyzed: 07/17/2007 (7G16005-MS1)				QC Source Sample: HQG0007-07									
Arsenic	6.71	93.5	mg/kg	N/A	4.67	88.8	83.3	88	88	80-120	6	20	
Barium	23.2	93.5	mg/kg	N/A	9.35	105	95.5	87	83	80-120	9	20	
Cadmium	ND	93.5	mg/kg	N/A	1.87	66.4	61.1	71	70	80-120	8	20	M1
Chromium	13.6	93.5	mg/kg	N/A	4.67	97.1	92.2	89	90	80-120	5	20	
Lead	1.68	93.5	mg/kg	N/A	9.35	75.4	69.8	79	78	80-120	8	20	M1
Selenium	0.771	93.5	mg/kg	N/A	9.35	78.5	71.6	83	81	80-120	9	20	
Silver	ND	9.35	mg/kg	N/A	4.67	7.33	6.61	78	76	80-120	10	20	M1

Volatile Organic Compounds by EPA 8260B

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99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Volatile Organic Compounds by EPA 8260B													
BatchSeq: 7G12011 Extracted: 07/11/07													
Matrix Spike Analyzed: 07/12/2007 (7G12011-MS1)				QC Source Sample: HQG0016-12									
1,1-Dichloroethene	ND	0.0998	mg/kg	N/A	0.00998	0.0861		86		65.1-127			
Chlorobenzene	ND	0.0998	mg/kg	N/A	0.00998	0.110		110		74.4-119			
Trichloroethene	ND	0.0998	mg/kg	N/A	0.00998	0.0920		92		72.9-119			
Surrogate: 1,2-Dichloroethane-d4			mg/kg					*136*		*58.3-156*			
Surrogate: 4-Bromofluorobenzene			mg/kg					*130*		*72.1-156*			
Surrogate: Dibromofluoromethane			mg/kg					*115*		*63.2-149*			
Surrogate: Toluene-d8			mg/kg					*118*		*70.5-145*			

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99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34

CERTIFICATION SUMMARY

Subcontracted Laboratories

Anatek Labs.

1282 Alturas Dr. - Moscow, ID 83843

Analysis Performed: 8270Modified Pest. Screen
Samples: HQG0016-01, HQG0016-02, HQG0016-03, HQG0016-04, HQG0016-05, HQG0016-06, HQG0016-07, HQG0016-08, HQG0016-09, HQG0016-10

Analysis Performed: 8321 Carbamate Herbicides
Samples: HQG0016-01, HQG0016-02, HQG0016-03, HQG0016-04, HQG0016-05, HQG0016-06, HQG0016-07, HQG0016-08, HQG0016-09, HQG0016-10

STL - Seattle, WA

5755 8th Street East - Tacoma,, WA 98424

Analysis Performed: 8081A Pesticides
Samples: HQG0016-01, HQG0016-02, HQG0016-03, HQG0016-04, HQG0016-05, HQG0016-06, HQG0016-07, HQG0016-08, HQG0016-09, HQG0016-10, HQG0016-19, HQG0016-20

Analysis Performed: 8151 Herbicides
Samples: HQG0016-01, HQG0016-02, HQG0016-03, HQG0016-04, HQG0016-05, HQG0016-06, HQG0016-07, HQG0016-08, HQG0016-09, HQG0016-10, HQG0016-19, HQG0016-20

Any abnormalities or departures from sample acceptance policy shall be documented on the 'Sample Receipt and Temperature Log Form' and 'Sample Non-conformance Form' (if applicable) included with this report.

For information concerning certifications of this facility or another TestAmerica facility, please visit our website at www.TestAmericaInc.com

Samples collected by TestAmerica Field Services personnel are noted on the Chain of Custody (COC) and are sampled in accordance with TA-CF SOP CF09-01.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC 62-180 Emerson Rd. Haleiwa, HI 96712 Matt Neal	Work Order: HQG0016 Project: Maalea Project Number: Maalaea Phase II ESA	Received: 07/02/07 Reported: 08/08/07 09:34

DATA QUALIFIERS AND DEFINITIONS

C-01 To reduce matrix interference, the sample extract has undergone sulfuric acid clean-up, method 3665A, which is specific to hydrocarbon contamination.
C-02 To reduce matrix interference, the sample extract has undergone copper clean-up, method 3660, which is specific to sulfur contamination.
C2 Calibration Verification recovery was below the method control limit for this analyte, however the average % difference for all analytes met method criteria. See Calibration Summary form. 91.15%
L1 Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above acceptance limits.
L2 Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was below acceptance limits.
M1 The MS and/or MSD were outside the acceptance limits due to sample matrix interference. See Blank Spike (LCS).
MHA Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information. See Blank Spike (LCS).
R3 The RPD exceeded the acceptance limit due to sample matrix effects.
Z Due to sample matrix effects, the surrogate recovery was below the acceptance limits.
Z3 The sample required a dilution due to the nature of the sample matrix. Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.
Z5 Due to sample matrix effects, the surrogate recovery was outside acceptance limits. Secondary surrogate recovery was within the acceptance limits.

ADDITIONAL COMMENTS

Oceanic Analytical Laboratory, Inc.
99-193 Aiea Heights Drive, Suite 121 Aiea, Hawaii 96701-3900
Telephone: (808)486-LABS (5227) Fax: (808)486-2456 E-mail: info@oceanic-labs.com

Chain of Custody / Analysis Request Form

LABORATORY USE ONLY
LAB JOB NO. HQG0016
LOCATION
CONTAINERS

Report To: Matt Neal
Company Name: Element Environmental LLC
Address: 62-180 Emerson Road
City: Haleiwa State: HI Zip: 96712
Phone: 637-1200 Fax: 637-0001
Sampler: MN
# of Samples in Shipment: 20

Project Identification
Job Name: Maalaea Phase II ESA
Job Number:
P.O. Number:
Date of Sample Shipment: 7/2/07
Date Results Needed: Standard TAT

Indicate Analysis Requested: PCBs; Organochlorine Pesticides; Chlorinated Herbicides; SVOCs; ICP Metals (Arsenic; Lead)

Item No.	Client Sample I.D.	Multi-Increment	COMP	GRAB	Matrix	Preservation Method	Date	Time	Number of Containers	Analyses	Laboratory No.
1	DU1	X			Soil		6/28/07	16:45	1	X X X X X	HQF0016-01
2	DU2	X					6/28/07	13:30	2		-02
3	DU3	X					6/20/07	15:51	2		-03
4	DU4	X					6/20/07	16:30	2		-04
5	DU5	X					6/28/07	16:50	2		-05
6	DU6	X					6/29/07	10:10	2		-06
7	DU7	X					6/29/07	11:10	2		-07
8	DU8	X					6/29/07	12:10	1		-08
9	DU9	X					6/29/07	14:10	1		-09
10	DU10	X					6/29/07	15:10	1		-10

Released by (Print/Signature)	Date / Time Released	Delivery Method	Received by (Print/Signature)	Company / Agency Affiliation	Date / Time Received	Condition Noted
Matt Neal / [signature]	7/2/07 / 1235	Hand	Wayne Perry	TA HON	7/2/07 / 1235	wet ice 0-3°C

Comments: Samples DU1 – DU10 are Multi Increment Samples

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CLIENT: Element Environmental LLC
CONTACT: Matt Neal PHONE NO: (808) 637-1200
PROJECT: Maalaea Phase II ESA SITE/PWSID#:
REPORTS TO: Matt Neal FAX NO.: 673-0001
INVOICE TO: QUOTE #
P.O. NUMBER

CT&E Reference:
PAGE 2 OF 2

HQG0016

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No. CONTAINERS	SAMPLE TYPE C= COMP G= GRAB	HVOC (1,3-dichloropropene)	Fuel Fingerprint (Gas & Diesel)	RCRA 8 Total Metals	Chlorinated herbicides	Organochlorine Pesticides	PCBs	HVOCs	SVOCs		REMARKS
HQG0016-11	DU1-VOC	6/29/07	16:30	Soil	2	G	X									
-12	DU2-VOC		15:55		2		X									
-13	DU3-VOC		15:23		2		X									
-14	DU4-VOC		14:53		2		X									
-15	DU5-VOC		14:26		2		X									
-16	DU6-VOC		13:53		1		X									
-17	DU7-VOC		13:25		2		X									
-18	DU8-VOC		12:33		2		X									
-19	DRUM 1		19:07		4			X	X	X	X	X	X	X		
-20	DRUM 2		19:17		4			X	X	X	X	X	X	X		

Collected/Relinquished By: (1)	Date	Time	Received By:
Matt Neal / Matt Neal	7/2/07	1235	Yvonne Yoshi-Roy
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received By:

Shipping Carrier:
Shipping Ticket No:
Special Deliverable Requirements:
Samples Received Cold? (Circle) YES NO
Temperature °C: 0.3°C
Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT
Requested Turnaround Time and Special Instructions:

STL

ANALYTICAL REPORT

Job Number: 580-6454-1

Job Description: HQG0016

For:
TestAmerica Analytical Testing Corp.
99-193 Aiea Heights Drive
Suite 121
Aiea, HI 96701

Attention: Yvonne Parry

Tiffany Ryan
Project Mgmt. Assistant
tiffany.ryan@testamericainc.com
07/23/2007

Project Manager: Terri L Torres

STL Seattle is a part of Severn Trent Laboratories, Inc.

Severn Trent Laboratories, Inc.
STL Seattle 5755 8th Street East, Tacoma, WA 98424
Tel (253) 922-2310 Fax (253) 922-5047 www.stl-inc.com

GC Semi VOA - Method 8081A
The matrix spike / matrix spike duplicate (MS/MSD) recoveries for batch 580-20818 were outside control limits for delta-BHC, Endosulfan II, Endosulfan sulfate, Endrin aldehyde, Endrin ketone, and Methoxychlor. It is believed that this is due to matrix interference. The associated laboratory control standard (LCS) met acceptance criteria. The data has been reported as is.

The surrogate recovery of Tetrachloro-m-xylene (126%) in sample 580-6454-4 associated with batch 580-20899 exceeded QC limits (49-123%). All other surrogates were within control limits. No further action was taken on this outlier.

No other analytical or quality issues were noted.

METHOD SUMMARY

Client: TestAmerica Analytical Testing Corp. Job Number: 580-6454-1

Description	Lab Location	Method	Preparation Method
Matrix: Solid			
Chlorinated Herbicides by GC-MS	STL SEA	SW846 8151A	
Chlorinated Herbicides by GC - Solids Prep	STL SEA		SW846 8151A
Organochlorine Pesticides by Gas Chromatography	STL SEA	SW846 8081A	
Ultrasonic Extraction (Low Level)	STL SEA		SW846 3550B

LAB REFERENCES:

STL SEA = STL Seattle

METHOD REFERENCES:

SW846 - "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

SAMPLE SUMMARY

Client: TestAmerica Analytical Testing Corp. Job Number: 580-6454-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
580-6454-1	HQG0016-01	Solid	06/29/2007 1645	07/09/2007 1150
580-6454-2	HQG0016-02	Solid	06/28/2007 1330	07/09/2007 1150
580-6454-3	HQG0016-03	Solid	06/28/2007 1551	07/09/2007 1150
580-6454-4	HQG0016-04	Solid	06/28/2007 1630	07/09/2007 1150
580-6454-5	HQG0016-05	Solid	06/28/2007 1650	07/09/2007 1150
580-6454-6	HQG0016-06	Solid	06/29/2007 1010	07/09/2007 1150
580-6454-7	HQG0016-07	Solid	06/29/2007 1110	07/09/2007 1150
580-6454-8	HQG0016-08	Solid	06/29/2007 1210	07/09/2007 1150
580-6454-9	HQG0016-09	Solid	06/29/2007 1410	07/09/2007 1150
580-6454-10	HQG0016-10	Solid	06/29/2007 1510	07/09/2007 1150
580-6454-11	HQG0016-19	Solid	06/29/2007 1907	07/09/2007 1150
580-6454-12	HQG0016-20	Solid	06/29/2007 1907	07/09/2007 1150

Analytical Data

Client: TestAmerica Analytical Testing Corp. — Job Number: 580-6454-1

Client Sample ID: HQG0016-01

Lab Sample ID: 580-6454-1 — Date Sampled: 06/29/2007 1645

Client Matrix: Solid — Date Received: 07/09/2007 1150

8151A Chlorinated Herbicides by GC-MS

Method:	8151A	Analysis Batch: 580-20656		Instrument ID:	SEA008
Preparation:	8151A	Prep Batch: 580-20441		Lab File ID:	L23796.D
Dilution:	1.0			Initial Weight/Volume:	30.0012 g
Date Analyzed:	07/13/2007 0727			Final Weight/Volume:	10 mL
Date Prepared:	07/11/2007 1401			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dalapon		ND		8.3
4-Nitrophenol		ND		3.3
Dicamba		ND		3.3
MCPP		ND		3.3
MCPA		ND		3.3
Dichlorprop		ND		3.3
2,4-D		ND		3.3
Pentachlorophenol		ND		3.3
Silvex (2,4,5-TP)		ND		3.3
2,4,5-T		ND		3.3
Dinoseb		ND		8.3
2,4-DB		ND		3.3

Surrogate	%Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	99	51 - 129

Analytical Data

Client: TestAmerica Analytical Testing Corp. — Job Number: 580-6454-1

Client Sample ID: HQG0016-02

Lab Sample ID: 580-6454-2 — Date Sampled: 06/28/2007 1330

Client Matrix: Solid — Date Received: 07/09/2007 1150

8151A Chlorinated Herbicides by GC-MS

Method:	8151A	Analysis Batch: 580-20656		Instrument ID:	SEA008
Preparation:	8151A	Prep Batch: 580-20441		Lab File ID:	L23797.D
Dilution:	1.0			Initial Weight/Volume:	30.4377 g
Date Analyzed:	07/13/2007 0750			Final Weight/Volume:	10 mL
Date Prepared:	07/11/2007 1401			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dalapon		ND		8.2
4-Nitrophenol		ND		3.3
Dicamba		ND		3.3
MCPP		ND		3.3
MCPA		ND		3.3
Dichlorprop		ND		3.3
2,4-D		ND		3.3
Pentachlorophenol		ND		3.3
Silvex (2,4,5-TP)		ND		3.3
2,4,5-T		ND		3.3
Dinoseb		ND		8.2
2,4-DB		ND		3.3

Surrogate	%Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	97	51 - 129

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-03

Lab Sample ID: 580-6454-3
Client Matrix: Solid

Date Sampled: 06/28/2007 1551
Date Received: 07/09/2007 1150

8151A Chlorinated Herbicides by GC-MS

Method:	8151A	Analysis Batch: 580-20656		Instrument ID:	SEA008
Preparation:	8151A	Prep Batch: 580-20441		Lab File ID:	L23798.D
Dilution:	1.0			Initial Weight/Volume:	30.5788 g
Date Analyzed:	07/13/2007 0812			Final Weight/Volume:	10 mL
Date Prepared:	07/11/2007 1401			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dalapon		ND		8.2
4-Nitrophenol		ND		3.3
Dicamba		ND		3.3
MCPP		ND		3.3
MCPA		ND		3.3
Dichlorprop		ND		3.3
2,4-D		ND		3.3
Pentachlorophenol		ND		3.3
Silvex (2,4,5-TP)		ND		3.3
2,4,5-T		ND		3.3
Dinoseb		ND		8.2
2,4-DB		ND		3.3

Surrogate	%Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	100	51 - 129

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-04

Lab Sample ID: 580-6454-4
Client Matrix: Solid

Date Sampled: 06/28/2007 1630
Date Received: 07/09/2007 1150

8151A Chlorinated Herbicides by GC-MS

Method:	8151A	Analysis Batch: 580-20656		Instrument ID:	SEA008
Preparation:	8151A	Prep Batch: 580-20441		Lab File ID:	L23799.D
Dilution:	1.0			Initial Weight/Volume:	30.6799 g
Date Analyzed:	07/13/2007 0835			Final Weight/Volume:	10 mL
Date Prepared:	07/11/2007 1401			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dalapon		ND		8.1
4-Nitrophenol		ND		3.3
Dicamba		ND		3.3
MCPP		ND		3.3
MCPA		ND		3.3
Dichlorprop		ND		3.3
2,4-D		ND		3.3
Pentachlorophenol		ND		3.3
Silvex (2,4,5-TP)		ND		3.3
2,4,5-T		ND		3.3
Dinoseb		ND		8.1
2,4-DB		ND		3.3

Surrogate	%Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	98	51 - 129

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-05

Lab Sample ID: 580-6454-5
Client Matrix: Solid

Date Sampled: 06/28/2007 1650
Date Received: 07/09/2007 1150

8151A Chlorinated Herbicides by GC-MS

Method:	8151A	Analysis Batch: 580-20656		Instrument ID:	SEA008
Preparation:	8151A	Prep Batch: 580-20441		Lab File ID:	L23800.D
Dilution:	1.0			Initial Weight/Volume:	31.0234 g
Date Analyzed:	07/13/2007 1106			Final Weight/Volume:	10 mL
Date Prepared:	07/11/2007 1401			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dalapon		ND		8.1
4-Nitrophenol		ND		3.2
Dicamba		ND		3.2
MCPP		ND		3.2
MCPA		ND		3.2
Dichlorprop		ND		3.2
2,4-D		ND		3.2
Pentachlorophenol		ND		3.2
Silvex (2,4,5-TP)		ND		3.2
2,4,5-T		ND		3.2
Dinoseb		ND		8.1
2,4-DB		ND		3.2

Surrogate	%Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	101	51 - 129

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-06

Lab Sample ID: 580-6454-6
Client Matrix: Solid

Date Sampled: 06/29/2007 1010
Date Received: 07/09/2007 1150

8151A Chlorinated Herbicides by GC-MS

Method:	8151A	Analysis Batch: 580-20656		Instrument ID:	SEA008
Preparation:	8151A	Prep Batch: 580-20441		Lab File ID:	L23801.D
Dilution:	1.0			Initial Weight/Volume:	30.4567 g
Date Analyzed:	07/13/2007 1129			Final Weight/Volume:	10 mL
Date Prepared:	07/11/2007 1401			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dalapon		ND		8.2
4-Nitrophenol		ND		3.3
Dicamba		ND		3.3
MCPP		ND		3.3
MCPA		ND		3.3
Dichlorprop		ND		3.3
2,4-D		ND		3.3
Pentachlorophenol		ND		3.3
Silvex (2,4,5-TP)		ND		3.3
2,4,5-T		ND		3.3
Dinoseb		ND		8.2
2,4-DB		ND		3.3

Surrogate	%Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	99	51 - 129

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-07

Lab Sample ID: 580-6454-7
Client Matrix: Solid

Date Sampled: 06/29/2007 1110
Date Received: 07/09/2007 1150

8151A Chlorinated Herbicides by GC-MS

Method: 8151A
Preparation: 8151A
Dilution: 1.0
Date Analyzed: 07/13/2007 1151
Date Prepared: 07/11/2007 1401

Analysis Batch: 580-20656
Prep Batch: 580-20441

Instrument ID: SEA008
Lab File ID: L23802.D
Initial Weight/Volume: 30.0123 g
Final Weight/Volume: 10 mL
Injection Volume:

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dalapon		ND		8.3
4-Nitrophenol		ND		3.3
Dicamba		ND		3.3
MCPP		ND		3.3
MCPA		ND		3.3
Dichlorprop		ND		3.3
2,4-D		ND		3.3
Pentachlorophenol		ND		3.3
Silvex (2,4,5-TP)		ND		3.3
2,4,5-T		ND		3.3
Dinoseb		ND		8.3
2,4-DB		ND		3.3

Surrogate	%Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	105	51 - 129

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-08

Lab Sample ID: 580-6454-8
Client Matrix: Solid

Date Sampled: 06/29/2007 1210
Date Received: 07/09/2007 1150

8151A Chlorinated Herbicides by GC-MS

Method: 8151A
Preparation: 8151A
Dilution: 1.0
Date Analyzed: 07/13/2007 1214
Date Prepared: 07/11/2007 1401

Analysis Batch: 580-20656
Prep Batch: 580-20441

Instrument ID: SEA008
Lab File ID: L23803.D
Initial Weight/Volume: 31.9987 g
Final Weight/Volume: 10 mL
Injection Volume:

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dalapon		ND		7.8
4-Nitrophenol		ND		3.1
Dicamba		ND		3.1
MCPP		ND		3.1
MCPA		ND		3.1
Dichlorprop		ND		3.1
2,4-D		ND		3.1
Pentachlorophenol		ND		3.1
Silvex (2,4,5-TP)		ND		3.1
2,4,5-T		ND		3.1
Dinoseb		ND		7.8
2,4-DB		ND		3.1

Surrogate	%Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	89	51 - 129

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-09

Lab Sample ID: 580-6454-9
Client Matrix: Solid

Date Sampled: 06/29/2007 1410
Date Received: 07/09/2007 1150

8151A Chlorinated Herbicides by GC-MS

Method:	8151A	Analysis Batch: 580-20656		Instrument ID:	SEA008
Preparation:	8151A	Prep Batch: 580-20441		Lab File ID:	L23804.D
Dilution:	1.0			Initial Weight/Volume:	30.0123 g
Date Analyzed:	07/13/2007 1236			Final Weight/Volume:	10 mL
Date Prepared:	07/11/2007 1401			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dalapon		ND		8.3
4-Nitrophenol		ND		3.3
Dicamba		ND		3.3
MCPP		ND		3.3
MCPA		ND		3.3
Dichlorprop		ND		3.3
2,4-D		ND		3.3
Pentachlorophenol		ND		3.3
Silvex (2,4,5-TP)		ND		3.3
2,4,5-T		ND		3.3
Dinoseb		ND		8.3
2,4-DB		ND		3.3

Surrogate	%Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	90	51 - 129

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-10

Lab Sample ID: 580-6454-10
Client Matrix: Solid

Date Sampled: 06/29/2007 1510
Date Received: 07/09/2007 1150

8151A Chlorinated Herbicides by GC-MS

Method:	8151A	Analysis Batch: 580-20656		Instrument ID:	SEA008
Preparation:	8151A	Prep Batch: 580-20441		Lab File ID:	L23805.D
Dilution:	1.0			Initial Weight/Volume:	31.3457 g
Date Analyzed:	07/13/2007 1259			Final Weight/Volume:	10 mL
Date Prepared:	07/11/2007 1401			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dalapon		ND		8.0
4-Nitrophenol		ND		3.2
Dicamba		ND		3.2
MCPP		ND		3.2
MCPA		ND		3.2
Dichlorprop		ND		3.2
2,4-D		ND		3.2
Pentachlorophenol		ND		3.2
Silvex (2,4,5-TP)		ND		3.2
2,4,5-T		ND		3.2
Dinoseb		ND		8.0
2,4-DB		ND		3.2

Surrogate	%Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	82	51 - 129

Analytical Data

Client: TestAmerica Analytical Testing Corp. Job Number: 580-6454-1

Client Sample ID: HQG0016-19

Lab Sample ID: 580-6454-11 Date Sampled: 06/29/2007 1907
Client Matrix: Solid Date Received: 07/09/2007 1150

8151A Chlorinated Herbicides by GC-MS

Method:	8151A	Analysis Batch: 580-20656		Instrument ID:	SEA008
Preparation:	8151A	Prep Batch: 580-20441		Lab File ID:	L23806.D
Dilution:	1.0			Initial Weight/Volume:	30.1255 g
Date Analyzed:	07/13/2007 1321			Final Weight/Volume:	10 mL
Date Prepared:	07/11/2007 1401			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dalapon		ND		8.3
4-Nitrophenol		ND		3.3
Dicamba		ND		3.3
MCPP		ND		3.3
MCPA		ND		3.3
Dichlorprop		ND		3.3
2,4-D		ND		3.3
Pentachlorophenol		ND		3.3
Silvex (2,4,5-TP)		ND		3.3
2,4,5-T		ND		3.3
Dinoseb		ND		8.3
2,4-DB		ND		3.3

Surrogate	%Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	85	51 - 129

Analytical Data

Client: TestAmerica Analytical Testing Corp. Job Number: 580-6454-1

Client Sample ID: HQG0016-20

Lab Sample ID: 580-6454-12 Date Sampled: 06/29/2007 1907
Client Matrix: Solid Date Received: 07/09/2007 1150

8151A Chlorinated Herbicides by GC-MS

Method:	8151A	Analysis Batch: 580-20656		Instrument ID:	SEA008
Preparation:	8151A	Prep Batch: 580-20441		Lab File ID:	L23807.D
Dilution:	1.0			Initial Weight/Volume:	30.1447 g
Date Analyzed:	07/13/2007 1344			Final Weight/Volume:	10 mL
Date Prepared:	07/11/2007 1401			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dalapon		ND		8.3
4-Nitrophenol		ND		3.3
Dicamba		ND		3.3
MCPP		ND		3.3
MCPA		ND		3.3
Dichlorprop		ND		3.3
2,4-D		ND		3.3
Pentachlorophenol		ND		3.3
Silvex (2,4,5-TP)		ND		3.3
2,4,5-T		ND		3.3
Dinoseb		ND		8.3
2,4-DB		ND		3.3

Surrogate	%Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	79	51 - 129

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-01

Lab Sample ID: 580-6454-1
Client Matrix: Solid

Date Sampled: 06/29/2007 1645
Date Received: 07/09/2007 1150

8081A Organochlorine Pesticides by Gas Chromatography

Method:	8081A	Analysis Batch: 580-20899		Instrument ID:	SEA035
Preparation:	3550B	Prep Batch: 580-20818		Lab File ID:	ECD28325.D
Dilution:	1.0			Initial Weight/Volume:	30.5684 g
Date Analyzed:	07/20/2007 1749			Final Weight/Volume:	20 mL
Date Prepared:	07/20/2007 0855			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Aldrin		ND	H	0.65
alpha-BHC		ND	H	0.65
beta-BHC		ND	H	0.65
delta-BHC		ND	H	0.65
gamma-BHC (Lindane)		ND	H	0.65
4,4'-DDD		ND	H	1.3
4,4'-DDE		ND	H	1.3
4,4'-DDT		ND	H	1.3
Dieldrin		ND	H	1.3
Endosulfan I		ND	H	0.65
Endosulfan II		ND	H	1.3
Endosulfan sulfate		ND	H	1.3
Endrin		ND	H	1.3
Endrin aldehyde		ND	H	1.3
Heptachlor		ND	H	0.65
Heptachlor epoxide		ND	H	0.65
Methoxychlor		ND	H	6.5
Endrin ketone		ND	H	1.3
Toxaphene		ND	H	65
alpha-Chlordane		ND	H	0.65
gamma-Chlordane		ND	H	0.65

Surrogate	%Rec	Acceptance Limits
Tetrachloro-m-xylene	103	49 - 123
DCB Decachlorobiphenyl	95	40 - 158

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-02

Lab Sample ID: 580-6454-2
Client Matrix: Solid

Date Sampled: 06/28/2007 1330
Date Received: 07/09/2007 1150

8081A Organochlorine Pesticides by Gas Chromatography

Method:	8081A	Analysis Batch: 580-20899		Instrument ID:	SEA035
Preparation:	3550B	Prep Batch: 580-20818		Lab File ID:	ECD28326.D
Dilution:	1.0			Initial Weight/Volume:	30.6645 g
Date Analyzed:	07/20/2007 1808			Final Weight/Volume:	20 mL
Date Prepared:	07/20/2007 0855			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Aldrin		ND	H	0.65
alpha-BHC		ND	H	0.65
beta-BHC		ND	H	0.65
delta-BHC		ND	H	0.65
gamma-BHC (Lindane)		ND	H	0.65
4,4'-DDD		ND	H	1.3
4,4'-DDE		ND	H	1.3
4,4'-DDT		ND	H	1.3
Dieldrin		ND	H	1.3
Endosulfan I		ND	H	0.65
Endosulfan II		ND	H	1.3
Endosulfan sulfate		ND	H	1.3
Endrin		ND	H	1.3
Endrin aldehyde		ND	H	1.3
Heptachlor		ND	H	0.65
Heptachlor epoxide		ND	H	0.65
Methoxychlor		ND	H	6.5
Endrin ketone		ND	H	1.3
Toxaphene		ND	H	65
alpha-Chlordane		ND	H	0.65
gamma-Chlordane		ND	H	0.65

Surrogate	%Rec	Acceptance Limits
Tetrachloro-m-xylene	101	49 - 123
DCB Decachlorobiphenyl	85	40 - 158

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-03

Lab Sample ID: 580-6454-3
Client Matrix: Solid

Date Sampled: 06/28/2007 1551
Date Received: 07/09/2007 1150

8081A Organochlorine Pesticides by Gas Chromatography

Method:	8081A	Analysis Batch: 580-20899		Instrument ID:	SEA035
Preparation:	3550B	Prep Batch: 580-20818		Lab File ID:	ECD26327.D
Dilution:	1.0			Initial Weight/Volume:	30.8802 g
Date Analyzed:	07/20/2007 1828			Final Weight/Volume:	20 mL
Date Prepared:	07/20/2007 0855			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Aldrin		ND	H	0.65
alpha-BHC		ND	H	0.65
beta-BHC		ND	H	0.65
delta-BHC		ND	H	0.65
gamma-BHC (Lindane)		ND	H	0.65
4,4'-DDD		ND	H	1.3
4,4'-DDE		ND	H	1.3
4,4'-DDT		ND	H	1.3
Dieldrin		ND	H	1.3
Endosulfan I		ND	H	0.65
Endosulfan II		ND	H	1.3
Endosulfan sulfate		ND	H	1.3
Endrin		ND	H	1.3
Endrin aldehyde		ND	H	1.3
Heptachlor		ND	H	0.65
Heptachlor epoxide		ND	H	0.65
Methoxychlor		ND	H	6.5
Endrin ketone		ND	H	1.3
Toxaphene		ND	H	65
alpha-Chlordane		ND	H	0.65
gamma-Chlordane		ND	H	0.65

Surrogate	%Rec		Acceptance Limits
Tetrachloro-m-xylene	105		49 - 123
DCB Decachlorobiphenyl	97		40 - 158

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-04

Lab Sample ID: 580-6454-4
Client Matrix: Solid

Date Sampled: 06/28/2007 1630
Date Received: 07/09/2007 1150

8081A Organochlorine Pesticides by Gas Chromatography

Method:	8081A	Analysis Batch: 580-20899		Instrument ID:	SEA035
Preparation:	3550B	Prep Batch: 580-20818		Lab File ID:	ECD26328.D
Dilution:	1.0			Initial Weight/Volume:	30.7934 g
Date Analyzed:	07/20/2007 1847			Final Weight/Volume:	20 mL
Date Prepared:	07/20/2007 0855			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Aldrin		ND	H	0.65
alpha-BHC		ND	H	0.65
beta-BHC		ND	H	0.65
delta-BHC		ND	H	0.65
gamma-BHC (Lindane)		ND	H	0.65
4,4'-DDD		ND	H	1.3
4,4'-DDE		ND	H	1.3
4,4'-DDT		ND	H	1.3
Dieldrin		ND	H	1.3
Endosulfan I		ND	H	0.65
Endosulfan II		ND	H	1.3
Endosulfan sulfate		ND	H	1.3
Endrin		ND	H	1.3
Endrin aldehyde		ND	H	1.3
Heptachlor		ND	H	0.65
Heptachlor epoxide		ND	H	0.65
Methoxychlor		ND	H	6.5
Endrin ketone		ND	H	1.3
Toxaphene		ND	H	65
alpha-Chlordane		ND	H	0.65
gamma-Chlordane		ND	H	0.65

Surrogate	%Rec		Acceptance Limits
Tetrachloro-m-xylene	126	X	49 - 123
DCB Decachlorobiphenyl	112		40 - 158

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-05

Lab Sample ID: 580-6454-5
Client Matrix: Solid

Date Sampled: 06/28/2007 1650
Date Received: 07/09/2007 1150

8081A Organochlorine Pesticides by Gas Chromatography

Method: 8081A
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 07/20/2007 1907
Date Prepared: 07/20/2007 0855

Analysis Batch: 580-20899
Prep Batch: 580-20818

Instrument ID: SEA035
Lab File ID: ECD28329.D
Initial Weight/Volume: 30.9321 g
Final Weight/Volume: 20 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Aldrin		ND	H	0.65
alpha-BHC		ND	H	0.65
beta-BHC		ND	H	0.65
delta-BHC		ND	H	0.65
gamma-BHC (Lindane)		ND	H	0.65
4,4'-DDD		ND	H	1.3
4,4'-DDE		ND	H	1.3
4,4'-DDT		ND	H	1.3
Dieldrin		ND	H	1.3
Endosulfan I		ND	H	0.65
Endosulfan II		ND	H	1.3
Endosulfan sulfate		ND	H	1.3
Endrin		ND	H	1.3
Endrin aldehyde		ND	H	1.3
Heptachlor		ND	H	0.65
Heptachlor epoxide		ND	H	0.65
Methoxychlor		ND	H	6.5
Endrin ketone		ND	H	1.3
Toxaphene		ND	H	65
alpha-Chlordane		ND	H	0.65
gamma-Chlordane		ND	H	0.65

Surrogate	%Rec	Acceptance Limits
Tetrachloro-m-xylene	57	49 - 123
DCB Decachlorobiphenyl	51	40 - 158

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-06

Lab Sample ID: 580-6454-6
Client Matrix: Solid

Date Sampled: 06/29/2007 1010
Date Received: 07/09/2007 1150

8081A Organochlorine Pesticides by Gas Chromatography

Method: 8081A
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 07/20/2007 1926
Date Prepared: 07/20/2007 0855

Analysis Batch: 580-20899
Prep Batch: 580-20818

Instrument ID: SEA035
Lab File ID: ECD28330.D
Initial Weight/Volume: 31.1468 g
Final Weight/Volume: 20 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Aldrin		ND	H	0.64
alpha-BHC		ND	H	0.64
beta-BHC		ND	H	0.64
delta-BHC		ND	H	0.64
gamma-BHC (Lindane)		ND	H	0.64
4,4'-DDD		ND	H	1.3
4,4'-DDE		ND	H	1.3
4,4'-DDT		ND	H	1.3
Dieldrin		ND	H	1.3
Endosulfan I		ND	H	0.64
Endosulfan II		ND	H	1.3
Endosulfan sulfate		ND	H	1.3
Endrin		ND	H	1.3
Endrin aldehyde		ND	H	1.3
Heptachlor		ND	H	0.64
Heptachlor epoxide		ND	H	0.64
Methoxychlor		ND	H	6.4
Endrin ketone		ND	H	1.3
Toxaphene		ND	H	64
alpha-Chlordane		ND	H	0.64
gamma-Chlordane		ND	H	0.64

Surrogate	%Rec	Acceptance Limits
Tetrachloro-m-xylene	67	49 - 123
DCB Decachlorobiphenyl	59	40 - 158

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-07

Lab Sample ID:	580-6454-7	Date Sampled:	06/29/2007 1110
Client Matrix:	Solid	Date Received:	07/09/2007 1150

8081A Organochlorine Pesticides by Gas Chromatography

Method:	8081A	Analysis Batch: 580-20899		Instrument ID:	SEA035
Preparation:	3550B	Prep Batch: 580-20818		Lab File ID:	ECD26331.D
Dilution:	1.0			Initial Weight/Volume:	29.8976 g
Date Analyzed:	07/20/2007 1946			Final Weight/Volume:	20 mL
Date Prepared:	07/20/2007 0855			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Aldrin		ND	H	0.67
alpha-BHC		ND	H	0.67
beta-BHC		ND	H	0.67
delta-BHC		ND	H	0.67
gamma-BHC (Lindane)		ND	H	0.67
4,4'-DDD		ND	H	1.3
4,4'-DDE		ND	H	1.3
4,4'-DDT		ND	H	1.3
Dieldrin		ND	H	1.3
Endosulfan I		ND	H	0.67
Endosulfan II		ND	H	1.3
Endosulfan sulfate		ND	H	1.3
Endrin		ND	H	1.3
Endrin aldehyde		ND	H	1.3
Heptachlor		ND	H	0.67
Heptachlor epoxide		ND	H	0.67
Methoxychlor		ND	H	6.7
Endrin ketone		ND	H	1.3
Toxaphene		ND	H	67
alpha-Chlordane		ND	H	0.67
gamma-Chlordane		ND	H	0.67

Surrogate	%Rec	Acceptance Limits
Tetrachloro-m-xylene	91	49 - 123
DCB Decachlorobiphenyl	83	40 - 158

Analytical Data

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-08

Lab Sample ID:	580-6454-8	Date Sampled:	06/29/2007 1210
Client Matrix:	Solid	Date Received:	07/09/2007 1150

8081A Organochlorine Pesticides by Gas Chromatography

Method:	8081A	Analysis Batch: 580-20899		Instrument ID:	SEA035
Preparation:	3550B	Prep Batch: 580-20818		Lab File ID:	ECD26334.D
Dilution:	1.0			Initial Weight/Volume:	30.6358 g
Date Analyzed:	07/20/2007 2045			Final Weight/Volume:	20 mL
Date Prepared:	07/20/2007 0855			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Aldrin		ND	H	0.65
alpha-BHC		ND	H	0.65
beta-BHC		ND	H	0.65
delta-BHC		ND	H	0.65
gamma-BHC (Lindane)		ND	H	0.65
4,4'-DDD		ND	H	1.3
4,4'-DDE		ND	H	1.3
4,4'-DDT		ND	H	1.3
Dieldrin		ND	H	1.3
Endosulfan I		ND	H	0.65
Endosulfan II		ND	H	1.3
Endosulfan sulfate		ND	H	1.3
Endrin		ND	H	1.3
Endrin aldehyde		ND	H	1.3
Heptachlor		ND	H	0.65
Heptachlor epoxide		ND	H	0.65
Methoxychlor		ND	H	6.5
Endrin ketone		ND	H	1.3
Toxaphene		ND	H	65
alpha-Chlordane		ND	H	0.65
gamma-Chlordane		ND	H	0.65

Surrogate	%Rec	Acceptance Limits
Tetrachloro-m-xylene	85	49 - 123
DCB Decachlorobiphenyl	74	40 - 158

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-09

Lab Sample ID: 580-6454-9
Client Matrix: Solid

Date Sampled: 06/29/2007 1410
Date Received: 07/09/2007 1150

8081A Organochlorine Pesticides by Gas Chromatography

Method: 8081A
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 07/20/2007 2104
Date Prepared: 07/20/2007 0855

Analysis Batch: 580-20899
Prep Batch: 580-20818

Instrument ID: SEA035
Lab File ID: ECD26335.D
Initial Weight/Volume: 30.9676 g
Final Weight/Volume: 20 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Aldrin		ND	H	0.65
alpha-BHC		ND	H	0.65
beta-BHC		ND	H	0.65
delta-BHC		ND	H	0.65
gamma-BHC (Lindane)		ND	H	0.65
4,4'-DDD		ND	H	1.3
4,4'-DDE		ND	H	1.3
4,4'-DDT		ND	H	1.3
Dieldrin		ND	H	1.3
Endosulfan I		ND	H	0.65
Endosulfan II		ND	H	1.3
Endosulfan sulfate		ND	H	1.3
Endrin		ND	H	1.3
Endrin aldehyde		ND	H	1.3
Heptachlor		ND	H	0.65
Heptachlor epoxide		ND	H	0.65
Methoxychlor		ND	H	6.5
Endrin ketone		ND	H	1.3
Toxaphene		ND	H	65
alpha-Chlordane		ND	H	0.65
gamma-Chlordane		ND	H	0.65

Surrogate	%Rec	Acceptance Limits
Tetrachloro-m-xylene	97	49 - 123
DCB Decachlorobiphenyl	89	40 - 158

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Client Sample ID: HQG0016-10

Lab Sample ID: 580-6454-10
Client Matrix: Solid

Date Sampled: 06/29/2007 1510
Date Received: 07/09/2007 1150

8081A Organochlorine Pesticides by Gas Chromatography

Method: 8081A
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 07/20/2007 2124
Date Prepared: 07/20/2007 0855

Analysis Batch: 580-20899
Prep Batch: 580-20818

Instrument ID: SEA035
Lab File ID: ECD26338.D
Initial Weight/Volume: 30.1861 g
Final Weight/Volume: 20 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Aldrin		ND	H	0.66
alpha-BHC		ND	H	0.66
beta-BHC		ND	H	0.66
delta-BHC		ND	H	0.66
gamma-BHC (Lindane)		ND	H	0.66
4,4'-DDD		ND	H	1.3
4,4'-DDE		ND	H	1.3
4,4'-DDT		ND	H	1.3
Dieldrin		ND	H	1.3
Endosulfan I		ND	H	0.66
Endosulfan II		ND	H	1.3
Endosulfan sulfate		ND	H	1.3
Endrin		ND	H	1.3
Endrin aldehyde		ND	H	1.3
Heptachlor		ND	H	0.66
Heptachlor epoxide		ND	H	0.66
Methoxychlor		ND	H	6.6
Endrin ketone		ND	H	1.3
Toxaphene		ND	H	66
alpha-Chlordane		ND	H	0.66
gamma-Chlordane		ND	H	0.66

Surrogate	%Rec	Acceptance Limits
Tetrachloro-m-xylene	95	49 - 123
DCB Decachlorobiphenyl	94	40 - 158

Analytical Data

Client: TestAmerica Analytical Testing Corp. Job Number: 580-6454-1

Client Sample ID: HQG0016-19

Lab Sample ID: 580-6454-11 Date Sampled: 06/29/2007 1907
Client Matrix: Solid Date Received: 07/09/2007 1150

8081A Organochlorine Pesticides by Gas Chromatography

Method:	8081A	Analysis Batch: 580-20899		Instrument ID:	SEA035
Preparation:	3550B	Prep Batch: 580-20818		Lab File ID:	ECD26339.D
Dilution:	1.0			Initial Weight/Volume:	30.4557 g
Date Analyzed:	07/20/2007 2223			Final Weight/Volume:	20 mL
Date Prepared:	07/20/2007 0855			Injection Volume:	
				Column ID:	PRIMARY

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Aldrin		ND	H	0.66
alpha-BHC		ND	H	0.66
beta-BHC		ND	H	0.66
delta-BHC		ND	H	0.66
gamma-BHC (Lindane)		ND	H	0.66
4,4'-DDD		ND	H	1.3
4,4'-DDE		ND	H	1.3
4,4'-DDT		ND	H	1.3
Dieldrin		ND	H	1.3
Endosulfan I		ND	H	0.66
Endosulfan II		ND	H	1.3
Endosulfan sulfate		ND	H	1.3
Endrin		ND	H	1.3
Endrin aldehyde		ND	H	1.3
Heptachlor		ND	H	0.66
Heptachlor epoxide		ND	H	0.66
Methoxychlor		ND	H	6.6
Endrin ketone		ND	H	1.3
Toxaphene		ND	H	66
alpha-Chlordane		ND	H	0.66
gamma-Chlordane		ND	H	0.66

Surrogate	%Rec	Acceptance Limits
Tetrachloro-m-xylene	97	49 - 123
DCB Decachlorobiphenyl	79	40 - 158

Analytical Data

Client: TestAmerica Analytical Testing Corp. Job Number: 580-6454-1

Client Sample ID: HQG0016-20

Lab Sample ID: 580-6454-12 Date Sampled: 06/29/2007 1907
Client Matrix: Solid Date Received: 07/09/2007 1150

8081A Organochlorine Pesticides by Gas Chromatography

Method:	8081A	Analysis Batch: 580-20899	Instrument ID:	SEA035
Preparation:	3550B	Prep Batch: 580-20818	Lab File ID:	ECD26340.D
Dilution:	1.0		Initial Weight/Volume:	31.3384 g
Date Analyzed:	07/20/2007 2242		Final Weight/Volume:	20 mL
Date Prepared:	07/20/2007 0855		Injection Volume:	
			Column ID:	PRIMARY

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Aldrin		ND	H	0.64
alpha-BHC		ND	H	0.64
beta-BHC		ND	H	0.64
delta-BHC		ND	H	0.64
gamma-BHC (Lindane)		ND	H	0.64
4,4'-DDD		ND	H	1.3
4,4'-DDE		ND	H	1.3
4,4'-DDT		ND	H	1.3
Dieldrin		ND	H	1.3
Endosulfan I		ND	H	0.64
Endosulfan II		ND	H	1.3
Endosulfan sulfate		ND	H	1.3
Endrin		ND	H	1.3
Endrin aldehyde		ND	H	1.3
Heptachlor		ND	H	0.64
Heptachlor epoxide		ND	H	0.64
Methoxychlor		ND	H	6.4
Endrin ketone		ND	H	1.3
Toxaphene		ND	H	64
alpha-Chlordane		ND	H	0.64
gamma-Chlordane		ND	H	0.64

Surrogate	%Rec	Acceptance Limits
Tetrachloro-m-xylene	88	49 - 123
DCB Decachlorobiphenyl	67	40 - 158

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Method Blank - Batch: 580-20441

Method: 8151A
Preparation: 8151A

Lab Sample ID: MB 580-20441/1-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 07/13/2007 0534
Date Prepared: 07/11/2007 1401

Analysis Batch: 580-20656
Prep Batch: 580-20441
Units: ug/Kg

Instrument ID: SEA008
Lab File ID: L23791.D
Initial Weight/Volume: 30.0000 g
Final Weight/Volume: 10 mL
Injection Volume:

Analyte	Result	Qual	RL
Dalapon	ND		8.3
4-Nitrophenol	ND		3.3
Dicamba	ND		3.3
MCPP	ND		3.3
MCPA	ND		3.3
Dichlorprop	ND		3.3
2,4-D	ND		3.3
Pentachlorophenol	ND		3.3
Silvex (2,4,5-TP)	ND		3.3
2,4,5-T	ND		3.3
Dinoseb	ND		8.3
2,4-DB	ND		3.3

Surrogate	% Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	100	51 - 129

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 580-20441

Method: 8151A
Preparation: 8151A

LCS Lab Sample ID: LCS 580-20441/2-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 07/13/2007 0557
Date Prepared: 07/11/2007 1401

Analysis Batch: 580-20656
Prep Batch: 580-20441
Units: ug/Kg

Instrument ID: SEA008
Lab File ID: L23792.D
Initial Weight/Volume: 30.0000 g
Final Weight/Volume: 10 mL
Injection Volume:

LCSD Lab Sample ID: LCSD 580-20441/3-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 07/13/2007 0620
Date Prepared: 07/11/2007 1401

Analysis Batch: 580-20656
Prep Batch: 580-20441
Units: ug/Kg

Instrument ID: SEA008
Lab File ID: L23793.D
Initial Weight/Volume: 30.0000 g
Final Weight/Volume: 10 mL
Injection Volume:

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Dalapon	57	59	16 - 74	4	30		
4-Nitrophenol	68	73	50 - 150	7	30		
Dicamba	94	90	48 - 123	4	30		
MCPP	105	111	53 - 154	5	30		
MCPA	107	106	50 - 150	1	30		
Dichlorprop	114	121	75 - 140	6	30		
2,4-D	86	92	46 - 136	6	30		
Pentachlorophenol	107	100	50 - 150	6	30		
Silvex (2,4,5-TP)	99	99	52 - 137	0	30		
2,4,5-T	99	104	45 - 135	4	30		
Dinoseb	68	80	18 - 157	15	30		
2,4-DB	107	113	50 - 155	5	30		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	104	99	51 - 129

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: TestAmerica Analytical Testing Corp. Job Number: 580-6454-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 580-20441

Method: 8151A
Preparation: 8151A

MS Lab Sample ID: 580-6454-12	Analysis Batch: 580-20656	Instrument ID: SEA008	
Client Matrix: Solid	Prep Batch: 580-20441	Lab File ID: L23794.D	
Dilution: 1.0		Initial Weight/Volume: 15.0126 g	
Date Analyzed: 07/13/2007 0642		Final Weight/Volume: 10 mL	
Date Prepared: 07/11/2007 1401		Injection Volume:	

MSD Lab Sample ID: 580-6454-12	Analysis Batch: 580-20656	Instrument ID: SEA008
Client Matrix: Solid	Prep Batch: 580-20441	Lab File ID: L23795.D
Dilution: 1.0		Initial Weight/Volume: 15.1266 g
Date Analyzed: 07/13/2007 0704		Final Weight/Volume: 10 mL
Date Prepared: 07/11/2007 1401		Injection Volume:

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Dalapon	23	23	16 - 74	1	30		
4-Nitrophenol	55	57	50 - 150	2	30		
Dicamba	65	71	48 - 123	8	30		
MCPP	78	86	53 - 154	9	30		
MCPA	69	75	50 - 150	7	30		
Dichlorprop	76	81	75 - 140	6	30		
2,4-D	55	62	46 - 138	11	30		
Pentachlorophenol	120	137	50 - 150	12	30		
Silvex (2,4,5-TP)	80	90	52 - 137	11	30		
2,4,5-T	66	73	45 - 135	9	30		
Dinoseb	104	105	18 - 157	0	30		
2,4-DB	122	130	50 - 155	6	30		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
2,4-Dichlorophenylacetic acid	80	80	51 - 129

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: TestAmerica Analytical Testing Corp. Job Number: 580-6454-1

Method Blank - Batch: 580-20818

Method: 8081A
Preparation: 3550B

Lab Sample ID: MB 580-20818/1-A	Analysis Batch: 580-20899	Instrument ID: SEA035
Client Matrix: Solid	Prep Batch: 580-20818	Lab File ID: ECD26322.D
Dilution: 1.0	Units: ug/Kg	Initial Weight/Volume: 30 g
Date Analyzed: 07/20/2007 1650		Final Weight/Volume: 20 mL
Date Prepared: 07/20/2007 0855		Injection Volume:
		Column ID: PRIMARY

Analyte	Result	Qual	RL
Aldrin	ND		0.67
alpha-BHC	ND		0.67
beta-BHC	ND		0.67
delta-BHC	ND		0.67
gamma-BHC (Lindane)	ND		0.67
4,4'-DDD	ND		1.3
4,4'-DDE	ND		1.3
4,4'-DDT	ND		1.3
Dieldrin	ND		1.3
Endosulfan I	ND		0.67
Endosulfan II	ND		1.3
Endosulfan sulfate	ND		1.3
Endrin	ND		1.3
Endrin aldehyde	ND		1.3
Heptachlor	ND		0.67
Heptachlor epoxide	ND		0.67
Methoxychlor	ND		6.7
Endrin ketone	ND		1.3
Toxaphene	ND		67
alpha-Chlordane	ND		0.67
gamma-Chlordane	ND		0.67

Surrogate	% Rec	Acceptance Limits
Tetrachloro-m-xylene	111	49 - 123
DCB Decachlorobiphenyl	111	40 - 158

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: TestAmerica Analytical Testing Corp. Job Number: 580-6454-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 580-20818

Method: 8081A
Preparation: 3550B

LCS Lab Sample ID:	LCS 580-20818/2-A	Analysis Batch:	580-20899	Instrument ID:	SEA035
Client Matrix:	Solid	Prep Batch:	580-20818	Lab File ID:	ECD26323.D
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	30 g
Date Analyzed:	07/20/2007 1709			Final Weight/Volume:	20 mL
Date Prepared:	07/20/2007 0855			Injection Volume:	
				Column ID:	PRIMARY

LCSD Lab Sample ID:	LCSD 580-20818/3-A	Analysis Batch:	580-20899	Instrument ID:	SEA035
Client Matrix:	Solid	Prep Batch:	580-20818	Lab File ID:	ECD26324.D
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	30 g
Date Analyzed:	07/20/2007 1729			Final Weight/Volume:	20 mL
Date Prepared:	07/20/2007 0855			Injection Volume:	
				Column ID:	PRIMARY

Analyte	% Rec. LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aldrin	108	108	53 - 126	1	24		
alpha-BHC	99	101	41 - 128	1	28		
beta-BHC	99	98	48 - 121	1	32		
delta-BHC	43	43	22 - 153	1	36		
gamma-BHC (Lindane)	98	99	50 - 127	1	29		
4,4'-DDD	104	97	44 - 141	6	41		
4,4'-DDE	104	100	47 - 140	4	40		
4,4'-DDT	96	90	34 - 159	6	47		
Dieldrin	101	98	53 - 134	3	32		
Endosulfan I	105	103	52 - 122	2	31		
Endosulfan II	105	100	53 - 132	5	36		
Endosulfan sulfate	85	81	42 - 128	6	43		
Endrin	100	96	46 - 138	4	36		
Endrin aldehyde	96	92	12 - 179	4	47		
Heptachlor	102	105	50 - 130	2	31		
Heptachlor epoxide	105	104	49 - 123	2	31		
Methoxychlor	100	94	46 - 154	7	46		
Endrin ketone	99	93	45 - 127	7	45		
alpha-Chlordane	101	98	46 - 118	3	33		
gamma-Chlordane	103	100	49 - 122	3	32		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Tetrachloro-m-xylene	106	108	49 - 123
DCB Decachlorobiphenyl	96	89	40 - 158

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: TestAmerica Analytical Testing Corp. Job Number: 580-6454-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 580-20818

Method: 8081A
Preparation: 3550B

MS Lab Sample ID:	580-6454-10	Analysis Batch:	580-20899	Instrument ID:	SEA035
Client Matrix:	Solid	Prep Batch:	580-20818	Lab File ID:	ECD26337.D
Dilution:	1.0			Initial Weight/Volume:	30.2004 g
Date Analyzed:	07/20/2007 2143			Final Weight/Volume:	20 mL
Date Prepared:	07/20/2007 0855			Injection Volume:	
				Column ID:	PRIMARY

MSD Lab Sample ID:	580-6454-10	Analysis Batch:	580-20899	Instrument ID:	SEA035
Client Matrix:	Solid	Prep Batch:	580-20818	Lab File ID:	ECD26338.D
Dilution:	1.0			Initial Weight/Volume:	30.2453 g
Date Analyzed:	07/20/2007 2203			Final Weight/Volume:	20 mL
Date Prepared:	07/20/2007 0855			Injection Volume:	
				Column ID:	PRIMARY

Analyte	% Rec. MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Aldrin	107	100	53 - 126	7	24		
alpha-BHC	82	74	41 - 128	10	28		
beta-BHC	62	54	48 - 121	14	32		
delta-BHC	12	10	22 - 153	22	36	F	F
gamma-BHC (Lindane)	75	70	50 - 127	8	29		
4,4'-DDD	87	72	44 - 141	18	41		
4,4'-DDE	107	98	47 - 140	9	40		
4,4'-DDT	81	69	34 - 159	16	47		
Dieldrin	72	63	53 - 134	14	32		
Endosulfan I	88	75	52 - 122	16	31		
Endosulfan II	14	12	53 - 132	17	36	F	F
Endosulfan sulfate	5	4	42 - 128	14	43	F	F
Endrin	75	61	46 - 138	20	36		
Endrin aldehyde	4	6	12 - 179	22	47	F	F
Heptachlor	96	90	50 - 130	6	31		
Heptachlor epoxide	85	76	49 - 123	11	31		
Methoxychlor	42	34	46 - 154	21	46	F	F
Endrin ketone	16	14	45 - 127	10	45	F	F
alpha-Chlordane	89	80	46 - 118	10	33		
gamma-Chlordane	84	76	49 - 122	10	32		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
Tetrachloro-m-xylene	93	87	49 - 123
DCB Decachlorobiphenyl	98	88	40 - 158

Calculations are performed before rounding to avoid round-off errors in calculated results.

DATA REPORTING QUALIFIERS

Client: TestAmerica Analytical Testing Corp.

Job Number: 580-6454-1

Lab Section	Qualifier	Description
GC Semi VOA		
	F	MS or MSD exceeds the control limits
	H	Sample was prepped or analyzed beyond the specified holding time
	X	Surrogate exceeds the control limits

SUBCONTRACT ORDER

TestAmerica - Honolulu, HI

HQG0016

STD TAT
7 days

6454

SENDING LABORATORY:
TestAmerica - Honolulu, HI
99-193 Aiea Heights Drive, Suite 121
Aiea, HI 96701
Phone: 808-486-5227
Fax: 808-486-2456
Project Manager: Yvonne K. Parry
Client: Element Environmental LLC

RECEIVING LABORATORY:
STL - Seattle, WA
5755 8th Street East
Tacoma,, WA 98424
Phone :(253) 922-2310
Fax: 253
Project Location: Hawaii
Receipt Temperature: 20.5 °C   Ice: Y / N

Analysis	Due	Expires	Interlab	Surch	Comments
Sample ID: HQG0016-01	**Solid/Soil**	Sampled: 06/29/07 16:45			
8081A Pesticides	07/13/07 12:00	07/13/07 16:45	$135.00	0%	
8151 Herbicides	07/13/07 12:00	07/06/07 16:45	$195.00	0%	
Containers Supplied:					
Sample ID: HQG0016-02	**Solid/Soil**	Sampled: 06/28/07 13:30			
8081A Pesticides	07/13/07 12:00	07/12/07 13:30	$135.00	0%	
8151 Herbicides	07/13/07 12:00	07/05/07 13:30	$195.00	0%	
Containers Supplied:					
Sample ID: HQG0016-03	**Solid/Soil**	Sampled: 06/28/07 15:51			
8081A Pesticides	07/13/07 12:00	07/12/07 15:51	$135.00	0%	
8151 Herbicides	07/13/07 12:00	07/05/07 15:51	$195.00	0%	
Containers Supplied:					
Sample ID: HQG0016-04	**Solid/Soil**	Sampled: 06/28/07 16:30			
8081A Pesticides	07/13/07 12:00	07/12/07 16:30	$135.00	0%	
8151 Herbicides	07/13/07 12:00	07/05/07 16:30	$195.00	0%	
Containers Supplied:					
Sample ID: HQG0016-05	**Solid/Soil**	Sampled: 06/28/07 16:50			
8081A Pesticides	07/13/07 12:00	07/12/07 16:50	$135.00	0%	
8151 Herbicides	07/13/07 12:00	07/05/07 16:50	$195.00	0%	
Containers Supplied:					

Samples 1-10 are multiincremental, please extract entire jar provided (~30g)

Released By	Date/Time	Received By	Date/Time
Yvonne Kotis PCP	7/5/07 13:45	K[signature]	7/9/07 1150A
Released By	Date/Time	Received By	Date/Time

SUBCONTRACT ORDER

TestAmerica - Honolulu, HI

HQG0016

Analysis	Due	Expires	Interlab	Surch	Comments
Sample ID: HQG0016-06	Solid/Soil	Sampled: 06/29/07 10:10			
8081A Pesticides	07/13/07 12:00	07/13/07 10:10	$135.00	0%	
8151 Herbicides	07/13/07 12:00	07/06/07 10:10	$195.00	0%	
Containers Supplied:					
Sample ID: HQG0016-07	Solid/Soil	Sampled: 06/29/07 11:10			
8081A Pesticides	07/13/07 12:00	07/13/07 11:10	$135.00	0%	
8151 Herbicides	07/13/07 12:00	07/06/07 11:10	$195.00	0%	
Containers Supplied:					
Sample ID: HQG0016-08	Solid/Soil	Sampled: 06/29/07 12:10			
8081A Pesticides	07/13/07 12:00	07/13/07 12:10	$135.00	0%	
8151 Herbicides	07/13/07 12:00	07/06/07 12:10	$195.00	0%	
Containers Supplied:					
Sample ID: HQG0016-09	Solid/Soil	Sampled: 06/29/07 14:10			
8081A Pesticides	07/13/07 12:00	07/13/07 14:10	$135.00	0%	
8151 Herbicides	07/13/07 12:00	07/06/07 14:10	$195.00	0%	
Containers Supplied:					
Sample ID: HQG0016-10	Solid/Soil	Sampled: 06/29/07 15:10			
8081A Pesticides	07/13/07 12:00	07/13/07 15:10	$135.00	0%	
8151 Herbicides	07/13/07 12:00	07/06/07 15:10	$195.00	0%	
Containers Supplied:					
Sample ID: HQG0016-19	Solid/Soil	Sampled: 06/29/07 19:07			
8081A Pesticides	07/13/07 12:00	07/13/07 19:07	$135.00	0%	
8151 Herbicides	07/13/07 12:00	07/06/07 19:07	$195.00	0%	
Containers Supplied:					
Sample ID: HQG0016-20	Solid/Soil	Sampled: 06/29/07 19:07			
8081A Pesticides	07/13/07 12:00	07/13/07 19:07	$135.00	0%	
8151 Herbicides	07/13/07 12:00	07/06/07 19:07	$195.00	0%	
Containers Supplied:					

LOGIN SAMPLE RECEIPT CHECK LIST

Client: TestAmerica Analytical Testing Corp. Job Number: 580-6454-1

Login Number: 6454

Question	T/F/NA	Comment
Radioactivity either was not measured or, if measured, is at or below background		
The cooler's custody seal, if present, is intact.		
The cooler or samples do not appear to have been compromised or tampered with.		
Samples were received on ice.		
Cooler Temperature is acceptable.		
Cooler Temperature is recorded.		
COC is present.		
COC is filled out in ink and legible.		
COC is filled out with all pertinent information.		
There are no discrepancies between the sample IDs on the containers and the COC.		
Samples are received within Holding Time.		
Sample containers have legible labels.		
Containers are not broken or leaking.		
Sample collection date/times are provided.		
Appropriate sample containers are used.		
Sample bottles are completely filled.		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs		
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.		
If necessary, staff have been informed of any short hold time or quick TAT needs		
Multiphasic samples are not present.		
Samples do not require splitting or compositing.		

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: TEST AMERICA - HONOLULU, HI
Address: 99-193 AIEA HEIGHTS DRIVE
AIEA, HI 96701-3900
Attn: YVONNE PARRY

Batch #: 070712032
Project Name: HQG0016

Analytical Results Report

Sample Number 070712032-001 **Sampling Date** 6/28/2007 **Date/Time Received** 7/12/2007 11:00 AM
Client Sample ID HQG0016-01 **Sampling Time** 4:45 PM **Extraction Date** 7/12/2007
Matrix: Soil

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Ametryne	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Atrazine	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Diazinon	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Fenamiphos	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Hexazinone	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Metribuzin	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Diuron	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
Oxamyl	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
%moisture	5.2	Percent		7/16/2007	CH	%moisture	

Surrogate Data

Sample Number 070712032-001

Surrogate Standard	Method	Percent Recovery	Control Limits
Terphenyl-d14	EPA 8270C	99.4	30-140

Comments:

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Client: TEST AMERICA - HONOLULU, HI
Address: 99-193 AIEA HEIGHTS DRIVE
AIEA, HI 96701-3900
Attn: YVONNE PARRY

Batch #: 070712032
Project Name: HQG0016

Analytical Results Report

Sample Number 070712032-002 **Sampling Date** 6/28/2007 **Date/Time Received** 7/12/2007 11:00 AM
Client Sample ID HQG0016-02 **Sampling Time** 1:30 PM **Extraction Date** 7/12/2007
Matrix: Soil

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Ametryne	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Atrazine	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Diazinon	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Fenamiphos	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Hexazinone	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Metribuzin	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Diuron	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
Oxamyl	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
%moisture	5.6	Percent		7/16/2007	CH	%moisture	

Surrogate Data

Sample Number 070712032-002

Surrogate Standard	Method	Percent Recovery	Control Limits
Terphenyl-d14	EPA 8270C	128.4	30-140

Comments:

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Client:	TEST AMERICA - HONOLULU, HI	**Batch #:**	070712032
Address:	99-193 AIEA HEIGHTS DRIVE	**Project Name:**	HQG0016
	AIEA, HI 96701-3900		
Attn:	YVONNE PARRY		

Analytical Results Report

Sample Number	070712032-003	**Sampling Date**	6/28/2007	**Date/Time Received**	7/12/2007	11:00 AM
Client Sample ID	HQG0016-03	**Sampling Time**	3:51 PM	**Extraction Date**	7/12/2007	
Matrix:	Soil					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Ametryne	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Atrazine	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Diazinon	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Fenamiphos	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Hexazinone	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Metribuzin	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Diuron	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
Oxamyl	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
%moisture	6.1	Percent		7/18/2007	CH	%moisture	

Surrogate Data

Sample Number 070712032-003			
Surrogate Standard	**Method**	**Percent Recovery**	**Control Limits**
Terphenyl-d14	EPA 8270C	137.2	30-140

Comments:

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Client:	TEST AMERICA - HONOLULU, HI	**Batch #:**	070712032
Address:	99-193 AIEA HEIGHTS DRIVE	**Project Name:**	HQG0016
	AIEA, HI 96701-3900		
Attn:	YVONNE PARRY		

Analytical Results Report

Sample Number	070712032-004	**Sampling Date**	6/28/2007	**Date/Time Received**	7/12/2007	11:00 AM
Client Sample ID	HQG0016-04	**Sampling Time**	4:30 PM	**Extraction Date**	7/12/2007	
Matrix:	Soil					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Ametryne	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Atrazine	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Diazinon	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Fenamiphos	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Hexazinone	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Metribuzin	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Diuron	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
Oxamyl	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
%moisture	5.9	Percent		7/18/2007	CH	%moisture	

Surrogate Data

Sample Number 070712032-004			
Surrogate Standard	**Method**	**Percent Recovery**	**Control Limits**
Terphenyl-d14	EPA 8270C	120.6	30-140

Comments:

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Client:	TEST AMERICA - HONOLULU, HI	**Batch #:**	070712032
Address:	99-193 AIEA HEIGHTS DRIVE	**Project Name:**	HQG0016
	AIEA, HI 96701-3900		
Attn:	YVONNE PARRY		

Analytical Results Report

Sample Number	070712032-005	**Sampling Date**	6/28/2007	**Date/Time Received**	7/12/2007	11:00 AM
Client Sample ID	HQG0016-05	**Sampling Time**	4:50 PM	**Extraction Date**	7/12/2007	
Matrix:	Soil					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Ametryne	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Atrazine	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Diazinon	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Fenamiphos	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Hexazinone	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Metribuzin	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Diuron	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
Oxamyl	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
%moisture	5.9	Percent		7/16/2007	CH	%moisture	

Surrogate Data

Sample Number 070712032-005

Surrogate Standard	Method	Percent Recovery	Control Limits
Terphenyl-d14	EPA 8270C	125.8	30-140

Comments:

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Client:	TEST AMERICA - HONOLULU, HI	**Batch #:**	070712032
Address:	99-193 AIEA HEIGHTS DRIVE	**Project Name:**	HQG0016
	AIEA, HI 96701-3900		
Attn:	YVONNE PARRY		

Analytical Results Report

Sample Number	070712032-006	**Sampling Date**	6/29/2007	**Date/Time Received**	7/12/2007	11:00 AM
Client Sample ID	HQG0016-06	**Sampling Time**	10:10 AM	**Extraction Date**	7/12/2007	
Matrix:	Soil					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Ametryne	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Atrazine	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Diazinon	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Fenamiphos	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Hexazinone	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Metribuzin	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Diuron	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
Oxamyl	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
%moisture	5.9	Percent		7/16/2007	CH	%moisture	

Surrogate Data

Sample Number 070712032-006

Surrogate Standard	Method	Percent Recovery	Control Limits
Terphenyl-d14	EPA 8270C	105.0	30-140

Comments:

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Client: TEST AMERICA - HONOLULU, HI
Address: 99-193 AIEA HEIGHTS DRIVE
AIEA, HI 96701-3900
Attn: YVONNE PARRY

Batch #: 070712032
Project Name: HQG0016

Analytical Results Report

Sample Number 070712032-007 | **Sampling Date** 6/29/2007 | **Date/Time Received** 7/12/2007 11:00 AM
Client Sample ID HQG0016-07 | **Sampling Time** 11:10 AM | **Extraction Date** 7/12/2007
Matrix: Soil

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Ametryne	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Atrazine	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Diazinon	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Fenamiphos	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Hexazinone	ND	mg/kg	0.05	7/28/2007	EMP	EPA 8270C	
Metribuzin	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Diuron	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
Oxamyl	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
%moisture	5.6	Percent		7/16/2007	CH	%moisture	

Surrogate Data

Sample Number 070712032-007

Surrogate Standard	Method	Percent Recovery	Control Limits
Terphenyl-d14	EPA 8270C	117.8	30-140

Comments:

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Client: TEST AMERICA - HONOLULU, HI
Address: 99-193 AIEA HEIGHTS DRIVE
AIEA, HI 96701-3900
Attn: YVONNE PARRY

Batch #: 070712032
Project Name: HQG0016

Analytical Results Report

Sample Number 070712032-008 | **Sampling Date** 6/29/2007 | **Date/Time Received** 7/12/2007 11:00 AM
Client Sample ID HQG0016-08 | **Sampling Time** 12:10 PM | **Extraction Date** 7/12/2007
Matrix: Soil

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Ametryne	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Atrazine	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Diazinon	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Fenamiphos	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Hexazinone	ND	mg/kg	0.05	7/28/2007	EMP	EPA 8270C	
Metribuzin	ND	mg/kg	0.05	7/28/2007	EMP	EPA 8270C	
Diuron	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
Oxamyl	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
%moisture	4.8	Percent		7/16/2007	CH	%moisture	

Surrogate Data

Sample Number 070712032-008

Surrogate Standard	Method	Percent Recovery	Control Limits
Terphenyl-d14	EPA 8270C	128.4	30-140

Comments:

Anatek Labs, Inc.

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Client:	TEST AMERICA - HONOLULU, HI	Batch #:	070712032
Address:	99-193 AIEA HEIGHTS DRIVE AIEA, HI 96701-3900	Project Name:	HQG0016
Attn:	YVONNE PARRY		

Analytical Results Report

Sample Number	070712032-009	Sampling Date	6/29/2007	Date/Time Received	7/12/2007 11:00 AM
Client Sample ID	HQG0016-09	Sampling Time	2:10 PM	Extraction Date	7/12/2007
Matrix:	Soil				

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Ametryne	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Atrazine	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Diazinon	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Fenamiphos	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Hexazinone	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Metribuzin	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Diuron	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
Oxamyl	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
%moisture	6	Percent		7/16/2007	CH	%moisture	

Surrogate Data

Sample Number 070712032-009

Surrogate Standard	Method	Percent Recovery	Control Limits
Terphenyl-d14	EPA 8270C	125.0	30-140

Comments:

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	TEST AMERICA - HONOLULU, HI	Batch #:	070712032
Address:	99-193 AIEA HEIGHTS DRIVE AIEA, HI 96701-3900	Project Name:	HQG0016
Attn:	YVONNE PARRY		

Analytical Results Report

Sample Number	070712032-010	Sampling Date	6/29/2007	Date/Time Received	7/12/2007 11:00 AM
Client Sample ID	HQG0016-10	Sampling Time	3:10 PM	Extraction Date	7/12/2007
Matrix:	Soil				

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Ametryne	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Atrazine	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Diazinon	ND	mg/Kg	0.05	7/26/2007	EMP	EPA 8270C	
Fenamiphos	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Hexazinone	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Metribuzin	ND	mg/kg	0.05	7/26/2007	EMP	EPA 8270C	
Diuron	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
Oxamyl	ND	mg/kg	0.02	7/25/2007	TGT	EPA 8321A	
%moisture	5.8	Percent		7/16/2007	CH	%moisture	

Surrogate Data

Sample Number 070712032-010

Surrogate Standard	Method	Percent Recovery	Control Limits
Terphenyl-d14	EPA 8270C	112.6	30-140

Authorized Signature John Coll

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

Comments:

Anatek Labs, Inc.
1282 Alturas Dr Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433
Email: moscow@anateklabs.com

Pesticide Screen EPA 8270C-MOD - Quality Control Report

Lab #	070712032-010
Blank	MB 7/12
Units	mg/Kg
Sample	
Extract date	7/12/2007
Analysis date	7/26/2007

Analyte	BLANK	Spike	LCS	%R	%R AR	LCS %R Failure
Diazinon	0.00	1.00	0.94	93.9	50-150	
Atrazine	0.00	1.00	0.62	61.8	50-150	

Analyte	Sample	Spike	MS	%R	MSD	%R	RPD	RPD AR	%R AR	MS %R Failure	MSD %R Failure	RPD Failure
Diazinon	0.00	1.00	1.01	100.7	1.01	101.0	0.3	25	50-150			
Atrazine	0.00	1.00	0.62	62.3	0.58	57.5	7.9	25	50-150			

R>2S = Result is more than 2X the spike added

Anatek Labs, Inc.
1282 Alturas Dr Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433
Email: moscow@anateklabs.com

EPA 8321MOD - MS/LFB Report

Lab #	070712032-010
Units	mg/Kg
Extraction date	7/13/2007
Analysis date	7/25/2007

Analyte	Sample	Spike	MS	%R	MS %R Failure
Diuron	0.00	0.1	0.0865	86.5	
Bromacil	0.00	0.1	0.106	106	
Oxamyl	0.00	1.0	0.556	55.6	

Lab #	070712032-010
Units	mg/Kg
Extraction date	7/13/2007
Analysis date	7/25/2007

Analyte	Sample	Spike	MS	%R	MS %R Failure
Diuron	0.00	0.1	0.0745	74.5	
Bromacil	0.00	0.1	0.104	104	
Oxamyl	0.00	1.0	0.774	77.4	

Lab #	LCS
Units	mg/Kg

Analyte	BLANK	Spike	LFB	%R	%R AR	LCS %R Failure
Diuron	0.00	0.1	0.0776	77.6	25-150	
Bromacil	0.00	0.1	0.0664	66.4	25-150	
Oxamyl	0.00	1	0.624	62.4	25-150	

Photo 1: Layout of Decision Units

Photo 2: Typical multi-increment sample.

Photo 3: Boring for volatile sample collection.

Photo 4: Sampling row for multi-increment sampling.

Photo 5: Drum area sample collection.

APPENDIX D-2.

Phase II Environmental Site Assessment Supplemental Letter Report (Dioxin Testing)

Supplemental Letter Report
Phase II Environmental Site Assessment

Maalaea Mauka
TMK (2) 3-6-001:018
Maalaea, Maui, Hawaii

Prepared for:

M&E Pacific, Inc.
841 Bishop Street, Suite 1900
Honolulu, Hawaii 96813

Prepared by:

element environmental llc
environmental · engineering · water resources
62-180 Emerson Road
Haleiwa, Hawaii 96712

April 2008

Introduction

This Phase II Environmental Site Assessment (ESA) Screening Letter Report is intended to supplement the Phase II ESA Screening Report completed in August 2007 for the Maalaea Mauka Property (TMK: (2) 3-6-001: parcel 018) located in Maui, Hawaii. This letter report summarizes the results of the dioxins/furans analysis performed on the multi-increment samples collected from the property.

Project Background

Element Environmental, LLC (E2) completed a Screening Phase II ESA in August 2007 to evaluate if residual levels of pesticides and herbicides resulting from historic agricultural use at the site are present in surface soils. E2 employed a multi-increment sampling approach to screen the entire 260 acre site. Ten multi-increment samples were collected from eight neighborhood-size decision units and analyzed for a full suite of pesticides and herbicides that may have been applied to the site in the past (Element, 2007).

Based on a review of the Phase II ESA Screening Report, the State of Hawaii Department of Health (HDOH) Hazard Evaluation and Emergency Response (HEER) Office recommended that the multi-increment samples be analyzed for dioxins/furans due to their historic association with herbicides and their persistence in the environment. HDOH HEER personnel stated that the multi-increment samples previously collected could be used for screening purposes if still available at the laboratory. HDOH HEER personnel stated that despite the samples being past the recommended extraction and analysis holding times for the analytical method, they would consider the dioxin/furan results valid for screening purposes due to their persistent nature (i.e. dioxins/furans would not degrade in properly stored samples).

Therefore, the ten multi-increment samples collected during the Screening Phase II ESA were analyzed for dioxins/furans using U.S. Environmental Protection Agency (EPA) Method 8290. The results of the analyses are presented below. The reader is referred to the Phase II ESA Screening Report (Element, 2007) for details regarding the project objectives, site history and background, sample rationale and methodology, sample collection techniques, and project location maps.

Dioxin Sample Results

The ten multi-increment samples were analyzed for dioxins/furans using EPA Method 8290. The analytical results are summarized in the attached Table 4-1a. The complete analytical laboratory report is presented in the attached Appendix.

All ten samples were found to contain low levels of dioxins/furans. By definition, the term "dioxins/furans" refers to a family of chlorinated compounds with similar chemical structures and mechanisms of toxicity. Each chlorinated compound is generally referred to as a congener. Per the HDOH HEER guidance memorandum, "Proposed Dioxin Action Levels for East Kapolei Brownfield Site," dated March 23, 2006, the evaluation of risk to human health focuses on 17 specific congeners, seven polychlorinated dibenzo-p-dioxins (PCDDs) and ten polychlorinated dibenzofurans (PCSFs). The individual congeners are not equally toxic. For risk assessment purposes, the toxicity of specific congeners is assigned a value relative to the toxicity of 2,3,7,8-TCDD, the most potent of the 17 congeners. The relative toxicity of each congener is calculated by multiplying the reported concentration of an individual congener by its respective Toxicity Equivalent Factor (TEF). The HDOH HEER guidance recommends the use of the World Health Organization's TEFs published in 2005 (Van den Berg, et al., 2006). The TEQ concentrations for individual congeners are then added together to calculate a total 2,3,7,8-TCDD TEQ concentration for the sample. A summary of the 2,3,7,8-TCDD TEQ concentrations for the ten samples is presented below.

Sample ID	2,3,7,8-TCDD TEQ Concentration (ng/kg)	HDOH Residential Action Level for Low Risk (ng/kg)
DU1	18.5	42.0
DU2	16.4	42.0
DU3	15.7	42.0
DU4	17.6	42.0
DU5	23.3	42.0
DU6	18.0	42.0
DU7	27.4	42.0
DU8	37.6	42.0
DU9	19.9	42.0
DU10	23.0	42.0

The HDOH HEER residential action level for "low risk" for 2,3,7,8-TCDD TEQ concentration is 42.0 nanograms/kilogram (ng/kg). Per the guidance memorandum, "no further action" is required for sites with 2,3,7,8-TCDD TEQ concentrations in soil less than 42.0 ng/kg. As indicated above, all ten multi-increment samples collected from the site had 2,3,7,8-TCDD TEQ concentrations below this "low risk" residential action level.

Summary of Findings

E2 completed a Screening Phase II ESA of the Maalaea Mauka property identified as TMK: (2) 3-6-001: parcel 018 located in Maui, Hawaii. The purpose of this Screening Phase II ESA was to evaluate if residual levels of pesticides and herbicides resulting from historic agricultural use at the site are present in surface soils.

Per the HDOH HEER technical report for investigation and assessment of former agricultural lands, the screening was completed on "neighborhood-size" decision units utilizing a multi-increment sampling approach. The 260-acre site was divided into eight decision units approximately 32.5 acres in size with one multi-increment surface soil sample collected from each unit. The multi-increment samples were analyzed for pesticide and herbicide constituents that may have been applied to the property. The results of the analyses indicated that residual pesticides and herbicides are not present at significant levels in the surface soils at the site. However, after a review of the Phase II ESA Screening Report, the HDOH HEER recommended that the multi-increment samples also be analyzed for dioxins/furans. Therefore, the multi-increment samples were subsequently analyzed for dioxins/furans.

The results of the dioxins/furans analyses indicate that the 2,3,7,8-TCDD TEQ concentrations in the ten multi-increment soil samples collected from the site are below the HDOH HEER "low risk" action level for residential sites. According to HDOH guidance, residential sites that contain 2,3,7,8-TCDD TEQ concentrations below the "low risk" action level do not require further action or restrictions on land use.

References

Element, 2006. *Phase I Environmental Site Assessment, Maalaea Mauka, Wailuku, Maui, Hawaii, TMK (2) 3-6-001: Parcel 018.* Prepared by Element Environmental, LLC, November 15, 2006.

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HDOH, 2006. *Proposed Dioxin Action Levels for East Kapolei Brownsfield Site.* Memorandum prepared by: State of Hawaii, Department of Health, Hazard Evaluation and Emergency Response Office, March 23, 2006.

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MDH, 2003. *Cancer Risk Assessment for Dioxins* (March 2003): Minnesota Department of Health, Risk Evaluation/Air Monitoring Unit. http://www.health.state.mn.us/divs/eh/risk/guidance/dioxinmemo1.html

Van den Berg et al., 2006. *The 2005 World Health Organization Re-evaluation of Human Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds*, Toxicological Sciences, October 2006, 93:223-241.

TABLES

Table 4-1a
Laboratory Analytical Results - Dioxin/Furan (EPA 8290)
Multi-increment Samples

Compound	TEF_{WHO05}	DU1 Result (ng/kg)	DU1 Detection Limit (ng/kg)	DU1 TEQ Result (ng/kg)	DU1 TEQ TCDD Concentration (ng/kg)
CDDs					
2,3,7,8-TetraCDD	1	ND	0.45	0.225	0.225
1,2,3,7,8-PentaCDD	1	ND	2.3	1.15	1.15
1,2,3,4,7,8-HexaCDD	0.1	4.0 J		4	0.4
1,2,3,6,7,8-HexaCDD	0.1	26		26	2.6
1,2,3,7,8,9-HexaCDD	0.1	9.6		9.6	0.96
1,2,3,4,6,7,8-HeptaCDD	0.01	550		550	5.5
1,2,3,4,6,7,8,9-OctaCDD	0.0003	4300 E		4300	1.29
CDFs					
2,3,7,8-TetraCDF	0.1	0.72 J		0.72	0.072
1,2,3,7,8-PentaCDF	0.03	2.5 J		2.5	0.075
2,3,4,7,8-PentaCDF	0.3	3.0 J		3	0.9
1,2,3,4,7,8-HexaCDF	0.1	18		18	1.8
1,2,3,6,7,8-HexaCDF	0.1	8.5		8.5	0.85
2,3,4,6,7,8-HexaCDF	0.1	6		6	0.6
1,2,3,7,8,9-HexaCDF	0.1	ND	1.6	0.8	0.08
1,2,3,4,6,7,8-HeptaCDF	0.01	170		170	1.7
1,2,3,4,7,8,9-HeptaCDF	0.01	14		14	0.14
1,2,3,4,6,7,8,9-OctaCDF	0.0003	370		370	0.111

TOTAL TEQ TCDD CONCENTRATION (ng/kg): 18.5

Compound	TEF_{WHO05}	DU2 Result (ng/kg)	DU2 Detection Limit (ng/kg)	DU2 TEQ Result (ng/kg)	DU2 TEQ TCDD Concentration (ng/kg)
CDDs					
2,3,7,8-TetraCDD	1	ND	0.35	0.175	0.175
1,2,3,7,8-PentaCDD	1	ND	2	1	1
1,2,3,4,7,8-HexaCDD	0.1	3.6 J		3.6	0.36
1,2,3,6,7,8-HexaCDD	0.1	26		26	2.6
1,2,3,7,8,9-HexaCDD	0.1	9.1		9.1	0.91
1,2,3,4,6,7,8-HeptaCDD	0.01	500		500	5
1,2,3,4,6,7,8,9-OctaCDD	0.0003	4000		4000	1.2
CDFs					
2,3,7,8-TetraCDF	0.1	ND	0.46	0.23	0.023
1,2,3,7,8-PentaCDF	0.03	ND	2.2	1.1	0.033
2,3,4,7,8-PentaCDF	0.3	ND	2.4	1.2	0.36
1,2,3,4,7,8-HexaCDF	0.1	15		15	1.5
1,2,3,6,7,8-HexaCDF	0.1	8.1		8.1	0.81
2,3,4,6,7,8-HexaCDF	0.1	5.7		5.7	0.57
1,2,3,7,8,9-HexaCDF	0.1	ND	0.5	0.25	0.025
1,2,3,4,6,7,8-HeptaCDF	0.01	160		160	1.6
1,2,3,4,7,8,9-HeptaCDF	0.01	13		13	0.13
1,2,3,4,6,7,8,9-OctaCDF	0.0003	360		360	0.108

TOTAL TEQ TCDD CONCENTRATION (ng/kg): 16.4

Table 4-1a
Laboratory Analytical Results - Dioxin/Furan (EPA 8290)
Multi-increment Samples

Compound	TEF_{WHO05}	DU3 Result (ng/kg)	Detection Limit (ng/kg)	TEQ Result (ng/kg)	TEQ TCDD Concentration (ng/kg)
CDDs					
2,3,7,8-TetraCDD	1	ND	0.33	0.165	0.165
1,2,3,7,8-PentaCDD	1	ND	1.9	0.95	0.95
1,2,3,4,7,8-HexaCDD	0.1	3.1 J		3.1	0.31
1,2,3,6,7,8-HexaCDD	0.1	24		24	2.4
1,2,3,7,8,9-HexaCDD	0.1	8.3		8.3	0.83
1,2,3,4,6,7,8-HeptaCDD	0.01	520		520	5.2
1,2,3,4,6,7,8,9-OctaCDD	0.0003	4100 E		4100	1.23
CDFs					
2,3,7,8-TetraCDF	0.1	ND	0.41	0.205	0.0205
1,2,3,7,8-PentaCDF	0.03	ND	1.5	0.75	0.0225
2,3,4,7,8-PentaCDF	0.3	ND	1.4	0.7	0.21
1,2,3,4,7,8-HexaCDF	0.1	11		11	1.1
1,2,3,6,7,8-HexaCDF	0.1	6.6		6.6	0.66
2,3,4,6,7,8-HexaCDF	0.1	4.6 J		4.6	0.46
1,2,3,7,8,9-HexaCDF	0.1	ND	2.1	1.05	0.105
1,2,3,4,6,7,8-HeptaCDF	0.01	180		180	1.8
1,2,3,4,7,8,9-HeptaCDF	0.01	13		13	0.13
1,2,3,4,6,7,8,9-OctaCDF	0.0003	360		360	0.108

TOTAL TEQ TCDD CONCENTRATION (ng/kg): 15.7

Compound	TEF_{WHO05}	DU4 Result (ng/kg)	Detection Limit (ng/kg)	TEQ Result (ng/kg)	TEQ TCDD Concentration (ng/kg)
CDDs					
2,3,7,8-TetraCDD	1	ND	0.39	0.195	0.195
1,2,3,7,8-PentaCDD	1	ND	2	1	1
1,2,3,4,7,8-HexaCDD	0.1	3.3 J		3.3	0.33
1,2,3,6,7,8-HexaCDD	0.1	27		27	2.7
1,2,3,7,8,9-HexaCDD	0.1	8.4		8.4	0.84
1,2,3,4,6,7,8-HeptaCDD	0.01	520		520	5.2
1,2,3,4,6,7,8,9-OctaCDD	0.0003	4400 E		4400	1.32
CDFs					
2,3,7,8-TetraCDF	0.1	ND	0.48	0.24	0.024
1,2,3,7,8-PentaCDF	0.03	ND	2	1	0.03
2,3,4,7,8-PentaCDF	0.3	ND	1.8	0.9	0.27
1,2,3,4,7,8-HexaCDF	0.1	16		16	1.6
1,2,3,6,7,8-HexaCDF	0.1	8.6		8.6	0.86
2,3,4,6,7,8-HexaCDF	0.1	6		6	0.6
1,2,3,7,8,9-HexaCDF	0.1	ND	0.66	0.33	0.033
1,2,3,4,6,7,8-HeptaCDF	0.01	230		230	2.3
1,2,3,4,7,8,9-HeptaCDF	0.01	18		18	0.18
1,2,3,4,6,7,8,9-OctaCDF	0.0003	550		550	0.165

TOTAL TEQ TCDD CONCENTRATION (ng/kg): 17.6

Table 4-1a
Laboratory Analytical Results - Dioxin/Furan (EPA 8290)
Multi-increment Samples

Compound	TEF_{WHO05}	DU5 Result (ng/kg)	Detection Limit (ng/kg)	TEQ Result (ng/kg)	TEQ TCDD Concentration (ng/kg)
CDDs					
2,3,7,8-TetraCDD	1	0.67 J		0.67	0.67
1,2,3,7,8-PentaCDD	1	2.5 J		2.5	2.5
1,2,3,4,7,8-HexaCDD	0.1	4.4 J		4.4	0.44
1,2,3,6,7,8-HexaCDD	0.1	31		31	3.1
1,2,3,7,8,9-HexaCDD	0.1	10		10	1
1,2,3,4,6,7,8-HeptaCDD	0.01	660		660	6.6
1,2,3,4,6,7,8,9-OctaCDD	0.0003	5400 E		5400	1.62
CDFs					
2,3,7,8-TetraCDF	0.1	0.71 J		0.71	0.071
1,2,3,7,8-PentaCDF	0.03	2.6 J		2.6	0.078
2,3,4,7,8-PentaCDF	0.3	ND	2.2	1.1	0.33
1,2,3,4,7,8-HexaCDF	0.1	20		20	2
1,2,3,6,7,8-HexaCDF	0.1	11		11	1.1
2,3,4,6,7,8-HexaCDF	0.1	7.1		7.1	0.71
1,2,3,7,8,9-HexaCDF	0.1	ND	0.84	0.42	0.042
1,2,3,4,6,7,8-HeptaCDF	0.01	270		270	2.7
1,2,3,4,7,8,9-HeptaCDF	0.01	20		20	0.2
1,2,3,4,6,7,8,9-OctaCDF	0.0003	600		600	0.18

TOTAL TEQ TCDD CONCENTRATION (ng/kg): 23.3

Compound	TEF_{WHO05}	DU6 Result (ng/kg)	Detection Limit (ng/kg)	TEQ Result (ng/kg)	TEQ TCDD Concentration (ng/kg)
CDDs					
2,3,7,8-TetraCDD	1	ND	0.4	0.2	0.2
1,2,3,7,8-PentaCDD	1	ND	2.2	1.1	1.1
1,2,3,4,7,8-HexaCDD	0.1	3.6 J		3.6	0.36
1,2,3,6,7,8-HexaCDD	0.1	26		26	2.6
1,2,3,7,8,9-HexaCDD	0.1	9.3		9.3	0.93
1,2,3,4,6,7,8-HeptaCDD	0.01	520		520	5.2
1,2,3,4,6,7,8,9-OctaCDD	0.0003	4400 E		4400	1.32
CDFs					
2,3,7,8-TetraCDF	0.1	0.64 J		0.64	0.064
1,2,3,7,8-PentaCDF	0.03	ND	1.8	0.9	0.027
2,3,4,7,8-PentaCDF	0.3	ND	1.7	0.85	0.255
1,2,3,4,7,8-HexaCDF	0.1	15		15	1.5
1,2,3,6,7,8-HexaCDF	0.1	11		11	1.1
2,3,4,6,7,8-HexaCDF	0.1	7.1		7.1	0.71
1,2,3,7,8,9-HexaCDF	0.1	ND	0.55	0.275	0.0275
1,2,3,4,6,7,8-HeptaCDF	0.01	230		230	2.3
1,2,3,4,7,8,9-HeptaCDF	0.01	16		16	0.16
1,2,3,4,6,7,8,9-OctaCDF	0.0003	550		550	0.165

TOTAL TEQ TCDD CONCENTRATION (ng/kg): 18.0

Table 4-1a
Laboratory Analytical Results - Dioxin/Furan (EPA 8290)
Multi-Increment Samples

Compound	TEF_{WHO05}	DU7 Result (ng/kg)	DU7 Detection Limit (ng/kg)	DU7 TEQ Result (ng/kg)	DU7 TEQ TCDD Concentration (ng/kg)
CDDs					
2,3,7,8-TetraCDD	1	0.81 J		0.81	0.81
1,2,3,7,8-PentaCDD	1	3.4 J		3.4	3.4
1,2,3,4,7,8-HexaCDD	0.1	5.7		5.7	0.57
1,2,3,6,7,8-HexaCDD	0.1	37		37	3.7
1,2,3,7,8,9-HexaCDD	0.1	16		16	1.6
1,2,3,4,6,7,8-HeptaCDD	0.01	790		790	7.9
1,2,3,4,6,7,8,9-OctaCDD	0.0003	6600 E		4400	1.32
CDFs					
2,3,7,8-TetraCDF	0.1	0.59 J		0.59	0.059
1,2,3,7,8-PentaCDF	0.03	ND	2.2	1.1	0.033
2,3,4,7,8-PentaCDF	0.3	ND	1.8	0.9	0.27
1,2,3,4,7,8-HexaCDF	0.1	18		18	1.8
1,2,3,6,7,8-HexaCDF	0.1	12		12	1.2
2,3,4,6,7,8-HexaCDF	0.1	8.9		8.9	0.89
1,2,3,7,8,9-HexaCDF	0.1	ND	0.69	0.345	0.0345
1,2,3,4,6,7,8-HeptaCDF	0.01	330		330	3.3
1,2,3,4,7,8,9-HeptaCDF	0.01	23		23	0.23
1,2,3,4,6,7,8,9-OctaCDF	0.0003	800		800	0.24

TOTAL TEQ TCDD CONCENTRATION (ng/kg): 27.4

Compound	TEF_{WHO05}	DU8 Result (ng/kg)	DU8 Detection Limit (ng/kg)	DU8 TEQ Result (ng/kg)	DU8 TEQ TCDD Concentration (ng/kg)
CDDs					
2,3,7,8-TetraCDD	1	1.1		1.1	1.1
1,2,3,7,8-PentaCDD	1	4.5 J		4.5	4.5
1,2,3,4,7,8-HexaCDD	0.1	8		8	0.8
1,2,3,6,7,8-HexaCDD	0.1	50		50	5
1,2,3,7,8,9-HexaCDD	0.1	22		22	2.2
1,2,3,4,6,7,8-HeptaCDD	0.01	1100		1100	11
1,2,3,4,6,7,8,9-OctaCDD	0.0003	11000 E		4400	1.32
CDFs					
2,3,7,8-TetraCDF	0.1	0.57 J		0.57	0.057
1,2,3,7,8-PentaCDF	0.03	3.2 J		3.2	0.096
2,3,4,7,8-PentaCDF	0.3	3.0 J		3	0.9
1,2,3,4,7,8-HexaCDF	0.1	24		24	2.4
1,2,3,6,7,8-HexaCDF	0.1	14		14	1.4
2,3,4,6,7,8-HexaCDF	0.1	12		12	1.2
1,2,3,7,8,9-HexaCDF	0.1	ND	1.9	0.95	0.095
1,2,3,4,6,7,8-HeptaCDF	0.01	480		480	4.8
1,2,3,4,7,8,9-HeptaCDF	0.01	37		37	0.37
1,2,3,4,6,7,8,9-OctaCDF	0.0003	1200		1200	0.36

TOTAL TEQ TCDD CONCENTRATION (ng/kg): 37.6

Table 4-1a
Laboratory Analytical Results - Dioxin/Furan (EPA 8290)
Multi-Increment Samples

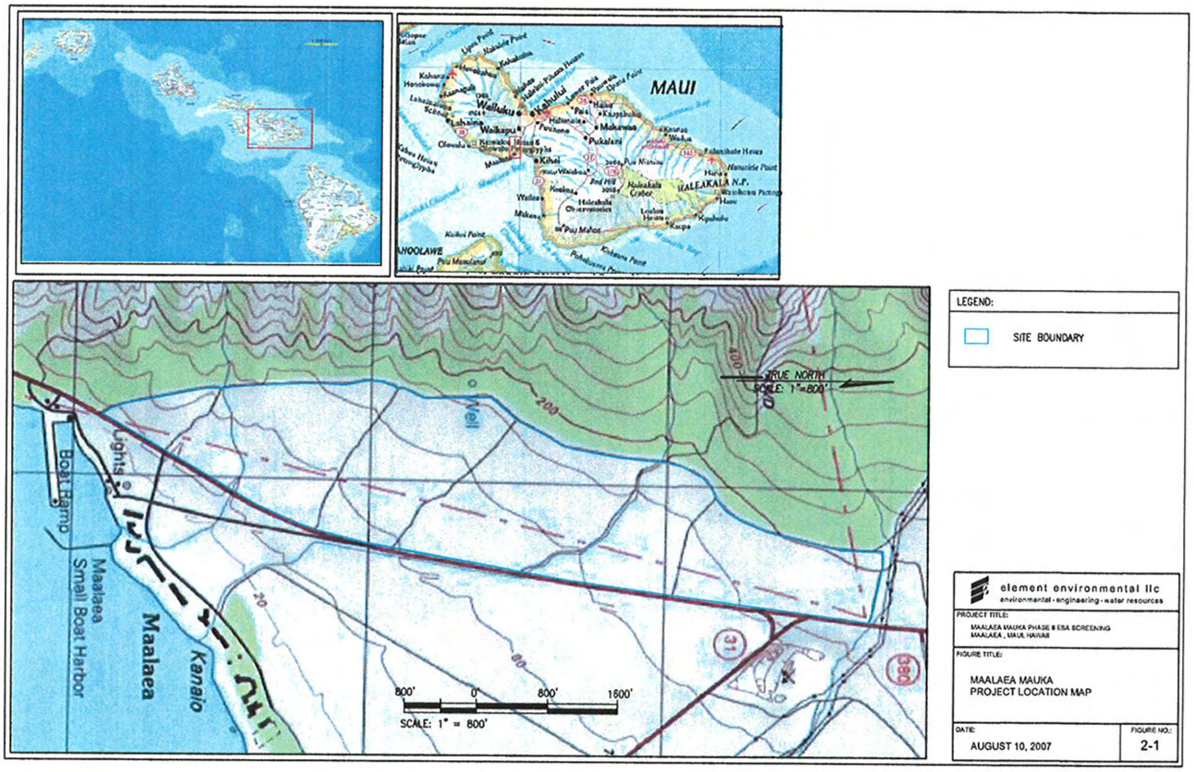
Compound	TEF_{WHO05}	DU9 Result (ng/kg)	DU9 Detection Limit (ng/kg)	DU9 TEQ Result (ng/kg)	DU9 TEQ TCDD Concentration (ng/kg)
CDDs					
2,3,7,8-TetraCDD	1	ND	0.53	0.265	0.265
1,2,3,7,8-PentaCDD	1	ND	1.4	0.7	0.7
1,2,3,4,7,8-HexaCDD	0.1	3.4 J		3.4	0.34
1,2,3,6,7,8-HexaCDD	0.1	29		29	2.9
1,2,3,7,8,9-HexaCDD	0.1	9.8		9.8	0.98
1,2,3,4,6,7,8-HeptaCDD	0.01	620		620	6.2
1,2,3,4,6,7,8,9-OctaCDD	0.0003	5100 E		5100	1.53
CDFs					
2,3,7,8-TetraCDF	0.1	0.56 J		0.56	0.056
1,2,3,7,8-PentaCDF	0.03	ND	2.2	1.1	0.033
2,3,4,7,8-PentaCDF	0.3	3.7 J		3.7	1.11
1,2,3,4,7,8-HexaCDF	0.1	20		20	2
1,2,3,6,7,8-HexaCDF	0.1	8.8		8.8	0.88
2,3,4,6,7,8-HexaCDF	0.1	5.2		5.2	0.52
1,2,3,7,8,9-HexaCDF	0.1	ND	0.96	0.48	0.048
1,2,3,4,6,7,8-HeptaCDF	0.01	200		200	2
1,2,3,4,7,8,9-HeptaCDF	0.01	15		15	0.15
1,2,3,4,6,7,8,9-OctaCDF	0.0003	470		470	0.141

TOTAL TEQ TCDD CONCENTRATION (ng/kg): 19.9

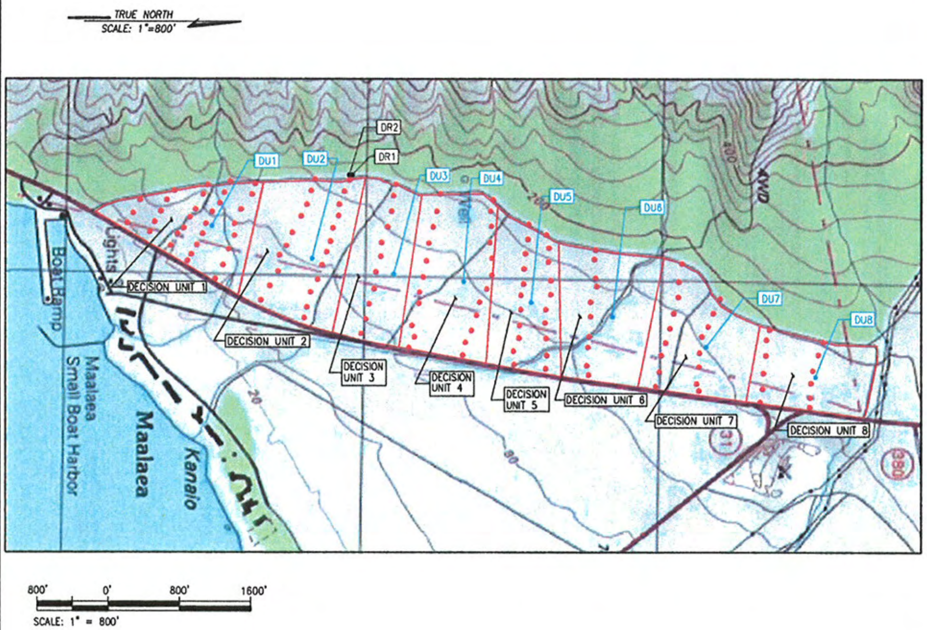
Compound	TEF_{WHO05}	DU10 Result (ng/kg)	DU10 Detection Limit (ng/kg)	DU10 TEQ Result (ng/kg)	DU10 TEQ TCDD Concentration (ng/kg)
CDDs					
2,3,7,8-TetraCDD	1	ND	0.36	0.18	0.18
1,2,3,7,8-PentaCDD	1	ND	2.4	1.2	1.2
1,2,3,4,7,8-HexaCDD	0.1	4.6 J		4.6	0.46
1,2,3,6,7,8-HexaCDD	0.1	32		32	3.2
1,2,3,7,8,9-HexaCDD	0.1	12		12	1.2
1,2,3,4,6,7,8-HeptaCDD	0.01	700		700	7
1,2,3,4,6,7,8,9-OctaCDD	0.0003	5500 E		5500	1.65
CDFs					
2,3,7,8-TetraCDF	0.1	0.65 J		0.65	0.065
1,2,3,7,8-PentaCDF	0.03	2.8 J		2.8	0.084
2,3,4,7,8-PentaCDF	0.3	3.1 J		3.1	0.93
1,2,3,4,7,8-HexaCDF	0.1	25		25	2.5
1,2,3,6,7,8-HexaCDF	0.1	13		13	1.3
2,3,4,6,7,8-HexaCDF	0.1	7.1		7.1	0.71
1,2,3,7,8,9-HexaCDF	0.1	ND	0.67	0.335	0.0335
1,2,3,4,6,7,8-HeptaCDF	0.01	220		220	2.2
1,2,3,4,7,8,9-HeptaCDF	0.01	15		15	0.15
1,2,3,4,6,7,8,9-OctaCDF	0.0003	420		420	0.126

TOTAL TEQ TCDD CONCENTRATION (ng/kg): 23.0

Notes:
1. J - Estimated result. Result is less than the reporting limit.
2. E - Estimated result. Result concentration exceeds the calibration range.
3. ND - Non detect.
4. For calculation purposes, 1/2 the detection limit value was used to calculate the TEQ TCDD Concentration for the ND results.
5. TEF WHO05 values from: "The World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds." Toxicological Sciences, October 2006, 93:223-241. Van den Berg, M, L. Birnbaum et.al.


MAUI
HALEAKALA N.P.
LEGEND:
SITE BOUNDARY
TRUE NORTH
SCALE: 1"=800'
Well
Lights
Boat Ramp
Maalaea
Small Boat Harbor
Maalaea
Kanaio
200
400
20
80
31
380
800' 0' 800' 1600'
SCALE: 1" = 800'
element environmental llc
environmental - engineering - water resources
PROJECT TITLE:
MAALAEA MAUKA PHASE II ESA SCREENING
MAALAEA , MAUI, HAWAII
FIGURE TITLE:
MAALAEA MAUKA
PROJECT LOCATION MAP
DATE:
AUGUST 10, 2007
FIGURE NO.:
2-1

FIGURES



LEGEND:

DECISION UNIT BOUNDARY

GPS SAMPLE LOCATIONS

MULTI-INCREMENTAL GPS SAMPLE LOCATION

DU1 VOC GPS SAMPLE LOCATION

DR1 FORMER DRUM GPS SAMPLE LOCATION

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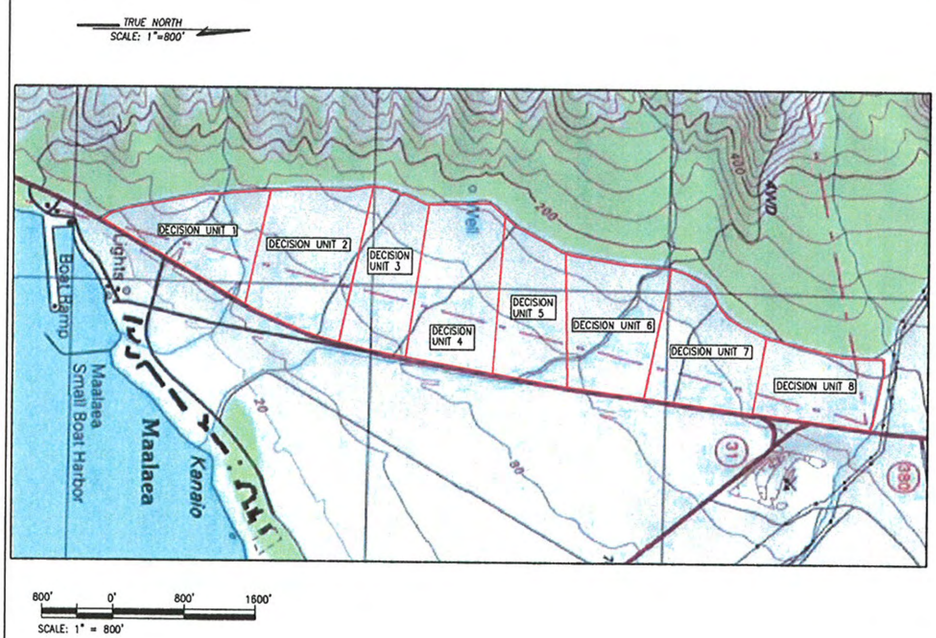
PROJECT TITLE:
MAALAEA MAUKA PHASE II ESA SCREENING
MAALAEA, MAUI, HAWAII

FIGURE TITLE:
MAALAEA MAUKA
GPS SAMPLE LOCATIONS

DATE: AUGUST 10, 2007

FIGURE NO.: 3-2



LEGEND:

DECISION UNIT BOUNDARY

element environmental llc
environmental • engineering • water resources

PROJECT TITLE:
MAALAEA MAUKA PHASE II ESA SCREENING
MAALAEA, MAUI, HAWAII

FIGURE TITLE:
MAALAEA MAUKA
DECISION UNITS

DATE: AUGUST 10, 2007

FIGURE NO.: 3-1

APPENDIX

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

April 24, 2008

LABORATORY REPORT

Client:
Element Environmental LLC
62-180 Emerson Rd.
Haleiwa, HI 96712
Attn: Matt Neal

Work Order: HRC0152
Project Name: Maalea
Project Number: RELOG of HQG0016, Maalaea Phase II ESA
Date Received: 03/27/08

The results listed within this Laboratory Report pertain only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a wet weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the sole use of TestAmerica and its client. This report shall not be reproduced, except in full, without written permission from TestAmerica.

TestAmerica Analytical Testing Corporation certifies that the analytical results contained herein apply only to the specific sample(s) analyzed.

This entire report was reviewed and approved for release.

If you have any questions relating to this analytical report, please contact your Laboratory Project Manager at 1-(808)486-5227

Samples were received into laboratory at a temperature of 0 °C.

NELAC states that samples which require thermal preservation shall be considered acceptable if the arrival temperature is within 2 degrees C of the required temperature or the method specified range. For samples with a temperature requirement of 4 degrees C, an arrival temperature from 0 degrees C to 6 degrees C meets specifications. Samples that are delivered to the laboratory on the same day that they are collected may not meet these criteria. In these cases, the samples are considered acceptable if there is evidence that the chilling process has begun, such as arrival on ice.

The reported results were obtained in compliance with the 2003 NELAC standards unless otherwise noted.

Approved By:

Marvin D. Heskett III
Laboratory Director

NELAC Certification # E87907

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC	Work Order: HRC0152	Received:	03/27/08
62-180 Emerson Rd.		Reported:	04/24/08 09:19
Haleiwa, HI 96712	Project: Maalea		
Matt Neal	Project Number: RELOG of HQG0016, Maalaea Phase II ESA		

SAMPLE IDENTIFICATION	LAB NUMBER	COLLECTION DATE AND TIME
DU1	HRC0152-01	06/29/07 16:45
DU2	HRC0152-02	06/28/07 13:30
DU3	HRC0152-03	06/28/07 15:51
DU4	HRC0152-04	06/28/07 16:30
DU5	HRC0152-05	06/28/07 16:50
DU6	HRC0152-06	06/29/07 10:10
DU7	HRC0152-07	06/29/07 11:10
DU8	HRC0152-08	06/29/07 12:10
DU9	HRC0152-09	06/29/07 14:10
DU10	HRC0152-10	06/29/07 15:10

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Element Environmental LLC	Work Order: HRC0152	Received:	03/27/08
62-180 Emerson Rd.		Reported:	04/24/08 09:19
Haleiwa, HI 96712	Project: Maalea		
Matt Neal	Project Number: RELOG of HQG0016, Maalaea Phase II ESA		

CERTIFICATION SUMMARY

Subcontracted Laboratories

STL - Sacramento, CA

880 Riverside Parkway - West Sacramento, CA 95605

Analysis Performed: 8290 Dioxin

Samples: HRC0152-01, HRC0152-02, HRC0152-03, HRC0152-04, HRC0152-05, HRC0152-06, HRC0152-07, HRC0152-08, HRC0152-09, HRC0152-10

For information concerning certifications of this facility or another TestAmerica facility, please visit our website at www.TestAmericaInc.com

DATA QUALIFIERS AND DEFINITIONS

ND Not detected at the reporting limit (or method detection limit if shown)

ADDITIONAL COMMENTS

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

April 22, 2008

TestAmerica Project Number: G8D020341
PO/Contract: HRC0152

Marvin Heskett
TestAmerica - Honolulu
RL Cushing Building
99-193 Aiea Heights Dr
Aiea, HI 96701

Dear Mr. Heskett,

This report contains the analytical results for the samples received under chain of custody by TestAmerica on April 2, 2008. These samples are associated with your HRC0152 project.

The test results in this report meet all NELAC requirements for parameters that accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The case narrative is an integral part of this report.

If you have any questions, please feel free to call me at (916) 374-4333.

Sincerely,

for
Robert Weidenfeld
Project Manager

880 Riverside Parkway West Sacramento, CA 95605 tel 916.373.5600 fax 916.372.1059 www.testamericainc.com

Table of Contents

TestAmerica West Sacramento Project Number G8D020341

Case Narrative

TestAmerica West Sacramento Project Number G8D020341

SOLID, 8290, Dioxins/Furans-non-incremental
Sample(s): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
The result for 2, 3, 7, 8-TCDF is reported from the confirmation analysis that occurred on April 16, 2008.

The concentrations of OCDD in many of the samples exceeded the upper quantitation level of the initial calibration curve, but the peaks did not saturate the instrument detector. Historical data indicates that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported with the 'E' qualifier.

Sample(s): 7, 9, 10
Several isomers have been qualified with the "JA" flag due to the ion abundance ratios being outside of criteria. The isomers have been reported as "estimated maximum possible concentrations" (EMPC) because the quantitation is based on the theoretical ion abundance ratios for these analytes.

There were no other anomalies associated with this project.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ACCREDITED IN ACCORDANCE WITH nelac

TestAmerica Laboratories West Sacramento Certifications/Accreditations

Certifying State	Certificate #	Certifying State	Certificate #
Alaska	UST-055	New York*	11666
Arizona	AZ0616	Oregon*	CA200005
Arkansas	04-067-0	Pennsylvania	68-1272
California*	01119CA	South Carolina	87014002
Colorado	NA	Texas	TX 270-2004A
Connecticut	PH-0691	Utah*	QUANT
Florida*	E87570	Virginia	00178
Georgia*	960	Washington	C087
Hawaii	NA	West Virginia	9930C, 334
Kansas*	E10375	Wisconsin	998204680
Louisiana*	01944	NFESC	NA
Michigan	9947	USACE	NA
Nevada	CA44	USDA Foreign Plant	37-82605
New Jersey*	CA005	USDA Foreign Soil	S-46613

*NELAP accredited. A more detailed parameter list is available upon request. Updated 9/21/07

QC Parameter Definitions

QC Batch: The QC batch consists of a set of up to 20 field samples that behave similarly (i.e., same matrix) and are processed using the same procedures, reagents, and standards at the same time.

Method Blank: An analytical control consisting of all reagents, which may include internal standards and surrogates, and is carried through the entire analytical procedure. The method blank is used to define the level of laboratory background contamination.

Laboratory Control Sample and Laboratory Control Sample Duplicate (LCS/LCSD): An aliquot of blank matrix spiked with known amounts of representative target analytes. The LCS (and LCSD as required) is carried through the entire analytical process and is used to monitor the accuracy of the analytical process independent of potential matrix effects. If an LCSD is performed, it may also be used to evaluate the precision of the process.

Duplicate Sample (DU): Different aliquots of the same sample are analyzed to evaluate the precision of an analysis.

Surrogates: Organic compounds not expected to be detected in field samples, which behave similarly to target analytes. These are added to every sample within a batch at a known concentration to determine the efficiency of the sample preparation and analytical process.

Matrix Spike and Matrix Spike Duplicate (MS/MSD): An MS is an aliquot of a matrix fortified with known quantities of specific compounds and subjected to an entire analytical procedure in order to indicate the appropriateness of the method for a particular matrix. The percent recovery for the respective compound(s) is then calculated. The MSD is a second aliquot of the same matrix as the matrix spike, also spiked, in order to determine the precision of the method.

Isotope Dilution: For isotope dilution methods, isotopically labeled analogs (internal standards) of the native target analytes are spiked into the sample at time of extraction. These internal standards are used for quantitation, and monitor and correct for matrix effects. Since matrix effects on method performance can be judged by the recovery of these analogs, there is little added benefit of performing MS/MSD for these methods. MS/MSD are only performed for client or QAPP requirements.

Control Limits: The reported control limits are either based on laboratory historical data, method requirements, or project data quality objectives. The control limits represent the estimated uncertainty of the test results.

Sample Summary

TestAmerica West Sacramento Project Number G8D020341

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
KKLR1	1	HRC0152-01	6/29/2007 04:45 PM	4/2/2008 09:15 AM
KKLR3	2	HRC0152-02	6/29/2007 01:30 PM	4/2/2008 09:15 AM
KKLR4	3	HRC0152-03	6/29/2007 03:51 PM	4/2/2008 09:15 AM
KKLR7	4	HRC0152-04	6/29/2007 04:30 PM	4/2/2008 09:15 AM
KKLR9	5	HRC0152-05	6/29/2007 04:50 PM	4/2/2008 09:15 AM
KKLTC	6	HRC0152-06	6/29/2007 10:10 AM	4/2/2008 09:15 AM
KKLTT	7	HRC0152-07	6/29/2007 11:10 AM	4/2/2008 09:15 AM
KKLTW	8	HRC0152-08	6/29/2007 12:10 PM	4/2/2008 09:15 AM
KKLTX	9	HRC0152-09	6/29/2007 02:10 PM	4/2/2008 09:15 AM
KKLT1	10	HRC0152-10	6/29/2007 03:10 PM	4/2/2008 09:15 AM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight

SUBCONTRACT ORDER

TestAmerica Honolulu

HRC0152

SENDING LABORATORY:

TestAmerica Honolulu
99-193 Aiea Heights Drive, Suite 121
Aiea, HI 96701
Phone: 808-486-5227
Fax: 808-486-2456
Project Manager: Marvin D. Heskett III
Client: Element Environmental LLC

RECEIVING LABORATORY:

TestAmerica West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone :(916) 373-5600
Fax: (916) 372-1059
Project Location: Hawaii
Receipt Temperature: 6 °C Ice: Y / N

Analysis	Units	Due	Expires	Interlab Price	Surch	Comments
Sample ID: HRC0152-01	**Solid/Soil**		Sampled: 06/29/07 16:45			**Relog of HQG0016-01**
8290 Dioxin	ug/kg	04/10/08	07/13/07 16:45	$650.00	0%	Sub to W. Sac
Containers Supplied: 2X 2.2 Incremental Sub-sample (analyze entire content) (B)						
Sample ID: HRC0152-02	**Solid/Soil**		Sampled: 06/28/07 13:30			**Relog of HQG0016-02**
8290 Dioxin	ug/kg	04/10/08	07/12/07 13:30	$650.00	0%	Sub to W. Sac
Containers Supplied: 2X 2oz Incremental Sub-sample (analyze entire content) (B)						
Sample ID: HRC0152-03	**Solid/Soil**		Sampled: 06/28/07 15:51			**Relog of HQG0016-03**
8290 Dioxin	ug/kg	04/10/08	07/12/07 15:51	$650.00	0%	Sub to W. Sac
Containers Supplied: 2X 2oz Incremental Sub-sample (analyze entire content) (B)						
Sample ID: HRC0152-04	**Solid/Soil**		Sampled: 06/28/07 16:30			**Relog of HQG0016-04**
8290 Dioxin	ug/kg	04/10/08	07/12/07 16:30	$650.00	0%	Sub to W. Sac
Containers Supplied: 2X 2oz Incremental Sub-sample (analyze entire content) (B)						
Sample ID: HRC0152-05	**Solid/Soil**		Sampled: 06/28/07 16:50			**Relog of HQG0016-05**
8290 Dioxin	ug/kg	04/10/08	07/12/07 16:50	$650.00	0%	Sub to W. Sac
Containers Supplied: 2X 2oz Incremental Sub-sample (analyze entire content) (B)						

Released By	Date/Time	Received By	Date/Time
[signature]	4/1/08	[signature]	4/2/08 - 1115
Released By	Date/Time	Received By	Date/Time

SUBCONTRACT ORDER
TestAmerica Honolulu
HRC0152

Analysis	Units	Due	Expires	Interlab Price	Surch	Comments
Sample ID: HRC0152-06	**Solid/Soil**		**Sampled: 06/29/07 10:10**			**Relog of HQG0016-06**
8290 Dioxin	ug/kg	04/10/08	07/13/07 10:10	$650.00	0%	Sub to W. Sac
Containers Supplied: 2x 2oz Incremental Sub-sample (analyze entire content) (B)						
Sample ID: HRC0152-07	**Solid/Soil**		**Sampled: 06/29/07 11:10**			**Relog of HQG0016-07**
8290 Dioxin	ug/kg	04/10/08	07/13/07 11:10	$650.00	0%	Sub to W. Sac
Containers Supplied: 2x 2oz Incremental Sub-sample (analyze entire content) (B)						
Sample ID: HRC0152-08	**Solid/Soil**		**Sampled: 06/29/07 12:10**			**Relog of HQG0016-08**
8290 Dioxin	ug/kg	04/10/08	07/13/07 12:10	$650.00	0%	Sub to W. Sac
Containers Supplied: 2x 2oz Incremental Sub-sample (analyze entire content) (B)						
Sample ID: HRC0152-09	**Solid/Soil**		**Sampled: 06/29/07 14:10**			**Relog of HQG0016-09**
8290 Dioxin	ug/kg	04/10/08	07/13/07 14:10	$650.00	0%	Sub to W. Sac
Containers Supplied: 2x 2oz Incremental Sub-sample (analyze entire content) (B)						
Sample ID: HRC0152-10	**Solid/Soil**		**Sampled: 06/29/07 15:10**			**Relog of HQG0016-10**
8290 Dioxin	ug/kg	04/10/08	07/13/07 15:10	$650.00	0%	Sub to W. Sac
Containers Supplied: 2x 2oz Incremental Sub-sample (analyze entire content) (B)						

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT TAL Honolulu PM RW LOG # 57167
LOT# (QUANTIMS ID) G8D020341 QUOTE# 73910 LOCATION W 9A

		Initials	Date
DATE RECEIVED 4/2/08	TIME RECEIVED 0915	CV	4/2/08
DELIVERED BY	☑ FEDEX ☐ CA OVERNIGHT ☐ CLIENT ☐ AIRBORNE ☐ GOLDENSTATE ☐ DHL ☐ UPS ☐ BAX GLOBAL ☐ GO-GETTERS ☐ TAL COURIER ☐ VALLEY LOGISTICS ☐ MORGAN HILL COURIER ☐ OTHER		
CUSTODY SEAL STATUS	☐ INTACT ☐ BROKEN ☑ N/A		
CUSTODY SEAL #(S)			
SHIPPPING CONTAINER(S)	☑ TAL ☐ CLIENT ☐ N/A		
TEMPERTURE RECORD (IN °C)	IR 4 ☑ 5 ☐ ☐ OTHER		
COC #(S)	NA		
TEMPERATURE BLANK	Observed: 3 Corrected: 3		
SAMPLE TEMPERATURE Observed: 6 5 6	Average: 6 Corrected Average: 6		
COLLECTOR'S NAME:	☐ Verified from COC ☑ Not on COC		
pH MEASURED	☐ YES ☐ ANOMALY ☑ N/A		
LABELED BY			
LABELS CHECKED BY			
PEER REVIEW	☑ NA		
SHORT HOLD TEST NOTIFICATION	SAMPLE RECEIVING; WETCHEM ☑ N/A; VOA-ENCORES ☑ N/A		
☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL	☑ N/A		
☑ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES	☐ N/A		
☐ CLOUSEAU	☐ TEMPERATURE EXCEEDED (2 °C – 6 °C)[1] ☑ N/A		

☐ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☐ PM NOTIFIED

Notes:

[1] Acceptable temperature range for State of Wisconsin samples is ≤4°C.
LEAVE NO SPACES BLANK. USE "N/A" IF NOT APPLICABLE.

QA-185 5/05 EM, Page 1

TestAmerica West Sacramento

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G8D020341

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB																				
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
___AGJ																				
500AGJ																				
250AGJ																				
125AGJ																				
50 CGJ	2									2										
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn																				
500PJna																				
500PJzn/na																				
250PJ																				
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
____°CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-185 5/05 EM

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LEAVE NO SPACES BLANK. USE "NA" IF NOT APPLICABLE.

SOLID, 8290, Dioxins/Furans Non-incremental

TestAmerica Honolulu

Client Sample ID: HRC0152-01

Trace Level Organic Compounds

Lot-Sample #...: G8D020341-001 Work Order #...: KKLR11AA Matrix.........: SOLID
Date Sampled...: 06/29/07 Date Received..: 04/02/08
Prep Date......: 04/08/08 Analysis Date..: 04/11/08
Prep Batch #...: 8099385
Dilution Factor: 1
% Moisture.....:

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.45	pg/g	SW846 8290
Total TCDD	0.60		pg/g	SW846 8290
1,2,3,7,8-PeCDD	ND	2.3	pg/g	SW846 8290
Total PeCDD	ND	2.3	pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	4.0 J		pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	26		pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	9.6		pg/g	SW846 8290
Total HxCDD	100		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	550		pg/g	SW846 8290
Total HpCDD	950		pg/g	SW846 8290
OCDD	4300 E		pg/g	SW846 8290
2,3,7,8-TCDF	0.72 J,CON		pg/g	SW846 8290
Total TCDF	4.1		pg/g	SW846 8290
1,2,3,7,8-PeCDF	2.5 J		pg/g	SW846 8290
2,3,4,7,8-PeCDF	3.0 J		pg/g	SW846 8290
Total PeCDF	43		pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	18		pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	8.5		pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	6.0		pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND	1.6	pg/g	SW846 8290
Total HxCDF	400		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	170		pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	14		pg/g	SW846 8290
Total HpCDF	740		pg/g	SW846 8290
OCDF	370		pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	73	(40 - 135)
13C-1,2,3,7,8-PeCDD	68	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	78	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	79	(40 - 135)
13C-OCDD	86	(40 - 135)
13C-2,3,7,8-TCDF	68	(40 - 135)
13C-1,2,3,7,8-PeCDF	71	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	67	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	74	(40 - 135)

NOTE(S):

J Estimated result. Result is less than the reporting limit.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis.

TestAmerica Honolulu

Client Sample ID: HRC0152-02

Trace Level Organic Compounds

Lot-Sample #...: G8D020341-002 Work Order #...: KKLR31AA Matrix.........: SOLID
Date Sampled...: 06/29/07 Date Received..: 04/02/08
Prep Date......: 04/08/08 Analysis Date..: 04/11/08
Prep Batch #...: 8099385
Dilution Factor: 1
% Moisture.....:

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.35	pg/g	SW846 8290
Total TCDD	0.55		pg/g	SW846 8290
1,2,3,7,8-PeCDD	ND	2.0	pg/g	SW846 8290
Total PeCDD	ND	2.0	pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	3.6 J		pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	26		pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	9.1		pg/g	SW846 8290
Total HxCDD	93		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	500		pg/g	SW846 8290
Total HpCDD	870		pg/g	SW846 8290
OCDD	4000		pg/g	SW846 8290
2,3,7,8-TCDF	ND CON	0.46	pg/g	SW846 8290
Total TCDF	2.2		pg/g	SW846 8290
1,2,3,7,8-PeCDF	ND	2.2	pg/g	SW846 8290
2,3,4,7,8-PeCDF	ND	2.4	pg/g	SW846 8290
Total PeCDF	30		pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	15		pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	8.1		pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	5.7		pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND	0.50	pg/g	SW846 8290
Total HxCDF	360		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	160		pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	13		pg/g	SW846 8290
Total HpCDF	710		pg/g	SW846 8290
OCDF	360		pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	75	(40 - 135)
13C-1,2,3,7,8-PeCDD	70	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	85	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	82	(40 - 135)
13C-OCDD	97	(40 - 135)
13C-2,3,7,8-TCDF	71	(40 - 135)
13C-1,2,3,7,8-PeCDF	73	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	75	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	78	(40 - 135)

NOTE(S):

J Estimated result. Result is less than the reporting limit.

CON Confirmation analysis.

TestAmerica Honolulu

Client Sample ID: HRC0152-03

Trace Level Organic Compounds

Lot-Sample #...: G8D020341-003 Work Order #...: KKLR41AA Matrix.........: SOLID
Date Sampled...: 06/29/07 Date Received..: 04/02/08
Prep Date......: 04/08/08 Analysis Date..: 04/11/08
Prep Batch #...: 8099385
Dilution Factor: 1
% Moisture.....:

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.33	pg/g	SW846 8290
Total TCDD	0.69		pg/g	SW846 8290
1,2,3,7,8-PeCDD	ND	1.9	pg/g	SW846 8290
Total PeCDD	3.6		pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	3.1 J		pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	24		pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	8.3		pg/g	SW846 8290
Total HxCDD	97		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	520		pg/g	SW846 8290
Total HpCDD	890		pg/g	SW846 8290
OCDD	4100 E		pg/g	SW846 8290
2,3,7,8-TCDF	ND CON	0.41	pg/g	SW846 8290
Total TCDF	3.0		pg/g	SW846 8290
1,2,3,7,8-PeCDF	ND	1.5	pg/g	SW846 8290
2,3,4,7,8-PeCDF	ND	1.4	pg/g	SW846 8290
Total PeCDF	25		pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	11		pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	6.6		pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	4.6 J		pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND	2.1	pg/g	SW846 8290
Total HxCDF	290		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	180		pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	13		pg/g	SW846 8290
Total HpCDF	750		pg/g	SW846 8290
OCDF	360		pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	82	(40 - 135)
13C-1,2,3,7,8-PeCDD	74	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	84	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	87	(40 - 135)
13C-OCDD	130	(40 - 135)
13C-2,3,7,8-TCDF	77	(40 - 135)
13C-1,2,3,7,8-PeCDF	78	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	74	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	82	(40 - 135)

NOTE(S):

J Estimated result. Result is less than the reporting limit.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis.

TestAmerica Honolulu

Client Sample ID: HRC0152-04

Trace Level Organic Compounds

Lot-Sample #...: G8D020341-004 Work Order #...: KKLR71AA Matrix.........: SOLID
Date Sampled...: 06/29/07 Date Received..: 04/02/08
Prep Date......: 04/08/08 Analysis Date..: 04/11/08
Prep Batch #...: 8099385
Dilution Factor: 1
% Moisture.....:

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.39	pg/g	SW846 8290
Total TCDD	1.4		pg/g	SW846 8290
1,2,3,7,8-PeCDD	ND	2.0	pg/g	SW846 8290
Total PeCDD	ND	2.0	pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	3.3 J		pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	27		pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	8.4		pg/g	SW846 8290
Total HxCDD	100		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	520		pg/g	SW846 8290
Total HpCDD	900		pg/g	SW846 8290
OCDD	4400 E		pg/g	SW846 8290
2,3,7,8-TCDF	ND CON	0.48	pg/g	SW846 8290
Total TCDF	3.9		pg/g	SW846 8290
1,2,3,7,8-PeCDF	ND	2.0	pg/g	SW846 8290
2,3,4,7,8-PeCDF	ND	1.8	pg/g	SW846 8290
Total PeCDF	33		pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	16		pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	8.6		pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	6.0		pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND	0.66	pg/g	SW846 8290
Total HxCDF	440		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	230		pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	18		pg/g	SW846 8290
Total HpCDF	1000		pg/g	SW846 8290
OCDF	550		pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	82	(40 - 135)
13C-1,2,3,7,8-PeCDD	77	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	82	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	76	(40 - 135)
13C-OCDD	82	(40 - 135)
13C-2,3,7,8-TCDF	76	(40 - 135)
13C-1,2,3,7,8-PeCDF	79	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	73	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	73	(40 - 135)

NOTE(S):

J Estimated result. Result is less than the reporting limit.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis.

TestAmerica Honolulu

Client Sample ID: HRC0152-05

Trace Level Organic Compounds

Lot-Sample #...: G8D020341-005 Work Order #...: KKLR91AA Matrix.........: SOLID
Date Sampled...: 06/29/07 Date Received..: 04/02/08
Prep Date......: 04/08/08 Analysis Date..: 04/11/08
Prep Batch #...: 8099385
Dilution Factor: 1
% Moisture.....:

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	0.67 J		pg/g	SW846 8290
Total TCDD	1.2		pg/g	SW846 8290
1,2,3,7,8-PeCDD	2.5 J		pg/g	SW846 8290
Total PeCDD	2.5		pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	4.4 J		pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	31		pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	10		pg/g	SW846 8290
Total HxCDD	120		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	660		pg/g	SW846 8290
Total HpCDD	1100		pg/g	SW846 8290
OCDD	5400 E		pg/g	SW846 8290
2,3,7,8-TCDF	0.71 J,CON		pg/g	SW846 8290
Total TCDF	3.4		pg/g	SW846 8290
1,2,3,7,8-PeCDF	2.6 J		pg/g	SW846 8290
2,3,4,7,8-PeCDF	ND	2.2	pg/g	SW846 8290
Total PeCDF	40		pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	20		pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	11		pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	7.1		pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND	0.84	pg/g	SW846 8290
Total HxCDF	530		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	270		pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	20		pg/g	SW846 8290
Total HpCDF	1100		pg/g	SW846 8290
OCDF	600		pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	52	(40 - 135)
13C-1,2,3,7,8-PeCDD	70	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	87	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	89	(40 - 135)
13C-OCDD	106	(40 - 135)
13C-2,3,7,8-TCDF	44	(40 - 135)
13C-1,2,3,7,8-PeCDF	68	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	74	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	89	(40 - 135)

NOTE(S):

J Estimated result. Result is less than the reporting limit.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis.

TestAmerica Honolulu

Client Sample ID: HRC0152-06

Trace Level Organic Compounds

Lot-Sample #...: G8D020341-006 Work Order #...: KKLTC1AA Matrix.........: SOLID
Date Sampled...: 06/29/07 Date Received..: 04/02/08
Prep Date......: 04/08/08 Analysis Date..: 04/11/08
Prep Batch #...: 8099385
Dilution Factor: 1
% Moisture.....:

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.40	pg/g	SW846 8290
Total TCDD	1.5		pg/g	SW846 8290
1,2,3,7,8-PeCDD	ND	2.2	pg/g	SW846 8290
Total PeCDD	ND	2.2	pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	3.6 J		pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	26		pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	9.3		pg/g	SW846 8290
Total HxCDD	100		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	520		pg/g	SW846 8290
Total HpCDD	880		pg/g	SW846 8290
OCDD	4400 E		pg/g	SW846 8290
2,3,7,8-TCDF	0.64 J,CON		pg/g	SW846 8290
Total TCDF	3.9		pg/g	SW846 8290
1,2,3,7,8-PeCDF	ND	1.8	pg/g	SW846 8290
2,3,4,7,8-PeCDF	ND	1.7	pg/g	SW846 8290
Total PeCDF	32		pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	15		pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	11		pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	7.1		pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND	0.55	pg/g	SW846 8290
Total HxCDF	360		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	230		pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	16		pg/g	SW846 8290
Total HpCDF	960		pg/g	SW846 8290
OCDF	550		pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	78	(40 - 135)
13C-1,2,3,7,8-PeCDD	78	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	83	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	86	(40 - 135)
13C-OCDD	98	(40 - 135)
13C-2,3,7,8-TCDF	76	(40 - 135)
13C-1,2,3,7,8-PeCDF	79	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	74	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	80	(40 - 135)

NOTE(S):

J Estimated result. Result is less than the reporting limit.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis

TestAmerica Honolulu

Client Sample ID: HRC0152-07

Trace Level Organic Compounds

Lot-Sample #...: G8D020341-007 Work Order #...: KKLTT1AA Matrix.........: SOLID
Date Sampled...: 06/29/07 Date Received..: 04/02/08
Prep Date......: 04/08/08 Analysis Date..: 04/11/08
Prep Batch #...: 8099385
Dilution Factor: 1
% Moisture.....:

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	0.81 J,JA		pg/g	SW846 8290
Total TCDD	3.1		pg/g	SW846 8290
1,2,3,7,8-PeCDD	3.4 J		pg/g	SW846 8290
Total PeCDD	3.4		pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	5.7		pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	37		pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	16		pg/g	SW846 8290
Total HxCDD	140		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	790		pg/g	SW846 8290
Total HpCDD	1300		pg/g	SW846 8290
OCDD	6600 E		pg/g	SW846 8290
2,3,7,8-TCDF	0.59 J,JA,CON		pg/g	SW846 8290
Total TCDF	5.2		pg/g	SW846 8290
1,2,3,7,8-PeCDF	ND	2.2	pg/g	SW846 8290
2,3,4,7,8-PeCDF	ND	1.8	pg/g	SW846 8290
Total PeCDF	35		pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	18		pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	12		pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	8.9		pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND	0.69	pg/g	SW846 8290
Total HxCDF	460		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	330		pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	23		pg/g	SW846 8290
Total HpCDF	1300		pg/g	SW846 8290
OCDF	800		pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	78	(40 - 135)
13C-1,2,3,7,8-PeCDD	75	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	86	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	90	(40 - 135)
13C-OCDD	101	(40 - 135)
13C-2,3,7,8-TCDF	74	(40 - 135)
13C-1,2,3,7,8-PeCDF	78	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	76	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	89	(40 - 135)

(Continued on next page)

TestAmerica Honolulu

Client Sample ID: HRC0152-07

Trace Level Organic Compounds

Lot-Sample #...: G8D020341-007 Work Order #...: KKLTT1AA Matrix.........: SOLID

NOTE(S):

J Estimated result. Result is less than the reporting limit.

JA The analyte was positively identified, but the quantitation is an estimate.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis.

TestAmerica Honolulu

Client Sample ID: HRC0152-08

Trace Level Organic Compounds

Lot-Sample #...: G8D020341-008 Work Order #...: KKLTW1AA Matrix.........: SOLID
Date Sampled...: 06/29/07 Date Received..: 04/02/08
Prep Date......: 04/08/08 Analysis Date..: 04/16/08
Prep Batch #...: 8099385
Dilution Factor: 1
% Moisture.....:

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	1.1		pg/g	SW846 8290
Total TCDD	3.4		pg/g	SW846 8290
1,2,3,7,8-PeCDD	4.5 J		pg/g	SW846 8290
Total PeCDD	7.8		pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	8.0		pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	50		pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	22		pg/g	SW846 8290
Total HxCDD	210		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	1100		pg/g	SW846 8290
Total HpCDD	1800		pg/g	SW846 8290
OCDD	11000 E		pg/g	SW846 8290
2,3,7,8-TCDF	0.57 J,CON		pg/g	SW846 8290
Total TCDF	5.2		pg/g	SW846 8290
1,2,3,7,8-PeCDF	3.2 J		pg/g	SW846 8290
2,3,4,7,8-PeCDF	3.0 J		pg/g	SW846 8290
Total PeCDF	52		pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	24		pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	14		pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	12		pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND	1.9	pg/g	SW846 8290
Total HxCDF	640		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	480		pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	37		pg/g	SW846 8290
Total HpCDF	1600		pg/g	SW846 8290
OCDF	1200		pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	65	(40 - 135)
13C-1,2,3,7,8-PeCDD	58	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	86	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	76	(40 - 135)
13C-OCDD	92	(40 - 135)
13C-2,3,7,8-TCDF	65	(40 - 135)
13C-1,2,3,7,8-PeCDF	62	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	93	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	71	(40 - 135)

NOTE(S):

J Estimated result. Result is less than the reporting limit.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis.

TestAmerica Honolulu

Client Sample ID: HRC0152-09

Trace Level Organic Compounds

Lot-Sample #...: G8D020341-009 Work Order #...: KKLTX1AA Matrix.........: SOLID
Date Sampled...: 06/29/07 Date Received..: 04/02/08
Prep Date......: 04/08/08 Analysis Date..: 04/16/08
Prep Batch #...: 8099385
Dilution Factor: 1
% Moisture.....:

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.53	pg/g	SW846 8290
Total TCDD	ND	0.53	pg/g	SW846 8290
1,2,3,7,8-PeCDD	ND	1.4	pg/g	SW846 8290
Total PeCDD	ND	1.4	pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	3.4 J,JA		pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	29		pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	9.8		pg/g	SW846 8290
Total HxCDD	110		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	620		pg/g	SW846 8290
Total HpCDD	1000		pg/g	SW846 8290
OCDD	5100 E		pg/g	SW846 8290
2,3,7,8-TCDF	0.56 J,CON		pg/g	SW846 8290
Total TCDF	3.7		pg/g	SW846 8290
1,2,3,7,8-PeCDF	ND	2.2	pg/g	SW846 8290
2,3,4,7,8-PeCDF	3.7 J		pg/g	SW846 8290
Total PeCDF	26		pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	20		pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	8.8		pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	5.2		pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND	0.96	pg/g	SW846 8290
Total HxCDF	390		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	200		pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	15		pg/g	SW846 8290
Total HpCDF	730		pg/g	SW846 8290
OCDF	470		pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	72	(40 - 135)
13C-1,2,3,7,8-PeCDD	74	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	89	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	86	(40 - 135)
13C-OCDD	106	(40 - 135)
13C-2,3,7,8-TCDF	70	(40 - 135)
13C-1,2,3,7,8-PeCDF	70	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	93	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	98	(40 - 135)

(Continued on next page)

TestAmerica Honolulu

Client Sample ID: HRC0152-09

Trace Level Organic Compounds

Lot-Sample #...: G8D020341-009 Work Order #...: KKLTX1AA Matrix.........: SOLID

NOTE(S):

J Estimated result. Result is less than the reporting limit.

JA The analyte was positively identified, but the quantitation is an estimate.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis.

TestAmerica Honolulu

Client Sample ID: HRC0152-10

Trace Level Organic Compounds

Lot-Sample #...: G8D020341-010 Work Order #...: KKLT11AA Matrix.........: SOLID
Date Sampled...: 06/29/07 Date Received..: 04/02/08
Prep Date......: 04/08/08 Analysis Date..: 04/18/08
Prep Batch #...: 8099385
Dilution Factor: 1
% Moisture.....:

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.36	pg/g	SW846 8290
Total TCDD	ND	0.62	pg/g	SW846 8290
1,2,3,7,8-PeCDD	ND	2.4	pg/g	SW846 8290
Total PeCDD	ND	2.4	pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	4.6 J		pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	32		pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	12		pg/g	SW846 8290
Total HxCDD	120		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	700		pg/g	SW846 8290
Total HpCDD	1200		pg/g	SW846 8290
OCDD	5500 E		pg/g	SW846 8290
2,3,7,8-TCDF	0.65 J,JA,CON		pg/g	SW846 8290
Total TCDF	7.3		pg/g	SW846 8290
1,2,3,7,8-PeCDF	2.8 J		pg/g	SW846 8290
2,3,4,7,8-PeCDF	3.1 J		pg/g	SW846 8290
Total PeCDF	83		pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	25		pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	13		pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	7.1		pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND	0.67	pg/g	SW846 8290
Total HxCDF	480		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	220		pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	15		pg/g	SW846 8290
Total HpCDF	800		pg/g	SW846 8290
OCDF	420		pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	85	(40 - 135)
13C-1,2,3,7,8-PeCDD	73	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	95	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	89	(40 - 135)
13C-OCDD	88	(40 - 135)
13C-2,3,7,8-TCDF	81	(40 - 135)
13C-1,2,3,7,8-PeCDF	74	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	80	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	89	(40 - 135)

(Continued on next page)

TestAmerica Honolulu

Client Sample ID: HRC0152-10

Trace Level Organic Compounds

Lot-Sample #...: G8D020341-010 Work Order #...: KKLT11AA Matrix.........: SOLID

NOTE(S):

J Estimated result. Result is less than the reporting limit.

E Estimated result. Result concentration exceeds the calibration range.

JA The analyte was positively identified, but the quantitation is an estimate.

CON Confirmation analysis.

QC DATA ASSOCIATION SUMMARY

G8D020341

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	SOLID	SW846 8290		8099385	
002	SOLID	SW846 8290		8099385	
003	SOLID	SW846 8290		8099385	
004	SOLID	SW846 8290		8099385	
005	SOLID	SW846 8290		8099385	
006	SOLID	SW846 8290		8099385	
007	SOLID	SW846 8290		8099385	
008	SOLID	SW846 8290		8099385	
009	SOLID	SW846 8290		8099385	
010	SOLID	SW846 8290		8099385	

METHOD BLANK REPORT

Trace Level Organic Compounds

Client Lot #...: G8D020341 **Work Order #...:** KKW1D1AA **Matrix.........:** SOLID
MB Lot-Sample #: G8D080000-385
Prep Date......: 04/08/08
Analysis Date..: 04/11/08 **Prep Batch #...:** 8099385
Dilution Factor: 1

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.043	pg/g	SW846 8290
Total TCDD	ND	0.089	pg/g	SW846 8290
1,2,3,7,8-PeCDD	ND	0.17	pg/g	SW846 8290
Total PeCDD	ND	0.17	pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	ND	0.068	pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	ND	0.12	pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	ND	0.18	pg/g	SW846 8290
Total HxCDD	ND	0.23	pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	ND	0.24	pg/g	SW846 8290
Total HpCDD	ND	0.48	pg/g	SW846 8290
OCDD	ND	0.67	pg/g	SW846 8290
2,3,7,8-TCDF	ND	0.087	pg/g	SW846 8290
Total TCDF	ND	0.087	pg/g	SW846 8290
1,2,3,7,8-PeCDF	ND	0.17	pg/g	SW846 8290
2,3,4,7,8-PeCDF	ND	0.048	pg/g	SW846 8290
Total PeCDF	ND	0.17	pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	ND	0.18	pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	ND	0.11	pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	ND	0.12	pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND	0.18	pg/g	SW846 8290
Total HxCDF	ND	0.18	pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	ND	0.25	pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	ND	0.12	pg/g	SW846 8290
Total HpCDF	ND	0.25	pg/g	SW846 8290
OCDF	ND	0.18	pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	70	(40 - 135)
13C-1,2,3,7,8-PeCDD	79	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	97	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	95	(40 - 135)
13C-OCDD	88	(40 - 135)
13C-2,3,7,8-TCDF	66	(40 - 135)
13C-1,2,3,7,8-PeCDF	80	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	76	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	99	(40 - 135)

NOTE(S):
Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Client Lot #...: G8D020341 **Work Order #...:** KKW1D1AC **Matrix.........:** SOLID
LCS Lot-Sample#: G8D080000-385
Prep Date......: 04/08/08 **Analysis Date..:** 04/11/08
Prep Batch #...: 8099385
Dilution Factor: 1

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD
2,3,7,8-TCDD	**20.0**	**19.8**	**pg/g**	**99**	**SW846 8290**
1,2,3,7,8-PeCDD	**100**	**107**	**pg/g**	**107**	**SW846 8290**
1,2,3,4,7,8-HxCDD	**100**	**98.9**	**pg/g**	**99**	**SW846 8290**
1,2,3,6,7,8-HxCDD	**100**	**108**	**pg/g**	**108**	**SW846 8290**
1,2,3,7,8,9-HxCDD	**100**	**111**	**pg/g**	**111**	**SW846 8290**
1,2,3,4,6,7,8-HpCDD	**100**	**104**	**pg/g**	**104**	**SW846 8290**
OCDD	**200**	**209**	**pg/g**	**104**	**SW846 8290**
2,3,7,8-TCDF	**20.0**	**19.7**	**pg/g**	**98**	**SW846 8290**
1,2,3,7,8-PeCDF	**100**	**99.4**	**pg/g**	**99**	**SW846 8290**
2,3,4,7,8-PeCDF	**100**	**96.4**	**pg/g**	**96**	**SW846 8290**
1,2,3,4,7,8-HxCDF	**100**	**113**	**pg/g**	**113**	**SW846 8290**
1,2,3,6,7,8-HxCDF	**100**	**119**	**pg/g**	**119**	**SW846 8290**
2,3,4,6,7,8-HxCDF	**100**	**126**	**pg/g**	**126**	**SW846 8290**
1,2,3,7,8,9-HxCDF	**100**	**128**	**pg/g**	**128**	**SW846 8290**
1,2,3,4,6,7,8-HpCDF	**100**	**104**	**pg/g**	**104**	**SW846 8290**
1,2,3,4,7,8,9-HpCDF	**100**	**101**	**pg/g**	**101**	**SW846 8290**
OCDF	**200**	**212**	**pg/g**	**106**	**SW846 8290**

INTERNAL STANDARD	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	69	(40 - 135)
13C-1,2,3,7,8-PeCDD	78	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	91	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	99	(40 - 135)
13C-OCDD	94	(40 - 135)
13C-2,3,7,8-TCDF	65	(40 - 135)
13C-1,2,3,7,8-PeCDF	79	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	78	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	101	(40 - 135)

NOTE(S):
Calculations are performed before rounding to avoid round-off errors in calculated results.
Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

Trace Level Organic Compounds

Client Lot #...: G8D020341 **Work Order #...:** KKW1D1AC **Matrix.........:** SOLID
LCS Lot-Sample#: G8D080000-385
Prep Date......: 04/08/08 **Analysis Date..:** 04/11/08
Prep Batch #...: 8099385
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
2,3,7,8-TCDD	99	(77 - 133)	SW846 8290
1,2,3,7,8-PeCDD	107	(74 - 145)	SW846 8290
1,2,3,4,7,8-HxCDD	99	(68 - 146)	SW846 8290
1,2,3,6,7,8-HxCDD	108	(79 - 141)	SW846 8290
1,2,3,7,8,9-HxCDD	111	(68 - 139)	SW846 8290
1,2,3,4,6,7,8-HpCDD	104	(74 - 147)	SW846 8290
OCDD	104	(75 - 153)	SW846 8290
2,3,7,8-TCDF	98	(80 - 146)	SW846 8290
1,2,3,7,8-PeCDF	99	(84 - 143)	SW846 8290
2,3,4,7,8-PeCDF	96	(76 - 157)	SW846 8290
1,2,3,4,7,8-HxCDF	113	(78 - 141)	SW846 8290
1,2,3,6,7,8-HxCDF	119	(78 - 144)	SW846 8290
2,3,4,6,7,8-HxCDF	126	(73 - 157)	SW846 8290
1,2,3,7,8,9-HxCDF	128	(70 - 144)	SW846 8290
1,2,3,4,6,7,8-HpCDF	104	(79 - 143)	SW846 8290
1,2,3,4,7,8,9-HpCDF	101	(79 - 150)	SW846 8290
OCDF	106	(70 - 158)	SW846 8290

INTERNAL STANDARD	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	69	(40 - 135)
13C-1,2,3,7,8-PeCDD	78	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	91	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	99	(40 - 135)
13C-OCDD	94	(40 - 135)
13C-2,3,7,8-TCDF	65	(40 - 135)
13C-1,2,3,7,8-PeCDF	79	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	78	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	101	(40 - 135)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

APPENDIX E.

Biological Resources Surveys

BIOLOGICAL RESOURCES SURVEY

for the

MAALAEA MAUKA PROJECT DISTRICT 12

MAALAEA, MAUI, HAWAII

by

ROBERT W. HOBDY
ENVIRONMENTAL CONSULTANT
Kokomo, Maui
January 2005

Prepared for: Ma'alaea Properties, LLC.

BIOLOGICAL RESOURCES SURVEY
MAALAEA MAUKA PROJECT DISTRICT 12
MAALAEA, MAUI

INTRODUCTION

The Maalaea Mauka Project District 12 lies on approximately 260 acres of land northwest of Ma'alaea. It is bounded on the east by 1.5 miles of Honoapi'ilani Highway extending from Ma'alaea to the Kihei Road Junction, and on the west by a similar distance along the base of the foothills of the West Maui Mountains. Of the 260 acres, 184 acres lie in the ahupua'a of Ukumehame and 76 acres lie within the ahupua'a of Waikapu.

SITE DESCRIPTION

The entire project area is gently sloping grassland through which run four small unnamed gullys that drain toward Ma'alaea and Ma'alaea Mud Flats. Elevations range from about 200 feet above mean sea level (amsl) at the top at the northwest corner down to about 35 feet amsl at the southern tip above Ma'alaea. Annual rainfall averages 14-16 inches with the bulk occurring between the months of November and April (Armstrong 1983). Soils are of the Pulehu Cobbly Clay Loam, Ewa Cobbly Silty Clay and Ewa Silty Clay series all of which have developed from igneous alluvium, are neutral, dark brown in color and at least 60 inches deep (Foote et al, 1972).

BIOLOGICAL HISTORY

The entire project area was once a dry native shrubland with scattered trees such as wiliwili (*Erythrina sandwicensis*). It was cleared for agricultural use in the late 1800's and was cultivated for sugar cane for over 100 years. During the 1990's pineapple was cultivated for a few years, after which the area was leased out for small scale agriculture until 2003. For the past year the land has lain fallow. Little of the original vegetation remains except in the some of the small gullies.

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the proposed Maalaea Mauka Project District 12 which was conducted during January 2005. The objectives of the survey were to:

1. Document what plant, bird and mammal species occur on the property or may likely occur in the existing habitat.
2. Document the status and abundance of each species.
3. Determine the presence or likely occurrence of any native flora and fauna, particularly any that are Federally listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.
4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.
5. Note which aspects of the proposed development pose significant concerns for plants or for wildlife and recommend measures that would mitigate or avoid these problems.

BOTANICAL SURVEY REPORT

SURVEY METHODS

A walk-through botanical survey method was used following a route to ensure complete coverage of the area. Areas most likely to harbor native or rare plants such as gullies were more intensively examined. Notes were made on plant species, distribution and abundance as well as terrain and substrate.

DESCRIPTION OF THE VEGETATION

The vegetation throughout the 260 acre project area is an open grassland consisting primarily of Guinea grass (*Panicum maximum*) and buffelgrass (*Cenchrus ciliaris*), with a variety of other grass and weed species. The four unnamed gullies also contain grass and weed species but also have a few scattered kiawe (*Prosopis pallida*) trees and one gully contains about 20 small native wiliwili trees. The vegetation also contains widespread remnants of the crop species that were cultivated during recent small scale agriculture period. Twenty one such species were recorded.

A total of 95 plant species were identified. Of this total two were endemic species, wiliwili and nehe (*Melanthera lavarum*), four were indigenous species 'a'ali'i (*Dodonaea viscosa*), 'ilima (*Sida fallax*), 'uhaloa (*Waltheria indica*) and 'ilie'e (*Plumbago zeylanica*) and two were Polynesian introductions, ki (*Cordylene fruticosa*) and ko (*Saccharum officinarum*).

DISCUSSION

The vegetation throughout the project area is dominated by non-native species. This is a result of over a century of intensive agricultural activity. Only six widespread and common native species occur here. No officially listed Threatened or Endangered plants (U.S. Fish and Wildlife Service 1999) are found on the site, nor do any plants proposed as candidate for such status occur on the property.

No wetlands occur on the site. Nothing remotely approaching the three essential criteria that define a Federally recognized wetland, namely 1) hydrophytic vegetation 2) hydric soils and 3) wetland hydrology occur within this dry project area.

Because the vegetation on the site is dominated primarily by non-native plants and because there are no rare or protected native species within the project area, there is little of botanical concern and the proposed project is not expected to have a significant negative impact on the botanical resources.

RECOMMENDATIONS

It is recommended that the native wiliwili trees growing in one of the gullies be left to provide a native accent to the project development. These hardy trees are a signature species of Hawaii's dryland forests and flourish in this habitat with no care required.

PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within each of two groups: Monocots and Dicots. Taxonomy and nomenclature of the flowering plants (Monocots and Dicots) are in accordance with Wagner et al. (1999).

For each species, the following information is provided:

1. Scientific name with author citation
2. Common English or Hawaiian name.
3. Bio-geographic status. The following symbols are used:
   - endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.
   - indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
   - non-native = all those plants brought to the islands intentionally or accidentally after western contact.
4. Abundance of each species within the project area:
   - abundant = forming a major part of the vegetation within the project area.
   - common = widely scattered throughout the area or locally abundant within a portion of it.
   - uncommon = scattered sparsely throughout the area or occurring in a few small patches.
   - rare = only a few isolated individuals within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
MONOCOTS			
AGAVACEAE (Agave Family)			
Asparagus officinalis L.	asparagus	non-native	common
Cordylene fruticosa (L.) A. Chev.	*ki*	polynesian	rare
CYPERACEAE (Sedge Family)			
Cyperus rotundus L.	nut grass	non-native	rare
MUSACEAE (Banana Family)			
Musa x paradisiaca L.	banana	non-native	uncommon
POACEAE (Grass Family)			
Bambusa vulgaris Schrad.ex Wendl.	feathery bamboo	non-native	rare
Bothriochloa pertusa (L.) A. Camus	pitted beardgrass	non-native	rare
Brachiaria subquadripara (Trin.) Hitch.	--------------	non-native	rare
Cenchrus ciliaris L.	buffelgrass	non-native	abundant
Cenchrus echinatus L.	sandbur	non-native	rare
Chloris barbata (L.) Sw.	swollen fingergrass	non-native	common
Chloris virgata Sw.	feather fingergrass	non-native	rare
Cynodon dactylon (L.) Pers.	Bermuda grass	non-native	uncommon
Digitaria insularis (L.) Mex ex Ekman	sourgrass	non-native	common
Digitaria violascens Link	*kukae pua'a*	non-native	uncommon
Echinochloa colona (L.) Link	jungle rice	non-native	rare
Eleusine indica (L.) Gaertn.	wiregrass	non-native	rare
Eragrostis tenella (L.) P. Beauv.Ex Roem. & Schult.	--------------	non-native	uncommon
Panicum maximum Jacq.	Guinea grass	non-native	abundant
Pennisetum purpureum Schumach.	Napier grass	non-native	uncommon
Rhynchelytrum repens (Willd.) Hubb.	Natal redtop	non-native	uncommon

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
Saccharum officinarum L.	sugar cane	polynesian	rare
Setaria verticillata (L.) P.Beauv.	bristly foxtail	non-native	rare
Sorghum bicolor (L.) Moench	sorghum	non-native	rare
Tragus berteronianus Schult.	goatgrass	non-native	uncommon
Zea mays L.	corn	non-native	rare
DICOTS			
ACANTHACEAE (Acanthus Family)			
Asystasia gangetica (L.) T. Anderson	Chinese violet	non-native	rare
AMARANTHACEAE (Amaranth Family)			
Amaranthus spinosus L.	spiny amaranth	non-native	uncommon
Amaranthus viridis L.	spleen amaranth	non-native	rare
ANACARDIACEAE (Mango Family)			
Mangifera indica L.	mango	non-native	rare
ASTERACEAE (Sunflower Family)			
Bidens pilosa L.	Spanish needle	non-native	rare
Calyptocarpus vialis Less	-----------------	non-native	rare
Conyza bonariensis (L.) Cronq.	hairy horseweed	non-native	rare
Emilia fosbergii Nicolson	red pualele	non-native	rare
Melanthera lavarum (Gaud.)W.L.Wagner&H.Rob.	*nehe*	endemic	rare
Pluchea carolinensis (Jacq.) G. Don	sourbush	non-native	uncommon
Sonchus oleraceus L.	*pualele*	non-native	rare
Synedrella nodiflora (L.) Gaertn.	nodeweed	non-native	rare
Tridax procumbens L.	coat buttons	non-native	rare
Verbesina encelioides (Cav.) Benth. & Hook.	golden crown beard	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
Xanthium strumarium L.	*kikania*	non-native	rare
BRASSICACEAE (Mustard Family)			
Brassica oleracea L.	cabbage	non-native	rare
CAPPARACEAE (Caper Family)			
Cleome gynandra L.	wild spider flower	non-native	rare
CARICACEAE (Papaya Family)			
Carica papaya L.	papaya	non-native	rare
CHENOPODIACEAE (Goosefoot Family)			
Chenopodium murale L.	*aheahea*	non-native	rare
CONVOLVULACEAE (Morning Glory Family)			
Ipomoea batatas (L.) Lam.	sweet potato	non-native	rare
Ipomoea obscura (L.) Ker-Gawl.	---------------	non-native	rare
Ipomoea triloba L.	little bell	non-native	rare
Merremia aegyptia (L.) Urb.	hairy merremia	non-native	uncommon
CUCURBITACEAE (Gourd Family)			
Momordica charantia L.	balsam pear	non-native	rare
EUPHORBIACEAE (Spurge Family)			
Chamaecyce hirta (L.) Millsp.	hairy spurge	non-native	uncommon
Chamaecyce hypericifolia (L.) Millsp.	graceful spurge	non-native	uncommon
Manihot dulcis (J.F.Gmel.) Pax	manioc	non-native	uncommon
Ricinus communis L.	castor bean	non-native	rare
Euphorbia cyathophora J.A.Murray	Mexican fire plant	non-native	rare
Euphorbia heterophylla L.	kaliko	non-native	rare
FABACEAE (Pea Family)			
Acacia farnesiana (L.) Willd.	klu	non-native	rare
Cajanus cajan (L.) Millsp.	pigeon pea	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
Chamaechrista nictitans (L.) Moench	partridge pea	non-native	common
Crotalaria incana L.	fuzzy rattlepod	non-native	rare
Crotalaria pallida Aiton	smooth rattlepod	non-native	uncommon
Desmanthus pernambucanus (L.) Thellung	slender mimosa	non-native	uncommon
Desmodium tortuosum (Sw.) DC	Florida beggarweed	non-native	rare
Erythrina sandwicensis Degener	*wiliwili*	endemic	uncommon
Erythrina variegata L.	fastigiate wiliwili	non-native	rare
Indigofera hendecaphylla Jacq.	creeping indigo	non-native	rare
Indigofera suffruticosa Mill.	*'iniko*	non-native	rare
Leucaena leucocephala (Lam.) deWit	*koa haole*	non-native	uncommon
Macroptilium atropurpureum (DC) Urb.	----------------------	non-native	uncommon
Macroptilium lathyroides (L.) Urb.	wild bean	non-native	rare
Phaseolus vulgaris L.	string bean	non-native	rare
Prosopis pallida (Humb.&Bonpl.Ex.Willd.) Kunth	*kiawe*	non-native	uncommon
Sesbania grandiflora (L.)Kunth Poir.	katurai	non-native	rare
LAMIACEAE (Mint Family)			
Leonotis nepetifolia (L.) R.Br.	lion's ear	non-native	uncommon
LAURACEAE (Laurel Family)			
Persea americana Mill.	avocado	non-native	rare
MALVACEAE (Mallow Family)			
Abutilon grandifolium (Willd.)Sweet	hairy abutilon	non-native	uncommon
Hisbiscus esculentus L.	okra	non-native	rare
Malva parviflora L.	cheese weed	non-native	rare
Malvastrum coromandelianum (L.) Garcke	false mallow	non-native	uncommon
Sida fallax Walp.	*'ilima*	indigenous	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
Sida rhombifolia L.	----------------------	non-native	uncommon
MORACEAE (Mulberry Family)			
Allaeanthus glaber Warb.	alokon	non-native	rare
Ficus microcarpa L. fil.	Chinese banyan	non-native	rare
MORINGACEAE (Moringa Family)			
Moringa oleifera Lam.	horseradish tree	non-native	rare
MYRTACEAE (Myrtle Family)			
Syzygium cumini (L.) Skeels	Java plum	non-native	rare
NYCTAGINACEAE (Four-o'clock Family)			
Boerhavia coccinea Mill.	---------------	non-native	rare
OXALIDACEAE (Wood Sorrel Family)			
Oxalis corniculata L.	yellow wood sorrel	non-native	rare
PLUMBAGINACEAE (Leadwort Family)			
Plumbago zeylanica L.	*'ilie'e*	indigenous	rare
PORTULACACEAE (Purslane Family)			
Portulaca oleracea L.	pigweed	non-native	rare
SAPINDACEAE (Soapberry Family)			
Dodonaea viscosa Jacq.	*'a'ali'i*	indigenous	rare
SOLANACEAE (Nightshade Family)			
Nicandra physalodes (L.) Gaertn.	apple of Peru	non-native	rare
Solanum melongena L.	eggplant	non-native	rare
STERCULIACEAE (Cacao Family)			
Waltheria indica L.	*'uhaloa*	indigenous	common
VERBENACEAE (Verbena Family)			
Stachytarpheta jamaicensis (L.) Vahl	Jamaica vervain	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
Verbena littoralis Kunth	*ha'u owi*	non-native	rare
ZYGOPHYLLACEAE (Creosote Bush Family)			
Tribulus terrestris L.	puncture vine	non-native	rare

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through survey method was conducted in conjunction with the botanical survey. All parts of the project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species abundance, activities and location as well as observations of trails, tracks scat and signs of feeding. In addition an evening visit was made to the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area.

RESULTS

MAMMALS

No mammals were observed anywhere in the project area during two site visits. Tracks of a feral cat (*Felis domestica*), however, were noted within one of the small abandoned agricultural plantings. Taxonomy and nomenclature follow Tomich (1986). Dense vegetation prevented good visibility of ground dwelling animals, but a significant population of cats, mongoose (*Herpestes auropunctatus*), rats (*Rattus rattus*) and mice (*Mus musculus*) would be expected. Cats and mongoose feed on rats and mice. While rats and mice were not seen, their presence is virtually guaranteed by an abundant food supply in the form of grass seed and herbaceous vegetation. Another mammal one might possibly see in this area would be axis deer (*axis axis*). No sign of axis deer was observed on the property during either the daytime survey or the evening survey.

A special effort was made to look for the native Hawaiian hoary bat by making an evening survey of the area. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. No evidence of such activity was observed though visibility was excellent and plenty of flying insects were seen. This area does not represent ideal bat habitat and there have been no reports of bat sightings in the vicinity.

BIRDS

There was moderate birdlife diversity in this normally dry area. An ample supply of grass and herbaceous plant seeds were available following a good winter wet season. Twelve species of non-native birds, one endemic species and one migratory species were seen, most taking advantage of this seasonal food supply. Taxonomy and nomenclature follow American Ornithologist's Union (1988), Berger (1981), Pratt et al.(1987) and Hawaii Audubon Society (1989).

Nutmeg mannikin (*Lonchura puntulata*) – Several large flocks were seen feeding on seeds in the extensive grasslands.

Barred dove (*Geopelia striata*) – Many barred doves were seen and heard in the kiawe trees and in the agricultural planting remnants. Their smaller size, striated body and white flashing tails feathers when taking flight distinguish this species from the spotted dove.

Common mynah (*Acridotheres tristis*) – A few pairs of mynahs were seen throughout the area, feeding in grassy openings or transiting the area high above the trees. They are confident and assertive birds.

Gray francolin (*Francolinus pondicerianus*) – A few gray francolins were seen in ground openings and in kiawe trees, but their loud and distinctive calls were heard frequently throughout the area indicating a larger population than seen.

Spotted dove (*Streptopelia chinensis*) – Several of these large doves were seen in trees and in the small agricultural planting remnants.

Java sparrow (*Padda oryzivora*) – One large flock of these distinctively colored birds was seen feeding on grass seeds.

Black francolin (*Francolinus francolinus*) – Scattered individuals were seen but their distinctive calls were heard throughout the project area.

Cattle egret (*Bubulcus ibis*) – A few egrets were seen feeding in grassy openings during the day and a few were seen transiting over the property to their roosting areas at Kealia Pond for the night.

House sparrow (*Passer domesticus*) A few sparrows were seen in and around trees in the gullies.

Japanese white-eye (*Zosterops japonica*) – A few white-eyes were seen feeding in the kiawe where their high pitched calls were frequently heard.

House finch (*Carpodacus mexicanus*) – A few pairs of these moderately-sized, light brown finches were seen in the kiawe trees and flying between them.

Kolea or golden plover (*Pluvialis fulva*) – A few plover were seen feeding in grassy openings during the late afternoon. These migratory birds are widespread and common in Hawaii during the fall and winter months.

Skylark (*Alauda arvensis*) – A single skylark was seen in a clearing alongside an old field road.

Nene (*Nesochen sanvicensis*) – Three endemic and Endangered nene were seen feeding on herbaceous vegetation in the agricultural planting remnants. Two of these birds had leg bands indicating that they had been reared as part of an endangered species recovery program at Haleakala National Park. A fourth nene was seen during the evening survey transiting the area heading toward the southern West Maui uplands for the night.

INSECTS

While insects in general were not tallied, they were abundant throughout the area and fueled the elevated bird activity observed. Although not found on the project site one native Sphingid moth, Blackburn's sphinx moth (*Manduca blackburni*), has been put on the Federal Endangered species list and this designation requires special focus (USFWS 2000). Blackburn's sphinx moth occurs on Maui although it has not been found in this area. Its native host plants are species of 'Aiea (*Nothocestrum*) and a non-native alternative host plant is tree tobacco (*Nicotiana glauca*). There are no 'aiea on or near the project area and no tree tobacco plants were observed during the survey. No Blackburn's sphinx moth or their larvae were observed.

CONCLUSIONS

Fauna surveys are seldom comprehensive due to the short window of observation, the seasonal nature of animal activities and the unpredictable nature of their daily movements. This survey, however, should be considered fairly representative due to the abundance of food resources present throughout the area and the resulting level of animal use. All twelve non-native bird species, as well as the indigenous migratory golden plover, are widespread and common on Maui and require no special consideration. While ideal for many types of non-native animals the habitat is not suitable in its present state for most native animals, and is far removed from remnant populations. Three Endangered nene (USFWS, 1999), however, were seen feeding on herbaceous vegetation within the project area and a fourth was seen flying over during the evening. Nene are strong fliers and wide ranging in their search for food. They seem to prefer open areas with lush grasses and herbs. They often utilize pastures, golf courses, large lawns and reservoir margins. While reared in the wild, these birds can become accustomed to people and their irrigated landscapes. These birds showed no sign of nesting behavior and appeared to be using these open fields for incidental feeding activity. This habitat, while useful to nene for such feeding, is not substantially different from thousands of acres of similar pastures and fields in southern West Maui, and should not be considered critical for their survival and well being. In fact if the proposed development contains substantial irrigated open space as indicated in preliminary plans, the habitat will continue to be suitable for incidental nene use and such use will no doubt continue. No unique or special habitats were found on the property.

The proposed changes in land use should have no significant impact on the fauna in this part of Maui.

RECOMMENDATIONS

Some seabirds such as the Endangered dark rumped petrel (*Pterodroma phaeopygia sandwichensis*) and the commoner wedge-tailed shearwater (*Puffinus pacificus chlororhynchus*), nesting on the summit of Haleakala and the coastal sites of Wailea Point and Molokini respectively, leave their burrows before dawn and return after sunset. These birds can become attracted to and confused by bright lights, crash and be killed by vehicles or cats and dogs that find them. Young birds are especially vulnerable when they fledge in late fall and take their first tentative flights. It is recommended that all significant outdoor lighting in the development be hooded to direct the light downward.

ANIMAL SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Animal species are arranged in descending abundance within two groups: Mammals and Birds. For each species the following information is provided:

1. Common name
2. Scientific name
3. Bio-geographical status. The following symbols are used:
   - endemic = native only to Hawaii; not naturally occurring anywhere else in the world.
   - indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
   - non-native = all those animals brought to Hawaii intentionally or accidentally after western contact.
   - migratory = spending a portion of the year in Hawaii and a portion elsewhere. In Hawaii the migratory birds are usually in the overwintering/non-breeding phase of their life cycle.
4. Abundance of each species within the project area:
   - abundant = many flocks or individuals seen throughout the area at all times of day.
   - common = a few flocks or well scattered individuals throughout the area.
   - uncommon = only one flock or several individuals seen within the project area.
   - rare = only one or two seen within the project area.

COMMON NAME	SCIENTIFIC NAME	STATUS	ABUNDANCE
BIRDS			
Nutmeg mannikin	*Lonchura puntulata*	non-native	common
Barred dove	*Geopelia striata*	non-native	common
Common mynah	*Acridotheres tristis*	non-native	common
Gray francolin	*Francolinus pondicerianus*	non-native	uncommon
Spotted dove	*Streptopelia chinensis*	non-native	uncommon
Java Sparrow	*Padda oryzivora*	non-native	uncommon
Black francolin	*Francolinus francolinus*	non-native	uncommon
Cattle egret	*Bubulcus ibis*	non-native	rare
House sparrow	*Passer domesticus*	non-native	rare
Japanese white-eye	*Zosterops japonica*	non-native	rare
House finch	*Carpodacus mexicana*	non-native	rare
Golden plover	*Pluvialis fulva*	indigenous/migratory	rare
Skylark	*Alauda arvensis*	non-native	rare
Nene	*Nesochen sanvicensis*	endemic	rare

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BIOLOGICAL RESOURCES SURVEY

for the

MA'ALAEA MAUKA PROPOSED WASTEWATER TREATMENT PROJECT

MA'ALAEA, MAUI, HAWAII

by

ROBERT W. HOBDY
ENVIRONMENTAL CONSULTANT
Kokomo, Maui
September 2006

Prepared for: Ma'alaea Properties, LLC.

MAALAEA MAUKA PROPOSED WASTEWATER TREATMENT PROJECT MA'ALAEA , MAUI

INTRODUCTION

The Maalaea Mauka Proposed Wastewater Treatment Project lies on 120 acres of land north of Ma'alaea within TMK(2)3-6-004:003(por.). It is bounded on the east by 0.6 miles of the Honoapi'ilani Highway running north from the Kuihelani junction and on the west by a similar distance along the base of the foothills of the West Maui Mountains. This property lies entirely within the ahupua'a lands of Waikapu.

SITE DESCRIPTION

The entire project area is gently sloping agricultural land between Pohakea and Palea'ahu Streams that drain toward the Ma'alaea Mudflats and Keāli'a Pond. Elevations range from 180 ft. above sea level along Honoapi'ilani Highway at the bottom up to 360 ft. above sea level at the top of the proposed water tank site. Annual rainfall averages between 16 and 20 inches per year with the bulk falling between November and March (Armstrong, 1983). Soils are of the Pulehu Cobbly Clay Loam, Ewa Silty Clay and Stony Alluvial Land series that are all deep, dark brown, neutral to slightly alkaline soils developed from igneous alluvium washed down from the West Maui Mountains (Foote et al. 1972).

BIOLOGICAL HISTORY

In ancient times the entire project area was a dry native shrubland with scattered trees such as wiliwili (*Erythrina sandwicensis*) and 'ohe (*Reynoldsia sandwicensis*) and a variety of native shrubs, vines and grasses. It was cleared for agricultural use in the late 1800's and was cultivated for sugar cane for over 100 years. Since the 1990's part of it was cultivated for pineapple but these lands are now fallow. The remainder is still in sugar cane production. Almost none of the original native vegetation remains. The area is now covered by agricultural crop plants and field weeds.

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the proposed

Maalaea Mauka Wastewater Treatment Project which was conducted during September, 2006.

The objectives of the survey were to:

1. Document what plant, bird and mammal species occur on the property or may likely occur in the existing habitat.
2. Document the status and abundance of each species.
3. Determine the presence or likely occurrence of any native flora and fauna, particularly any that are Federally listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.
4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.
5. Note which aspects of the proposed development pose significant concerns for plants or for wildlife and recommend measures that would mitigate or avoid these problems.

BOTANICAL SURVEY REPORT

SURVEY METHODS

A walk-through botanical survey method was used following multiple routes to ensure complete coverage of the area. Areas most likely to harbor native plants such as gullies or rock outcrops were more intensively examined. Notes were made on plant species, distribution and abundance as well as terrain and substrate.

DESCRIPTION OF THE VEGETATION

The vegetation on the largest part of this project consists of old abandoned pineapple (*Ananas comosus*) fields with a large assortment of agricultural weeds such as bitter melon (*Momordica charantia*), little bell (*Ipomoea triloba*) and swollen fingergrass (*Chloris barbata*). The active sugar cane (*Saccharum officinarum*) fields are a dense montypic growth with only a few weed species along the roads. The proposed water tank site is primarily kiawe (*Prosopis pallida*), koa haole (*Leucaena leucocephala*) and buffelgrass (*Cenchrus ciliaris*).

A total of 79 plant species were recorded. Of this total, 5 were common indigenous species: koali awahia (*Ipomoea indica*), ʻilima (*Sida fallax*), ilie'e (*Plumbago zeylanica*), popolo (*Solanum americanum*) and ʻuhaloa (*Waltheria indica*) all of which are widespread in Hawaii and other countries. One, sugar cane,

is a Polynesian introduction. The remaining 73 species were agricultural weeds or escaped ornamental or landscape plants.

DISCUSSION AND RECOMMENDATIONS

The vegetation throughout the project area is dominated by agricultural and non-native weeds. This is the result of over a hundred years of intensive cultivation, burning, harvesting and plowing. Only five common indigenous plants were found scattered sparsely within the area. No officially listed Threatened or Endangered Plants Species (USFWS, 1999) were found on the property, nor were any plants proposed for such status found. No special habitats were identified.

No wetlands occur on this dry property. The ditch and reservoir adjacent to this project are by Federal definition not wetlands.

Because the vegetation is dominated by non-native species and because there are no rare, protected species or special habitats, there is little of botanical concern and the proposed project is not expected to have a significant negative impact on the botanical resources in this part of Maui.

PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within each of two groups: Monocots and Dicots. Taxonomy and nomenclature of the flowering plants (Monocots and Dicots) are in accordance with Wagner et al. (1999) and Staples and Herbst, 2005).

For each species, the following information is provided:

1. Scientific name with author citation

2. Common English or Hawaiian name.

3. Bio-geographical status. The following symbols are used:
   endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.
   indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
   non-native = all those plants brought to the islands intentionally or accidentally after western contact.

4. Abundance of each species within the project area:
   abundant = forming a major part of the vegetation within the project area.
   common = widely scattered throughout the area or locally abundant within a portion of it.
   uncommon = scattered sparsely throughout the area or occurring in a few small patches.
   rare = only a few isolated individuals within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
MONOCOTS			
AGAVACEAE			
Furcraea foetida (L.) Haworth	Mauritius hemp	non-native	rare
BROMELIACEAE (Bromeliad Family)			
Ananas comosus (L.) Merrill	pineapple	non-native	abundant
CYPERACEAE (Sedge Family)			

Cyperus rotundus L.	nut sedge	non-native	rare
POACEAE (Grass Family)			
Brachiaria subquadripara (Trin.) Hitchc.	--------------------	non-native	uncommon
Cenchrus ciliaris L.	buffelgrass	non-native	uncommon
Chloris barbata (L.) Sw.	swollen fingergrass	non-native	common
Coix lacryma-jobi L.	Job's tears	non-native	rare
Cynodon dactylon (L.) Pers.	Bermuda grass	non-native	rare
Digitaria insularis (L.) Mez ex Ekman	sourgrass	non-native	rare
Echinochloa crus-galli (L.) P. Beauv.	barnyard grass	non-native	rare
Eleusine indica (L.) Gaertn.	wiregrass	non-native	rare
Melinis minutiflora P. Beauv.	molasses grass	non-native	rare
Melinis repens (Willd.) Zizka	Natal redtop	non-native	uncommon
Panicum maximum Jacq.	Guinea grass	non-native	common
Saccharum officinarum L.	sugar cane	Polynesian	abundant
DICOTS			
ACANTHACEAE (Acanthus Family)			
Asystasia gangetica (L.) T. Anderson	Chinese violet	non-native	rare
Thunbergia fragrans Roxb.	sweet clock-vine	non-native	rare
AMARANTHACEAE (Amaranth Family)			
Amaranthus spinosus L.	spiny amaranth	non-native	uncommon
Amaranthus viridis L.	slender amaranth	non-native	rare
ANACARDIACEAE (Mango Family)			
Schinus terebinthifolius Raddi	Christmas berry	non-native	rare
APOCYNACEAE (Dogbane Family)			
Thevetia peruviana (Pers.) K. Schumann	be-still tree	non-native	rare
ASCLEPIADACEAE (Milkweed Family)			
Asclepias physocarpa (E. Mey.) Schlecter	baloon plant	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
Calotropis procera (W.Aiton) W. Aiton	small crownflower	non-native	rare
ASTERACEAE (Sunflower Family)			
Ageratum conyzoides L.	*maile hohono*	non-native	rare
Conyza bonariensis (L.) Cronq.	hairy horseweed	non-native	uncommon
Crassocephalum crepidioides (Benth.) S. Moore	------------------	non-native	rare
Emilia fosbergii Nicolson	red pualele	non-native	uncommon
Emilia sonchifolia (L.) DC.	violet pualele	non-native	rare

Flaveria trivervia (Spreng.) C. Mohr	-----------------	non-native	rare
Lactuca sativa L.	prickly lettuce	non-native	rare
Pluchea carolinensis (Jacq.) G. Don	sourbush	non-native	rare
Pluchea indica (L.) Less.	Indian fleabane	non-native	rare
Senecio madagascariensis Poir.	fireweed	non-native	rare
Synedrella nodiflora (L.) Gaertn.	nodeweed	non-native	rare
Tridax procumbens L.	coat buttons	non-native	uncommon
BIGNONIACEAE (Catalpa Family)			
Spathodea campanulata P. Beauv.	African-tulip tree	non-native	uncommon
BUDDLEIACAE (Butterfly Bush Family)			
Buddleia asiatica Lour.	dog tail	non-native	uncommon
CAPPARACEAE (Caper Family)			
Cleome gynandra L.	wild spider flower	non-native	rare
CHENOPODIACEAE (Goosefoot Family)			
Atriplex suberecta verd.	---------------	non-native	rare
CONVOLVULACEAE (Morning Glory Family)			
Ipomoea alba L.	moon flower	non-native	uncommon
Ipomoea indica (J. Burm.) Merr.	*koali awahia*	indigenous	rare
Ipomoea obscura (L.) Ker-Gawl.	-----------------	non-native	rare
Ipomoea triloba L.	little bell	non-native	common
CURCURBITACEAE (Gourd Family)			
Curcurbita pepo L.	pumpkin	non-native	rare
Momordica charantia L.	bitter melon	non-native	common
EUPHORBIACAE (Spurge Family)			
Chamaesyce hirta (L.) Millsp.	hairy spurge	non-native	uncommon
Chamaesyce hypericifolia (L.) Millsp.	graceful spurge	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
Ricinus communis L.	Castor bean	non-native	rare
FABACEAE (Pea Family)			
Acacia farnesiana (L.) Willd.	klu	non-native	rare
Canavalia cathartica Thouars	*maunaloa*	non-native	uncommon
Crotalaria incana L.	fuzzy rattlepod	non-native	uncommon
Crotalaria pallida Aiton	smooth rattlepod	non-native	rare
Crotalaria retusa L.	-----------------	non-native	rare
Desmodium totuosum (Sw.) DC.	Florida beggarweed	non-native	rare
Indogofera hendecaphylla Jacq.	creeping indigo	non-native	rare

Indigofera suffruticosa Mill.	*iniko*	non-native	rare
Leucaena leucocephala (Lam.) de Wit	*koa haole*	non-native	uncommon
Macroptilium atropurpureum (DC.) Urb.	----------------	non-native	uncommon
Neonotonia wightii (Wight & Arnott) Lackey	tineroo	non-native	rare
Prosopis pallida (Humb.& Bonpl. ex Willd) Kunth	*kiawe*	non-native	rare
Senna occidentalis (L.) Link	coffee senna	non-native	rare
LAMIACEAE (Mint Family)			
Leonotis nepetifolia (L.) R. Br.	Lion's ear	non-native	rare
MALVACEAE (Mallow Family)			
Abutilon grandifolium (Willd.) Sweet	hairy abutilon	non-native	rare
Malvastrum coromandelianum (L.) Garcke	false mallow	non-native	uncommon
Sida fallax Walp.	*'ilima*	indigenous	rare
Sida rhombifolia L.	Cuban jute	non-native	rare
NYCTAGINACEAE (Four-o'clock Family)			
Boerhavia coccinea Mill.	-----------------	non-native	common
Bougainvillea spectabilis Willd.	bougainvillea	non-native	rare
Mirabilis jalapa L.	four-o'clock	non-native	rare
ONAGRACEAE (Evening Primrose Family)			
Ludwigia octovalvis (Jacq.) Raven	primrose willow	non-native	rare
PASSIFLORACEAE (Passion Flower Family)			
Passiflora edulis Sims	passion fruit	non-native	rare
PLUMBAGINACEAE (Plumbago Family)			
Plumbago zeylanica L.	*'ili'e'e*	indigenous	rare
SOLANACEAE (Nightshade Family)			

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
Nicotiana glauca R.C. Graham	tree tobacco	non-native	rare
Solanum americanum Mill.	*popolo*	indigenous	rare
Solanum lycopersicum L.	cherry tomato	non-native	uncommon
STERCULIACEAE (Cacao Family)			
Waltheria indica L.	*'uhaloa*	indigenous	uncommon
TILIACEAE (Linden Family)			
Triumfetta semitriloba Jacq.	Sacramento bur	non-native	rare
VERBENACEAE (Verbena Family)			
Lantana camara L.	lantana	non-native	rare
ZYGOPHYLLACEAE (Creosote Bush Family)			

Tribulus terrestris L.	puncture vine	non-native	rare

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through survey method was conducted in conjunction with the botanical survey. All parts of the project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species abundance, activities and location as well as observations of trails, tracks scat and signs of feeding. In addition an evening visit was made to the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area.

RESULTS

MAMMALS

Just one mammal was observed in the project area during two site visits. Taxonomy and nomenclature follow Tomich (1986).

Feral cat (*Felis catus*) – One feral cat was seen along an old pineapple field road hunting for birds and rodents.

Dense vegetation prevented good visibility of other ground dwelling mammals, but a significant population of rats (*Rattus rattus*) and mice (*Mus domesticus*) would be expected. Rats and mice were not seen but they are known to frequent this type of habitat. Mongoose (*Herpestes auropunctatus*) are also known to frequent such habitat where they and cats feed on rodents and birds. Axis deer (*Axis axis*) are also known to occur in nearby gulches and might occasionally visit this property during night forays although no such activity or signs were observed.

A special effort was made to look for the native Hawaiian hoary bat by making an evening survey of the area. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. No evidence of such activity was observed though visibility was excellent and plenty of flying insects were seen. This area does not represent ideal bat habitat and there have been no reports of bat sightings in the vicinity.

BIRDS

There was moderate birdlife diversity observed within the project area feeding on an ample supply of seeds, insects and herbaceous vegetation. Eleven species of birds were recorded; 9 non-native species, 1 indigenous waterbird and 1 endemic goose. Taxonomy and nomenclature follow American Ornithologists' Union (2005).

Zebra dove (*Geopelia striata*) – Large flocks of these small doves were seen throughout the project area feeding on seeds along roads and in grassy clearings.

Gray francolin (*Francolinus pondicerianus*) – Families of these francolins were seen along plantation roads and on the margins of grass clearings throughout the project area.

Nutmeg mannikin (*Lonchura punctulata*) – A few flocks of these tiny brown birds were seen feeding on grass seeds in deeper grass.

Black francolin (*Francolinus francolinus*) – A few solitary black francolins were seen along field margins and calling with their distinctive buzzing voice. They are secretive and wary birds.

House sparrow (*Passer domesticus*) A couple pairs of sparrows were seen flying between bushes.

Cattle egret (*Bubulcus ibis*) – Two individual egrets were seen hunting for insects in the fallow pineapple fields.

Common myna (*Acridotheres tristis*) – A few myna were seen in the upper part of the property.

'Auku'u, Black-crowned night-heron (*Nycticorax nycticorax hoactli*) – Three herons were seen along the fringes of the adjacent reservoir at the top of the property. These are strictly waterbirds and the dry open property contains no habitat for these large birds. 'Auku'u are widespread and fairly common in Hawai'i.

Spotted dove (*Streptopelia chinensis*) – Just one of these large doves was seen within the fallow pineapple fields.

Red-creasted cardinal (Paroaria coronata) – One of these cardinals was heard calling in the kiawe trees at the top of the property during the evening survey.

Nēnē (*Branta sandvicensis*) – A flock of about 10 of these endemic nene were seen circling overhead during the evening survey. They had taken flight from the adjacent golf course and were heading up to the West Maui Mountains where they spend the night. They are attracted to the lush grasses on the golf course fairways where they feed. The subject property is too dry at this time of year to provide habitat for these birds and is less than preferred habitat at any time of year.

INSECTS

While insects in general were not tallied, they were common throughout the property. Although not found on the property, one native sphingid moth, Blackburn's sphinx moth (*Manduca blackburni*), has been put on the Federal Endangered species list and this designation requires special focus (USFWS, 2000). Blackburn's sphinx moth occurs on Maui although it has not been found in this area. Its native host plants are species of 'aiea (*Nothocestrum spp.*) and alternative host plants are tobacco (*Nicotiana tabacum*) and tree tobacco (*Nicotiana glauca*). There are no 'aiea on or near the property but a few tree tobacco were found near the top of the

property. Each of these was carefully examined and no Blackburns' sphinx moth or their lavae were found.

DISCUSSION AND RECOMMENDATIONS

Fauna surveys are seldom comprehensive due to the short window of observations, the seasonal nature of animal activities and the usually unpredictable nature of their daily movements. This survey, however, should be considered fairly representative. More lengthy surveys and at different times of the year might turn up a few additional animal species but it is unlikely that any species of environmental concern would be found. While ideal for many types of non-native mammals and birds, it is not suitable in its present state for most native animals and it is far removed from remnant populations.

The flock of nēnē, while not seen using the property, deserves comment. Nēnē are strong fliers and range widely looking for suitable feeding area. They feed on grasses and small fruits and seem to be attracted to lush golf courses, parks, lawns and the margins of reservoirs. Other open field and agricultural lands may also be occasionally used but less frequently. Thus they may occasionally use the subject property but it is not preferred habitat. Nēnē are an Endangered species and this status is in effect where ever they may be. If found on the property people should be careful not to injure or harass them.

No other Threatened or Endangered mammal, bird or insect was seen on the property. No special habitats were found either. The proposed changes in land use are thus not expected to have a significant negative impact on the fauna resources in this part of Maui.

No specific recommendations other than the general caution regarding nēnē are deemed appropriate for the fauna resources.

ANIMAL SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Animal species are arranged in descending abundance within two groups: Mammals and Birds. For each species the following information is provided:

1. Common name
2. Scientific name
3. Bio-geographical status. The following symbols are used:
   endemic = native only to Hawaii; not naturally occurring anywhere else

in the world.

indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).

non-native = all those animals brought to Hawaii intentionally or accidentally after western contact.

migratory = spending a portion of the year in Hawaii and a portion elsewhere. In Hawaii the migratory birds are usually in the overwintering/non-breeding phase of their life cycle.

4. Abundance of each species within the project area:

abundant = many flocks or individuals seen throughout the area at all times of day.

common = a few flocks or well scattered individuals throughout the area.

uncommon = only one flock or several individuals seen within the project area.

rare = only one or two seen within the project area.

MAMMALS

COMMON NAME	SCIENTIFIC NAME	STATUS	ABUNDANCE
Feral cat	*Felis catus*	non-native	rare

BIRDS

Zebra dove	*Geopelia striata*	non-native	abundant
Gray francolin	*Francolinus pondicerianus*	non-native	common
Nutmeg mannikin	*Lonchura punctulata*	non-native	uncommon
Black francolin	*Francolinus francolinus*	non-native	rare
House sparrow	*Passer domesticus*	non-native	rare
Cattle egret	*Bubulcus ibis*	non-native	rare
Common myna	*Acridotheres tristis*	non-native	rare
'Auku'u, Black-crowned night-heron	*Nycticorax nycticorax hoactli*	indigenous	rare
Spotted dove	*Streptopelia chinensis*	non-native	rare
Red-crested cardinal	*Paroaria coronata*	non-native	rare
Nene	*Branta sandwicensis*	Endemic	rare

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APPENDIX F.

Water Quality and Marine Biological Resources Survey

AECOS No. 1094

Maalaea Mauka Development: Water Quality and Marine Biology of Maʻalaea Harbor and Nearby Maʻalaea Bay

Maʻalaea aerial view from the south Photo credit: NOAA/NOS

AECOS, Inc.
45-939 Kamehameha Highway, Room 104
Kaneʻohe, Hawaiʻi 96744

September 5, 2006

Maalaea Properties is proposing to develop a residential community on a 260 acre parcel on the central Maui plain above Maʻalaea Small Boat Harbor. In 2005, *AECOS* undertook surveys of the water quality and biota of the adjacent marine area to assess "baseline" conditions. Overall, waters adjacent to the shore at Maʻalaea are generally murky with re-suspended sediments, have high nutrient levels, have most hard surfaces covered by seaweed, and support almost no live coral. Conversely, just offshore (at and exceeding about 6 ft depth), waters are generally clear, nutrient levels are lower, seaweed cover is less, and live coral cover ranges from 5% to over 50% of available hard bottom.

The water quality of northwest Maʻalaea Bay is degraded and does not meet the Water Quality Standards set by the Hawaii Department of Health for most nutrients (nitrate + nitrite, total nitrogen, and total phosphorus), chlorophyll α (an indicator of phytoplankton growth), and turbidity (an indicator of suspended sediments). These waters appear to be largely affected by groundwater inputs and not surface water run-off. However, during infrequent major storm events, surface water runoff is significant and is the primary source of particulates to nearshore waters.

New buildings, roads, and sidewalks to be built as part of this project will increase the amount of impervious surfaces in the watershed, leading to a reduction in rainfall infiltration into the ground and an increase in peak runoff. The runoff from the development project may reach the nearshore community via existing drainage systems and affect Kapoli Beach Park, Maʻalaea Small Boat Harbor, and Kanaio Beach.

The nearshore marine community of northwest Maʻalaea Bay is quite variable, ranging from the sand and mud bottom within Maʻalaea Small Boat Harbor to a reef supporting in excess of 50% coral cover found off Kanaio. The nearshore marine community is adapted to elevated levels of silt and sediment associated with runoff, especially along the shoreline and in the Harbor where many silt-tolerant species occur. However, of particular concern are the impacts on algal and coral communities that could be subjected to project associated runoff.

During the construction phase, it will be necessary to: (1) employ Best Management Practices (BMPs) to prevent soil erosion and surface runoff from getting into the Bay; (2) have detention basins in place and functional prior to other land grubbing and grading; and (3) develop a water quality monitoring program to ensure the short and long-term effectiveness of the BMPs. Limiting early site grading work to the dry season on Maui can reduce runoff impacts. If proper BMPs are employed during construction and runoff into the nearshore waters minimized, the proposed development should have minimal long-term adverse effects on the nearby marine communities.

Maalaea Mauka Development: Water Quality and Marine Biology of Ma'alaea Harbor and Nearby Ma'alaea Bay[1]

September 5, 2006 *AECOS* No. 1094

Katie Laing, Al Cattell, Eric Guinther, and Susan Burr
AECOS, Inc.
45-939 Kamehameha Highway, No. 104
Kaneohe, Hawai'i 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: AECOS@AECOS.com

Introduction

Ma'alaea Properties, LLC is proposing the development of a 260 acre parcel on the central Maui plain above Ma'alaea Small Boat Harbor, Wailuku District, Island of Maui, Hawai'i (Fig. 1). The now vacant agricultural lands proposed for development are on the mauka side of Honoapiilani Highway, beginning near the intersection of Honoapiilani and Kuihelani highways and extending southwest nearly to the west intersection of Honoapiilani Highway and Ma'alaea Road (Fig. 2).

The proposed project includes construction of a residential development with approximately 950 single family and multi-family dwelling units and some 27 acres set aside for open space. The creation of buildings, roads, and sidewalks will increase the impervious surfaces and lead to a reduction in rainfall infiltrated into the ground. Increased peak runoff flow from the development is to be addressed by a series of drainage detention basins on the mauka (mountain) side of Honoapiilani Highway (M & E Pacific, 2005).

The purpose of this report is to identify sensitive biological resources in the nearby marine environment that may be potentially impacted by runoff associated with the proposed development. This report includes results from a marine biological survey and water quality sampling in nearshore waters of Ma'alaea Bay and Ma'alaea Small Boat Harbor into which drainage from the project area may flow. The survey

[1] This document has been prepared for Ma`alaea Properties, LLC for inclusion in an Environmental Assessment entitled "Environmental Impact Statement for Proposed Maalaea Mauka Residential Subdivision" and will therefore become part of the public record.

area spans the coastline from Kapoli Park, west of the Boat Harbor, to Kanaio drainage ditch and includes the Boat Harbor itself.

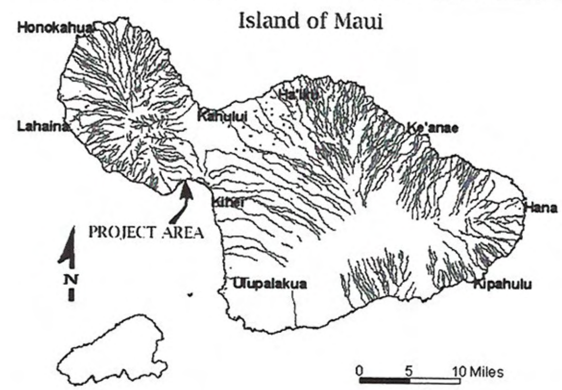

Figure 1. Project location at Ma'alaea on the Island of Maui.

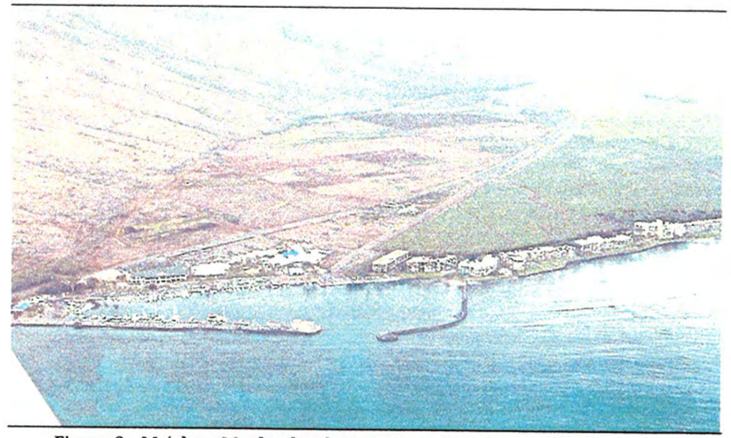

Figure 2. Ma'alaea Mauka development would be located in the area of agricultural lots across Honoapiilani Highway from Ma'alaea (upslope, behind the harbor in this aerial photograph from NOAA/NOS, 2003).

Methods

Water Quality Survey

Water quality samples were collected for this survey on three different occasions (September 9, 2005; January 12, 2006; and June 2, 2006) on four nearshore transects in the vicinity of potential drainage discharges from the Maalaea Mauka Project area. Each transect included a shoreline station and a station at or close to the 6 ft (2 m) depth contour directly offshore from the shoreline station (Fig. 3). These water samples were collected to update an existing data base on water quality conditions in and near Ma'alaea Small Boat Harbor where potential drainage discharges from the project would go.

Water samples were analyzed for physical parameters (salinity, temperature, pH, dissolved oxygen, turbidity, and total suspended solids), for nutrients (ammonia, nitrate+nitrite, total nitrogen and total phosphorus), and for chlorophyll α. Temperature, pH, salinity, and dissolved oxygen (DO) were measured in the field. Samples for turbidity, salinity, total suspended solids (TSS), nutrients and chlorophyll were collected in appropriate containers, placed on ice, and taken to *AECOS*, Inc. laboratory on O'ahu for analyses. The analytical methods and instruments used on these samples are presented in Table 1.

Table 1. Analytical methods used in the water quality sampling program for the Ma`alaea Mauka Project.

Analysis	Method	Reference	Instrument
Ammonia	alkaline phenol	Karoleff in Grasshoff et al. (1986)	Technicon AutoAnalyzer II
Chlorophyll α	10200 H	Standard Methods, 18th Edition (1992)	Turner Model 112 fluorometer
Dissolved Oxygen	EPA 360.1	EPA (1979)	YSI Model 550 DO meter
Nitrate + Nitrite	EPA 353.2	EPA (1993)	Technicon AutoAnalyzer II
pH	EPA 150.1	EPA (1993)	SA 250
Salinity	bench salinometer	Grasshoff in Grasshoff et al. (1986)	AGE Model 2100 salinometer
Temperature	Thermister calibrated to NBS cert. thermometer (EPA 170.1)	EPA (1979)	YSI Model 550 DO meter
Total Nitrogen	persulfate digestion/EPA 353.2	D'Elia et al. (1977) / EPA (1993)	Technicon AutoAnalyzer II

Table 1 (continued).

Analysis	Method	Reference	Instrument
Total Phosphorus	persulfate digestion/EPA 365.1	Karoleff in Grasshoff et al. (1986)/EPA (1993)	Technicon AutoAnalyzer II
Total Suspended Solids	Method 2540D (EPA 160.2)	Standard Methods 18th Edition (1992); EPA (1979)	Mettler H31 balance
Turbidity	Method 2130B (EPA 180.1)	Standard Methods 18th Edition (1992); EPA (1993)	Hach 2100P Turbidimeter

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Marine Biological Survey

On September 30, 2005 a marine reconnaissance survey was undertaken by AECOS biologists snorkeling three areas likely to be impacted by storm water runoff originating from the project area. These survey areas are shown in Fig. 3 and, from west to east, are referred to as south breakwater, east of east breakwater, and Kanaio drainage. Species of macroalgae and marine animals observed in each of the three areas were recorded and estimates of relative abundances noted. The faunal survey included species of fishes, coral, and other macro-invertebrates. Cryptic and nocturnal species were likely not encountered or noted during this daytime survey.

To survey the south breakwater area, biologists snorkeled from Kapoli Beach Park parallel to the breakwater and out to the 6 ft (2 m) depth contour. To survey the east of east breakwater area, biologists started adjacent to the Maalaea Kai condominium and swam perpendicular to shore out to the 6 ft (2 m) depth contour. To survey the Kanaio drainage ditch area, biologists swam perpendicular to the shoreline beginning on either side of a shallow shoal between Island Sands and Banyans condominiums and out to the 6 ft (2 m) depth contour.

Most specimens encountered were identified in the field based on the experience of the biologists and various published texts: algae were identified using Magruder and Hunt (1979), Abbott (1999), and Abbott and Huisman (2004); coral species were identified using Fenner (2005), macroinvertebrates were identified using Hoover (1998); and fish species were identified using Randall (1996) and Hoover (1993).

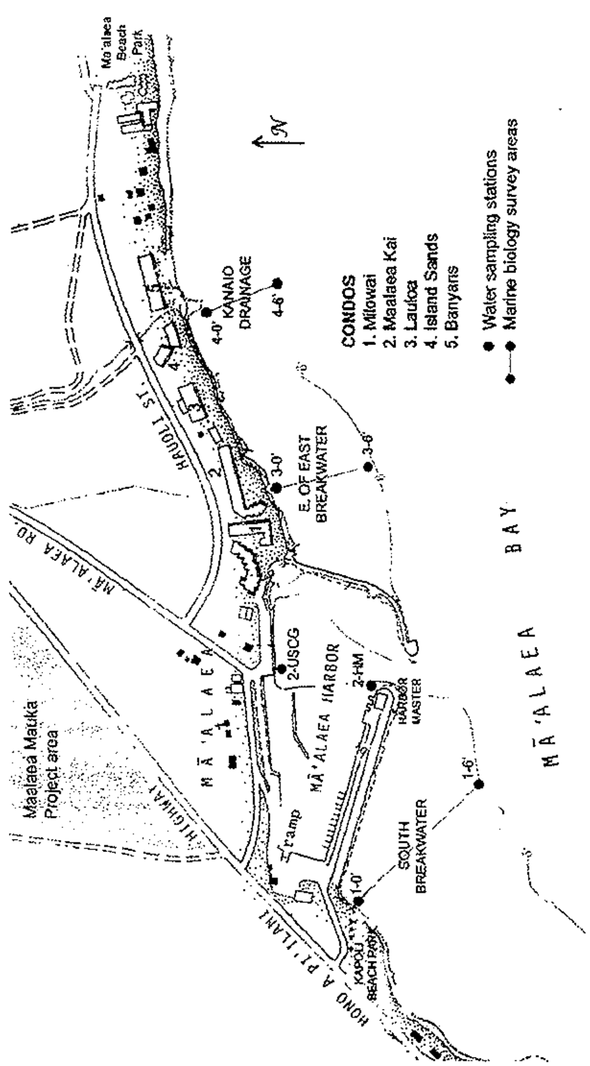

Figure 3. Location of the September 30, 2005 marine biological survey areas and water quality sample stations for the Maalaea Mauka Project (base map from *AECOS*, 1980).

Water Quality

Ma'alaea Bay is a large open bight on the southern coast of Maui. Bay waters are subject to the water quality standards and criteria of Hawaii Administrative Rules Title 11, Department of Health Chapter 54, Water Quality Standards (HDOH, 2004) and classified as Class A open coastal waters. Ma'alaea Boat Harbor is classified by these State regulations as a Class A embayment. The objective of Class A waters is that their use for recreational purposes and aesthetic enjoyment be protected. Any other use shall be permitted as long as it is compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters (HDOH, 2004).

Historical Review

Department of Health monitoring

The Hawaii Department of Health (HDOH) maintains a coastal water quality monitoring program that includes Ma'alaea Boat Harbor and several beaches along the east side of Ma'alaea Bay between Kihei and Makena. Water quality data for these sites were obtained from the EPA STORET database (USEPA, 2005) and are described herein based on sampling off four beaches along the Kihei-Wailea coastline of Ma'alaea Bay and southward. These beach locations are indicated in Figure 4. The data are summarized in Table 2 and represent samples collected between 1990 and 2005.

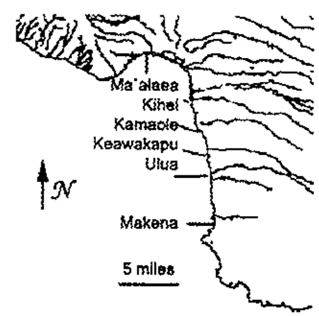

Figure 4. The four beach (Kihei, Kamaole, Keawakapu, and Ulua) and Ma'alaea Boat Harbor locations where water quality data were collected by HDOH in Ma'alaea Bay on the Island of Maui.

Table 2. Historic water quality data from selected nearshore areas along the Ma'alaea-Kihei-Makena coast (after USEPA, 2005).

Location (Collection Period)		Salinity (ppt)	Temp. (°C)	DO sat. (ppt)	pH	Turbidity (ntu)	NO_3+NO_2 (µg N/l)	Total N (µg N/l)	Total P (µg P/l)	Chl. α (µg/l)
Ma'alaea Boat Harbor (9/90 - 01/06)	mean	34.00	25.0	96	8.2	3.80	33.4	218	21.8	0.77
	range	31.0 - 35.4	18.7 - 28.2	55 - 134	7.6 - 8.8	0.6 - 142	0.5 - 200	100 - 530	11.0 - 100	0.10 - 19.4
	n	*403*	*328*	*289*	*181*	*308*	*51*	*26*	*41*	*50*
Kihei Beach Park (09/89 - 08/90)	mean	28.63	22.3	80	8.1	2.30	82	402	55.0	64.50
	range	21.90 - 31.50	19.0 - 26.8	45 - 130	8.0 - 8.1	0.48 - 5.09	10 - 560	100 - 860	31 - 96	4.40 - 417
	n	*12*	*12*	*12*	*10*	*10*	*12*	*9.0*	*12*	*12*
Kamaole Beach (09/90 - 12/98)	mean	34.08	24.7	72	8.2	0.66	44	147	10.2	0.52
	range	32.00 - 35.00	19.0 - 28.6	72 - 86	7.2 - 8.9	0.05 - 4.2	2.7 - 232	71 - 316	5.0 - 24	0.07 - 10.3
	n	*113*	*62*	*51*	*53*	*38*	*41*	*41*	*25*	*50*
Keawakapu Beach (09/90 - 12/98)	mean	34.57	24.6	87	8.2	0.92	28	126	9.7	0.91
	range	33.00 - 35.20	19.3 - 28.8	71 - 112	7.7 - 8.9	0.15 - 3.0	1.6 - 105	71 - 360	3.7 - 22	0.08 -11.1
	n	*106*	*55*	*43*	*47*	*31*	*41*	*41*	*41*	*41*
Ulua Beach (09/90 - 12/98)	mean	34.44	25.0	108	8.2	0.87	45	142	9.4	0.66
	range	32.73 - 35.20	19.20 - 29.3	89 - 134	7.2 - 8.9	0.22 - 6.00	4.6 - 351	15.9 - 460	2.5 - 112	0.04 - 0.66
	n	*110*	*61*	*49*	*52*	*37*	*40*	*49*	*40*	*48*

Average salinity levels and temperature values were quite similar at all of the monitored stations with the exception of Kihei Beach Park where both salinity and temperature means were notably lower. Salinity was consistently low at Kihei Beach Park as indicated by the range of salinities over the monitoring period (21.9 - 31.5 ppt) and indicates that there is a more or less continuous input of fresh water at this location. The average pH at Kihei Beach Park was also slightly lower than the other three locations. Mean dissolved oxygen (DO) saturation levels were quite variable between the four stations. Geometric mean values for turbidity ranged from a low of 0.66 ntu at Kama'ole Beach to a high of 3.80 ntu in Ma'alaea Boat Harbor. The lowest geometric mean nutrient levels occurred at Kama'ole Beach and the highest at Kihei Beach Park, while the lowest chlorophyll levels were noted at Ulua Beach and the highest at Kihei Beach Park.

Table 3. A summary of the physical water quality parameters measured in the nearshore waters of Ma'alaea Bay and Ma'alaea Small Boat Harbor (*AECOS*, 1994).

Station		Salinity (ppt)	Temp. (°C)	DO sat. (%)	pH	Turbidity (ntu)	TSS (mg/l)
1 - 0							
	mean	33.63	25.5	112	8.43	2.48	5.2
	range	33.34 - 33.88	24.2 - 26.5	103 - 122	8.42 - 8.44	1.65 - 3.21	4.2 - 7.4
	n	*3*	*3*	*2*	*3*	*3*	*3*
1 - 6							
	mean	34.40	25.3	95	8.29	0.77	2
	range	34.27 - 34.57	---	---	8.20 - 8.41	0.68 - 1.01	1.5 - 3.4
	n	*5*	*1*	*1*	*3*	*6*	*5*
2 - USGS							
	mean	32.43	25.5	87	8.22	3.11	5.7
	range	32.15 - 32.63	25.3 - 25.8	83 - 90	8.20 - 8.24	2.02 - 4.85	5.5 - 6.0
	n	*3*	*3*	*2*	*3*	*3*	*3*
2 - HM							
	mean	33.54	25.8	94	8.28	1.46	2.9
	range	33.41 - 33.77	25.6 - 26.0	91 - 98	8.26 - 8.30	1.24 - 1.64	2.6 - 3.3
	n	*3*	*3*	*2*	*3*	*3*	*3*
3 - 0							
	mean	29.59	26.7	189	8.59	2.67	6.4
	range	27.45 - 33.79	26.5 - 27.0	173 - 205	8.50 - 8.70	1.40 - 5.08	4.1 - 10.1
	n	*3*	*3*	*2*	*3*	*2*	*2*
4 - 0							
	mean	33.5	25.7	105	8.33	3.58	12.1
	range	---	---	---	---	---	---
	n	*1*	*1*	*1*	*1*	*1*	*1*

Maui Ocean Center

AECOS prepared an Environmental Assessment for Maalaea Triangle and Maui Ocean Center (*AECOS*, 1994) and collected samples from several of the same stations that were sampled during the present survey. The water quality results from this earlier survey are presented in Tables 3 (above) and 4. Note that in these tables station designations from the earlier survey have been changed to correspond to station naming convention used in the present survey.

Table 4. A summary of the nutrient and chlorophyll water quality parameters measured in the nearshore waters of Ma'alaea Bay (*AECOS*, 1994).

Station	NH_3 (µg N/l)	NO_3+NO_2 (µg N/l)	TN (µg N/l)	TP (µg P/l)	Chl. α (µg/l)
1 - 0					
mean	7	24	168	14	1.00
range	5 - 9	12 - 51	137 - 201	11 - 15	0.84 - 1.12
n	3	3	3	3	3
1 - 6					
mean	2	22	137	15	0.39
range	2 - 3	16-26	128 - 153	10 - 21	0.24 - 0.52
n	3	3	3	3	3
2 - USGS					
mean	19	217	342	39	1.08
range	15 - 22	192 - 264	315 - 399	34 - 44	0.91 - 1.35
n	3	3	3	3	3
2 - HM					
mean	12	82	219	21	0.83
range	10 - 13	69 - 98	205 - 226	20 - 21	0.61 - 1.35
n	3	3	3	3	3
3 - 0					
mean	6	171	446	35	2.45
range	<1 - 24	61 - 320	361 - 511	28 - 48	2.04 - 2.94
n	3	3	3	3	2
4 - 0					
mean	5.5	88	232	32	3.7
range	5 - 6	70 - 111	196 - 275	21 - 48	---
n	2	2	2	2	1

Salinity levels in the, 1994, study ranged from a low of 27.45 ppt at Sta. 3-0 to a high of 34.57 ppt at Sta. 1-6, while mean temperature varied from 24.2 °C at Sta. 1-0 to 27.0 °C at Sta. 2-USGS (Table 2). pH ranged from a low of 8.20 at Sta. 1-6 and Sta. 2-USGS to a high of 8.70 at Sta. 3-0. Dissolved oxygen (DO) saturation levels were quite variable with a range from 83% of saturation at Sta. 2-USGS to 205% at Sta. 3-0. Turbidity values ranged from 0.68 ntu at Sta. 1-6 to 5.08 ntu at Sta. 3-0, while total suspended solids (TSS) varied from 1.5 mg/l at Sta. 1-6 to 12.1 mg/l at Sta.4-0.

Ammonia concentrations ranged from undetectable at Sta. 3-0 to 24 µg/l at the same station. Nitrate + nitrite concentrations were variable, ranging from 12 µg N/l at Sta. 1-0 to 320 µg N/l at Sta. 3-0. Total nitrogen (TN) varied from 137 µg N/l at Sta. 1-0 to 511 µg N/l at Sta. 3-0, while total phosphorus (TP) varied from 10 µg P/l

at Sta. 1-6 to 48 µg P/l at Sta. 3-0 and Sta. 4-0. Chlorophyll ranged from 0.24 µg/l at Sta. 1-6 to 3.7 µg/l at Sta. 4-0.

Maui and Molokai TMDL

A DOH project entitled "Maui and Molokai TMDL" (TMDL = Total Maximum Daily Load) included (in addition to other locations on Maui and Moloka'i) a series of sampling events at stations scattered along the shoreline of Ma'alaea Bay from Ma'alaea Boat Harbor in the northwest to Keawakapu (see Fig. 4) in the south (Laws, 2001). These samples were collected mostly at the mouths of drainage discharge points between December 2000 and March 2001. The results from these sampling events are presented in Table 5.

Table 5. Geometric mean concentrations of water quality parameters at nearshore stations in the Ma'alaea/Kihei area (after Laws, 2001).

Station	Salinity (ppt)	Tubidity (ntu)	TSS (mg/L)	TDP† (µg P/L)	NO_3+NO_2 (µg N/L)	NH_3 (µg N/L)	TDN† (µg N/L)	Chl. α (µg/L)
Ma'alaea harbor	31.3	9.7	35.1	17.98	208.6	5.2	402	5.1
Kealia Pond	35.4	1.4	20.3	6.51	2.8	1.0	113	0.5
Mokulele	34	3.4	33.1	9.92	56	1.3	234	1.5
Kaunoulu	30.9	9.6	47.9	8.99	247.8	1.5	389	1.8
Kalepolepo Pond	32.6	5.2	29.9	7.13	75.6	2.8	234	1.4
Kulanihakoi	32.3	23.7	64.9	9.3	100.8	5.2	281	3.3
Luana Kai	33.1	16.1	45.7	6.82	29.4	8.7	218	1.4
South Lipoa	32.8	8.8	35.6	7.13	8.4	1.5	147	0.9
Kalama Park	34	20.7	57.7	8.68	8.4	6.0	182	3.2
Cove Park	32.7	6.5	33.6	18.6	134.4	1.1	295	2.3
Maui Coast	34.9	1.8	22.3	8.37	15.4	1.3	125	0.7
South Kamaole II	35.1	1.1	21.4	9.92	18.2	1.5	123	0.6
Kihei Boat Ramp	28.2	3.3	22.8	8.99	291.2	1.4	759	1.4
Keawakapu	35.3	1.2	21.5	7.13	19.6	1.4	140	0.8

† TDP and TDN represent total dissolved phosphorus and nitrogen respectively as opposed to total phosphorus and total nitrogen and therefore are not directly comparable with State water quality criteria or other nitrogen and phosphorus values presented in this report.

In general, the values reported by Laws fall within the ranges reported elsewhere in this document with several exceptions. The TSS results are unrealistically high and likely caused by some procedural or analytical error. Typically such values suggest that the filters were not well washed with distilled water prior to drying, so the weight of the salt on the filter is included in the suspended solids weight. Another common source of deviation from typical values comes from sampling in the surf zone, which causes fine sand to be incorporated in the TSS sample (not an error, but results in elevated TSS and poor correspondence between TSS and turbidity). The mean nitrate + nitrite concentration in Ma'alaea Boat Harbor is high compared with other studies at this location. This result might be from the specific sampling site; i.e., samples collected closer to the actual land discharge site compared with the other surveys. The values reported for total dissolved phosphorus and nitrogen are expectedly low compared with other surveys which measured total phosphorus and total nitrogen levels (i.e., both dissolved and particulate fractions) as required by HDOH protocols. Based on the results of his study, Laws (2001) concluded that much of the nutrient enrichment occurring in the coastal waters of Ma'alaea Bay was related to groundwater inputs.

2005-2006 (Present) Survey

The results from the 2005-06 sampling events are presented in Table 6. Salinity was consistently lower at the shoreline stations (Sta. 1-0, Sta. 2-USCG, Sta. 3-0 and Sta. 4-0) compared with those stations along the 6 ft (2 m) depth contour (Table 6). Also, at the shoreline stations, average salinity tended to decrease from west to east; i.e., from Sta. 1-0 to Sta. 4-0, except at Station 3-0 which had the lowest mean salinity. Average salinity at the 6 ft (2 m) contour stations did not show such a trend. Temperature values did not show any trends moving away from the shoreline, but average temperature values did increase from west to east at the shoreline stations.

Dissolved oxygen (DO) saturation levels were generally higher at the shoreline stations when compared with stations further out, except within Ma'alaea Boat Harbor where the average DO saturation level was higher at Sta. 2-HM nearer the harbor mouth. pH did not demonstrate any particular trends, ranging from a low of 7.81 at Sta.3-0 to a high of 8.42 at Sta. 4-0. Particulate levels (turbidity and TSS) were consistently higher at the shoreline stations when compared with the 6 ft (2 m) depth contour stations.

Table 6. Physical water quality characteristics in Ma'alaea Bay and Harbor from the 2005-06 survey.

Station / Date	Salinity (ppt)	Temp (°C)	DO sat. (%)	pH	Turbidity (ntu)	TSS (mg/l)
1 - 0						
9-Sep-05	35	26.7	101	8.26	2.76	8.8
12-Jan-06	33.1	23.2	93	8.11	1.70	7.6
2-Jun-06	33.95	24.8	99	8.07	4.38	11.3
Mean	**34.0**	**24.9**	**98**	**8.15**	**2.74**	**9.1**
1 - 6						
9-Sep-05	35	26.5	90	8.15	0.74	5.6
12-Jan-06	34.5	23.6	91	8.14	1.04	2.5
2-Jun-06	34.40	24.7	95	8.04	2.38	11.4
Mean	**34.6**	**24.9**	**92**	**8.11**	**1.22**	**5.4**

Table 6 (continued).

Station / Date	Salinity (ppt)	Temp (°C)	DO sat. (%)	pH	Turbidity (ntu)	TSS (mg/l)
2 - USCG						
9-Sep-05	35	27.0	89	8.13	1.42	5.3
12-Jan-06	34.0	23.5	85	8.12	0.84	4.9
2-Jun-06	32.57	25.2	92	8.02	4.24	14.7
Mean	**33.7**	**25.2**	**89**	**8.09**	**1.72**	**7.3**
2 - HM						
9-Sep-05	35	26.6	90	8.15	0.88	5.1
12-Jan-06	34.3	23.5	92	8.16	0.82	2.8
2-Jun-06	33.80	25.0	92	8.02	3.60	14.2
Mean	**34.4**	**25.0**	**91**	**8.11**	**1.37**	**5.9**
3 - 0						
9-Sep-05	34	27.9	147	8.34	1.40	9.1
12-Jan-06	30.3	24.3	71	7.81	3.72	13.6
2-Jun-06	32.12	25.5	117	8.18	3.07	13.7
Mean	**32.1**	**25.9**	**112**	**8.11**	**2.52**	**11.9**
3 - 6						
9-Sep-05	35	27.6	84	8.20	0.65	3.9
12-Jan-06	33.6	23.5	96	8.18	0.92	5.2
2-Jun-06	34.66	25.1	99	8.13	1.19	5.7
Mean	**34.4**	**25.4**	**93**	**8.17**	**0.89**	**4.9**
4 - 0						
9-Sep-05	34	27.7	145	8.42	2.53	11.1
12-Jan-06	30.1	25.5	96	8.05	3.58	31.8
2-Jun-06	32.83	26.8	105	8.16	2.95	14.8
Mean	**32.3**	**26.7**	**115**	**8.21**	**2.99**	**17.4**
4 - 6						
9-Sep-05	35	27.6	93	8.22	0.67	6.3
12-Jan-06	32.9	24.1	104	8.16	1.11	5.0
2-Jun-06	34.58	25.7	96	8.11	1.50	8.8
Mean	**34.2**	**25.8**	**98**	**8.16**	**1.04**	**6.5**

The results of nutrient and chlorophyll α analyses are presented in Table 7. Ammonia nitrogen, an intermediate breakdown product of organic nitrogen, was not present in detectable amounts except at Sta. 3-0 and Sta. 4-0 and then only when salinity levels were <32 ppt (see Table 6), indicating an ammonia source either from groundwater inputs or surface water runoff to these nearshore waters. Shoreline station means for nitrate+nitrite, total nitrogen (TN) and total phosphorus (TP) were greater when compared with the 6 ft (2 m) depth contour stations, except in Ma'alaea Harbor (i.e., Sta. 2-USCG & Sta. 2-HM), demonstrating an influence of terrestrial inputs on these nutrients. Similarly, there was an increase in mean concentration for these nutrients from west to east at the shoreline stations.

Table 7. Nutrient and chlorophyll *a* water quality characteristics in Ma'alaea Bay and Harbor for 2005-2006.

Station / Date	NH_3 (µg N/l)	NO_3+NO_2 (µg N/l)	TN (µg N/l)	TP (µg P/l)	Chl. *a* (µg/l)
Sta. 1 - 0					
9-Sep-05	<1	52	202	17	1.72
12-Jan-06	<1	46	179	18	3.38
2-Jun-06	<1	21	175	22	2.50
Mean	**<1**	**37**	**185**	**19**	**2.44**
Sta. 1 - 6					
9-Sep-05	<1	16	138	12	0.41
12-Jan-06	<1	17	161	15	1.04
2-Jun-06	<1	5	163	21	1.93
Mean	**<1**	**11**	**154**	**16**	**0.94**
Sta. 2 - USCG					
9-Sep-05	<1	97	247	21	0.53
12-Jan-06	<1	61	173	17	0.64
2-Jun-06	<1	71	250	30	4.00
Mean	**<1**	**75**	**220**	**22**	**1.11**
Sta. 2 - HM					
9-Sep-05	<1	221	403	36	0.56
12-Jan-06	<1	72	199	16	0.69
2-Jun-06	<1	274	429	55	2.84
Mean	**<1**	**163**	**325**	**32**	**1.03**
Sta. 3 - 0					
9-Sep-05	<1	64	230	17	3.62
12-Jan-06	130	252	835	73	21.1
2-Jun-06	<1	186	440	55	5.05
Mean	**3.2**	**144**	**439**	**41**	**7.28**
Sta. 3 - 6					
9-Sep-05	<1	14	146	12	0.37
12-Jan-06	<1	84	188	11	1.80
2-Jun-06	<1	3	137	19	0.84
Mean		**15**	**156**	**14**	**0.82**

Table 7 (continued).

Station / Date	NH3 (µg N/l)	NO3+NO2 (µg N/l)	TN (µg N/l)	TP (µg P/l)	Chl. a (µg/l)
Sta. 4 - 0					
9-Sep-05	11	292	524	36	5.40
12-Jan-06	10	412	692	71	27.10
2-Jun-06	<1	161	374	35	6.45
Mean	**3.8**	**269**	**514**	**45**	**9.81**
Sta. 4 - 6					
9-Sep-05	<1	13	156	12	0.80
12-Jan-06	<1	161	266	16	2.54
2-Jun-06	<1	5	153	17	1.02
Mean	**<1**	**22**	**185**	**15**	**1.27**

Chlorophyll *a* distribution was similar to that for nitrate + nitrite, TN and TP with higher concentrations close to the shore and a trend of increasing concentration in the nearshore waters from west to east, exceptions being the Ma'alaea Harbor stations.

To determine if a correlation between salinity and the other water quality parameters exists, a coefficient of determination (the square of the correlation coefficient) was calculated for salinity with each of the other measured water quality parameters (Table 8). The coefficient of determination estimates the amount of variation that can be attributed to the causative parameter—in this case salinity. Thus, while salinity had little effect on the physical parameters measured (i.e., temperature, DO, pH and particulates), it accounted for at least 70 percent of the variation in nitrate+nitrite, TN, TP, and chlorophyll concentrations thus demonstrating the influence of salinity—in this case, terrestrial freshwater inputs—on these particular water quality parameters.

Table 8. A comparison of the correlation coefficient (r) and coefficient of determination (r^2) between salinity and the other water quality parameters.

Coefficient	Temp	DO	DO sat.	pH	Turbidity	TSS
R	0.254	-0.166	-0.094	0.353	-0.655	-0.730
r^2	0.06	0.03	0.01	0.12	0.43	0.53

Coefficient	NH_4	NO_3+NO_2	TN	TP	Chl. *a*
R	-0.551	-0.836	-0.879	-0.852	-0.836
r^2	0.30	0.70	0.77	0.73	0.70

Marine Biology

Ma'alaea Bay

Ma'alaea Bay is used extensively for public recreation and offers easily accessible reef and offshore areas for pleasure divers and fisherman alike. Ma'alaea Small Boat Harbor is one of only two berthing areas for small craft on Maui. The harbor is the home port of a sport charter fishing fleet, a small commercial fishing fleet, whale watching tour boats, as well as Maui headquarters of the U. S. Coast Guard. The harbor also has a launch ramp which is heavily used by Maui's trailer-boat fishermen (*AECOS*, 1980; 1994).

Historically, the shallow water fauna of western Ma'alaea Bay was considered unusual in several respects. A large number of species uncommon elsewhere were found to be relatively common in Ma'alaea Bay. The variety of sponges and bryozoans, and the highly diverse assemblage of gastropod mollusks historically made Ma'alaea Bay an area of special interest for nature study, photography, and scientific research (Maciolek, 1971). Degraded in recent decades, the current status of these special biological resources in is largely unknown (see Butler, 1975).

The long, continuous sand beach east from Kanaio is readily accessible to the public. The small shore break allows easy entry along its entire length. The ocean is relatively calm, and currents are relatively weak, allowing easy access into the water and safe swimming. The shallow waters, less than 30 ft (10 m) deep, between Kanaio and Palalau (by Kealia Pond) are considered best for snorkeling and diving because of the highly diverse flora and fauna and seasonally clear waters (Clark, 1980). The waters off Kapoli Park (west of the boat harbor) are also used by snorkelers.

At least two reef flat areas near the harbor are popular with *limu* (edible seaweed) gatherers: the shallows off and south of Kapoli Park and the reef flat off Ma'alaea Beach Park (Figure 3). Several popular seaweeds such as *limu manauea* (*Gracilaria coronopifolia*) and *limu huluhuluwaena* (*Grateloupia filicina*) are sought in these areas (McDermid, 1990).

Ma'alaea Bay is within the boundaries of the Hawaiian Islands Humpback Whale National Marine Sanctuary. The sanctuary was established in 1992 to protect endangered humpback whales (*Megaptera novaengliae*) and their habitat (HIHWNMSA, 2005).

Waters off Kapoli Beach Park

The marine reef environment found off of Kapoli Beach Park and Ma'alaea Boat Harbor's south breakwater (essentially southwest of the harbor) have been surveyed

by *AECOS* (2005a, 2005b, 1994), USFWS (1993), McDermid (1990), Brewer (1987), Kinzie (1972), and Maciolek (1971). Images representative of the area in 2005 are provided below as Fig. 5 and biological data are presented in the appendix.

The shoreline at Kapoli Beach Park is a mixed sand and basalt boulder beach, with intertidal boulders near the water line supporting the algae, *Ahnfeltia concinna* and *Chaetomorpha antennina* (present survey; *AECOS*, 1994). Subtidally, the same algal grouping exists with the exception of *C. antennina* which drops out and is replaced by *Ulva fasciata* and *Sargassum echinocarpum* (Fig. 5b). In 1994, *Pterocladia capillacea* was prominent with some *Ulva* (*AECOS*, 1994). Supralittoral invertebrates found here and on the south breakwater include the false limpet (*Siphonaria normalis*), the black nerite (*Nerita picea*), the dotted periwinkle (*Littoraria pintado*), the helmet urchin (*Colobocentrotus atratus*), and grapsid crabs (present survey; Brewer, 1987). Brewer (1987) noted unattached algal mats, mostly of *Hypnea musciformis*.

The bottom grades from smooth rounded boulders and cobbles to a wide flat limestone reef or shelf (*AECOS*, 1994) occurring 8-10 m (26 to 33 ft) offshore of the beach, beyond which (20 m/66 ft offshore) an "undulating surface of limestone ..... slopes gently, forming a reef flat of sorts." Algal coverage is substantial, nearly 100% over large areas close to shore and thinning gradually away from shore (Brewer, 1987; *AECOS*, 1994). Brewer (1987) commented on the "...unusually high diversity and abundance of algal macrophytes" and McDermid's (1990) survey of the algal community off of the south breakwater documented 25 species. Especially notable was an extensive growth of *Grateloupia filicina*, considered a culturally important Hawaiian food resource (Abbott, 1999). In 2005, the area was dominated by lush growths of *Ulva reticulata* and *Acanthophora spicifera* (Fig. 5d). Of the twenty-five species recorded by McDermid and the twenty-eight species recorded by *AECOS* in 2005, eight (*Pterocladia capillacea, Melanamansia glomerata, Acanthophora spicifera, Codium edule, Ulva fasciata, Ulva reticulata, Ahnfeltia concinna*, and *Hypnea musciformis*) are considered to be potential food resources for Green sea turtle (*Chelonia mydas*; Forsyth and Balazs, 1989; Russel and Balazs, 2000).

Macro-invertebrates of the reef platform include sea urchins and sea cucumbers, including: blue-black urchin (*Echinothrix diadema*), slate-pencil urchin (*Heterocentrotus mammilatus*), rock-boring urchin (*Echinometra mathaei*), collector urchin (*Tripneustes gratilla*), black sea cucumber (*Holothuria atra*), and white-spotted sea cucumber (*Actinopyga mauritiana*; present survey, 2005; *AECOS*, 1994; USFWS, 1993; Brewer, 1987). Scattered coral colonies (*Porites lobata, Poc. meandrina*, and *Poc. damicornis*) in this area often appeared stunted in their growth form likely due to the shallow, wave-swept conditions.

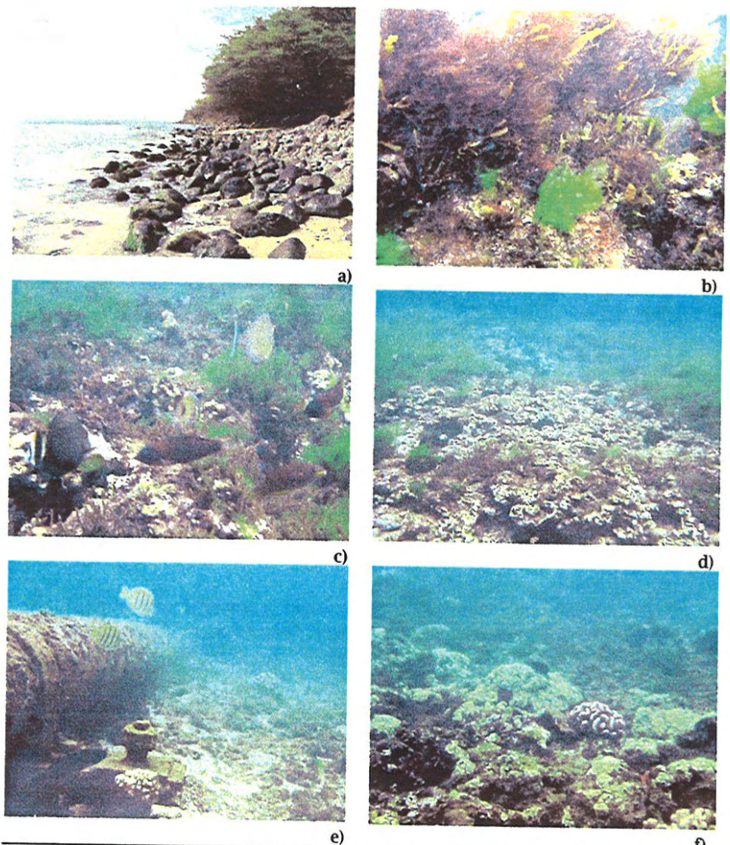

Figure 5. Kapoli Beach Park marine biological survey area, nearshore to offshore. a) Kapoli Park shoreline; b) alga rich shallows (*Hypnea musciformis, Sargassum,* and *Ulva fasciata); c)* diverse fish life (*Acanthophora spicifera,* and an abundance of *Ulva reticulata);* d) coralline algal consolidated bench; e) pipeline with corals f) low profile corals (*Porites lobata, Montiora capitata, Pocillopora meandrina,* and *Porites compressa*).

USFWS (1993) reported a diverse assemblage of fishes on the reef flat including: butterflyfish (*Chaetodon lunula, C. miliaris, C. ornatisssimus, and C. unimaculatus*), damselfish (*Abudefduf abdominalis* and *Stegastes fasciolatus*), goatfish (*Mulloides flavolineolatus, M. vanicolensis, and Parupeneus multifasciatus*), surgeonfish (*Acanthurus triostegus*), wrasse (*Stethojoulis balteata*), and triggerfish (*Rhinecanthus rectangulus*). Likewise, our 2005 survey revealed a diverse assemblage of fishes (Fig. 5c) on the reef flat with many juveniles present, including juvenile *kala* or unicornfish (*Naso unicornis*) and threadfin butterflyfish (*Chaetodon auriga*). Herbivorous surgeonfish (Acanthuridae) and wrasses (Labridae) made up the majority of fishes at this site with the most abundant being *manini* (*Acanthurus triostegus*), as well as the endemic wrasses, saddle wrasse (*Thalassoma duperrey*) and belted wrasse (*Stethojulis balteata*). Other common fishes include raccoon butterflyfish (*Chaetodon lunula*), brighteye damsel (*Plectroglyphidodon johnstonianus*), reef triggerfish (*Rhinecanthus rectangulus*), black surgeon (*Ctenochaetus strigosus*) and unicornfish (*N. unicornis*).

AECOS (1994) and Brewer (1987) recorded low fish abundances on this reef flat, but found a distinct increase in numbers roughly 90 m (300 ft) south of the breakwater where an increase in vertical relief occurs. The present survey did not survey the benthos this far offshore. Acanthurids were again common including: *A. nigroris, A. achilles, A. glaucopareius, A. olivaceous,* and *Manini* (*Acanthurus triostegus*) (Brewer, 1987). *AECOS* (1994) also mentioned the saddle wrasse (*Thalassoma duperrey*) and Moorish idol (*Zanclus cornutus*). Brewer (1987) noted a "conspicuous" absence of butterflyfishes and goatfishes and suggested a possible link between their absence and heavy sport-fishing and aquarium-fish collecting in the area.

Roughly half way down the length of the south breakwater the limestone bench flattens for a short distance and is covered by a layer of sand. In this area a pair of pipelines (Maui Ocean Center seawater intake lines) cross perpendicular from shore (Fig. 5e) and these now host slightly larger coral colonies of the same species (*Porites lobata, Poc. meandrina,* and *Poc. damicornis*) as observed in closer to shore. A large school of adult unicornfish or *kala* (*Naso unicornis*) was observed here in 2005. Beyond this section, the reef topography becomes increasingly diverse, with crevices and small overhangs. This area had the greatest coral cover observed off Kapoli Beach, roughly 10%, with, in order of abundance, scattered small colonies of *P. lobata, Poc. meandrina,* and *Poc. damicornis* (Fig. 5f).

The reef beyond the bench where the reef slope begins is described as having an increase in coral cover (*AECOS*, 1994; USFWS, 1993; Brewer, 1987). This area was not surveyed by the 2005 survey. The following description of this area is from *AECOS* (1994, p. 64 and 65):

At depths of 5 to 6 m (16 to 20 ft), the bottom remains low relief limestone, but with a silty sand veneer. Corals and other large benthic invertebrates are rare, as are fishes due to a lack of vertical relief or cover.

Kinzie (1972) conducted nine transects from the shore out to depths of -20 m (65 ft) to quantify the benthic biota in Maʻalaea Bay. Two transects were located south of Maʻalaea Harbor, the remainder were to the east. The transect closest to Kapoli Park (No. 2) was laid in an ESE direction from the shoreline about 450 ft SW from the base of the south breakwater. No corals were reported on any of the five 20 meter sections sampled along the No. 2 transect. Coral abundance increased further southward and off McGregor Point [a headland southwest of Maʻalaea Harbor] and Manuohule is luxuriant on the reef front (Kinzie, 1972; *AECOS*, 1980).

Likewise, Brewer (1987) and USFWS (1993) noted a near absence of corals fronting the south breakwater. But further out on the reef slope, Brewer (1987) observed approximately 50% coral cover with *Porites lobata* and *Montipora flabellata* most common and *Porites compressa, Poc. Meandrina, and Poc. damicornis* also present. *AECOS* (1994) also notes a sharp increase in coral cover "... perhaps to 15 to 20 % of the bottom over small areas" on the reef front.

Waters East of East Breakwater

USFWS (1993) surveyed the east breakwater and the "fringing reef flat" off the east breakwater; Brewer (1987) surveyed the base of the east breakwater, but not the adjacent reef flat, and *AECOS* (1994) surveyed the "beachrock shelf" east of the harbor including the waters off Kanaio. Images representative of this area in 2005 are presented in Fig. 6 and biological data are presented in the appendix.

In 1987, Brewer described the rocky intertidal of the east breakwater as having a "prominent yellowish-green band in the upper intertidal zone along the entire length of the breakwater" due to thick growth of *Ahnfeltia concinna*. In 1993, thick stands of *Ahnfeltia concinna* were still seen, as well as *Pterocladia capillacea* attached to the wave-washed boulders (USFWS, 1993). The east breakwater also provided habitat for common intertidal mollusks such as *Nerita picea* and the false limpet (*Siphonaria normalis*) [referred to as *Cellana exarata* by USFWS], as well as rock crab (*Grapsus tenuicrustatus*) and helmet urchin (*Colobocentrotus atratus*; Brewer, 1987; USFWS, 1993). Collector urchins (*Tripneustes gratilla*) were common subtidally. Also noted were small colonies of cauliflower coral (*Poc. meandrina*) and *Poc. damicornis* (referred to as *Poc. cespitosa*) subtidally on the breakwater (Brewer, 1987). Fishes at the breakwater were relatively sparse with the Hawaiian flagtail or *aholehole* (*Kuhlia sandvicensis*) most common, followed in abundance by juvenile wrasses, *manini*, Hawaiian sergeant (*Abudefduf abdominalis*), and *Stegastes faciolatus*, and *Monotaxis grandoculis* (Brewer, 1987).

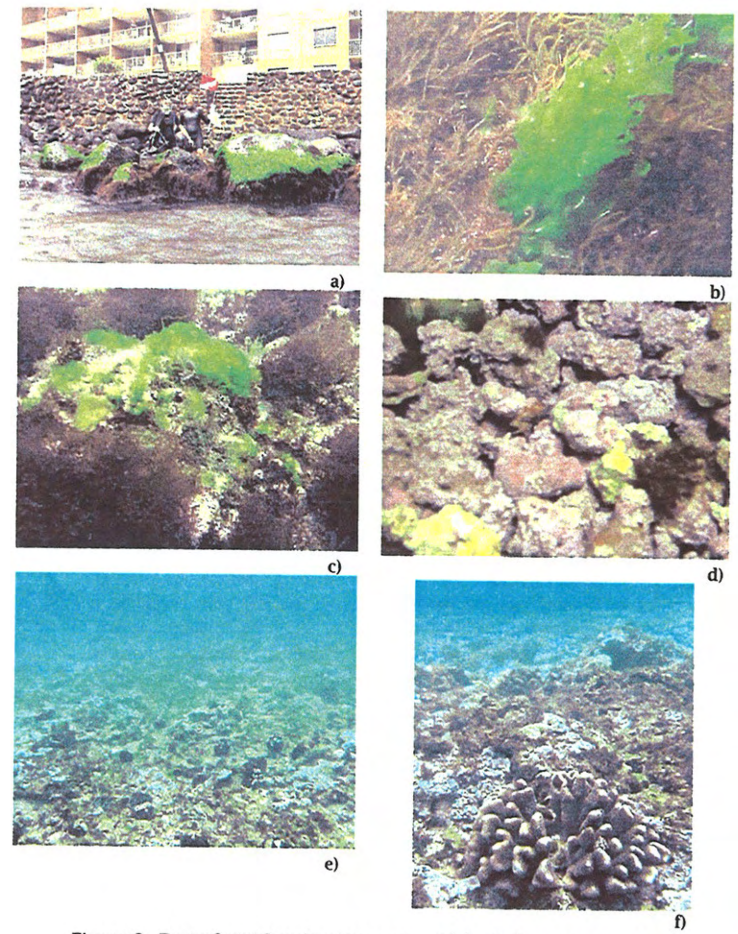

Figure 6. East of east breakwater marine biological survey area; images presented nearshore to offshore: a) algae dominated shoreline; b) boulder with *U. fasciata, Hypnea musciformes* , and *Pterocladiella capillaceae;* c) algal community; d) coralline algal rubble field; e) urchin barren with sparse coral cover; f) corals (*Pocillopora meandrina* and *Montipora flabellata*).

A similar flora and fauna was observed in 2005 close by in the intertidal zone east of the east breakwater. Adjacent to the Maalaea Kai condominium the rocky intertidal is bordered landward by a vertical 2 m (6 ft) rock wall with a section of steps providing access to the water at the shoreline (Fig. 6a, above). The rock and boulder zone that fronts the access point forms a somewhat protected tide pool. The splash zone hosted the thin-shelled rock crab (*Grapsus tenuicrustatus*) and several mollusk species (brown purse shell, black nerite, and dotted periwinkle). The intertidal flora of the wave-washed rocks was similar to that found at the east breakwater and Kapoli Beach except a lush growth of *Ulva fasciata* replaced *Chaetomorpha antennina* alongside *Grateloupia filicina* and *Ahnfeltia concinna* (Fig. 6b). The nearshore waters are murky and heavily littered with drift algae. Due to low visibility conditions, fish observations could not be made here.

Subtidally, the rock and boulder shore gives way to a sand bottom (likely shallow sand over limestone reef) littered with rubble patches and attached algal colonies of *G. filicina* and/or *Hypnea musciformis* (the authors possibly mistook *G. filicina* for *H. musciformis* at times in the field) and the false limpet (*Siphonaria normalis*; Fig. 6c).

Roughly, 10 m (33 ft) from shore the bottom transitions to a rubble field with sparse coral colonies (*Montipora capitata* and *Pocillopora meandrina*) followed by a consolidated reef zone of greater complexity with crevices and small pockets of sand and rubble, previously described as a "beachrock shelf" (*AECOS*, 1994). The reef flat or "beachrock shelf" located east of the east breakwater was found in 1994 to generally not support an abundance of algae (*AECOS*, 1994). Conversely, the 2005 survey found a diverse assemblage of algal species which almost completely covered the bottom. *Ulva fasciata* was again present but greatly reduced in biomass with a cropped back appearance. Prominent were *Melanamansia glomerata* (previously recorded as *Amansia glomerata*) and *Acanthophora spicifera*. Scattered grazing scars, encrusting coralline algae, and live coral colonies (*Montipora flabellata*) were common amongst the algal laden seascape (Fig. 6e).

In 2005, dozens of *Tripneustes gratilla* were observed foraging in the open while rock-boring urchins (*E. mathaei*) lined crevices and blue-black urchins (*Echinothrix diadema*) and slate urchins (*Heterocentrotus mammilatus*) found cover under small overhangs. In 1993 and 1994, the same urchin species were observed as well as Christmas tree worms and spiny lobster (USFWS, 1993; *AECOS*, 1994). Other macro-invertebrates found in 2005 include an unidentified smooth black sponge, sea cucumbers, black-lipped pearl oyster (*Pinctada margaritifera*), snakehead cowry (*Cypraea caputserpentis*), blue swallow tail slug (*Chelidonura hirundina*), and day octopus (*Octopus cyanea*).

Adjacent to the east breakwater coral cover increased with distance from shore with 10% at the east breakwater and 50-75% at approximately 8 m (25 ft) depth where coverage then declined abruptly (USFWS, 1993). Common species were *Porites lobata, Poc. meandrina, Poc. damicornis, Poc. eydouxi, and Montipora flabellata*. In the present survey, coral cover became more substantial around the 6 ft (2 m) depth contour on the reef flat with nearly 40% cover by blue rice coral (*M. flabellata*) and cauliflower coral (*Poc. meandrina*) (Fig. 6f). This area also had two species of corals not recorded at the other 2005 survey areas: crust coral (*Leptastrea purpurea*) and ocellated coral (*Cyphastrea ocellina*), whereas absent was lace coral (*Poc. damicornis*).

The USFWS (1993) noted large feeding aggregations of herbivorous surgeonfishes (Acanthuridae), including *Acanthurus blochii, A. olivaceaus, A. xanthopterus, Naso literatus*, and *N. unicornis* foraging the reef slope off the east breakwater. In 2005, large schools of surgeonfish were not observed. Most common in this area were wrasses (Labridae) followed by butterflyfishes (Chaetodontidae) and damselfishes (Pomacentridae). *AECOS* (1994) found the labrids, *Stethojulis balteata* and *Stegastes fasciolatus*, most common between the harbor and Kanaio, while *Acanthurus nigroris* and *Mulloidichthys flavolineolatus* were most common off of Palalau (an area east of Kanaio).

The area was found to be quite depauperate of fishes in 2005, hosting only 26 species as compared to Kanaio with 49 species. Not previously mentioned by other reports were the many sedentary fishes common during the 2005 study, including the bullethead rock skipper (*Blenniella gibbifrons*), the scarface blenny (*Cirripectes vanderbilti*), the speckled scorpionfish (*Sebastapistes coniorta*), and the triple fin blenny (*Enneapterygius atriceps*). The saddle (*Thalassoma duperrey*) and belted wrasses (*Stethojulis balteata*) were abundant and the reef triggerfish (*Rhinecanthus rectangulus*) common.

Kanaio Drainage

The present (2005) survey was undertaken off a concrete box culvert (Fig. 7a) that passes beneath Hauoli St. between Island Sands and Banyans condominiums in an area known as Kanaio. The concrete drainage structure ends short of a sand beach, but water flow scars were evident out to the upper reach of the beach. The sand beach allows easy access to the nearshore environment (Fig. 7b). The shoreline was littered with algal debris which was also suspended in the first few meters of murky nearshore waters. A sand spit exists seaward of the drainage ditch which was completely littered with small boulders. These intertidal boulders hosted a community dominated by hookweed (*Hypnea musciformis*), *Pterocladiella capillacea*, and *Ulva fasciata* with the false limpet (*Siphonaria normalis*) occurring as well. Submerged boulders had roughly 100% algal cover with nearly equal coverage by *U.*

fasciata and *H. musciformis*. Images representative of this area in 2005 are presented in Fig. 7 and biological data are presented in the appendix.

The sand spit boulder field grades into a coralline algae-encrusted rubble field, which grades to rubble and sand, and eventually becomes a consolidated limestone reef with increasing topographic diversity (Fig. 7c,d). Unlike the reef flat off of the east breakwater, the shallows off Kanaio were found in 1994 to have an abundance of algae (*AECOS*, 1994). Common off Kanaio were, *Ulva reticulata, Grateloupia hawaiiana, Amansia glomerata, and Acanthophora spicifera*. Also noted were sediment resistant species such as *Halimeda discoidea* and *Codium edule* east of Kanaio, close to Kealia Pond. Most of these same species were observed in 2005. *AECOS* (1994) also noted an abundance of urchins (*Tripneustes gratilla* and *Heterocentrotus mammilatus*) amongst their survey areas with the greatest abundance of various urchins occurring off of Kanaio. During the present study, the collector urchin, slate pencil urchin, and rock-boring urchin were all prevalent on the reef flat.

An abundance of fishes with moderate species diversity (37 species) was found during the 2005 survey (Fig. 7d). The most abundant species were belted wrasse and saddle wrasse. Also common were the threadfin butterflyfish (*Chaetodon auriga*), racoon butterflyfish (*Chaetodon lunula*), Hawaiian sergeant (*Abudefduf abdominalis*), brighteye damsel (*Plectroglyphidodon johnstonianus*), lavender tang (*Acanthurus nigrofuscus*), blue lined surgeon (*Acanthurus nigroris*), palenose parrotfish (*Scarus psittacus*), and the reef trigger (*Rhinecanthus rectangulus*), as well as a fair number of juveniles, like the elegant coris (*Coris ventusta*) and the threadfin butterflyfish. Numerous juvenile wrasses were also seen throughout the surveyed areas. In 1994, the belted wrasse (*Stethojulis balteata*), Pacific gregory (*Stegastes fasciolatus*), and bluelined surgeonfish were considered some of the most common fishes off of Palalau (an area east of Kanaio). Also, in 1994, yellowstripe goatfish (*Mulloidichthys flavolineolatus*) were found as common (east of Kanaio) while the present study found them to be rare. A sand channel exists at the east end of the 2005 Kanaio Drainage survey area. A leatherback or *lai* (*Scomberoides lysan*) was sighted at the edge of this channel.

Kinzie (1972) surveyed 9 transects throughout Ma`alaea Bay and reported the greatest coral cover (average of 15%) at Kanaio with the most common species being *Montipora capitata, Poc. meandrina,* and *Montipora patula* (referred to as *Montipora verrucosa, Pocillopora ligulata, and Montipora verrilli*, respectively). In 2005, the coral community was found to be dominated by *Porites lobata, Montipora capitata,* and *Pocillopora meandrina* with scattered colonies of finger coral (*Porites compressa*) and spreading rice coral (*Montipora patula*; Fig. 7e). Coral cover was

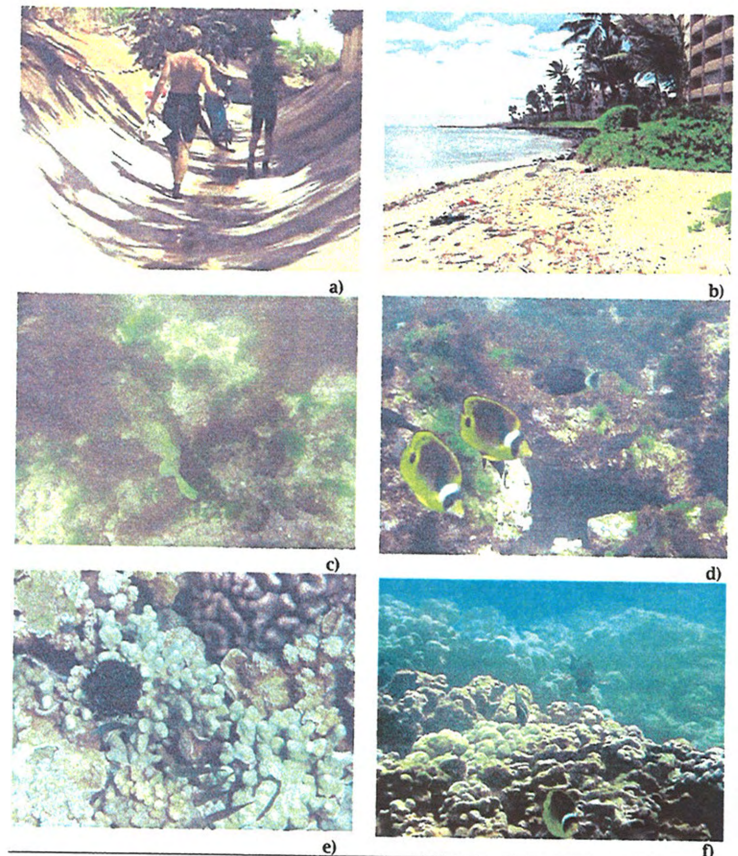

Figure 7. Kanaio Drainage marine biological survey area, images ordered from nearshore to offshore: a) Kanaio drainage ditch; b) sandy shoreline of Kanaio; c) turbid water, coralline algal encrusted gravel bottom with *U. fasciata* and *Arothron hispidus*; d) small boulders, *Chaetodon lunula*, other fish, and algae; e) *Porites compressa, Pocillopora meandrina, Montipora capitata,* and *Tripneustes gratilla* (collector urchin); f) high coral cover and high topographic diversity.

upwards of 60% on portions of the reef and was the greatest of any area visited during the present survey (Fig. 7f). A species not recorded in the other 2005 survey areas, but recorded here, is the antler coral, *Pocillopora eydouxi*.

Ma'alaea Small Boat Harbor

Much of Ma'alaea Small Boat Harbor is soft bottom and supports a variety of infaunal invertebrates typical of this substratum type. Boulder revetments line the margin of the harbor basin and provide surfaces for attachment of intertidal and subtidal forms. A small, dark sand beach occurs in the northeast corner of the harbor. Remnants of the former reef flat remain within the harbor where dredging has not been undertaken.

Below is a description of the harbor and its marine floral and faunal inhabitants compiled from several surveys of the area (*AECOS*, 2005a, 2005b, 1994; USFWS, 1993; McDermid, 1990; Brewer, 1987; USFWS, 1980;). A species listing from the surveys conducted by *AECOS* in 2004 and 2005 are presented in the appendix.

The intertidal habitat within the harbor is predominantly basalt revetment stones and concrete surfaces which host a wide variety of intertidal creatures. Brewer (1987) lists thin-shelled rock crab or *'a'ama* crab (*Grapsus tenuicrustatus*) and common supratidal snails (*Nerita picea*, *Littorina pintado* and *L. scabra*) as conspicuous inhabitants by the USCG station. Near the low tide line the fleshy green algae, *Ulva fasciata* and *U. reticulata* were occasionally found along with filamentous blue-green algae. Surveys in May and April 1994 found essentially the same species with some additional forms seen further inside the harbor (*AECOS*, 1994). Along the shore west from the USCG station a small species of oyster (*Ostrea* sp.) was common, and in the vicinity of the boat ramp, clusters of mussels (*Brachidontes crebristriatus*) were present near the water line. The *'alamihi* crab (*Metopograpsus thukuhar*) was conspicuous everywhere on rocks just above and below the water line, replacing the *'a'ama* crab which was present, but only common in the eastern part of the harbor. Algae were mostly limited to scattered, large growths of *Ulva reticulata* and some *U. lactuca*, but encrusting, pink *Porolithon onkoides* could be found on boulders. USFWS (1980, 1993) reports of *opihi* (*Cellana exarata*) as being abundant in the harbor may refer to the false limpet (*Siphonaria normalis*). In 2005, dozens of limpet, the thin-shelled rock crab (*Grapsus tenuicrustatus*) and flat crab (*Percnon planissimum*) were observed on the rocks above the water line (*AECOS*, 2005b). Burrowing sentinel crabs (*Macrophthalmus* sp.) were abundant in the mud bottom basin adjacent to the USCG station (*AECOS*, 2005b).

Brewer (1987) noted lace coral (*Pocillopora damicornis*) (reported as *P. cespitosa*) as the "...only significant (and somewhat surprising) benthic organism observed in the

harbor ...attached to the concrete sea wall ...west of the Coast Guard station." Observations made in 1994 along the shore west from the USCG station, noted that coral cover declines further into the harbor, with only small, scattered heads of lace coral present (*AECOS*, 1994). A 1980 USFWS survey, although possibly impaired by low visibility (reported at 3 ft), reported no corals and no macroalgae anywhere along the northern edge of the harbor between the boat ramp (furthest point inside) and the east breakwater.

In the vicinity of the U.S. Coast Guard station dock occurs a mud bottom basin with a small area (less than 10 m^2) of boulders and undredged reef with growth of at least two coral species: rice coral (*Montipora capitata*) and lace coral (*P. damicornis*; *AECOS*, 1994, 2005b). Rice coral colonies were observed in 1994 and 2005 at sizes of over 10 inches (25 cm) across. In 2005, scattered coral colonies covered up to 30% of the hard surfaces, which was higher than the 10% reported by *AECOS* in 1994 for the same area (*AECOS*, 1994). In addition to rice and lace coral, lobe coral (*Porites lobata*) and sandpaper coral (*Montipora patula*) were also present (*AECOS*, 2005b). Other benthic invertebrates observed were hydroid (?*Halocordyle disticha*), burrowing urchin (*Echinometra mathaei*), and spaghetti worm (*Loimia medusa*). Algal growth was limited to sparse turf with silt and scattered large fronds of *Ulva reticulata*. Hawaiian flagtail fish (*Kuhlia sandvicensis*) were found under sheltered overhangs (*AECOS*, 2005b).

In October 2005, the concrete seawall immediately east of the USCG station was surveyed by *AECOS* (2005b). At about 1 m (3 ft) depth the seawall was densely covered by rice coral colonies (*Montipora capitata*). Roughly 70% of the surface was covered with coral, but in some places the coverage exceeded 100% with colonies overlapping each other on the vertical surface. The Moorish idol (*Zanculus cornutus*) and surgeonfishes (Acanthuridae), and a variety of planktivorous fishes were common in this area.

The trapezoidal shaped reef remnant in the middle of the harbor adjacent to the USCG station was visited by USFWS biologists in 1993. The shoal was covered by sand and silt. The introduced red alga, hookweed (*Hypnea musciformis*), covered much of the shallow bottom. A few small colonies of the corals, *Porites rus* and *Pocillopora damicornis*, and two species of sea urchins, *Diadema paucispinum* and *Echinometra mathaei*, were observed in this area. In 2005, surprisingly nearly 30%, cover of *Montipora capitata* and a fair number of small *Pocillopora damicornis* colonies were noted. A variety of urchins were observed on the reef and a large school of the yellow-stripe goatfish (*Mulloidichthys flavolineatus*) stayed near the eastern edge of the reef.

A shallow flat occurs inside the harbor along the east breakwater. This shallow water area of some 2 acres was surveyed by Brewer (1987) and USFWS (1993). The biota in 1987 was dominated by "dense, tangled stands of .....*Ulva fasciata, Ulva reticulata, Hypnea chordacea, Amansia glomerata, Gracilaria* cf. *bursapastoris*, and *Grateloupia filicina*, with 100% cover in some patches. USFWS (1993) found the reef flat to be heavily infested by the red alga, *Hypnea musciformis*, but *Bryopsis pinnata, Codium reediae, C. reticulata, Ulva fasciata*, and *Sargassum echinocarpum* occurred as well. Large amounts of hookweed could be seen on the small beach inside the harbor, indicating that this species remained abundant on the reef flat. Between 1999 and 2000, Smith (2000) also found an abundance of hookweed with 80% coverage in northwest Ma'alaea Bay. Two species of fishes, *manini* and *aholehole*, were numerically dominant, but numerous juvenile wrasses and a moray eel were noted by Brewer (1987). No live coral was seen in the area, noted as silted over close to the harbor channel, in contrast to that section of the same reef flat lying outside of the east breakwater (*AECOS*, 1994).

Fishes are certainly not abundant, but the harbor fauna includes more than the anchovy or *nehu* (*Stolephorus purpureus*) listed by Brewer (1987). *AECOS* (1994) observed the following species near the sampan wharf (roughly in order of abundance observed): Hawaiian flagtail or *aholehole* (*Kuhlia sandvicensis*), convict tang or *manini* (*Acanthurus sandvicensis*), Hawaiian sergeant or *mamo* (*Abudefduf abdominalis*), moorish idol (*Zanclus cornutus*), box fish (*Ostracion meleagris*), belted wrasse (*Stethojulis balteata*), pearl wrasse or *'opule* (*Anampses cuvier*), Hawaiian white-spotted toby (*Canthigaster jactator*), Hawaiian dascyllus or *alo'ilo'i* (*Dascyllus albisella*), raccoon butterflyfish or *lau hau* (*Chaetodon lunula*), lizardfish (*Synodus* cf. *variegatus*), blacktail snapper or *to'au* (*Lutjanus fulvus*), pualu (*Acanthurus* cf. *xanthopterus*), weke (*Mulloidichthyes vanicolensis*), juvenile sidespot goatfish or *malu* (*Parupeneus pleurostigma*), Jenkin's damsel (*Stegastes fasciolatus*), parrotfish (*Scarus* sp.), and cornetfish (*Fistularia commersoni*). Barracuda (*Sphyraena barracuda*), *aholehole*, and schools of mullet (*Mugil cephalus*) and small silverside (*?Spratelloides delicatulus*) occur throughout the inner harbor. The paucity of fishes recorded from the harbor in 1987 may be attributed to the poor underwater visibility at the time of the survey (Brewer, 1987). USFWS (1980) listed *manini* and *nehu* as abundant, and *aholehole* and barracuda as found in "occasional numbers". The report further mentions that Ma'alaea Harbor supports a "short, but intense seasonal, recreational fishery of bigeye scad or *hahalalu* (*Selar crumenophthalmus*)."

In 2004 and 2005, *AECOS* (2005a, b) observed 57 fish species within the harbor and at the harbor mouth. Twenty-one of these were observed only in the harbor and not in surrounding reef areas. Most notable were observations of eleven species of surgeonfish, eight species of wrasse, six species of goatfish, and spotted eagle ray (*Aetobatis narinari*). At the harbor mouth surgeonfish were represented by eyestripe surgeonfish (*Acanthurus dussumieri*), lavender tang (*Acanthurus

nigrofuscus*), with convict surgeonfish or *manini* (*Acanthurus triostegus*) being most abundant. Two large schools of yellowstripe goatfish were noted here as well.

In 2005, the present survey observed an extensive coral community that extends from the breakwater boulders shoreward inside the east breakwater. Coral coverage approached 90% in the limited space around the tip of the east breakwater with rice coral (*Montipora capitata*), cauliflower coral (*Pocillopora meandrina*), lobe coral (*Porites lobata*), and finger coral (*Porites compressa*) predominating. Commensal snapping shrimp (*Alphaeus deuteropus*) were abundant in surface grooves of lobe coral. The most conspicuous fishes were the large and abundant eyestripe surgeonfish (*Acanthurus dussumierei*). The red reef lobster (*Enoplometopus occidentalis*), usually only seen at night, was recorded from the finding of a detached pincer. The area immediately outside of the channel, fronting the tip of the east breakwater hosts numerous small colonies of blue rice coral (*Montipora flabellata*), cauliflower coral, lobe coral, and finger coral. Urchins and juvenile palenose parrotfish (*Scarus psittacus*) are also very common amongst the many small coral colonies of this high wave energy platform.

Ma'alaea Boat Harbor provides a wide array of habitats and thus supports a high diversity of marine biota. Of the 80 fish species observed in the 2004 and 2005 surveys of NW Ma'alaea Bay (present survey; *AECOS*, 2005a and 2005b), more than 70% (57 species) were observed inside the harbor. Likewise, 70% (32 species) of the macro-invertebrate species were found inside the harbor. The same did not apply to algae and corals with the algal community being the least diverse and the coral community no more diverse than the other areas surveyed.

Discussion

Water Quality

Water quality conditions in the nearshore coastal waters of Hawai'i are determined to a large degree by prevailing salinity regimes. Because of its open configuration, much of Ma'alaea Bay is regularly flushed by open ocean water of oceanic salinity and excellent water quality. At the same time, nearshore waters of the Bay are influenced by both surface water runoff and groundwater inputs from the adjacent land that not only lower salinity levels, but also introduce particulate matter, nutrients and other chemicals which degrade the quality of these coastal waters. Thus, separate State water quality criteria have been developed for "wet" and "dry" conditions in Hawaiian coastal waters (Table 9) based upon the amount of freshwater discharging into the coastal waters (HDOH, 2004). Specifically, the regulations state that "wet" criteria apply when open coastal waters receive more than three million gallons per day of fresh water discharge per mile of shoreline. Conversely, "dry" criteria apply when fresh water discharge per mile is less than three million gallons per day. The open coast water quality criteria pertain to Sta.s 1-0, 1-6, 3-0, 3-6, 4-0 and 4-6 (all but the Ma'alaea Harbor stations). Since it is difficult to practically make an accurate determination of freshwater discharge, it is assumed herein that "dry" criteria apply since annual rainfall in this region of Maui is typically low: only about 15 inches (M&E Pacific, 2005).

Table 9. State of Hawaii water quality criteria for open coastal waters (after HDOH, 2004).

Parameter	Geometric Mean value not to exceed this value	Value not to be exceeded more than 10% of the time	Value not to be exceeded more than 2% of the time
Total Nitrogen (µg N/l)	110.00 *150.00*	180.00 *250.00*	250.00 *350.00*
Ammonia Nitrogen (µg N/l)	2.00 *3.50*	5.00 *8.50*	9.00 *15.00*
Nitrate+Nitrite (µg N/l)	3.50 *5.00*	10.00 *14.00*	20.00 *25.00*
Total Phosphorus (µg P/l)	16.00 *20.00*	30.00 *40.00*	45.00 *60.00*
Chlorophyll - α (µg/l)	0.15 *0.30*	0.50 *0.90*	1.00 *1.75*
Turbidity (NTU)	0.20 *0.50*	0.50 *1.25*	1.00 *2.00*

Two values: upper, "dry" criteria apply when the open coastal waters receive less than three million gallons per day of freshwater discharge per shoreline mile; lower, "wet" (italicized) criteria apply when the open coastal waters receive more than three million gallons per day of freshwater discharge per shoreline mile.

Other "standards":

- pH units shall not deviate more than 0.5 units from a value of 8.1.
- Dissolved oxygen shall not decrease below 75% of saturation.
- Temperature shall not vary more than 1 C° from ambient conditions.
- Salinity shall not vary more than 10% from natural or seasonal changes.

Sta. 2-USGS & Sta. 2-MH are located within Ma'alaea Boat Harbor and fall under the State water quality standards applicable to embayments (Table 10). As with open coastal waters, HDOH water quality criteria incorporate "wet" and "dry" components, depending upon the amount of fresh water entering the bay on a daily basis. It is assumed that "dry" criteria apply in Ma'alaea Boat Harbor due to the low annual rainfall conditions in this region of Maui.

The water quality data from the shoreline and 6 ft (2 m) contour stations have been combined and are presented in Tables 11 and 12 as transects (e.g., Sta. 1-0 & Sta. 1-6 have been combined as Transect 1 and so forth) for comparison with the State water quality criteria. Since the water quality data collected for this study represent baseline conditions, salinity and temperature at all stations would be considered to be "ambient" as specified above in the footnotes to Table 9 and Table 10 above.

Table 10. State of Hawaii water quality criteria for embayments. (after HDOH, 2004).

Parameter	Geometric Mean value not to exceed this value	Value not to be exceeded more than 10% of the time	Value not to be exceeded more than 2% of the time
Total Nitrogen (µg N/l)	150.00 *200.00*	250.00 *350.00*	350.00 *500.00*
Ammonia Nitrogen (µg N/l)	3.50 *6.00*	8.50 *13.00*	1500 *20.00*
Nitrate+Nitrite (µg N/l)	5.00 *8.00*	14.00 *20.00*	25.00 *35.00*
Total Phosphorus (µg P/l)	20.00 *25.00*	40.00 *50.00*	60.00 *75.00*
Chlorophyll α, (µg/l)	0. 50 *1.50*	1.50 *4.50*	3.00 *8.50*
Turbidity (NTU)	0.40 *1.50*	1.00 *3.00*	1.50 *5.00*

Two values: upper, "dry" criteria apply when average fresh water inflow is less than one percent of the embayment volume per day; lower, "wet" (italicized) criteria apply when average fresh water inflow equals or exceeds one percent of the embayment volume per day.

Other "standards":

- pH units shall not deviate more than 0.5 units from a value of 8.1.
- Dissolved oxygen shall not decrease below 75% of saturation.
- Temperature shall not vary more than 1 C° from ambient conditions.
- Salinity shall not vary more than 10% from natural or seasonal changes.

Dissolved oxygen (DO) saturation levels were within the "...shall be greater than or equal to 75 percent saturation criterion, except at Transect 3 during the January 12, 2006 sampling event (see Table 6). pH levels were consistently within the State criterion range of 7.6 - 8.6 and represent ambient conditions. Turbidity consistently exceeded State criteria for both "wet" and "dry" conditions.

Ammonia concentrations met State criteria (both "wet" and "dry") at all stations, being undetectable most of the time (Table 12). However, ammonia concentration at Transect 3 did reach a high level (130 µg N/l) during the January 12, 2006 sampling event. Since salinity was also quite low at this transect on this date (30.3 ppt), it is likely that the high ammonia concentration was associated with surface runoff from a storm event.

Table 11. Summary statistics for the physical water quality data combining shoreline and 6 ft (2 m) depth contour stations for the Ma`alaea Mauka Project.

Location		Salinity (ppt)	Temp (ºC)	DO sat. (%)	pH	Turbidity (NTU)
Transect 1						
	mean	**34.3**	**24.9**	**95**	**8.13**	**1.83**
	range	33.1 - 35	23.2 - 26.7	90 - 101	8.04 - 8.30	0.74 - 4.38
	n	*6*	*6*	*6*	*6*	*6*
Transect 2						
	mean	**34.1**	**25.1**	**90**	**8.10**	**1.54**
	range	32.57 - 35	23.5 - 27.0	85 - 92	8.02 - 8.16	0.82 - 4.24
	n	*6*	*6*	*6*	*6*	*6*
Transect 3						
	mean	**33.3**	**25.7**	**102**	**8.14**	**1.50**
	range	30.3 - 35	23.5 - 27.9	71 - 147	7.8 - 8.34	0.65 - 3.72
	n	*6*	*6*	*6*	*6*	*6*
Transect 4						
	mean	**33.2**	**26.2**	**106.5**	**8.19**	**1.76**
	range	30.1 - 35	24.1 - 27.7	93 - 145	8.05 - 8.42	0.67 - 3.58
	n	*6*	*6*	*6*	*6*	*6*

State "dry" criteria were exceeded at all four transects for nitrate + nitrite, total nitrogen, total phosphorus and chlorophyll *α* geometric means; although total phosphorus just exceeded the geometric mean criterion at Transect 1.

The historic HDOH physical water quality data from Ma'alaea Boat Harbor (Table 2, above) are in reasonable agreement with the results from the Harbor samples collected in the present survey (Sta. 2-USGS and Sta. 2-HM in Table 6 and 7 above). Thus, salinity, temperature and pH means are nearly identical, while DO saturation levels in the present study were somewhat lower as were turbidity levels when compared with the long-term HDOH means. There was less agreement with the nutrient data between the two data sets with nitrate + nitrite means being notably higher in the present study. Total nitrogen, total phosphorus and chlorophyll *α* levels were also elevated compared with the HDOH data, but all measurements in the 2005 survey fell within the range of the HDOH data.

Mean salinity levels (33.2 – 34.3 ppt) at the three coastal sites in the present survey (Transects 1, 3, and 4) were lower compared with the means for the HDOH surveys, except for the Kihei Beach Park location (28.63 ppt), while mean temperatures in the present survey tended to be somewhat higher. Both DO saturation levels and pH values were comparable for both data sets, while geometric mean values for turbidity in the present survey were higher, except when compared with Kihei Beach Park.

Table 12. Summary statistics for the nutrient and chlorophyll *α* water quality data collected from the combined shoreline and 6' stations for the Ma`alaea Mauka Project.

Location		NH_4 (µg N/l)	NO_3+NO_2 (µg N/l)	TN (µg N/l)	TP (µg P/l)	Chl. *α* (µg/l)
Transect 1						
	mean	**<1**	**20**	**169**	**17**	**1.51**
	range	---	5.0 - 52	138 - 202	12 -22	0.41 - 3.38
	n	*6*	*6*	*6*	*6*	*6*
Transect 2						
	mean	**<1**	**111**	**268**	**26**	**1.07**
	range	---	61 - 274	173 - 429	16 - 55	0.53 - 4.00
	n	*6*	*6*	*6*	*6*	*6*
Transect 3						
	Mean	**1.3**	**47**	**261**	**24**	**2.45**
	Range	<1-130	3.0 - 252	137 - 835	11 - 73	0.37 - 21.1
	n	*6*	*6*	*6*	*6*	*6*
Transect 4						
	mean	**1.4**	**77**	**308**	**26**	**3.54**
	range	<1 - 11	5.0 - 77	153 - 692	12 - 71	0.80 - 27.1
	n	*6*	*6*	*6*	*6*	*6*

Nitrate+nitrite mean concentrations at the three coastal sites (Transects 1, 3, and 4) in the 2005-06 survey were comparable with those of the HDOH monitoring program. Total nitrogen means, on the other hand, were somewhat elevated compared with the HDOH data, except at the Kihei Beach Park station. Similarly, total phosphorus and chlorophyll means in the 2005-06 survey were higher than those in the HDOH data, except for the Kihei Beach Park station.

Salinity levels were typically lower during the 1994 *AECOS* study (Table 4) as compared with the 2005-06 survey, but there were distinct trends between the two data sets. Thus, there was an increase in salinity between Sta. 1-0 and Sta. 1-6 and Sta. 2-USGS and Sta. 2-HM. Also, the lowest mean salinity occurred at Station 3-0 in both studies. Temperatures tended to be slightly higher in the 1994 study, except at Sta. 4-0 but were generally within the same range for both studies. Dissolved oxygen saturation levels were fairly similar at Sta. 2-USGS and Sta. 2-HM and the highest levels in both surveys were recorded at Sta. 1-0, Sta. 3-0 and Sta. 4-0.

Particulate concentrations were somewhat variable between the survey efforts as is to be expected, since these parameters are influenced by runoff and both wind and wave action. Nevertheless, TSS levels were high in the present study by something on the order of double, except at Sta. 2-USGS. The reason for this difference is not clear, although it does not appear to be due to runoff as higher salinities were recorded in the most recent survey as compared with the 1994 results.

There was considerable variation between the nutrient and chlorophyll *a* concentrations between the two surveys (Tables 4 and 7) and no distinct trends were apparent between the two data sets.

Marine Biology

Summary of 2004 and 2005 Surveys

Each of the four areas of NW Ma'alaea Bay discussed above differs in topographic complexity, coral cover, algal cover, and species diversity. However, the three nearshore areas surveyed, with the exception of the Harbor, exhibit a similar nearshore to offshore zonation, grading from an algal-rich nearshore swash zone out to a consolidated coralline reef and then to a zone of increased topographical relief and coral cover yet further off the shore.

The summary presented below reflects data collected during our three recent surveys of NW Ma'alaea Bay and Ma'alaea Boat Harbor conducted in September 2005 (present survey), October 2005 (*AECOS*, 2005b), and November 2004 (*AECOS*, 2005a). Data are compiled in table format as an appendix.

The algal community of northwestern Ma'alaea Bay is diverse and dominates much of the intertidal and subtidal benthos. In general, a swath of immense algal biomass exists within roughly the first 3 m (9 ft) from shore which is eventually replaced by an urchin dominated zone. Thirty-four algal species were recorded with nearly all of those recorded at the South Breakwater. On the other hand, the Harbor itself hosts less than half that number. Many species found throughout the survey area are food resources for humans as well as sea turtles.

A total of eleven coral species were recorded with the following four occurring throughout the survey area including inside the Harbor; in order of abundance these four are *Montipora capitata, Porites lobata, M. flabellata, Pocillopora*

meandrina, and *Porites compressa*. Elevated coral cover occurs around the west tip of the east breakwater, on the reef flat of Kanaio, and surprisingly the inner Harbor east of the USCG station on a concrete wall (*M. capitata*). The southeast portion of the Harbor receives sufficient influx of ocean water through the harbor channel to support an extensive coral community with up to 90 percent cover. The most common corals are rice coral (*Montipora capitata*) and lobe coral (*Porites lobata*). The offshore area east of the east breakwater has nearly 40% cover of *M. flabellata*. Kanaio Drainage was the only area with antler coral.

A total of 45 invertebrate species, other than corals, were recorded, with between 21 and 32 species recorded from each survey area. Urchins are some of the most conspicuous members of the marine community in shallow water here, with rock-boring urchin, *Tripneustes gratilla*, and the collector urchin, *Echinometra methaei*, dominating the seascape. It is worth noting that urchins feed on algae, and their large numbers may well account for a sharp decline in algal abundance offshore.

A total of eighty fish species were recorded during the three recent surveys (present survey; *AECOS*, 2005a; *AECOS*, 2005b). Data presented for south breakwater and the harbor area are from at least two survey dates and resulted in roughly twice the number of fish species recorded as compared to the other two survey areas. Therefore, the number of species reported is likely skewed by the number of site visits. The most common fishes are the saddle wrasse (*Thalasoma duperrey*) and the belted wrasse (*Stethojulis balteata*), both endemic to Hawaiian waters. Butterflyfishes were recorded throughout the study area with the raccoon (*Chaetodon lunula*) and threadfin butterflyfish (*Chaetodon auriga*) most common. The area of greatest fish diversity appears to be along the surge dominated reef flat off of the south breakwater. Of the 62 marine fish species recorded during the present survey, 12 species or 20% are endemic, meaning they are found only in the Hawaiian Islands and no other geographic region. Very few pelagic fishes were recorded; only the bluefin trevally (*Caranx melampygus*) at South Breakwater and the Harbor, the mackerel scad or *opelu* (*Decapterus macarellus*) also at South Breakwater, and the leatherback or *lai* (*Scomberoides lysan*) at the two eastern sites.

No sea turtles or other endangered or threatened species were observed during our survey. However, three species—the humpback whale (*Megaptera novaeangliae*), the hawksbill sea turtle (*Eretmochelys imbricata*), and the green sea turtle (*Chelonia mydas*)—are protected under the Endangered Species Act of 1973 (Federal Register, 1999a, 1999b, and 2001) and Hawaii Administrative Rule (DLNR, 1998) and are reported from Ma'alaea Bay.

Ma`alaea Bay is an important calving, breeding, and nursing area for the endangered humpback whale between December and May each year (Forestell and Brown, 1991). When not migrating, the humpback whales come very close to shore and Maui offers great opportunities to view the whales from shore or by boat. The threatened green sea turtle (*Chelonia mydas*) and the endangered hawksbill sea turtle (*Eretmochelys imbricata*) are known to frequent Ma'alaea Bay (SRGII, 2004) and USFWS reported a large green sea turtle in the harbor in 1994 (USFWS, 1993).

Assessment

The nearshore marine community of northwest Ma'alaea Bay is quite variable ranging from the mud-lined bottom of Ma'alaea Boat Harbor to the reef supporting in excess of 50% coral cover found off Kanaio. The nearshore marine community is somewhat adapted to elevated levels of silt and sediment associated with runoff, especially along the shoreline and in the Harbor where many silt-tolerant species are found. However, of particular concern are the algal and coral communities which may be most likely impacted by project associated run-off.

There are several sites where run-off may be expected to impact the neashore community via existing drainage systems along northwest Ma'alaea Bay including: Ma'alaea Boat Harbor, Kapoli Beach, and Kanaio drainage ditch. Each of these areas hosts an important marine community. Ma'alaea Boat Harbor serves as a protected area for many juvenile fish and invertebrates and hosts a variety of corals both in the interior of the Harbor, but especially near the mouth of the Harbor. The waters off Kapoli Beach, west of the Boat Harbor, support a species-rich algal community that is important for human consumption and sea turtle consumption. The Kapoli Beach area also boasts a wide variety of fishes, many being juveniles. Land run-off via concrete-lined drainage ditch emptying at the Kanaio shore has the greatest potential for impacting an area of live coral. This ditch could carry run-off from the Maalaea Mauka Development Project not retained by the upslope basins.

It is often difficult to pinpoint the causes of water quality degradation in nearshore coastal waters. In northwest Ma'alaea Bay, 70% of variation in nutrients (except ammonia) and chlorophyll *a* concentrations can be attributed to variations in salinity, i.e. freshwater inputs or lack thereof. The source of freshwater input at the coastline can be from groundwater or surface water runoff. Based upon the paucity of rainfall in the Ma'alaea area—about 15 inches annually (M&E Pacific, 2005)—it can be concluded that much of the variation in salinity and nutrients in these nearshore coastal waters is the result of groundwater inputs.

Changes in particulate (turbidity and TSS) concentrations, on the other hand, are not necessarily associated with changes in salinity, or any other water quality parameter. In this case, much of the variation in particulates may be associated with turbulence caused by wind and waves stirring up bottom sediments in the shallow coastal water. Certainly, surface runoff is significant during major storm

events and such events are likely the primary source of particulates to these nearshore waters.

Conclusions

The proposed construction of a residential development on a 260-acre parcel on the central Maui plain above Ma'alaea Small Boat Harbor will include the construction of buildings, roads, parking lots, and sidewalks. The construction of these will increase coverage by impervious surfaces and will lead to a reduction in rainfall infiltration into the ground. Because the development is located some distance from the shore, construction will not directly impact the nearshore reef community of northwestern Ma'alaea Bay or Ma'alaea Boat Harbor. However, indirect impacts could occur if care is not taken to control storm water runoff from the project site, most particularly during land grading and early construction phases. In order to reduce the release of fine sediments or other pollutants into the marine environment, suitable BMPs (Best Management Practices) need to be implemented during construction and post-construction phases.

During rain events, water collects from impervious surfaces (roads, roofs, sidewalks, etc.) and follows a downhill path of least resistance. Unimpeded, this run-off continues on its course to the nearshore environment where it introduces an array of land-based pollutants. Drainage pathways for run-off should be directed into percolation areas rather than directly into existing drainage ways which lead to the ocean. In order to reduce the amount of polluted run-off it is recommended to use a) unlined ditches leading to unlined percolation basins and b) to establish planted percolation areas to act as a natural buffer surrounding the planned flood basins along their drainage pathways to the ocean. Vegetation surrounding these surfaces will act as a natural buffer to reduce pollutant levels in run-off and drought-tolerant native plant species should be considered. This approach will also minimize post-construction contributions of pollutants such as pesticides and herbicides, as well as oil and gasoline spills from vehicles.

Overall, if BMPs are followed and if special care is given to reduce silt-laden runoff the Maalaea Mauka development project has the potential to improve rather than degrade the nearby marine environment compared with existing land use practices at the project site. According to aerial photographs taken in 2003, the 960-acre project area has little groundcover in place to reduce surface run-off. Also, the Maalaea Waterfront Plaza which lies downstream from the project site has experienced flooding during large storms under existing drainage conditions (M&E Pacific, 2005).

M&E Pacific (2005) proposes a series of detention basins be developed for the proposed Maalaea Mauka development which should minimize particulates in storm water runoff into the bay. These detention basins would be located on the mauka side of Honoapiilani Highway and correspond to existing detention basins. Plans include considerations for drainage ways down to the proposed detention basins, but not beyond towards the ocean. The basins should be in place and functional prior to general site grading.

During the construction phase, it will be necessary to: (1) employ Best Management Practices (BMPs) to prevent soil erosion and surface runoff into the bay; and (2) develop a water quality monitoring program to ensure the long-term effectiveness of the BMPs. Since there are no perennial water flows through or near the project site, monitoring should generally duplicate the coastal water quality stations utilized in our survey. Monitoring the water quality of intermittent storm run-off may provide some useful information (and will likely be required under grading regulations), but can be very difficult to interpret in terms of compliance of construction-related BMPs. Visual observations are typically more instructive. Limiting early site grading work to the dry season on Maui can reduce runoff impacts at the time when storm runoff would have the potential to carry the most particulates to coastal waters. If proper BMPs are employed during construction and runoff into the nearshore waters minimized, the proposed development should have minimal long-term adverse effects on the nearby marine communities.

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APPENDIX TABLE

2004-2005 marine species list for the waters off Ma'alaea, Maui

Checklist and abundance of aquatic biota observed in nearshore waters of Ma`alaea Bay (present study & 2005a[1]) and Ma`alaea Small Boat Harbor (AECOS, 2005a[1] & b[2]).

PHYLUM, CLASS, ORDER, FAMILY		Location			
Genus species	Common name	South Breakwater 1	Ma`alaea Harbor 2	East of East Breakwater 3	Kanaio Drainage 4
		ALGAE			
CHLOROPHYTA	GREEN ALGAE				
Bryopsis pennata		O[1]			
Chaetomorpha antennina		A			
Cladophora sp.		P, O[1]	P[1]	P	P
Cladophora fascicularis				P	
Codium edule		P		P	
Halimeda opuntia		P, R[1]	P[1]		
Halimeda discoidea		P			
Ulva fasciata	sea lettuce	A, A[1]	P[1,2]	A	A
Ulva reticulata		A, R[1]	P[1,2]	P	A
Valonia aegagrophila			P[2]		
PHAEOPHYTA	BROWN ALGAE				
Dictyota acutiloba					P
Dictyota bartayresiana	*alani*	P, O[1]		P	P
Giffordia breviarticulata	*hulu`ilio*	U[1]			
Ralfsia pangoensis		P	P[1]		
Sargassum echinocarpum		C			
RHODOPHYTA	RED ALGAE				
Acanthophora spicifera	spiny seaweed	A, C[1]	P[1]	A	A
Ahnfeltia concinna (F)	*`aki`aki*	C[1]			
Coelothrix irregularis				P	
Desmia hornemannii		P		P	
Gracillaria parvispora (F)	*ogo*	P			P
Grateloupia hawaiiana (F)	*huluhuluwaena*	P	P[2]		
Grateloupia filicina (F)		A		A	
Gymnogongrus sp.		P			
Hydrolithon reinboldii		U[1]			
Hypnea musciformis	hookweed	A, O[1]	P[1]	A	A
Jania sp.		P		P	
Laurencia nidifica (F)	*mane`one`o*	P			
Laurencia parvipapillata (F)	*lipe`epe`e*			P	
Melanamansia glomerata		P, C[1]		P	P
Peyssonnelia sp.		P	P[2]	P	P
Peyssonnelia rubra			P[2]		
Porolithon onkodes		P, A[1]	P[2]	P	P
Pterocladiella capillacea		A, O[1]			P
Pterocladiella caerulescens		P		P	
HETEROKONTOPHYTA, BACILLARIOPHYCEAE	BLUE-GREEN ALGAE				
Indet.	pseudofilamentous diatom		P[1]		

PHYLUM, CLASS, ORDER, FAMILY / Genus species	Common name	Location: South Breakwater 1	Ma`alaea Harbor 2	East of East Breakwater 3	Kanaio Drainage 4
	INVERTEBRATES				
PORIFERA					
indet.	smooth black sponge			R	
CNIDARIA, HYDROZOA					
HYDROIDA					
Pennaria cf. *disticha*	Christmas tree hydroid		P[1]		
CNIDARIA, ANTHOZOA					
CUBOZOA					
Carybdea sp.	box jellyfish	R[1]	P[2]		
SCLERACTINIA, POCILLOPORIDAE					
Pocillopora eydouxi	antler coral				R
Pocillopora damicornis	lace coral	O, R[1]	P[1,2]		R
Pocillopora meandrina	cauliflower coral	C, O[1]	P[1]	A	A
ACROPORIDAE					
Montipora capitata	rice coral	C, O[1]	P[1,2]	C	A
Montipora patula	spreading coral	O	P[1,2]		C
Montipora flabellata	blue rice coral	U, R[1]	P[1]	A	U
PORITIDAE					
Porites lobata	lobe coral	C, C[1]	P[1,2]	C	A
Porites compressa	finger coral	U, R[1]	P[1,2]	U	U
AGARICIIDAE					
Pavona varians	corrugated coral			U	
FAVIIDAE					
Leptastrea purpurea	crust coral			U	
Cyphastrea ocellina	ocellated coral	U	P[1,2]	U	
ZOANTHIDEA, ZOANTHIDAE					
Palythoa caesia	blue-gray zoanthid	R, O[1]	P[1]		
ALCYONACEA, ALCYONIIDAE					
Carijoa risei	snowflake coral		P[1]		
ANELLIDA, POLYCHAETA, ACICULATA	WORMS				
AMPHINOMIDAE					
Pherecardia striata	lined fireworm		P[2]		
CANALIPALAPATA					
SABELLIDAE					
indet.	tube worm		P[2]		
SERPULIDAE					
Sabellastarte sanctijosephi	feather duster worm		P[1,2]		
Spirobranchus giganteus	Christmas-tree worm	U	P[1]		U
TEREBELLIDAE					
Loimia medusa	medusa spaghetti worm	R	P[1,2]	R	R
indet.	unknown pink spaghetti worm		P[2]		

PHYLUM, CLASS, ORDER, FAMILY / Genus species	Common name	Location: South Breakwater 1	Ma`alaea Harbor 2	East of East Breakwater 3	Kanaio Drainage 4
MOLLUSCA, GASTROPODA	MOLLUSKS				
PATELLIDAE					
Cellana sandwicensis	yellow-foot `opihi	R[1]	P[2]		
Siphonaria normalis	false `opihi	C[1]	P[1,2]		C
TROCHIDAE					
Trochus intextus	woven top		P[2]	U	
NERITIDAE					
Nerita picea	black nerite	C, O[1]	P[1,2]	C	C
LITTORINIDAE					
Littoraria pintado	dotted periwinkle	C	P[1,2]	C	C
VERMETIDAE					
Serpulorbis variabilis	variable worm snail	O	P[1,2]	O	O
CYPRAEIDAE					
Cypraea caputserpentis	snakehead cowry			R	
CONIDAE					
Conus marmoreus	marbled cone	R			
MOLLUSCA, GASTROPODA, CEPHALASPIDEA					
AGLAJIDAE					
Chelidonura hirundina	blue swallowtail slug			R	
MOLLUSCA, BIVALVIA					
ARCIDAE					
Arca ventricosa	ventricose ark shell		P[2]		C
PTERIIDAE					
Pinctada margaritifera	black-lipped pearl oyster	U, R[1]	P[2]	O	U
ISOGNOMONIDAE					
Isognomon perna	brown purse shell	U		C	C
OSTREIDAE					
Ostrea sandvicensis	Hawaiian oyster		P[1,2]		
MOLLUSCA, CEPHALOPODA, OCTOPODA					
OCTOPODIDAE					
Octopus cyanea	day octopus	R[1]			R
MOLLUSCA, CEPHALOPODA, TEUTHOIDEA					
SEPIOLIDAE					
Sepioteuthis lessoniana	oval squid	R[1]			
ARTHOPODA, CRUSTACEA, DECAPODA					
ALPHEIDAE					
Alpheus deuteropus	snapping shrimp	C	P[1]	C	C
TRAPEZIIDAE					
Trapezia flavopunctata	yellow-spotted guard crab				R
Trapezia intermedia	common guard crab			R	
GRAPSIDAE					
Grapsus tenuicrustatus	thin-shelled rock crab	C, C[1]	P[1,2]	C	C
Percnon planissimum	flat rock crab		P[2]		

PHYLUM, CLASS, ORDER, FAMILY		Location			
Genus species	Common name	South Breakwater	Ma`alaea Harbor	East of East Breakwater	Kanaio Drainage
		1	2	3	4
OCYPODIDAE					
Macrophthalmus sp.	sentinel crab		P[2]		
ENOPLOMETOPIDAE					
Enoplometopus occidentalis	red reef lobster †		P[1]		
ECHINODERMATA, OPHIUROIDEA	BRITTLE STARS				
OPHIOCOMIDAE					
Ophiocoma erinaceus	spiny brittle star	U		U	U
ECHINODERMATA, ECHINOIDAE	SEA URCHINS				
DIADEMATIDAE					
Diadema paucispinum	long-spined urchin	O, O[1]	P[1,2]	O	O
Echinothrix calamaris	banded urchin	R[1]	P[2]		U
Echinothrix diadema	blue-black urchin	U[1]	P[1]		O
ECHINOMETRIDAE					
Colobocentrotus atratus	helmet urchin	R[1]			
Echinometra mathaei	rock-boring urchin	C, A[1]	P[1,2]	A	A
Echinometra oblonga	oblong urchin	A[1]			
Heterocentrotus mammillatus	slate-pencil urchin	O, C[1]	P[1,2]	C	C
TOXOPNEUSTIDAE					
Tripneustes gratilla	collector urchin	A,C[1]	P[1,2]	A	A
ECHINODERMATA, HOLOTHUROIDAE	SEA CUCUMBERS				
HOLOTHURIIDAE					
Actinopyga mauritiana	white-spotted sea cucumber	U, O[1]	P[1]	U	U
Holothuria sp.	sea cucumber	C		C	
Holothuria atra	black sea cucumber	U[1]	P[2]	U	
	VERTEBRATES				
VERTEBRATA, CHONDRICHTHYES	SHARKS & RAYS				
MYLIOBATIDAE					
Aetobatis narinari	spotted eagle-ray		P[1]		
VERTEBRATA, PICES	FISHES				
MURAENIDAE					
Echidna nebulosa	snowflake moray	R[1]	P[2]		
Gymnomuraena zebra	zebra moray				R
Scuticaria tigrina	tiger moray			R	R
ENGRAULIDAE					
Encrasicholina purpurea	Hawaiian anchovy		P[2]		
AULOSTOMIDAE					
Aulostomus chinensis	trumpetfish	R, R[1]	P[1,2]		
FISTULARIIDAE					
Fistularia commersonii	cornetfish	A, U[1]	P[1,2]		U
SERRANIDAE					
Cephalopholis argus	peacock grouper, *roi*	R			U

PHYLUM, CLASS, ORDER, FAMILY		Location			
Genus species	Common name	South Breakwater	Ma`alaea Harbor	East of East Breakwater	Kanaio Drainage
		1	2	3	4
SYNODONTIDAE					
Saurida sp.	lizardfish		P[1]		
Synodus ulae	*`ulae*		P[2]		
SCORPAENIDAE					
Sebastapistes coniorta (E)	speckled scorpionfish			U	U
Scorpaenopsis diabolus	devil scorpionfish	R[1]			
KUHLIIDAE					
Kuhlia sandvicensis (E)	Hawaiian flagtail		P[1,2]		
CIRRHITIDAE					
Cirrhitops fasciatus	redbarred hawkfish	R			
CARANGIDAE					
Caranx melampygus	bluefin trevally	R[1]	P[1]		
Decapterus macarellus	mackerel scad, *`opelu*	U			
Scomberoides lysan	leatherback, *lai*			R	R
LUTJANIDAE					
Lutjanus fulvus	blacktail snapper		P[2]		
MUGILIDAE					
Mugil cephalus	striped mullet, *`ama`ama*		P[2]		
MULLIDAE					
Mulloidichthys flavolineatus	yellowstripe goatfish	R,R[1]	P[1,2]		R
Mulloidichthys vanicolensis	yellowfin goatfish		P[1,2]		
Parupeneus cyclostomus	blue goatfish		P[1]		
Parupeneus multifasciatus	manybar goatfish	R,R[1]	P[1]	R	R
Parupeneus porphyreus (E)	whitesaddle goatfish	R,R[1]	P[1]		R
Upeneus arge	bandtail goatfish		P[2]		
KYPHOSIDAE					
Kyphosus bigibbus	brown chub		P[1]		
CHAETODONTIDAE					
Chaetodon auriga	threadfin butterflyfish	O	P[1,2]	O	C
Chaetodon lunula	raccoon butterflyfish	C, O[1]	P[1,2]	O	O
Chaetodon miliaris (E)	milletseed butterflyfish		P[1,2]		
Chaetodon unimaculatus	one-spot butterflyfish	R[1]			
POMOCENTRIDAE					
Abudefduf abdominalis (E)	Hawaiian sargeant	U,C[1]	P[1,1]	O	O
Abudefduf sordidus	blackspot sergeant		P[2]		
Chromis vanderbelti	blackfin chromis	U			U
Dascyllus albisella (E)	Hawaiian dascyllus		P[1,2]		R
Plectroglyphidodon imparipennis	brighteye damselfish	C	P[2]	O	C
Plectroglyphidodon johnstonianus	blue-eye damselfish	U			R
Stegastes fasciolatus	Pacific gregory	U,C[1]	P[1,2]		

PHYLUM, CLASS, ORDER, FAMILY Genus species	Common name	Location South Breakwater 1	Ma'alaea Harbor 2	East of East Breakwater 3	Kanaio Drainage 4
LABRIDAE					
indet.	juveniles	A		A	A
Anampses cuvier (E)	pearl wrasse	R[1]			
Bodianus bilunulatus (E)	Hawaiian hogfish	R[1]			
Cheilio inermis	cigar wrasse	R[1]	P[1]		
Coris gaimard	yellowtail coris	R,R[1]	P[1]		R
Coris venusta (E)	elegant coris				R
Gomphosus varius	bird wrasse	R,U[1]	P[1]	R	R
Labroides phthirophagus (E)	Hawaiian cleaner wrasse	U[1]	P[1]		R
Macropharyngodon geoffrey (E)	shortnose wrasse	R[1]			
Novaculichthys taeniourus	rockmover wrasse	R,R[1]			
Stethojulis balteata (E)	belted wrasse	A	P[1,2]	A	A
Thalassoma ballieui (E)	old woman wrasse		P[2]		
Thalassoma duperrey (E)	saddle wrasse	A, C[1]	P[1,2]	A	A
Thalassoma trilobatum	Christmas wrasse	O,O[1]	P[2]	O	O
SCARIDAE					
indet.	juveniles			O	O
Scarus psittacus	pale nose parrotfish	U	P[2]		C
Scarus rubroviolaceus	red-lip parrotfish		P[2]		
BLENNIIDAE					
Blenniella gibbifrons	bullethead rockskipper		P[2]	R	
Cirripectes vanderbilti (E)	scarface blenny	R		R	
Plagiotremus sp.	fang blenny			R	
TRIPTERYGIIDAE					
Enneapterygius atriceps	triple fin blenny		P[2]	R	
BLENNIDAE					
Blenniella gibbifrons	bullethead rockskipper		P[2]		
GOBIDAE					
Psilogobius mainlandi (E)	Hawaiian shrimp goby		P[2]		
ZANCLIDAE					
Zanclus cornutus	Moorish idol	R,U[1]	P[1,2]		U
ACANTHURIDAE					
Acanthurus blochii	ring-tail surgeonfish	U,O[1]	P[1,2]	U	O
Acanthurus dussumieri	eye-stripe surgeonfish		P[1]		
Acanthurus guttatus	white-bar surgeonfish	U,C[1]	P[1,2]		
Acanthurus leucopareius	whitespotted surgeonfish	R	P[1,2]		
Acanthurus nigrofuscus	lavender tang	U[1]	P[1,2]		C
Acanthurus nigroris	bluelined surgeonfish	C			U
Acanthurus olivaceus	orangeband surgeonfish	R			
Acanthurus triostegus	*manini*	A,A[1]	P[1,2]	U	U
Acanthurus xanthopterus	yellowfin surgeonfish	U	P[2]		
Ctenochaetus hawaiiensis	black surgeonfish		P[2]		
Ctenochaetus strigosus	goldring surgeon	R,U[1]	P[1,2]		

PHYLUM, CLASS, ORDER, FAMILY Genus species	Common name	Location South Breakwater 1	Ma'alaea Harbor 2	East of East Breakwater 3	Kanaio Drainage 4
ACANTHURIDAE (cont.)					
Naso lituratus	orangespine unicornfish	U,R[1]		R	U
Naso unicornis	unicornfish, *kala*	C,R[1]	P[1]	O	C
Zebrasoma flavescens	yellow tang		P[1,2]		
BALISTIDAE					
Rhinecanthus rectangulus	reef triggerfish	C,U[1]	P[1]	C	C
MONOCANTHIDAE					
Cantherhines dumerilii	barred filefish		P[2]	R	
OSTRACIIDAE					
Ostracion meleagris	spotted boxfish	U,C[1]	P[1,2]	U	R
TETRAODONTIDAE					
Arothron hispidus	stripebelly puffer	R		R	R
Canthigaster amboinensis	ambon toby	U	P[2]		U
Canthigaster jactator (E)	HI white spotted toby		P[2]		

KEY TO SYMBOLS USED IN TABLE 1:

Location:

1 - West Breakwater - west of west breakwater, outside harbor off Kapoli Beach.
2 - Maalaea Harbor - Ma'alaea Small Boat Harbor & channel (surveyed 2004 & 2005).
3 - East of East breakwater - adjacent to Ma'alaea Kai condominium.
4 - Kanaio Drainage - adjacent to Island Sands condominium.

Abundance categories:

P - Present
R - Rare - Only one or two individuals observed in area.
U - Uncommon - Three to no more than a dozen individuals seen in area.
O- Occasional - Seen irregularly and always in small numbers; more than a dozen individuals in area.
C - Common - Seen regularly, although generally in small numbers.
A - Abundant - Found in large numbers and widely distributed.

Other symbols and categories:

† - Shell, carapace, or test only (not seen alive).
E - Endemic - Found in Hawaii and nowhere else.
F - Food resource - Alga collected for consumption.

QC:

Animals were identified in the field on September 30, 2005 by S. Burr, K. Laing, and C. Linebaugh and algae were identified in the laboratory by C. Linebaugh.

[1] Reported in AECOS (2005a), Nov. 17, 2004, Ma'alaea ferry pier survey.
[2] Reported in AECOS (2005b), Oct. 24, 2005, USCG harbor survey.

APPENDIX G.

Archaeological Inventory Survey Reports

SCS Project 534-1

AN ARCHAEOLOGICAL INVENTORY SURVEY REPORT ON 259.903 ACRES IN MA`ALAEA, UKUMEHAME AND WAIKAPU AHUPUA`A, WAILUKU DISTRICT, MAUI ISLAND, HAWAI`I [TMK: (2) 3-6-01:18]

Prepared by:
Jon Wilson, B.A.
and
Michael F. Dega, Ph.D.
April 2005

Prepared for:
AFK Development
1132 Norman Drive
Manteca, CA 95336

SCIENTIFIC CONSULTANT SERVICES Inc.

711 Kapiolani Blvd. Suite 975 Honolulu, Hawai`i 96813

ABSTRACT

Scientific Consultant Services (SCS), Inc., conducted Archaeological Inventory Survey on a 259.903-acre land parcel in Ma`alaea, Ukumehame and Waikapu Ahupua`a, Wailuku District, Maui Island, Hawai`i [TMK: (2) 3-6-01:18]. The work consisted of historical background and archival research; pedestrian survey and inspection of the parcel; mapping and description of site features; subsurface testing (excavation by backhoe); consultation with state archaeologist Dr. Melissa Kirkendall; and, analysis, interpretation, and reporting of all relevant data. The main objectives of the project were to determine if significant cultural and/or historic resources occurred on the parcel; and, to provide significance assessments and recommendations.

The main results of this study were as follows: Three historic sites, all related to sugarcane agriculture, were identified, documented for the first time, and assigned SIHP numbers: Site 50-50-09-5657 (clearing mounds), Site 50-50-09-5658 (irrigation modifications), and Site 50-50-09-5659 (dirt road). These three sites were the only archaeological sites found within the project area, and all three are considered significant under Criterion D of the Hawaii State and National Register of Historic Places. A 100 percent pedestrian survey concluded that no prehistoric sites exist on the surface of the project area.

Subsurface testing was comprised of twenty backhoe trenches (a volume of approximately 292 cubic meters) which did not reveal any subsurface historic, or prehistoric, cultural material. Rather, excavation confirmed the extent, both in physical and temporal depth, of historic and modern agricultural activity within the project area. No burial features or human remains were observed during pedestrian survey or encountered during subsurface testing.

The following actions are recommended: No further archaeological work is necessary within the project area, with the exception of a period of observation during future earth-moving activity. An archaeologist must be on site during the leveling of a representative sample (a minimum of four) of the thirteen clearing mound features that comprise State Site 50-50-09-5657. This archaeological observation is necessitated by the possibility of historic and/or prehistoric features or artifacts having been buried under/within the large clearing mounds.

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INTRODUCTION

Scientific Consultant Services (SCS), Inc., conducted Archaeological Inventory Survey (AIS) on a 259.903-acre land parcel in Ma`alaea, Ukumehame and Waikapu Ahupua'a, Wailuku District, Maui Island, Hawai`i [TMK: (2) 3-6-01:18] (Figures 1 and 2). The work consisted of historical background and archival research; pedestrian survey and inspection of the parcel; mapping and description of site features; subsurface testing (excavation by backhoe); consultation with state archaeologist Dr. Melissa Kirkendall; and, analysis, interpretation, and reporting of all relevant data. Fieldwork was conducted on January 31–February 11, 2005 by Jon Wilson, B.A. and Eric Pope, B.A. under the supervision of Principal Investigator Michael F. Dega, Ph.D.

Archaeological work in the project area was conducted to determine the presence/absence of archaeological features in surface and subsurface contexts through complete pedestrian survey and representative subsurface testing. The ultimate goals of the project were to determine if significant cultural and/or historic resources occurred on the parcel; and, to provide significance assessments and recommendations to the State Historic Preservation Division (SHPD). Plans for the "Ma`alaea Mauka" residential project by AFK Development utilize nearly the entire project area detailed within this AIS. Included in development plans are over one thousand residential units, a community center, a park and open areas, buffer zones, and roadways.

ENVIRONMENTAL SETTING

PROJECT AREA DESCRIPTION AND LOCATION

Maui's Wailuku District encompasses an area from the eastern half of the West Maui Mountains, north to Kahului Bay, south to Ma`alaea Bay, and includes the entire Kahului Isthmus (Figure 3). Near the southwestern corner of Wailuku District, the boundary separating Ukumehame Ahupua`a and Waikapu Ahupua`a runs from *mauka* to *makai* (roughly west to east). At an elevation of approximately 55 meters (180 feet) the *ahupua`a* boundary sharply angles south toward Ma`alaea Bay. This sharp angle between the two *ahupua`a* marks the northeastern boundary of the current project area. The *ahupua`a* boundary then divides the project area as it continues south, leaving roughly 65 percent of the parcel in Ukumehame Ahupua`a, and 35 percent of the parcel in Waikapu Ahupua`a (see Figure 1).

The "Ma`alaea Mauka" project area consists of one contiguous 259.903-acre parcel that uses the Honoapiilani Highway as its *makai* border. The three-sided project area's southern terminus is a triangular point *mauka* of Ma`alaea Small Boat Harbor. The northern boundary line

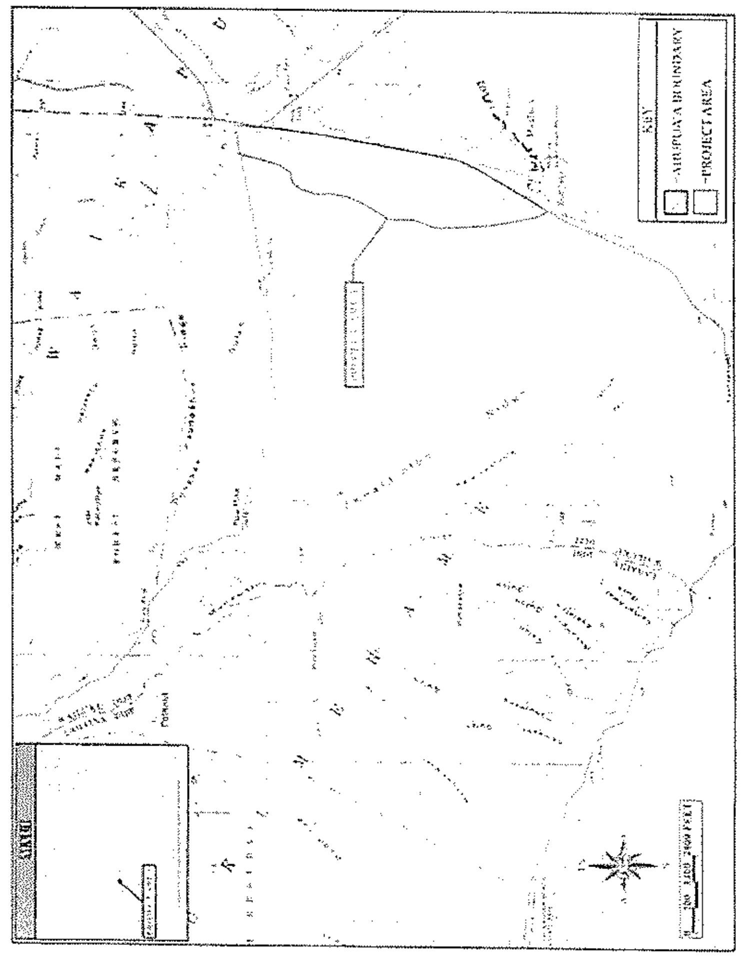

Figure 1: USGS Ma`alaea Quadrangle Showing Project Area Location.

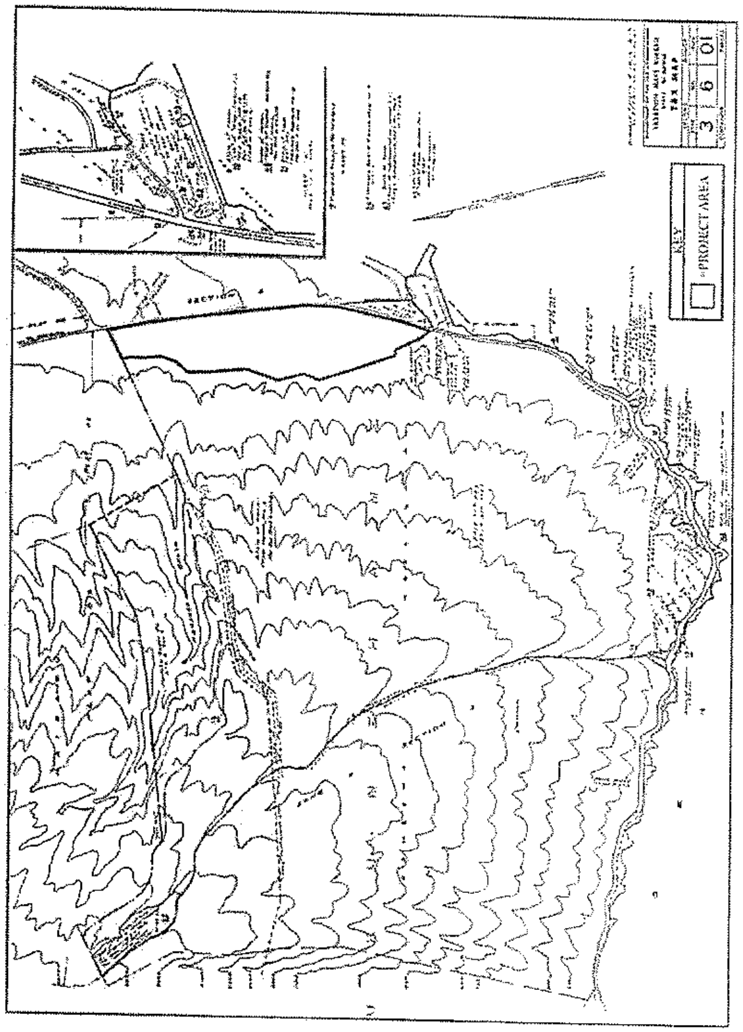

Figure 2: TMK [Tax Map Key] Showing Project Area Location.

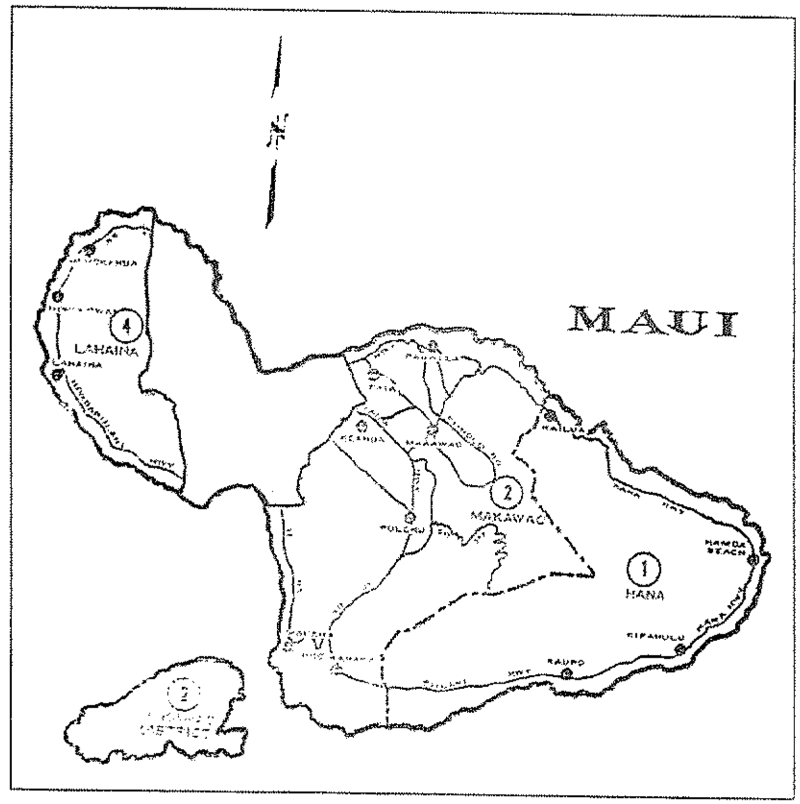

Figure 3: Wailuku District Boundaries.

extends *mauka* from a point 183 m (600 feet) south of the Kuihelani Highway's intersection with Honoapiilani Highway. The long, narrow project area runs 2.7 kilometers (1.7 miles) along the Honoapiilani Highway (Figure 4), and at it widest is 579 m (1900 feet).

PROJECT AREA LANDFORM

The sharp transition from valley floor to mountain slope is the most distinct visual feature of the nearby terrain. This dramatic elevation increase, however, occurs just *mauka* of the relatively flat project area (Figure 5). With the southeastern end of the project area having an elevation of 12 m (40 feet), and the northwestern perimeter high point of 61 m (200 feet), the maximum elevation difference throughout the project area is only 49 m (160 feet). The average *makai* to *mauka* elevation gained from walking the width of the project area (about half a kilometer) is only 24m (80 feet). The average elevation gained from climbing the next half kilometer beyond the project area's *mauka* border is 146 m (480 feet).

The gently-sloping terrain of the project area has been made more flatly uniform through decades of agricultural activity. Few distinct naturally-occurring landmarks remain within the project area's topography. Certain points within the project area afford an uninterrupted view of its entire expanse. The four perennial *mauka-makai* running drainages that cross the project area remained dry at the time of survey. It is likely that these narrow water courses that span the parcel's width only flow in times of heavy rains. Two of the four drainages are fairly shallow and narrow, and do not originate much farther upslope than the base of the mountains. The two more significant drainages appear on the USGS topographical map (see Figure 1), and are currently diverted under Honoapiilani Highway, eventually emptying into Ma'alaea Bay. Of these two, the southern drainage originates at an elevation of 335 m (1100 feet), and the northern drainage (Figure 6) originates near Puu Moe at 640 m (2100 feet). However, at a maximum width of less than four meters, it is likely that even these two more significant water sources served to irrigate the project area only in times of heavy rainfall.

CLIMATE AND VEGETATION

The project area receives 25 to 38 centimeters (10 to 15 inches) of rainfall annually (Armstrong 1983). This area is much drier than higher elevations to the west that receive as much as twenty times the level of precipitation. Air temperatures are consistently slightly warmer here than the Maui seasonal high and low averages, mostly due to the lower, coastal elevation.

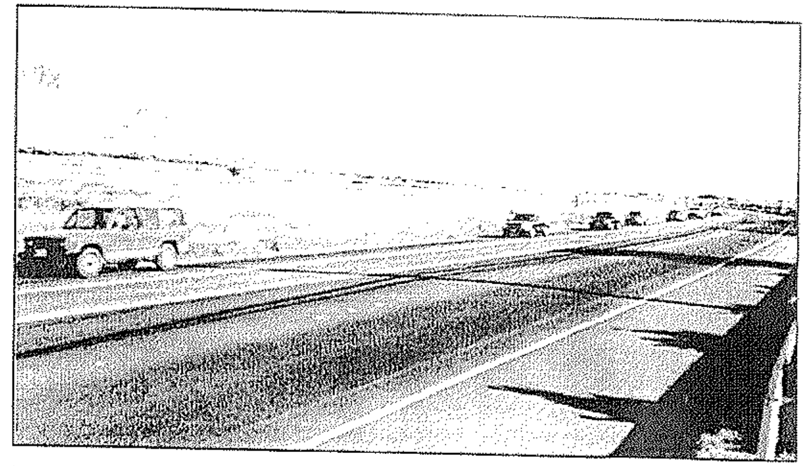

Figure 4: Project Area Overview. View to North, Across Honoapiilani Highway.

Figure 5: Project Area Overview. View to North, from Southern Quadrant.

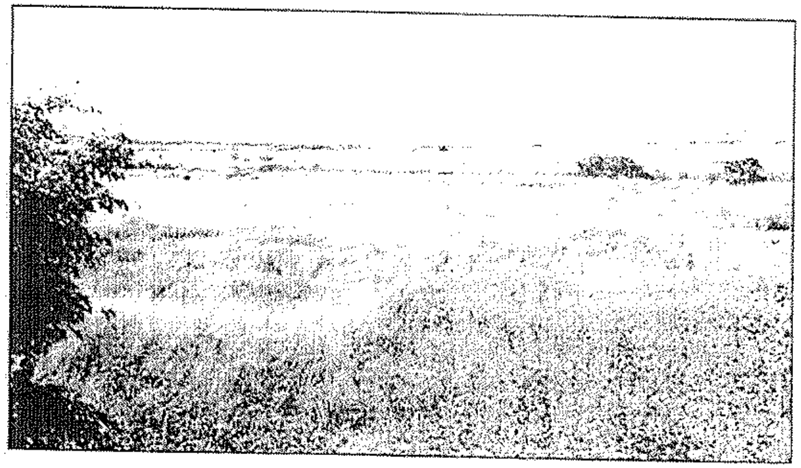

Figure 6: *Mauka-Makai* Vegetation Line Marks the Northern Drainage Appearing on the USGS Map. Northern Half of Project Area, View to South.

At the time of survey, project area vegetation consisted of a mix of introduced grasses and trees, few native species, and a variety of small garden plots with a mix of planted crop species. The only areas not covered by vegetation were the multiple dirt road segments that transect the property. Introduced grasses, ranging from 0.5 to 1.0 m tall, covered roughly 85 percent of the project area. Few *kiawe* trees (*Prosopis pallida*) were found outside of drainage perimeters, but along and within the drainages these introduced trees were abundant. *Kiawe* also lines the *mauka* side of the *mauka* perimeter road, and grows very dense within the State-owned lands at the base of the mountains. Overall, few trees exist within the former agriculture fields. Recent *koa haole* (*Leucaena leucocephala*) trees have grown to a height of no more than 1.5 m within the fields, but grow to a height of over 3.0 m along the *mauka* perimeter roads. Other species include lantana (*Lantana camarara*), sparse sisal (*Agave sisalana*), and the native *'ilima* (*Sida* sp.).

Over twenty different patches of recently abandoned garden crops are scattered throughout the southern 80 percent of the project area. None are larger than one acre, and none of these patches exist within the rockier northern soils. Two local informants spoke of "renting" land for small-scale farming within the "past couple of years," be it through a formal contract

with the previous land owner or not. Rows of banana trees occur in at least five different areas. One banana patch also includes gourds; papaya trees are interspersed throughout. At the center of the property, surface plastic irrigation pipes appear to be recently constructed and lead to a square sod field. The most elaborate small-scale farming remnant is what appears to be a *Ficus* sp. nursery at the center of the project area's northern half. Here, three rows of identically-sized trees are paralleled by what appear to be recently constructed concrete walkways and irrigation piping (Figure 7).

SOILS

As the project area extends north, its soils contain a greater concentration of basalt cobble and boulder. According to Foote *et al.* (1972:101), soils in the project area fall into mainly two categories: the Ewa Series (80 percent of the project area) and the Pulehu Series (most of the northern 20 percent). The Ewa Series consists of well-drained soils occurring on alluvial fans within Oahu and Maui. They are derived from igneous rock, moderately sloping, and best suited for sugar cane, truck crops, and pasture. The southern third of the project area consists entirely of Ewa Silty Clay (EsB), ideal for sugarcane. Bordering EsB soil to the north is a large contiguous section of Ewa Cobbly Silty Clay (EtB), covering roughly 50 percent of the project area. Foote *et al.* note that the removal of a surface layer of cobble renders this soil equally suitable to sugarcane cultivation as the less rocky soil to the south (1972:29–30, 115–116).

Figure 7: Possible Tree Nursery at Center of Project Area.

Roughly 20 percent of the project area, entirely concentrated at the northern end, consists of a Pulehu Series soil—specifically, Pulehu Cobbly Clay Loam (PtB). This soil is very similar to the Ewa Series in almost every aspect except its greater surface rock concentration. Thus, a direct correlation can be seen between the location of PtB soil and the 13 large, agricultural clearing mounds (State Site 50-50-09-5657) concentrated in the northern end of the project area (Figures 8 and 9). In an effort to create sugarcane fields equally productive as lands to the south, decades of tilling have deposited these enormous mounds of concentrated boulders. (See "RESULTS" section, below, for further discussion of the historic origin of the Site -5657 mounds).

TRADITIONAL AND HISTORIC SETTING

PRE-CONTACT TO EARLY HISTORIC ERA

Wailuku District, is frequently mentioned in historical texts and oral tradition as being politically, ceremonially, and geographically important during traditional times (Cordy 1981, 1996; Kirch 1985). Wailuku was considered a "chiefly center" (Sterling 1998:90) with many of the chiefs and much of the area's population residing near or within portions of `Īao Valley and lower Wailuku. The importance of the district is reflected by the relatively large number of *heiau* that were reportedly present in pre-Contact times. Oral tradition accounts surrounding these *heiau* provide examples of how religion tied into political power in the traditional Wailuku setting. Indeed, the period immediately preceding contact with the Europeans was one of considerable upheaval and conflict. *Wailuku*, meaning 'water of destruction,' succinctly describes the area in the late 1700s. Political power emanating from Moloka`i was an active element during the mid-eighteenth century. The resulting battle at Kalae`ili`ili (A.D. 1765) led to the expulsion of Keeaumoku and the Moloka`i *ali`i* and the beginning of Kahekili's reign (Kamakau 1992). Kahekili successfully defended his capital in Wailuku throughout the 1770s, until his defeat at the hands of Kamehameha's forces.

Closer to the current project area, in the southwest corner of Wailuku District, prehistoric settlement was not as dense as concentrations to the north. Climate had much to do with that trend, as the Ma`alaea area is a more arid environment than the rain-soaked fields to the north. According to Tomonari-Tuggle and Tuggle (1991), the majority of the pre-Contact population was located southwest of the project area, near what is now Ukumehame Beach State Park. Settlement was also probable north of Kealia Pond in Waikapu Ahupua`a. Handy and Handy report that before the historic sugarcane plantations in this region, water from Waikapu Stream ". . . was diverted into lo`i and its overflow was dissipated on the dry plains of the broad isthmus between West and East Maui" (1972:496).

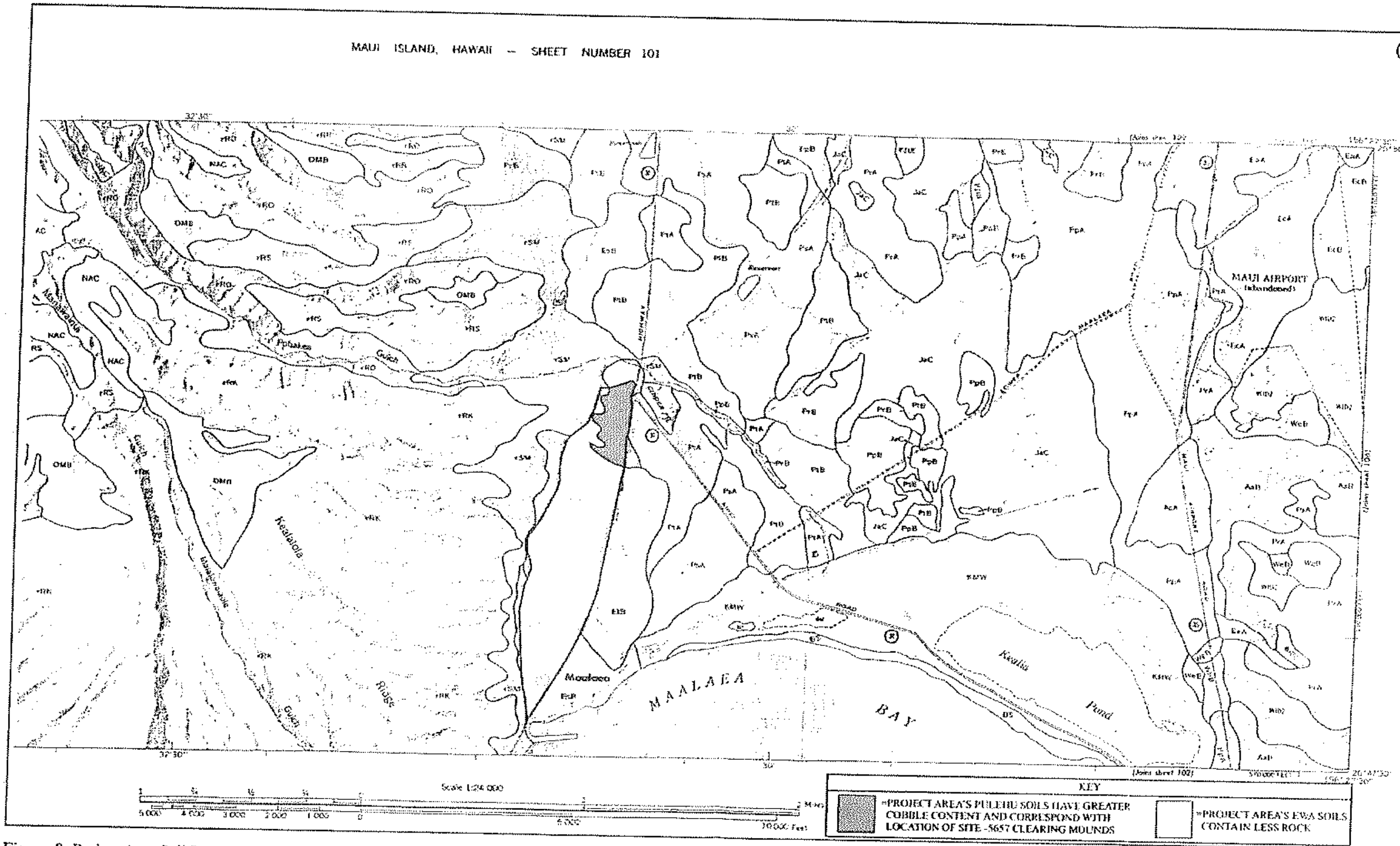

Figure 8: Project Area Soil Type Distribution (adapted from Foote *et al.* [1972:101]).

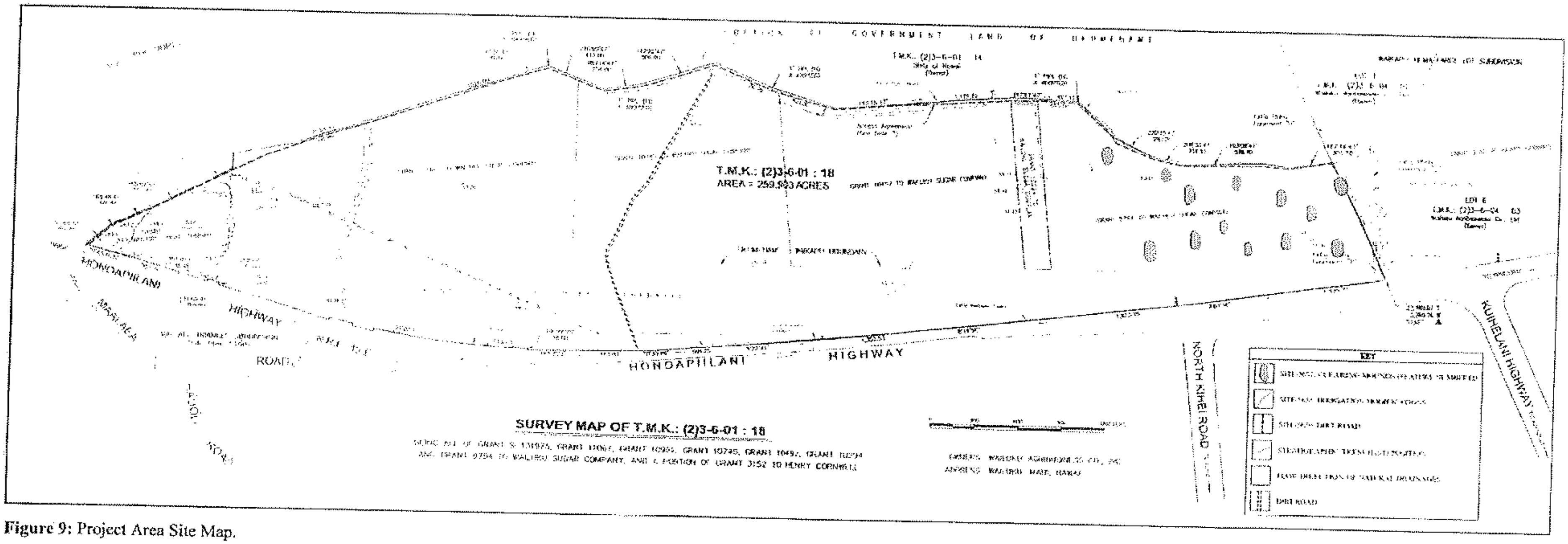

Figure 9: Project Area Site Map.

Wailuku District would see drastic change after Captain James Cook's 1778 arrival in Kahului Bay. The reign of Kamehameha I was intertwined with the increasing presence of Europeans within the Hawaiian Islands. By 1821, American missionaries had established a foothold in Lahaina and first arrived in Wailuku a year later. The religion of the Hawaiian people began to wane under the influence of Christianity. Fredericksen and Fredericksen (2002:4) point to a girls' seminary (Central Female Boarding School), established in Wailuku in 1836, as one of the initial steps in the conversion of Hawaiian language and customs in Maui.

THE GREAT MĀHELE

In 1848, commissioners of the Great Māhele instigated an extreme modification to traditional land tenure on all islands that resulted in a division of lands and a system of private ownership. The Māhele was based upon the principles of Western law. While a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian society into that of a market economy (Kuykendall Vol. I 1938:145, footnote 47, *et passim*; Daws 1968:111; Kame`eleihiwa 1992:169–170, 176). The dramatic shift from a redistributive economy to a market economy resulted in drastic changes to land tenure, among other things. As a result, foreigners demanded private ownership of land to ensure their investments (Kuykendall Vol. I, 1938:145, *et passim*; Kame`eleihiwa 1992:178; Kelly 1998:4).

Once lands were made available and private ownership was instituted, native Hawaiians, including the *maka`āinana* (commoners), were able to claim land plots upon which they had been cultivating and living. Oftentimes, foreigners were simply just given lands by the *ali`i*. However, commoners would often only make claims if they had first been made aware of the foreign procedures (*kuleana* lands, or land commission awards). These claims could not include any previously cultivated or currently fallow land, *okipu*, stream fisheries, or many other natural resources necessary for traditional survival (Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). Awarded parcels were labeled as Land Commission Awards (LCAs). If occupation could be established through the testimony of witnesses, the petitioners were issued a Royal Patent number and could then take possession of the property. Commoners claiming house lots in Honolulu, Hilo, and Lāhainā were required to pay commutation to the government before obtaining a Royal Patent for their awards (Chinen 1961:16).

During the Māhele, Wailuku District was declared Crown Land and numerous Land Commission Awards, approximately 180, were awarded within Wailuku Ahupua'a alone (Creed 1993). A handful of foreigners (*i.e.*, Anthony Catalena, James Louzada, E. Bailey) gained

control of large parcels of lands that would later be used for mass cultivation of sugar. Significantly, the majority of LCAs were awarded to Hawaiians, a gauge that can be used to measure pre-Contact settlement, since there was little overall change in traditional land use among Hawaiians prior to 1853 (Creed 1993:38).

During the Māhele, there were no land claims within the current project area. This fact may be attributed to the sparse pre-1848 Hawaiian population within the parcel, a result of settlement conditions within these *ahupua`a* favoring the coastal area.

THE LATE HISTORIC PERIOD AND GROWTH OF THE SUGAR INDUSTRY

Another influence that brought change to Maui was foreign commercialism. Two Chinese brothers, Ahung and Atai, of Honolulu's Hungtai Company arrived in Wailuku to explore the possibility of setting up one of its earliest sugar mills in 1828. Atai soon created a plant that processed sugar cane cultivated by Hawaiians, named the Hungtai Sugar Works (Dorrance and Morgan 2000:15–16). Ahung later joined Kamehameha III's sugar producing enterprise, although by 1844 both operations had ceased. The Wailuku Sugar Company was the next to follow, in 1862, and would expand sugar production over the next 126 years of its existence—4,450 acres by 1939, still more than three decades before its maximum production levels.

As it expanded its territory, the Wailuku Sugar Company first appeared on maps of the project area in the in the 1920s (Bureau of Conveyances, Grant 9794), although their acquisition of the project area land may have been as early as the turn of the century (Kennedy and Trimble 1992:4). Successive grants (Grant 10294 through to Grant S-13975) would follow in decades following and fully encompass the Ukumehame Ahupua'a side of the project area in Wailuku Sugar land. Kennedy and Trimble (1992:4) summarize the history of the Waikapu Ahupua`a (*makai*) portion of the project area by detailing its acquisition from the state government on November 18, 1875 by Henry Cornwell (Grant 3152). Cornwell subsequently sold to Claus Spreckels, and by the turn of the century the entire project area was under sugarcane cultivation.

Wailuku Sugar Company ended production in 1988, having averaged over 30,000 tons of sugar produced annually at its pinnacle in the 1970s (Dorrance and Morgan 2000:66). Owner C. Brewer & Company, Ltd. shut down sugar cultivation on the project area, which was then used almost entirely for pineapple cultivation starting no later than 1992 (Kennedy and Trimble 1992:1). The lands were under pineapple for at least the next three years (Tomonari-Tuggle 1995:11)—probably slightly longer—before transitioning to smaller-scale "garden" plots.

PREVIOUS ARCHAEOLOGY

Six studies on file within the SHPD-Kapolei archives summarize the most relevant previous archaeology within the vicinity of the current project area. Figure 10 exhibits the locations of these studies in relation to the current project area. Examination of the archaeological record helped to form the expected findings and, consequently, the subsurface testing pattern charted on Figure 9.

Most relevant to the current study is the only other previous archaeological study that took place within the current project area. Kennedy and Trimble (1992) surveyed an area that overlaps State Site 50-50-09-5659 (historic dirt road), first recorded in the present study (see Figure 10). While Kennedy and Trimble also note the lack of archaeological features in their project area due to the obvious history of intense agriculture, their 1992 report does not consider the road upon which their survey takes place to be a potential historic agricultural feature (as discussed below under "RESULTS"). The project area detailed in their study is no more than 5 meters wider than the dirt road itself, and concludes that "No artifacts, midden, or structures of historic or prehistoric significance were identified on the subject property" (1992:11).

An earlier Kennedy report (1986) entitled *Letter Report: Walk-Through Examination of the Proposed Maalaea Triangle, Maui (TMK: 3-6-01:1)* also concluded with negative results. This project area is located on the *makai* side of Honoapiilani Highway and extends to the coastline (see Figure 10). This was the first archaeological study performed on this parcel and Kennedy does mention (1986:2) nearby sites that are detailed in later studies.

Monitoring within a smaller section of the same project area described by Kennedy (1986) resulted in a single site—a previously disturbed historic burial: State Site 50-50-09-4480 (McGerty, Burgett, and Spear 1998). McGerty *et. al*'s report, entitled *Draft: Monitoring Report on Earth Moving and Construction Excavations, Maui Ocean Center Site, Maui, Hawaii. (TMK: 3-6-01:001 and 019)* describes a pearl shell button found with the burial. The location of Site -4480 is of interest to the current study as its position is approximately 200 m *makai* of the current project area's southern corner. As subsequent subsurface testing would prove, however, the sandy matrix McGerty *et. al* experienced in the Maui Ocean Center monitoring contrasted the reddish clay of the current project area, rendering the likelihood of encountering burials much less. Nonetheless, the McGerty *et. al* (1998) study also mentions two more burials found not far to the north from Site -4480. While these (Sites -3553 and -3554) are even less spatially related

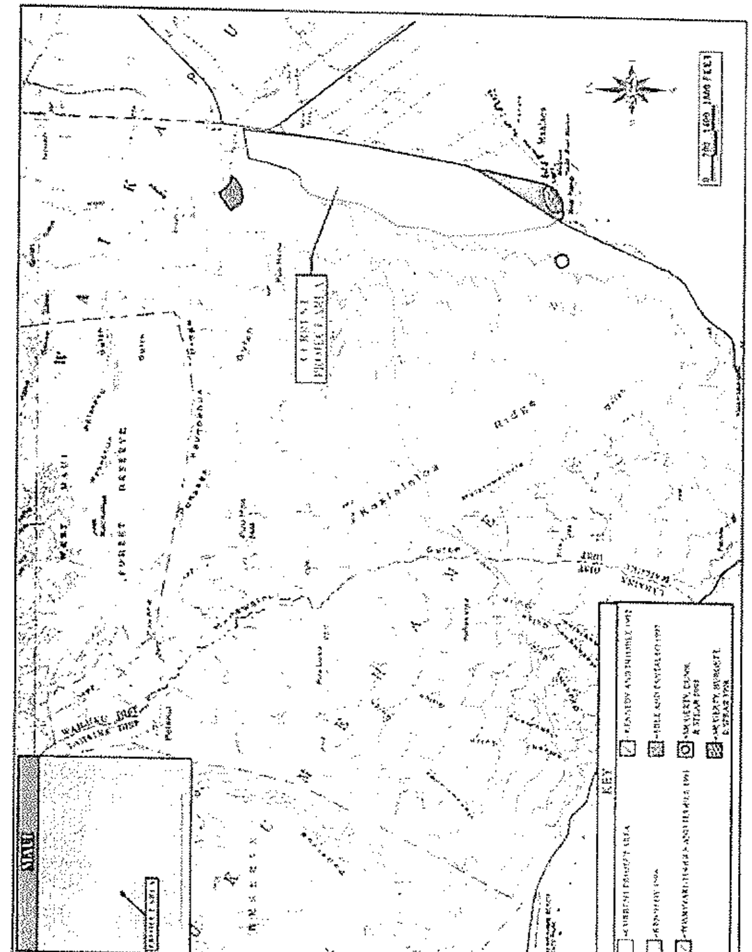

Figure 10: Locations of Selected Previous Archaeological Studies Near Current Project Area.

to the current project area, their presence will later call for increased testing in the southern portion of the current project area (closest to the sandy coastal matrices).

McGerty, Dunn, and Spear (1998) conducted Data Recovery in an area of five traditional sites documented by Moore and Kennedy (1995). These sites (50-50-09-3555, -4022, -4137, -4138, -4139) consisted of 28 features, including petroglyphs, subsurface firepits, agricultural terracing, rock mounds, and a C-shape. McGerty et. al's testing at Sites -4138, and -4139 did not produce any significant artifacts, however, radiocarbon analysis of a charcoal sample produced a date of A.D. 1390 to 1650. This sample was recovered from the C-shape (Site 4139, Feature C) which was determined to be a prehistoric temporary habitation. This site is less than 300 m *mauka* of the current project area's southern point.

There is no doubt that the current project area was utilized as a segment of an important trail system in the early 1800s, and probably prehistorically as well. The Lahaina Pali Trail is five miles long and crosses the southern slopes of the West Maui Mountains between Olowalu and Ma`alaea. The start of this trail, now a demonstration trail as part of the Na Ala Hele Trail System, borders the current project area near the center of the *mauka* border. By the historic period in which the trail's significance as a probable prehistoric route was realized, the portion *makai* of the current trail head (*i.e.* the portion transecting the width of the current project area) was already destroyed by sugarcane cultivation. Thus, the trail starts immediately outside the project area, within the State-owned lands. A 1991 study by Tomonari-Tuggle and Tuggle documented 18 sites upon the trail, the majority of historic origin (Figure 11).

SETTLEMENT PATTERN

Archaeological settlement data indicates that initial colonization and occupation of the Hawaiian Islands first occurred on the windward sides of the main islands, with populations eventually settling into drier leeward areas at later periods (Kirch 1985). Archaeological dates for initial occupation of the Hawaiian Islands far pre-date accepted ranges gathered from palynological data. A more conservative estimate for initial occupation of the islands is the A.D. 9th century (Athens 1997), if one is to lay more credibility with the pollen record than the archaeological record. In the Waihe`e and Wai`ehu areas of Wailuku, Kirch (1985:87) notes that "a number of coastal dune midden sites have been reported, and at least one of these contained pearl-shell fishhooks similar to those from the Bellows Site, eroding from the wave-cut midden." (The Bellows site, located on the windward coast of O`ahu, has yielded the controversial data of occupation dates from A.D. 300 to 600 [Pearson *et al.* 1971], one of the earliest dated sites in the

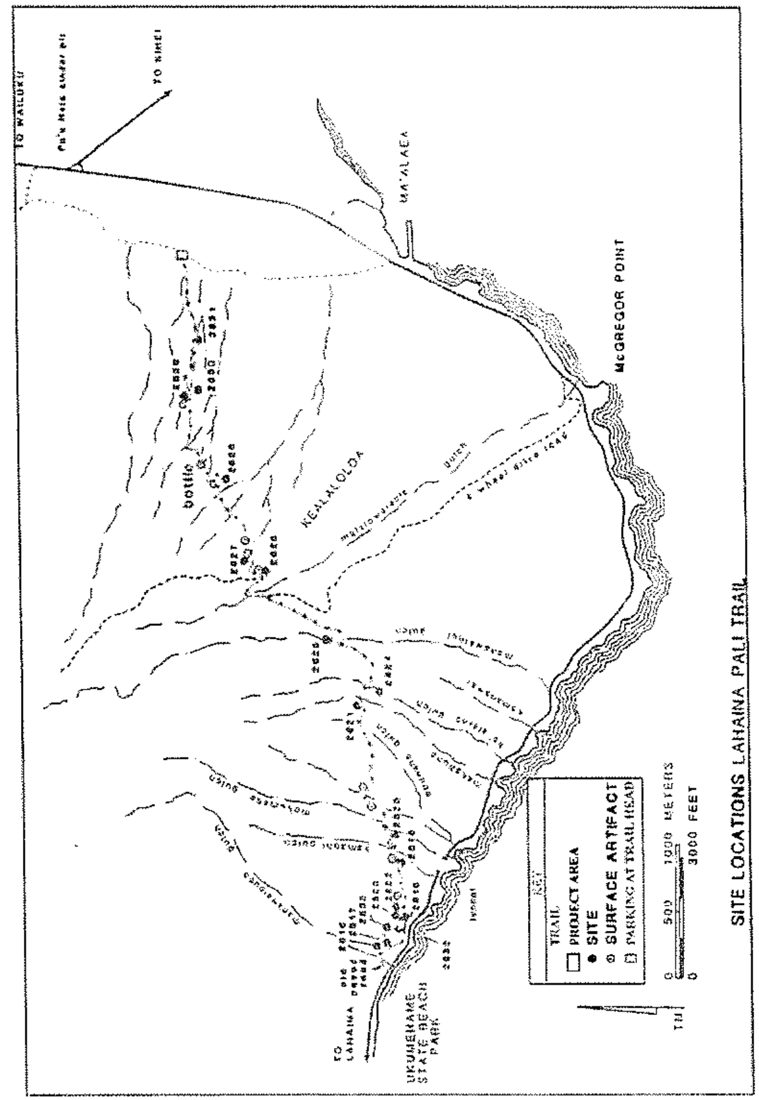

Figure 11: Project Area in Relation to Lahaina Pali Trail (Adapted from Tomonari-Tuggle and Tuggle 1991).

Hawaiian Islands. For the most part, these dates have now been diagnosed as problematic and are no longer considered valid.)

More recent research within Wailuku District indicates that Wailuku Ahupua'a was likely settled between *c.* A.D. 1100 (Kirch 1985:142) and A.D. 1200 (Fredericksen and Fredericksen 1996), whereas *ahupua`a* to the northeast have produced slightly earlier date ranges and *ahupua`a* to the southwest have later settlement dates. The earliest populations purportedly used local resources and seldom ventured into upland valleys. Cordy (in Creed 1993) suggests, however, that upper valley areas on windward coasts were likely populated before the A.D. 1100s. Coastal settlement was still dominant, but populations began exploiting and living in more upland *kula* zones. Population expansion to inland areas did not occur until the *c.* A.D. 12th century but continued through the 16th century. Large scale or intensive agricultural endeavors were implemented in association with habitation. Coastal lands were used for settlement and taro was cultivated in near-coastal reaches and in the uplands. Upland areas of Maui such as the Waiohuli-Kula area contained large garden enclosures, ceremonial structures, and permanent habitation sites by *c.* A.D. 1600.

Nearer the coast in lands like the current project area (*c.* 40–85 meters amsl), taro was cultivated along stream courses, dryland taro was grown on *kula* lands, and populations settled there as well. In the current parcel, however, no LCA records exist that might link prehistoric agriculture to historically documented practice.

EXPECTED FINDINGS

Based on all available physiographic, archaeological, and historical evidence, the following expectations guided this study:

- Historically-significant surface features were expected, particularly those pertaining to historic period sugarcane agriculture. SCS staff conducted a brief reconnaissance (prior to AIS) which reported the presence of the large clearing mounds. The reconnaissance did not report any other historic or prehistoric surface features, however, the probability of documenting additional historic agricultural features during AIS was considered high.

- A variety of traditional Hawaiian sites have been documented at locations within 500 meters outside of all three borders of the project area. While the probability of

encountering prehistoric archaeological surface features within the project area was considered low, there remained a moderate possibility of encountering subsurface cultural layers from a prehistoric period. The latter would depend largely on the existence of a previously undisturbed matrix stratigraphically lower (*i.e.*, older) than historically tilled soils.

- The probability of discovery of historic or prehistoric unmarked burials, or marked burials, was considered low. A slightly higher, yet still low, probability existed in regards to the discovery of scattered human remains during subsurface testing. While burials have been located within the sandy matrix of the adjacent parcels *makai* of Honoapiilani Highway (*i.e.*, during construction activities at the Maui Ocean Center; see McGerty, Burgett, and Spear 1998), SHPD records contain no documented burials *mauka* of Honoapiilani Highway (including on, or within a kilometer, of the current project area). The lack of burial sites immediately *mauka* of the highway can be attributed to two main factors: (1) the types of soils found here were generally less favored in prehistoric burial practices, and (2) the lands have been subject to continual agricultural activity for nearly a century, and in some cases, longer.

METHODOLOGY

In addition to analysis, interpretation, and preparation of this document, the work described in this Archaeological Inventory Survey report consisted of archival research, fieldwork, consultation (both professional and informal— *i.e.* talks with local residents and workers). No laboratory work was necessary. Specifics on all of these research activities are described in detail below.

ARCHIVAL RESEARCH

In addition to referencing available resources at SCS, archival research was conducted at the SHPD library facility (Kapolei, HI) and on the SHPD website before, during, and after the fieldwork described in this report. Archival work consisted of general research on the history and archaeology of the project area, as well as specific searches of previous archaeological studies in and around the subject parcel. Historic land use data, maps, and narrative information were obtained from the Hawaii Bureau of Conveyances as well as the Waihona `Aina Corporation.

FIELD METHODS

Fieldwork was conducted on January 31–February 11, 2005 by Jon Wilson, B.A. and Eric Pope, B.A. under the supervision of Principal Investigator Michael F. Dega, Ph.D. All aspects of the work were photographed and archived on the SCS computer database. Likewise, all fieldnotes, sketches, planviews, profiles, and maps are archived in SCS's Honolulu office.

Fieldwork resulted in a thorough, 100% pedestrian survey project area. The pedestrian survey was conducted via hundreds of east-west transects spanning the width of the project area, starting at the northern border and ending at the southern point. The method of pedestrian survey varied in relation to terrain. In areas of shorter grass and greater surface visibility (*i.e.*, among the Site –5657 clearing mounds) fieldworkers were spaced a maximum of 15 meters apart. In areas of denser vegetation and less surface visibility (*i.e.*, within and bordering the natural drainages) the distance between transect paths was reduced to 5 meters. A total of four temporary sites were plotted on a recently drafted (January 7, 2005) surveyor's map by calculating exact position via tape, compass, and pre-existing survey markers.

SUBSURFACE TESTING

Twenty stratigraphic trenches (ST-1 through ST-20) were excavated in the project area via backhoe, exposing a total of 293.4 linear meters (962.6 feet) of subsurface matrix. A standard 60-cm wide backhoe bucket was used, and the average width of trenches was 64 cm throughout the volume. Sixteen hours of intermittent excavation was conducted over the course of two days: February 9 and 10, 2005.

Methodology regarding excavation was as follows: first, the desired location was flagged by a field archaeologist. Excavation followed with an archaeologist monitoring at all times. Post excavation, three photographs were taken (overall position of the ST within the immediate vicinity of the project area, the length of the entire trench, and a close-up of the selected profiled wall). Also, a sketch stratigraphic profile was recorded on graph paper. All measurements, including detailed soil descriptions, were recorded in fieldnotes, and potential cultural material was screened from *in situ* matrix, or backfill, and thoroughly examined. Finally, the backhoe filled-in the trench.

Three main factors played a role in trench positioning: (1) the desire to excavate at the locations of the four temporary sites found during pedestrian survey, (2) the desire to gain an understanding of subsurface stratigraphy at locations evenly distributed throughout the project area, and (3) the desire to place a higher number of trenches in an area deemed slightly likelier to

contain subsurface prehistoric cultural material (the southern "triangle" *mauka* of the Ma`alaea Small Boat Harbor). This section of the project area lies in between multiple prehistoric sites already registered within the State Index of Historic Places (SIHP). Areas roughly 200 meters *mauka* and *makai* of the project area's southern point have contained traditional features. Therefore, 40 percent (8 STs) of the total individual excavations were placed within this triangle. Trench excavation locations were recorded using tape and compass, and were documented on a project area map (see Figure 9). Trench numbers indicate the chronological order in which they were excavated. Table 1 (in SUBSURFACE STRATIGRAPHY section) details the factors involved in trench positioning.

Maximum depth of individual trench excavation ranged from 96–247 centimeters below surface (cmbs), and averaged 156 cmbs. Bedrock (and/or extremely consolidated clays with decomposing gray basalt directly overlying bedrock) was reached in 16 of the 20 units. Of the units in which bedrock was reached, the shallowest depth was 72 cmbs and the deepest was 151 cmbs; average depth bedrock was first encountered was 114 cmbs. The four STs in which bedrock was not reached were either positioned in an area of convexed surface topography (*i.e.*, the surrounding field had been tilled so that it was higher at the center where the trench was located), or where extra soil had been likely imported for increased crop productivity. Total excavated area was roughly 187.8 square meters; total excavated volume was 292.9 cubic meters.

RESULTS

This section describes: (1) the three archaeological sites documented in the project area; and, (2) the subsurface testing, sediments, and stratigraphy throughout the project area. No significant artifacts or features were exposed in any the trenches. Excavation resulted in relatively homogenous soil stratification—what might be expected in an area subjected to decades of similar agricultural practice. The only relevant change in soil stratigraphy corresponded to the (previously discussed) shift in soil type from north to south. Some matrices had inclusions of modern debris, evidencing agricultural activity (likely small-scale) as recently as 2003.

SITE DESCRIPTION: 50-50-09-5657

Site 50-50-09-5657 consists of 13 historic clearing mounds located throughout the northern twenty percent of the project area (see Figure 9). The average feature measures approximately 40 by 30 m and is piled over 11 m high (Figure 12). Mega-boulders form at least

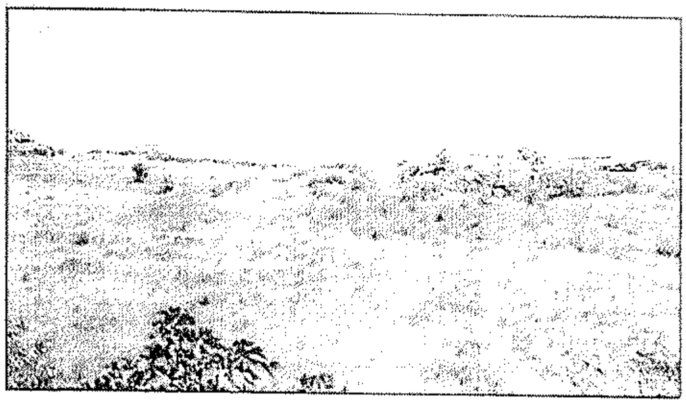

Figure 12: A Typical Boulder Mound Feature of Site -5657. View to Northeast.

the exterior layer of these features, with the average boulder measuring approximately 0.9 by 0.7 by 0.6 m. The majority of these features have a 4.0 m bulldozer blade track forming a ramp from the base to the summit (Figure 13). Heavy machinery scars are visible on the majority of surface boulders. Plastic irrigation tubing—both the ubiquitous black plastic (2 cm diameter) variety, and a larger-diameter white plastic tubing—can be found among surface crevices.

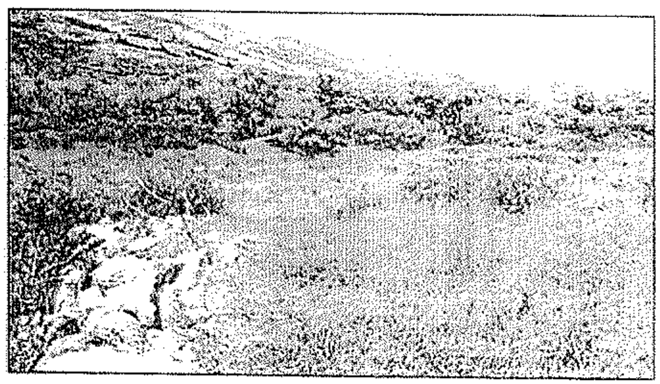

Figure 13: A Pushed "Ramp" on Top of a Site -5657 Mound Feature. Indicates Large Clearing Machinery in the Most Recent Layer of Mound Formation. View to Northwest.

Despite evidence of modern deposit on the exterior of Site -5657, the interior and/or base of these features are very likely historic. Rocky soil type, coupled with land-use records, indicates the necessity of boulder clearing prior to initial sugarcane cultivation. The even distribution of the clearing mounds within the northern portion of the project area may also point to historic agricultural technique. Whereas early 20th century clearing technology and methodology may have been limited to creating sporadic piles (to be gradually added on to throughout later decades), modern technology from the outset would have been likelier to clear the whole field level. Finally, enhancement of a 1965 aerial photo [Awai *et al.* (1967:map 30)] (Figure 14) shows the mounds in their same positions as present—a likely indicator of their locations at least a decade prior to 1965 as well.

While excavation or "testing" of Site -5657 clearing mounds could be accomplished only via highly specialized, very heavy machinery, SCS did perform representative subsurface testing in areas in between mounds (see "Subsurface Testing", below, specifically ST-15, ST-16, ST-17). Nothing of historic or prehistoric archaeological significance was found on the exterior of, or in between, the mounds. Confirmation of the historic origin of Site 50-50-09-5657 may be gained through archaeological observation of their deconstruction (see "RECOMMENDATIONS" section, below).

SITE DESCRIPTION: 50-50-09-5658

Site 50-50-09-5658 consists of dozens of likely historic sugarcane field irrigation modifications. All of these features are modifications within, or stemming out from, the two most significant perennial water courses. These drainages are the two interior drainages within the project area (see Figure 9). The northern of these drainages is approximately 730 m long, and the one directly south is approximately 460 m long. At intervals throughout their length, these two natural drainages have been widened by hand tools to increase and disperse water flow.

This widening modification involves two types: stream bank alterations (collectively recorded as Feature 1) and two narrow ditches (Feature 2 and Feature 3). Dozens of bank alterations are evidenced by shovel cuts and deposits. These modifications were not readily noticeable prior to pedestrian survey within the drainages themselves. When walking the two to four meter deep drainages, it becomes apparent that water flow was manipulated by removing parts of the soil stream bank in certain areas, and fortifying it by soil deposits in other areas. While this sort of alteration can be found within any 50 m stretch of these two drainages, only two isolated areas contain narrow channels extending from the streams. The southern interior stream has an 8 m shallow channel (Feature 2: 30 cm wide and 25 cm deep) that extends from

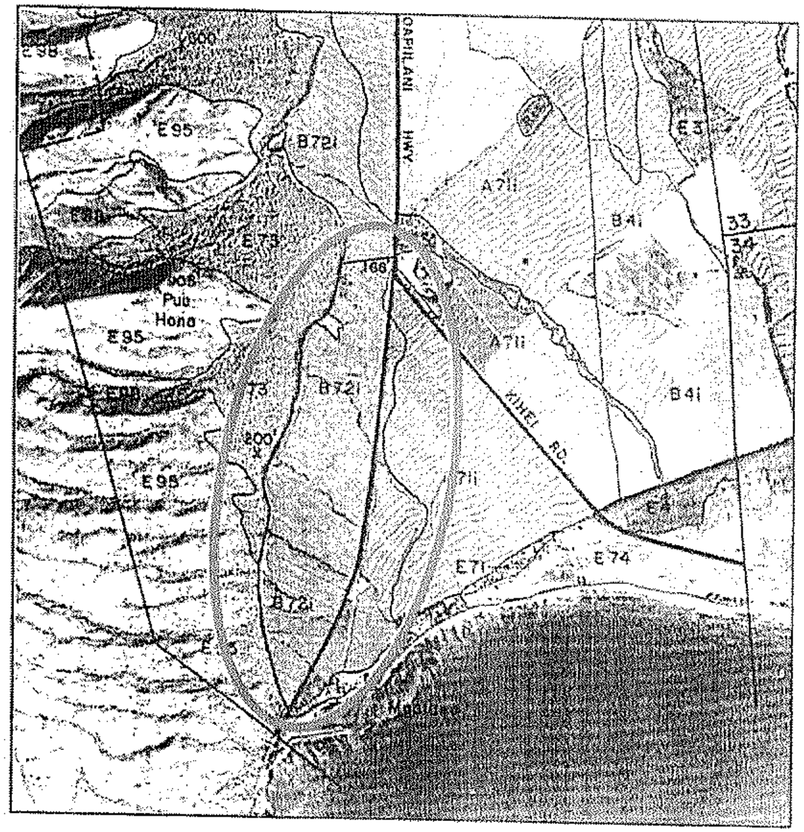

Figure 14: Aerial Photo of Project Area (Adapted from Awai *et al.* [1967:map 30]).

the southern bank to the southwest (see location of ST-11, Figure 9). The northern interior stream has an almost identical 7 m channel (Feature 3) extending eastward from its eastern bank (see location of ST-18, Figure 9).

It is likely that many more of these irrigation channels existed prior to the advent of more efficient irrigation methods (*i.e.*, imported water via tubing networks). Subsurface testing within and around these two channels produced none of the black irrigation tubing found at a depth of approximately 15 cmbs in the majority of all excavation. Surface observations also point to the historic origin of the subtle channel modifications. The channels extend outward from the stream and disappear under more recent deposits of tilled soil. This soil contains fragments of irrigation tubing (Figure 15), whereas no surface or subsurface matrix near the channel contains traces of modern disturbance. It is probable, that these two channels mark small areas that have remained undisturbed since historic use.

Nonetheless, ST-11 and ST-18, at a combined linear 19.1 m, excavated nearly 40 percent of this area. No historic material was observed, other than the depth of the soil-lined channels themselves.

SITE DESCRIPTION: 50-50-09-5659

Site 50-50-09-5659 consists of a historic dirt road that parallels the *mauka* perimeter of the entire project area (Figure 16). At some locations, the project area boundary extends several meters beyond (west of) this road—always including the entire width of the road within its boundaries. Thus, the length of the road is roughly equal to the length of the *mauka* perimeter of the project area (approximately three kilometers); the width of the road averages 4.0 m.

The Site -5659 road originates at the southern terminus of the project area and extends beyond the northern boundary where it forms a right angle with another dirt road segment that connects to Honoapiilani Highway. No less than seven other dirt road segments also connect Site -5659 to Honoapiilani Highway by transecting the width of the project area at various *mauka-makai* angles (see Figure 9). Site -5659's condition suggests that it is frequently traveled by Lahaina Pali trail hikers' vehicles. The parking area for the trail head is a turn out just two meters *mauka* of Site -5659, near the center of the project area's western border. The road is passable via car here. Other, less frequented sections of the road are only passable via four-wheel drive vehicles. One section near the southern point of the project area is washed out, and impassable.

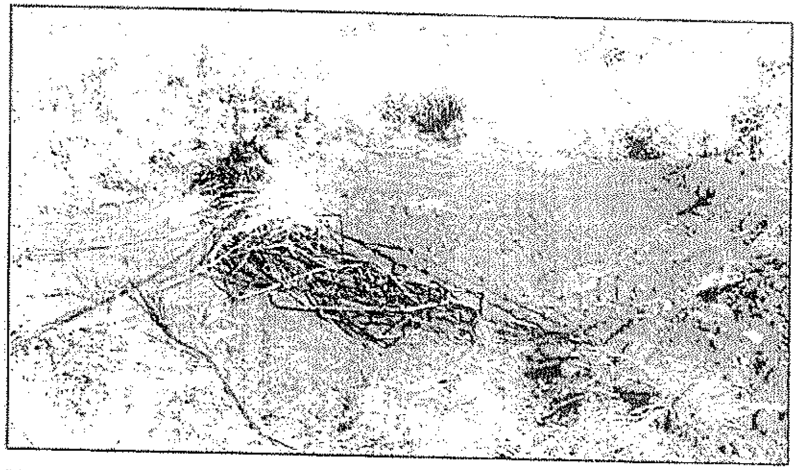

Figure 15: Example of Abundant Irrigation Tubing Found on Surface to 60 cmbs throughout Project Area.

Figure 16: A Segment of Site -5659, Historic Dirt Road.

It is highly probable that this road, along with others that no longer exist, was an original access and cane transport route within the project area. Whereas the predecessor to Honoapiilani Highway offered access along the *makai* border of the original cane fields, a similar *mauka* access (Site -5659) would have been required if the fields were to be worked at all. Awai *et al.*'s aerial photo (see Figure 14) proves that the project area's internal roads are modern (as locations have shifted since) but Site -5659 was in an identical position in 1965, and likely at least a decade earlier as well.

While modern trash was found throughout all sections of Site -5659, no cultural material of archaeological interest was found on the surface of the road. Likewise, the few stratigraphic trenches that were positioned near the road revealed no subsurface cultural material or differing soil stratigraphy (ST-1 and ST-2).

SUBSURFACE STRATIGRAPHY

As stated above, 20 stratigraphic trenches (ST-1 through ST-20) were excavated in the project area (see Table 1), exposing a total of 293.4 linear meters (962.6 ft.) of subsurface matrix. Total excavated area was roughly 187.8 square meters; total excavated volume was approximately 292.9 cubic meters. Depth of excavation ranged from 96–247 cmbs, and averaged 156cmbs. Bedrock, and/or extremely consolidated clays with decomposing gray basalt that directly overlying bedrock, was reached in 16 of the 20 units. Of the units in which bedrock was reached, the shallowest depth was 72 cmbs and the deepest was 151 cmbs; average depth bedrock was first encountered was 114 cmbs. The four STs in which bedrock was not reached were either positioned in an area of convexed surface topography (*i.e.*, the surrounding field had been tilled so that it was higher at the center where the trench was located), or where extra soil had been likely imported for increased crop productivity.

Table 1 presents a summary of all relevant quantitative and qualitative stratigraphic and cultural material observations for each trench. Following, each stratigraphic trench is documented with photograph(s) and post-excavation profile drawing. (Photos and profiles documenting trenches that are very similar to previously described trenches have not been included due to redundancy.) Indeed, the first stratigraphic trench excavated proved to be the standard for nearly every succeeding trench. Only slight variation followed, in both stratigraphy and cultural make-up.

Table 1: Summary of Stratigraphic Trenches within TMK: (2) 3-6-01:18.

Stratigraphic Trench Number	Reason for ST Position*	Trench Length (m)	Maximum Depth (in centimeters)	Average Bedrock Depth (in centimeters)	Cultual Material within ST	ST Orientation (Magnetic)
ST-1	HP*	7.0	154	116	Modern agriculture remnant	North / South
ST-2	HP	7.0	165	125	—	North / South
ST-3	HP	7.0	190	151	—	East / West
ST-4	HP	7.0	153	92	—	North / South
ST-5	HP	7.0	173	112	—	East / West
ST-6	HP, R*	7.0	242	Bedrock not reached	—	North / South
ST-7	HP	7.0	122	106	—	East / West
ST-8	HP	39.1	219	112	Modern agriculture remnant	North / South
ST-9	TS*	21.3	145	104	Modern agriculture remnant	East / West
ST-10	TS, R	17.7	142	112	Modern agriculture remnant	North / South
ST-11	TS	7.1	96	72	Historic agriculture feature (surface)	North / South
ST-12	TS	10.2	247	Bedrock not reached	Modern midden	310 degrees
ST-13	TS	13.7	141	Bedrock not reached	Modern agriculture remnant	240 degrees
ST-14	TS	32.0	153	Bedrock not reached	Modern agriculture remnant	290 degrees
ST-15	R, TS	21.4	110	103	Modern agriculture remnant	290 degrees
ST-16	R, TS	17.3	136	119	—	North / South
ST-17	R, TS	20.6	116	101	—	East / West
ST-18	TS	12.0	160	151	Historic agriculture feature (surface)	East / West
ST-19	R	17.0	125	118	—	East / West
ST-20	R	15.0	133	124	Modern agriculture remnant	North / South

Excavation Intent: (TS) = trenches tested a specific Temporary Site; (R) = trenches dispersed throughout project area for Representative testing of stratigraphy; (HP) = trenches tested the southern "triangle" of project area, which lies in an area between concentrated traditional sites, thus a slightly Higher Probability of encountering prehistoric subsurface features.

TRENCH SUMMARIES

STRATIGRAPHIC TRENCH 1 (ST-1)

ST-1 was positioned at the far southern corner of the project area (see Figure 9) with the intent to test the section of the parcel with the highest probability of containing traditional features. This probability was calculated based on the position of the "southern triangle" of the project area (Figure 17) in relation to previously documented traditional sites not far outside its *mauka* and *makai* borders. ST-1 measured 7.00 by 0.64 m (Figure 18).

Layer I was a 116 cm thick, dark reddish-brown (2.5YR 3/3) clay loam (Figure 19). The matrix was of a medium-sized, blocky ped structure, and was firm. Rock content was less than

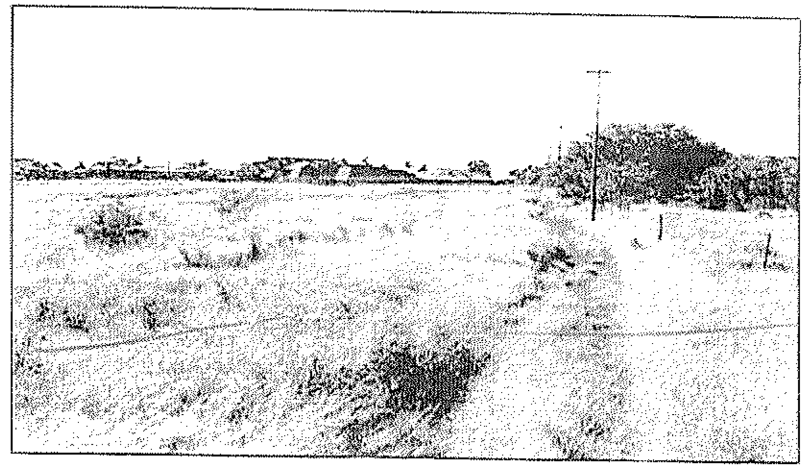

Figure 17: Southern "Triangle" of Project Area, with Site -5659 (Road) at Right. View to Southeast.

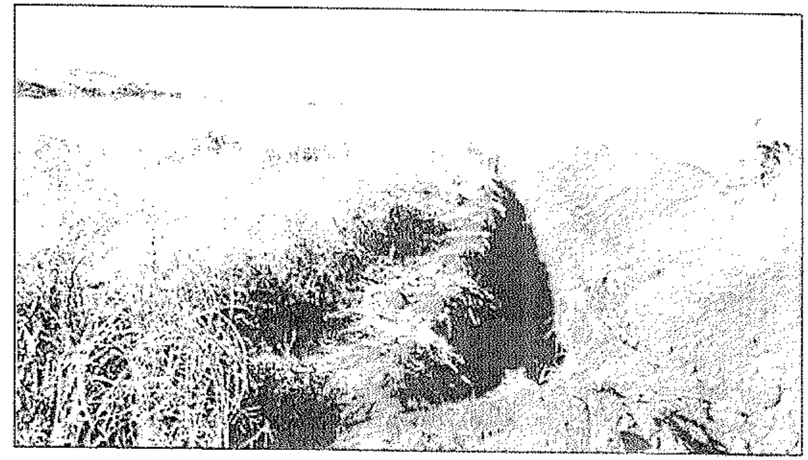

Figure 18: ST-1, Post-excavation. View to North.

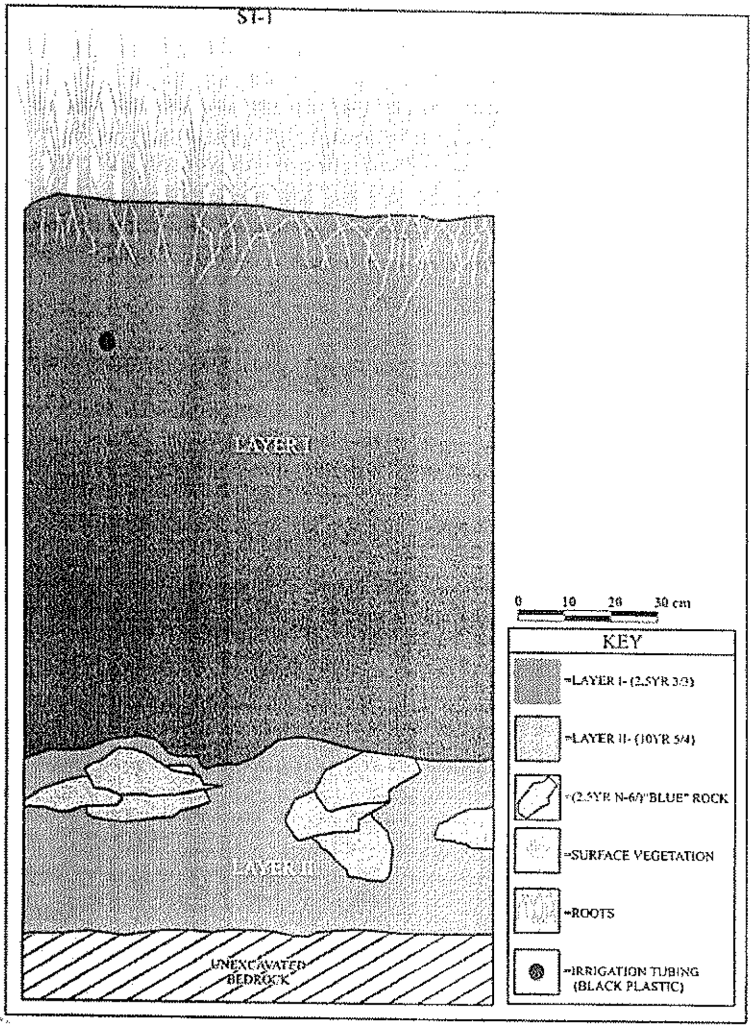

Figure 19: ST-1, Post-excavation. East Wall Stratigraphic Profile (Representative Section).

10 percent. Forty centimeter-tall grass grew dense on the surface and the fine roots extended over 15 cmbs. A 2-cm thick black plastic irrigation pipe had been severed by the backhoe bucket during excavation. The pipe was visible in the east wall profile at 27 cmbs (Figure 20). This was the only cultural material to be observed within ST-1. The base of Layer I likely indicates the subsurface extent of agricultural activity within the project area's southern triangle.

Layer II averaged 38 cm thick and was a yellowish-brown (10YR 5/4) culturally sterile matrix. The soil was a fine, granular ped structure, and was very hard. Twenty percent of Layer II was composed of "blue rock", and a harder, darker bedrock was exposed at the base. Excavation was then terminated at a maximum depth of 154 cmbs.

STRATIGRAPHIC TRENCH 2 (ST-2)

ST-2, like ST-1, intended to test the southern triangle for a cultural deposit. The stratigraphy of ST-2 was very similar to that of ST-1 in every respect, and the recorded profiles appeared nearly identical. No cultural material was observed within ST-2.

Figure 20: ST-1, Post-excavation. East Wall Photograph.

STRATIGRAPHIC TRENCH 3 (ST-3)

ST-3 was also placed in the "higher probability" zone of subsurface cultural deposit. This trench was the first that was oriented east-west, with the intent of possibly observing a change in the stratigraphy from ST-1 and ST-2. No change was observed and no cultural material was revealed.

STRATIGRAPHIC TRENCH 4 (ST-4)

ST-4 continued the trend of similar profiles (see Figure 19). However, this trench revealed bedrock at a slightly shallower depth (92 cmbs) than previously encountered. It is probable that ST-4's position near a graded, modern dirt road caused a portion of surface soil to erode downslope toward the highway. No cultural material observed.

STRATIGRAPHIC TRENCH 5 (ST-5)

ST-5 repeated the results of STs 2–4.

STRATIGRAPHIC TRENCH 6 (ST-6)

ST-6 was the first trench to be positioned farther north within the southern triangle. There remained the increased probability of encountering subsurface traditional features, however, the archaeological record shows that this chance would grow smaller as trench positions extended north. ST-6 also sought to gain a better understanding of overall project area stratigraphy outside of the southern triangle.

Excavation ceased after more than 200 cm of culturally sterile, homogenous soil. Bedrock was not encountered. This single, homogenous stratigraphic layer would also be observed in three more trenches to come. The likely explanation involves the subtle shape of the field immediately surrounding the trench. Tilling has left the surface within 75 m *mauka* and *makai* sloping down and away from the trench, which was positioned on a minor "crest." Thus, the piled soil here is not a true indicator of typical Layer I thickness. No cultural material was observed in this trench.

STRATIGRAPHIC TRENCH 7 (ST-7)

ST-7 resulted in a profile that matched the majority of previously excavated trenches. No cultural material was observed in this trench.

STRATIGRAPHIC TRENCH 8 (ST-8)

ST-8 resulted in a profile that matched the majority of previously excavated trenches. A black, plastic irrigation tube (identical to the one found in ST-1) extended from the east wall to

the west wall of the trench. This was the last trench to be positioned inside the southern triangle area—initially thought to have been a location of higher traditional site potential. However, no traditional subsurface features were observed within the southern triangle.

STRATIGRAPHIC TRENCH 9 (ST-9)

ST-9 was positioned with the intent to test an area near and within a Temporary Site. Pedestrian survey flagged the dirt road adjacent to ST-9's position as a possible historic road Figure 21). This trench revealed no difference in subsurface stratigraphy than previous excavation, nor did the trench produce any artifacts that may have been within the discard zone of historic traffic. The only cultural material observed was the usual irrigation tubing at 20 cmbs. Research unrelated to the subsurface testing later revealed this dirt road to be modern.

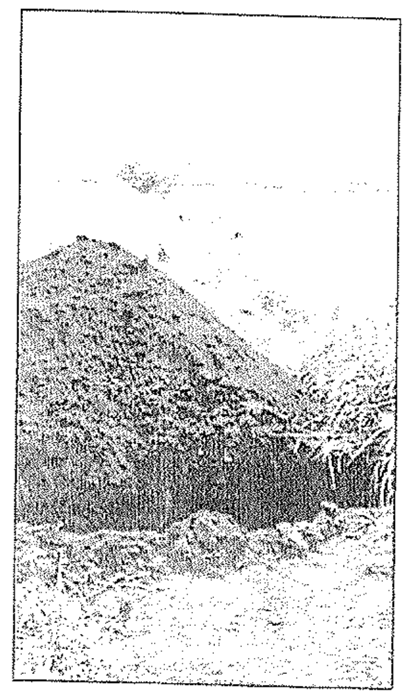

Figure 21: ST-9. Post-excavation. View to Southwest.

STRATIGRAPHIC TRENCH 10 (ST-10)

ST-10 also served to test a possible historic dirt road. The results were identical to ST-9, except that an *in situ* irrigation tube was observed at 58 cmbs. This depth increased known range of modern agricultural manipulation within the project area.

STRATIGRAPHIC TRENCH 11 (ST-11)

ST-11 was positioned to test a temporary site (ditch) that later became part of State Site 50-50-09-5658 (irrigation modification). Other than both the north and south wall profiles displaying the depth of the shallow ditch itself, no further cultural material was observed. (See ST-18 profile for a better subsurface representation of Site -5658.)

STRATIGRAPHIC TRENCH 12 (ST-12)

ST-12 also intended to test a temporary site, one which excavation proved to be modern. The "nursery" of Ficus sp. trees (Temporary Site 2) at the center of the project area was initially flagged as a temporary site. Although some surface features appeared modern (i.e., the relatively new appearance of the concrete walkways), the possibility existed that this temporary site could have been constructed at the location of historic cane workers' camp. A concrete building foundation was mapped in association with the tree rows (Figure 22).

ST-12 extended northwest from the foundation toward the concrete walkways of the nursery. A Coca Cola aluminum 12 ounce can was found *in situ* at a depth of 96 cmbs (Figure 23). The can's manufacture date was clearly decipherable: 2003. Other midden followed; a Dentine gum wrapper at 106 cmbs and a fragmented plastic fork head at 120 cmbs.

Excavation ceased after 247 cm of culturally sterile, homogenous soil. The matrix near the foundation pad had clearly been recently altered.

STRATIGRAPHIC TRENCH 13 (ST-13)

ST-13 sought to further explore what might lie beneath Temporary Site 2. The results of ST-13 also resulted in modern midden, and a single homogenous layer of "filled" soil. A 6-cm diameter, white PVC water pipe was uncovered 4 cmbs (Figure 24). The pipe ran perpendicular to the trench's length and was certainly part of a irrigation system involving the Ficus trees. The standard irrigation tubing appeared in the north wall profile at 19 cmbs. A shard of clear window glass was observed at 88 cmbs. Excavation ceased after 141 cm of culturally sterile, homogenous soil.

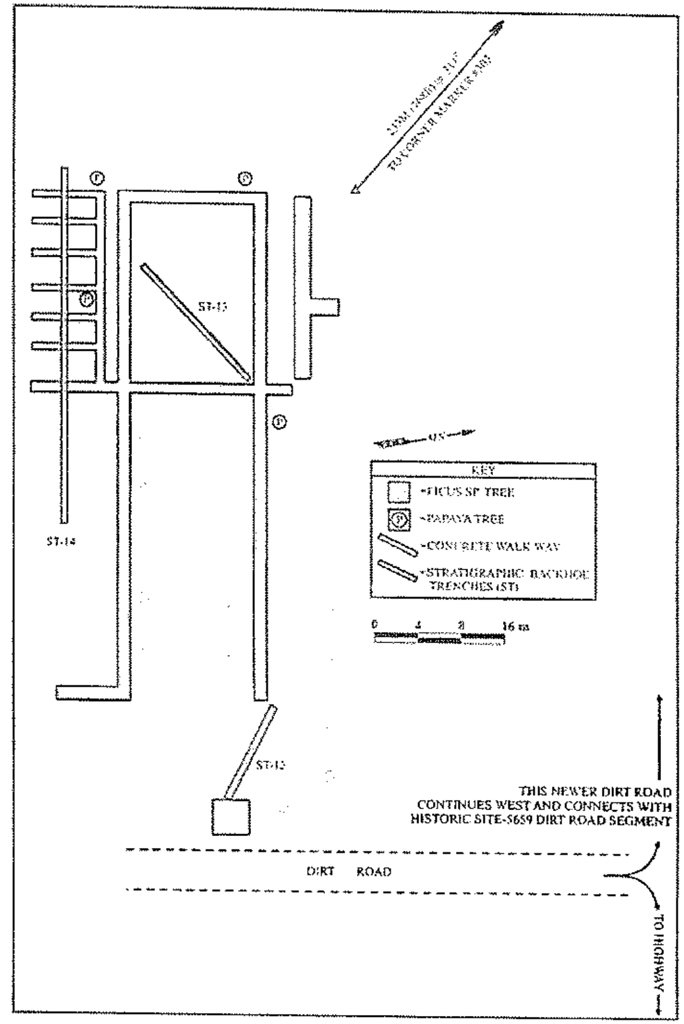

Figure 22: Plan View Map of Temporary Site 2, A Possible Modern *Ficus* sp. Nursery.

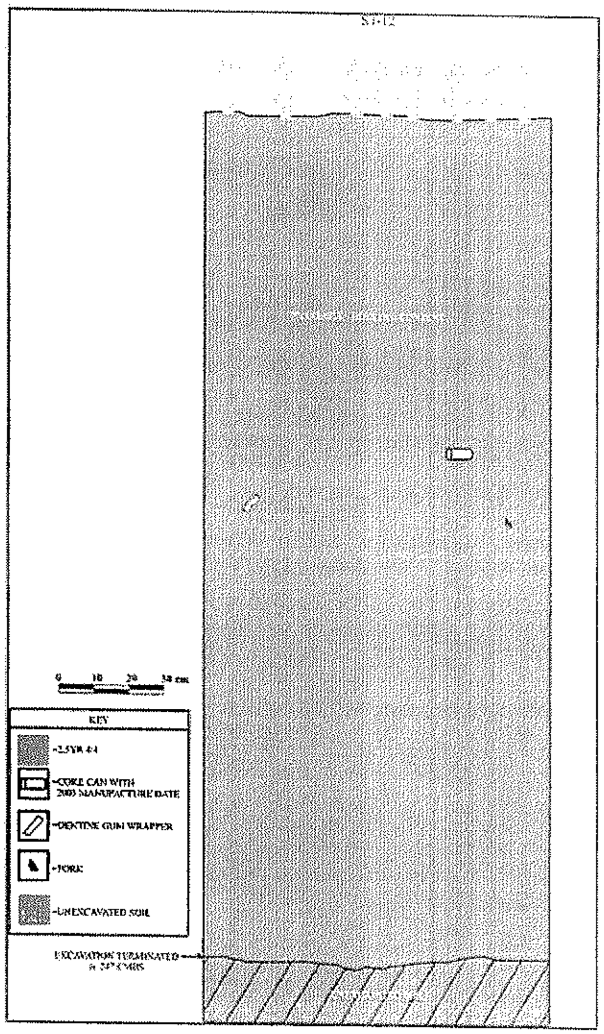

Figure 23: ST-12, Post-excavation. North Wall Stratigraphic Profile (Representative Section).

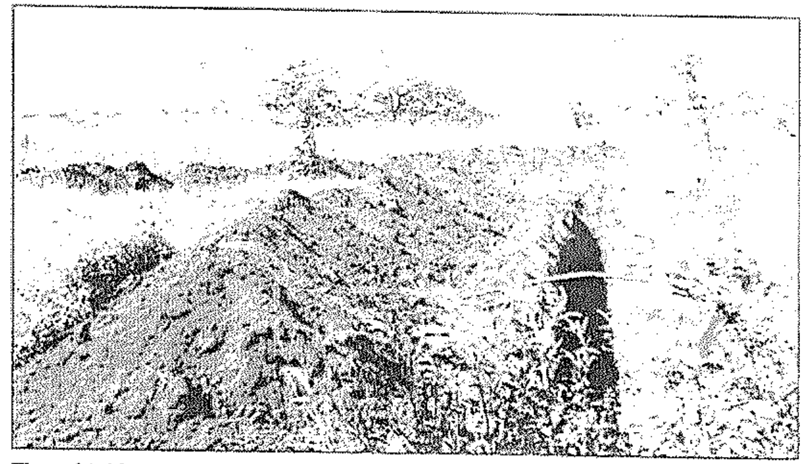

Figure 24: ST-13, Post-excavation. View to Southwest.

STRATIGRAPHIC TRENCH 14 (ST-14)

ST-14 provided another modern absolute date, albeit from a shallower provenience. A defunct electrical box (possibly used for lighting or irrigation system function) was attached to a series wires inside a PVC pipe at 39 cmbs (Figures 25 and 26). The manufacture date stamped on the pipe was "01/04/01". A section of the pipe was patched with an aluminum Coke can and adhesive. Once again, the manufacture date of the can was 2003. ST-14 also did not reach bedrock, although Layer I had a cobble content of 25 percent, higher than other areas tested previously (Figure 27).

No historic or traditional artifacts or features were observed at Temporary Site 2. Thus, the temporary designation was retracted, as this nursery is most likely a more elaborate example of the dozens of small-scale modern agriculture plots that are scattered throughout the project area. Extensive excavation did not reveal any evidence indication an older cultural layer beneath this area.

STRATIGRAPHIC TRENCH 15 (ST-15)

ST-15 sought to gain a representation of subsurface stratigraphy with the area of the (later-designated) Site -5657 clearing mounds. ST-15 was positioned in between two clearing mound features along the western border of the project area's north end (see Figure 9). Results

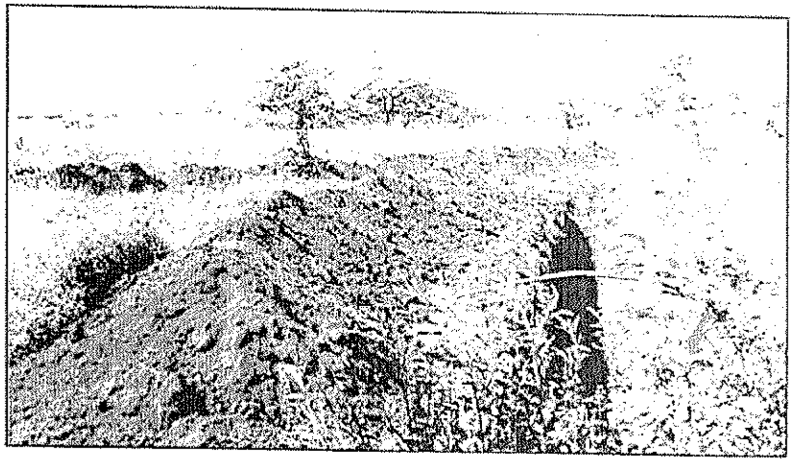

Figure 25: ST-14 Excavation. View to West.

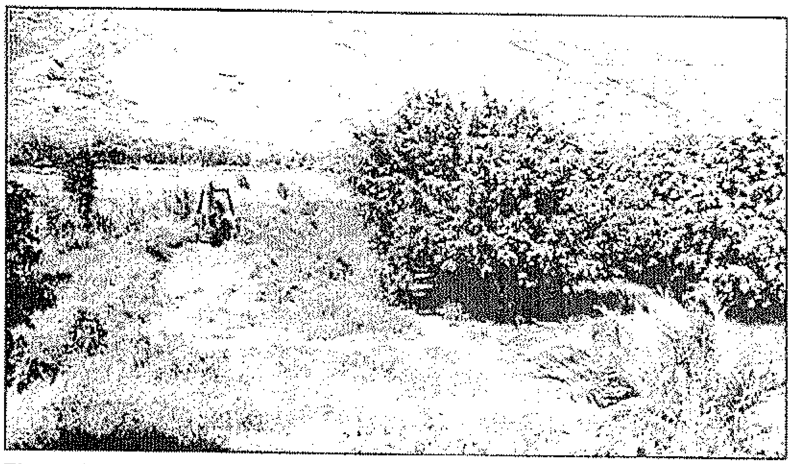

Figure 26: ST-14 Excavation. View to West.

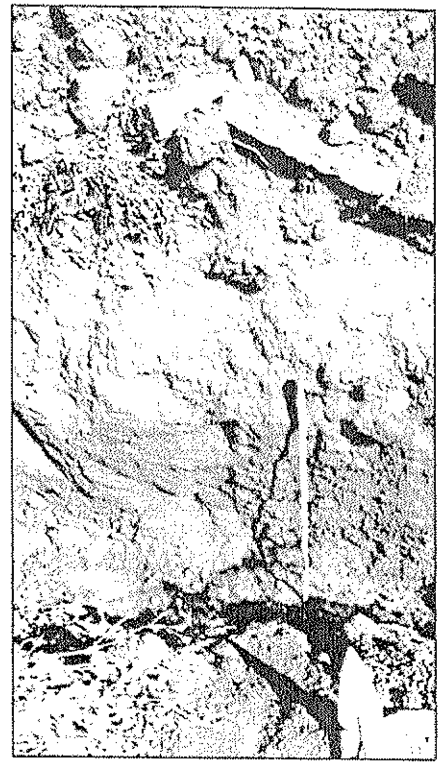

Figure 27: ST-14, Post-excavation. North Wall Photograph.

matched soil records that showed the area to have a greater rock concentration than areas to the south. ST-15 exhibited the first truly significant stratigraphy variation from the previous 14 trenches (Figures 28, 29, and 30).

Layer I was a 20 cm thick, dark brown (7.5YR 3/2) clay loam. The matrix was of a medium-sized, blocky ped structure, and was firm. It had a rock content of approximately five percent. Fifteen centimeter-tall grass grew dense on the surface and the fine roots extended 5 cmbs). No cultural material was observed within Layer I.

Figure 29: ST-15, Post-excavation. North Wall Photograph.

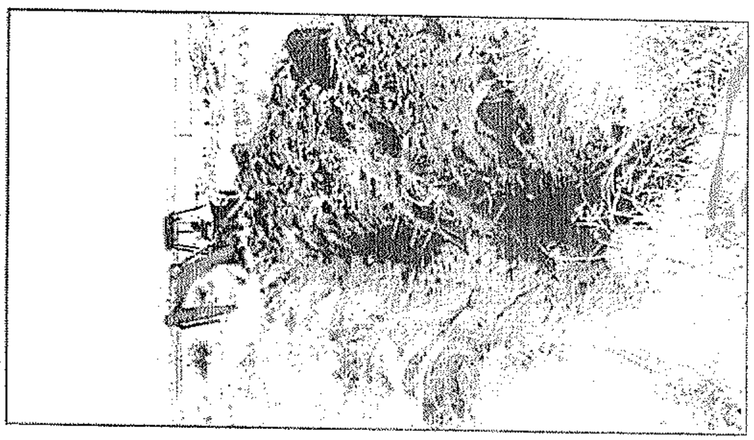

Figure 28: ST-15, Post-excavation. View to East.

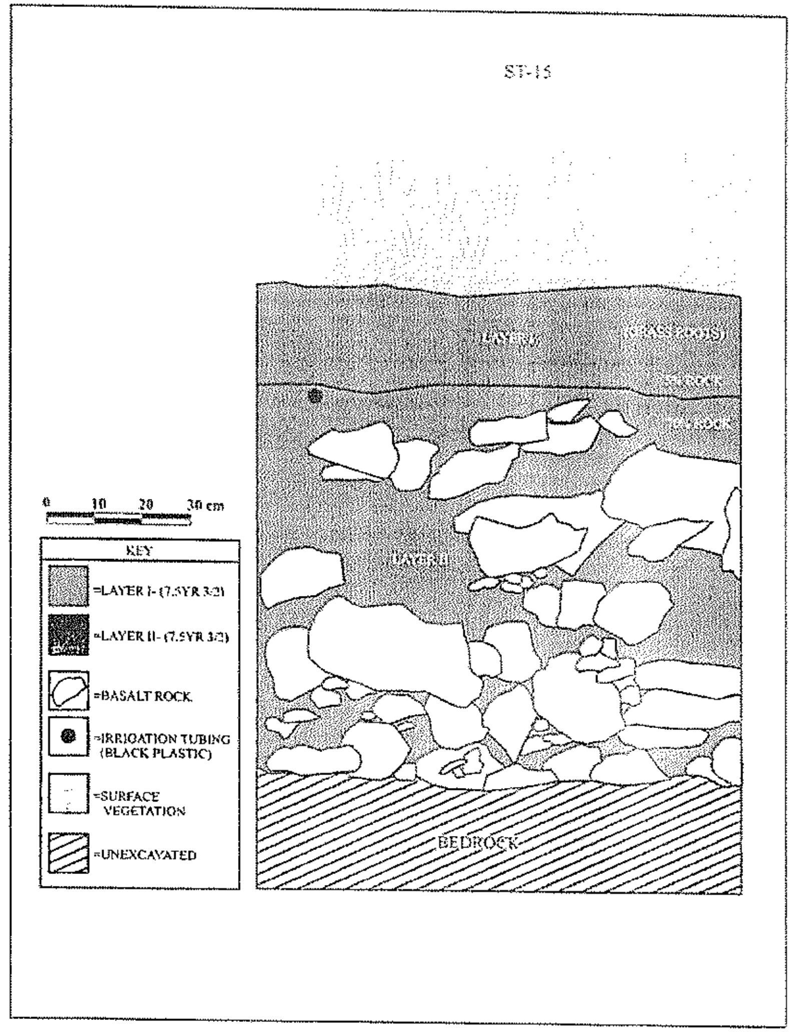

Figure 30: ST-15, Post-excavation. North Wall Stratigraphic Profile (Representative Section).

Layer II averaged 83 cm thick and was also a dark brown (7.5YR 3/2) clay loam. This matrix drastically changed in cobble and small boulder content—a concentration of 70 percent rock. Nonetheless, the common, black irrigation tubing was observed at 21 cmbs—the only cultural material. Whereas Layer I had been stripped of its rock (which then formed the piles of Site -5657), Layer II was beneath the planting soil.

STRATIGRAPHIC TRENCH 16 AND 17 (ST-16 AND ST-17)

ST-16 and ST-17 were excavated perpendicular to each other along the *makai* border of the project area's northern end (Figure 31). The trenches created an "L-shape" with the intention to expose stratigraphy both east-west and north-south in an immediate area. No notable variation was observed between ST-15, ST-16, or ST-17. The latter two trenches contained no cultural material.

STRATIGRAPHIC TRENCH 18 (ST-18)

ST-18, like ST-11, sought to expose the profile of a Site -5658 irrigation modification (shallow ditch). The trench was positioned perpendicular to ditch (which extended from a natural drainage). Aside from exposing the depth and width of the subtle feature, no change in stratigraphy was observed when compared to profiles of southern trenches (Figure 32).

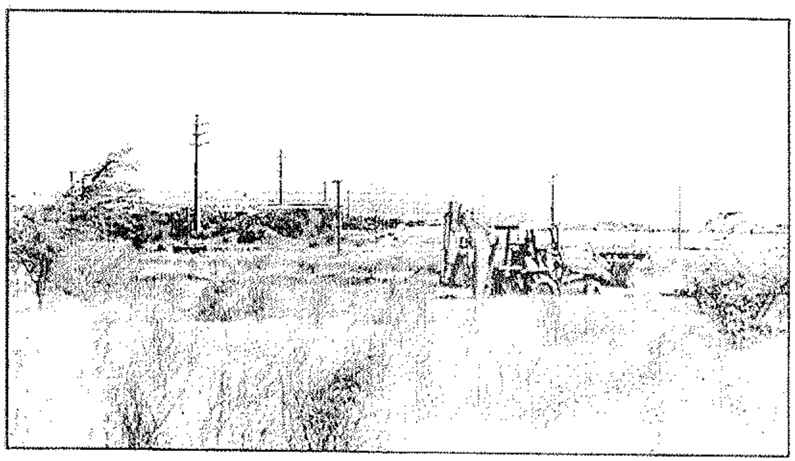

Figure 31: ST-16 Excavation. View to East.

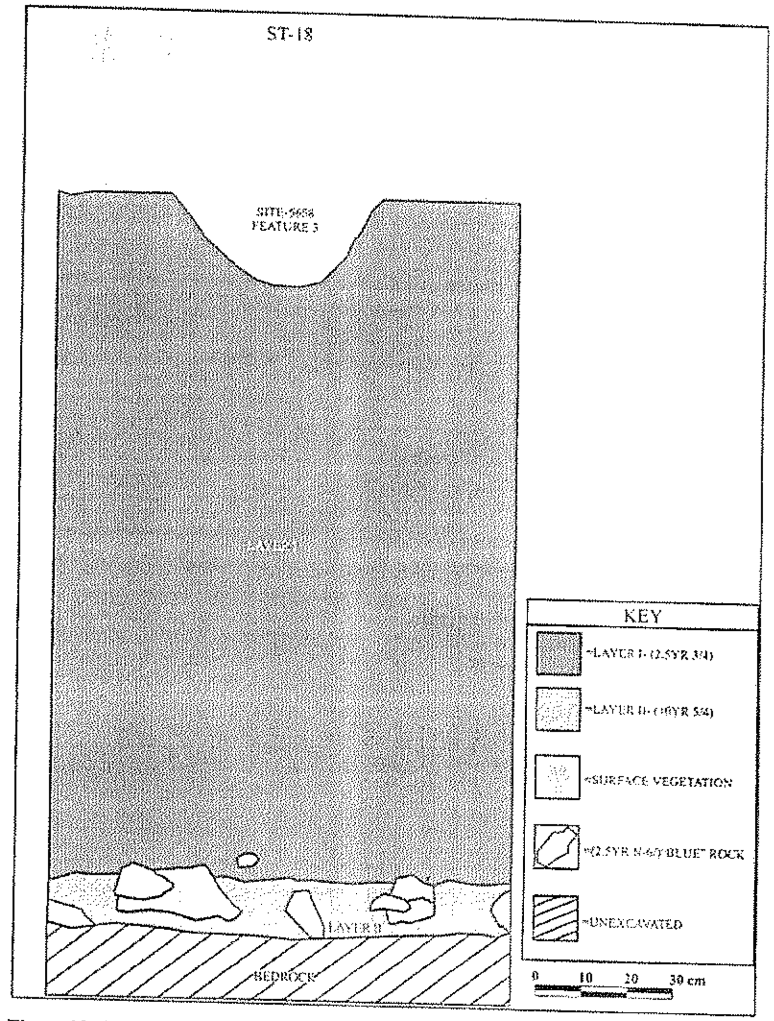

Figure 32: ST-18, Post-excavation. South Wall Stratigraphic Profile (Representative Section).

STRATIGRAPHIC TRENCH 19 (ST-19)

ST-19 sought to test a portion of the project area that remained relatively un-sampled toward the end of the subsurface testing period. Although this region was over 200 m away from any other trench, the stratigraphy was nearly identical to that of trenches to the south (Figure 33). No cultural material was observed within this trench.

STRATIGRAPHIC TRENCH 20 (ST-20)

ST-20 sought to test a portion of the project area that remained relatively un-sampled at the close of the subsurface testing period (Figure 34). Although this region was over 300 m away from any other trench, the stratigraphy was nearly identical to that of all trenches other than ST-14 through ST-17 (the higher rock concentrations). A west wall profile of ST-20 did reveal a black plastic "anti-weed" cover at 3 cmbs, along with irrigation tubing at 25 cmbs (Figure 35).

SUMMARY OF RESULTS

In summary, this Archaeological Inventory Survey resulted in the following findings:

- Three historic sites, all related to sugarcane agriculture, were identified, documented for the first time, and assigned SIHP numbers: Site 50-50-09-5657 (clearing mounds), Site 50-50-09-5658 (irrigation modifications), and Site 50-50-09-5659 (dirt road).

- A 100 percent pedestrian survey concluded that no prehistoric sites exist on the surface of the project area.

- Twently backhoe trenches (a volume of approximately 292 cubic meters) did not reveal any subsurface historic, or prehistoric, cultural material. Rather, excavation confirmed the extent, both in physical and temporal depth, of historic and modern agricultural activity within the project area.

- No burial features or human remains were observed during pedestrian survey or encountered during subsurface testing.

SIGNIFICANCE ASSESSMENTS

Three sites were documented in the project area [TMK: (2) 3-6-01:18] during Archaeological Inventory Survey. All three sites were of historic period construction and related to sugarcane agriculture. The sites have been evaluated for significance according to the criteria

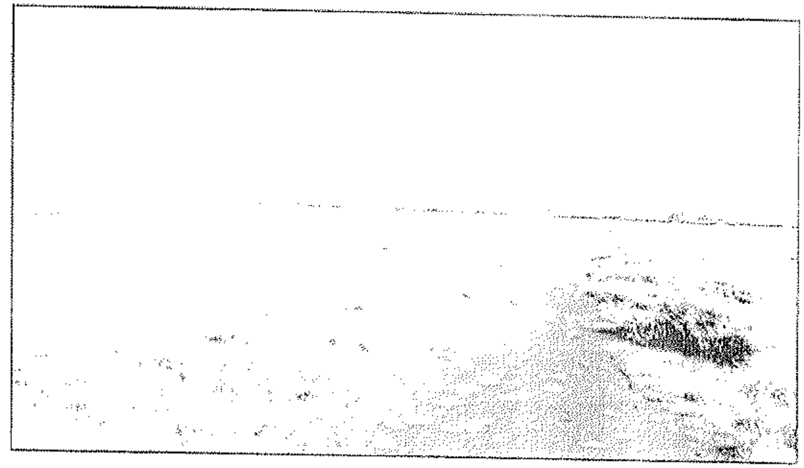

Figure 33: Location of ST-19 within Central Project Area. View to East.

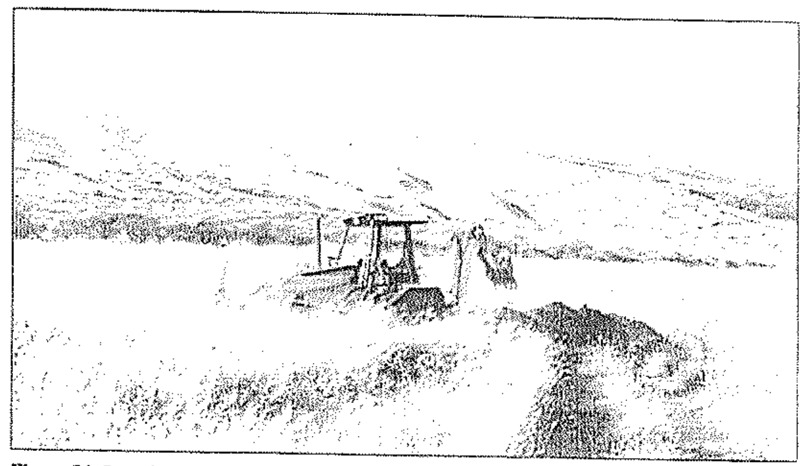

Figure 34: Location of ST-20 within Central Project Area. View to West.

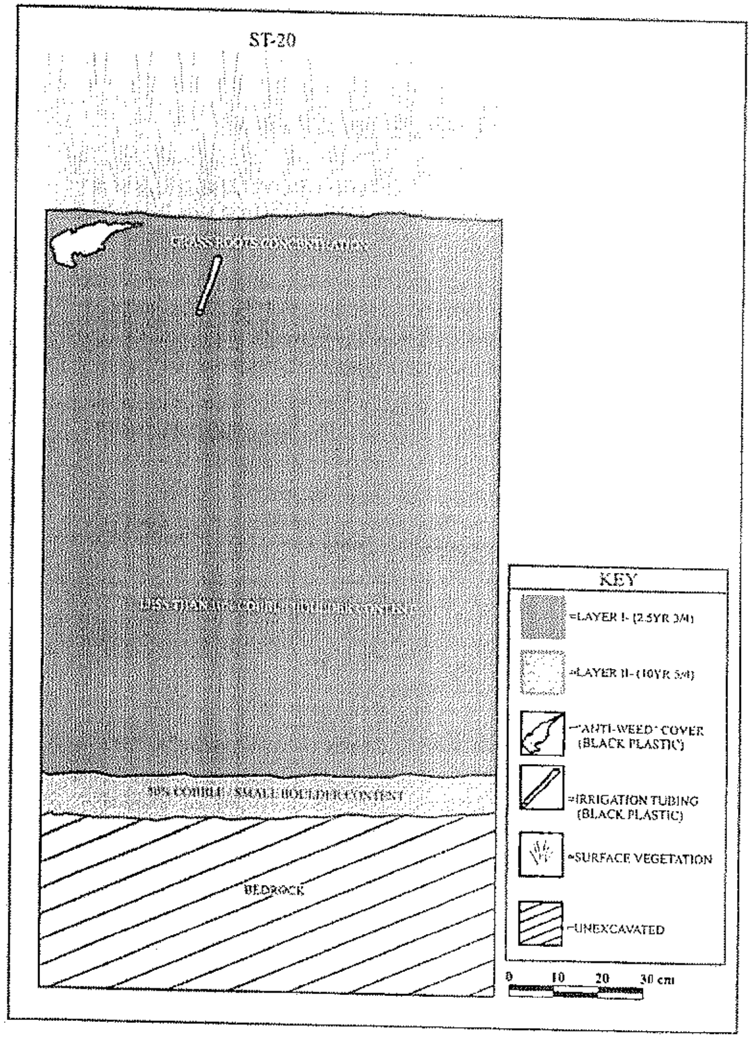

Figure 35: ST-20, Post-excavation. East Wall Stratigraphic Profile (Representative Section).

established for the State and National Register of Historic Places. Site 50-50-09-5657 (clearing mounds), Site 50-50-09-5658 (irrigation modifications), and Site 50-50-09-5659 (dirt road) are all considered significant under Criterion D. The five criteria are listed below:

Criterion A: Site is associated with events that have made a significant contribution to the broad patterns of our history;

Criterion B: Site is associated with the lives of persons significant to our past;

Criterion C: Site is an excellent site type; embodies distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual construction;

Criterion D: Site has yielded or has the potential to yield information important in prehistory or history;

Criterion E: Site has cultural significance; probable religious structures or burials present (State of Hawai'i criteria only).

RECOMMENDATIONS

Two of the three sites recorded during Inventory Survey require no further archaeological procedures. Criterion D sites 50-50-09-5658 (irrigation modifications) and 50-50-09-5659 (dirt road) have been listed in the SIHP. Identification, testing, analysis, and classification of the sites have been fully documented within this AIS report.

Site 50-50-09-5657 (clearing mounds), also classified under Criterion D, requires one additional archaeological procedure prior to the completion of its documentation (assuming no additional cultural material is located). Discussion between SCS and Dr. M. Kirkendall concluded that the internal construction of Site -5657's thirteen features is still unknown. It is possible that traditional Hawaiian features may be contained within these thirteen large piles of boulders.

Previous archaeological observations during construction activity on Maui have documented prehistoric architecture and artifacts under historic agriculture deposits. As sugarcane lands were originally cleared, it is possible that farmers deposited rubble on top of the nearest pre-existing "rock pile". As locally gathered rock was a staple for traditional Hawaiian architecture, the pre-existing "rock piles" may have been a variety unidentified traditional features—constructions ranging from simple temporary shelters to elaborate religious platforms.

Due to this possibility, SCS recommends that an archaeologist observes—and directs the method of—the leveling of a sample portion of Site -5657's thirteen mound features. Those responsible for scheduling initial earth-moving procedures at the Ma'alaea Mauka project area will be required to coordinate the presence of an archaeological observer during Site -5657 deconstruction. An archaeologist must be on site prior to any earth-moving activity within the northern 20 percent of the project area, that is, any operation of heavy machinery that occurs within a 15.0 meter (50 feet) radius of a Site -5657 mound.

Deconstruction should incorporate machinery that slowly removes Site -5657 surface boulders in stages, rather than pushes any intact section of mound to a different location. The exact number of mound deconstructions to be witnessed by the archaeologist on site may be determined based on the contents of the first four mounds selected for leveling. Should additional historic and/or prehistoric cultural material be observed during Site -5657 leveling, archaeological procedures will follow SHPD's guidelines for an inadvertent discovery.

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AN ARCHAEOLOGICAL INVENTORY SURVEY OF AN APPROXIMATELY 115 ACRE PROPERTY FOR THE PROPOSED MĀ`ALAEA WATER TREATMENT PLANT EFFLUENT REUSE AREA INCLUDING THE POTENTIAL WATER TANK LOCATION AND DETENTION PONDS A AND B WAIKAPŪ AHUPUA`A, WAILUKU DISTRICT, ISLAND OF MAUI, HAWAI`I [TMK: (2) 3-6-004:003 (por.)]

Prepared By:
Michael F. Dega, Ph.D
and
Cathleen A. Dagher, B.A.
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Prepared for:
Maalaea Properties, LLC
255 West Waiko Road
Wailuku, Hawaii 96793

ABSTRACT

At the request of Maalaea Properties, LLC., the current landowner, Scientific Consultant Services, Inc. (SCS) conducted an Archaeological Inventory Survey on approximately 115 acres of land located in Mā`alaea, Waikapū Ahupua`a, Wailuku District, Island of Maui, Hawai`i [TMK:(2)3-6-004:003 (por.)]. The project included archival research and involved a systematic pedestrian survey of the parcel, the mapping and recording of identified features, and the mechanical excavation of twenty-six stratigraphic trenches.

Seven sites were newly identified and documented during the survey. All of the identified sites (50-50-09-6251 through 50-50-09-6257 related to historic commercial agriculture. These sites consisted of three historic irrigation ditches (Sites 50-50-09-6251, T-1; 50-50-09-6254, T-4; and 50-50-09-6257, (-7), three clearing mounds (Sites 50-50-09-6252, T-2; 50-50-09-6253, T-3; and 50-50-09-6256, T-6), and one modified stream drainage (Site 50-50-09-6255, T-5). One additional clearing pile lies to the northwest of the project area; however, this feature was not recorded as it is located outside the project area boundaries.

As part of the survey, a total of twenty-six trenches were mechanically excavated by backhoe. Excavation did not reveal any significant cultural materials or features in the subsurface deposits of any of the trenches. All of the stratigraphic trenches were culturally sterile, except for modern debris and items associated with modern commercial agriculture. However, excavation did reveal a relatively homogenous soil stratification—what might be expected in an area subjected to decades of similar agricultural practice. Most of the matrices had inclusions of modern debris, evidencing recent agricultural activity. Portions of the project area are currently under commercially grown pineapple and sugarcane.

All of the sites in the project area have been assessed as significant under Criterion D, information content only.

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INTRODUCTION

At the request of Maalaea Properties, LLC., the current landowner, Scientific Consultant Services, Inc. (SCS) conducted an Archaeological Inventory Survey on approximately 115 acres of land for the proposed Wastewater Treatment Facility, effluent reuse area, water tank site, and two detention basins. The project area is located in Mā`alaea, Waikapū Ahupua`a, Wailuku District, Maui Island, Hawai`i [TMK: (2) 3-6-0014:003 (por.)] at an elevation ranging from approximately 190 to 400 feet above mean sea level (amsl) (Figures 1, 2 and 3). This Inventory Survey included historic background research and settlement pattern analysis prior to fieldwork, a systematic pedestrian survey of the project area, the mapping and recording of newly identified features, and involved the mechanical excavation of 26 stratigraphic trenches. Fieldwork was conducted between September 14 and October 5, 2006 by SCS personnel Allison Chun, Ph.D., and D. Dillon, B.A. The Principle Investigator for this project was Michael Dega, Ph.D.

The Archaeological Inventory Survey of the project area was conducted to determine the presence/absence of archaeological sites and features in surface and subsurface contexts through complete systematic survey and representative subsurface testing, to provide adequate recordation and documentation of all historic sites present, to determine the significance of these sites, and to provide recommendations to the State Historic Preservation Division (SHPD) concerning site significance and mitigation in lieu of future land use in the project area.

A total of seven sites were newly identified and documented during the survey. All of the identified sites (50-50-09-6251 through 50-50-09-6257) related to historic commercial agriculture. These historic commercial agriculture sites consisted of three historic irrigation ditches (Sites 50-50-09-6251, T-1; 50-50-09-6254, T-4; and 50-50-09-6257, T-7), three clearing mounds (Sites 50-50-09-6252, T-2; 50-50-09-6253, T-3; and 50-50-09-6256, T-6), and a modified stream drainage (Site 50-50-09-6255, T-5). One additional clearing pile lies to the northwest of the project area; however, this feature was not recorded as it is outside the project area.

As part of the survey, 26 trenches were mechanically excavated by backhoe. Excavation did not reveal any significant cultural materials or features in the subsurface deposits of any of the trenches. All of the stratigraphic trenches were culturally sterile, except for modern debris and items associated with modern commercial agriculture. However, excavation did result in relatively homogenous soil stratification—what might be expected in an area subjected to decades of similar agricultural practice. Most of the matrices had inclusions of modern debris, evidence of agricultural activity.

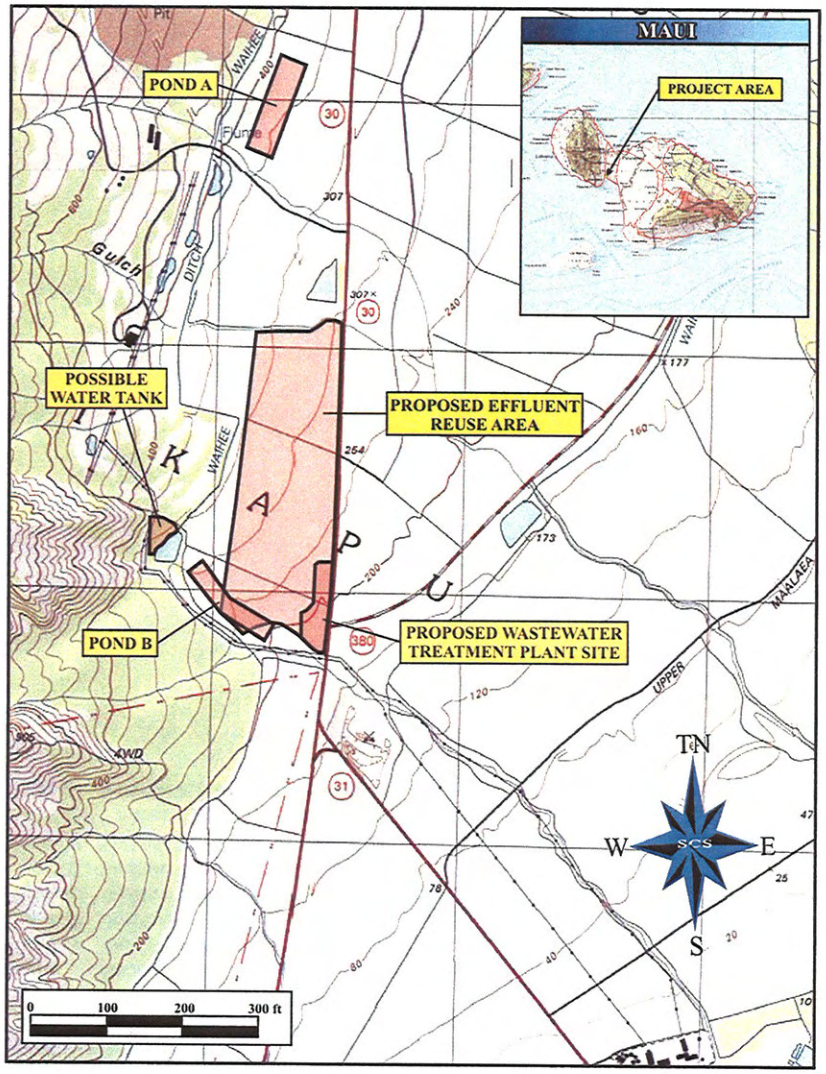

Figure 1: : USGS Quadrangle (Ma`alaea and Wailuku) Map Showing Project Areas.

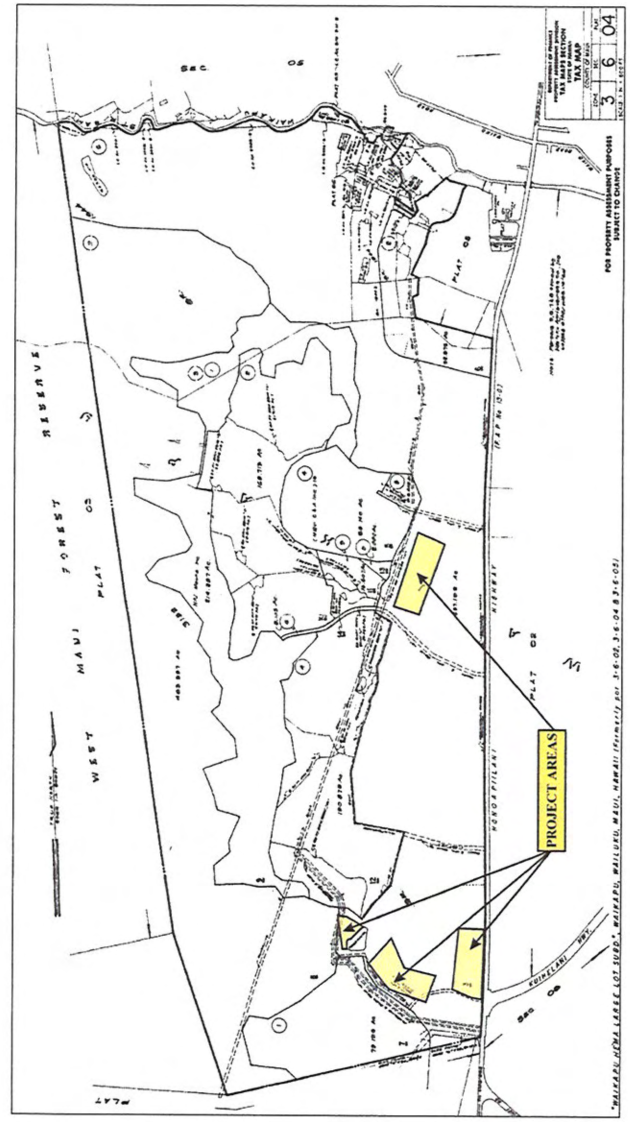

Figure 2: Tax Map Key [TMK] (2) 3-6-004:003 (por.) Showing Project Area

Figure 3: **Project Area Overview Center of Effluent Re-Use Area (Pineapple Field) to East.**

Please note that stratigraphic trench excavations were not conducted at several areas including: the irrigation ditches [Sites -6251 (T-1), 6254 (T-4), and -6255 (T-5)] as they are currently in use. In addition, excavations were not conducted at Site -6256 (T-6), the proposed water tank site, and Site -6257 (T-7), the junkyard and the borrow pit sites for Detention Pond B. All of these areas have all been subjected to extensive previous bulldozer disturbance, as evidenced by large displaced boulders and high berms, which has made these areas inaccessible to bulldozers.

ENVIRONMENTAL SETTTING

PROJECT AREA DESCRIPTION AND LOCATION

Maui's Wailuku District encompasses an area from the eastern half of the West Maui Mountains, north to Kahului Bay, south to Ma`alaea Bay, and includes the entire Kahului Isthmus (Figure 4). The current project area is located in Wailuku District immediately north of the boundary separating Ukumehame Ahupua`a and Waikapu Ahupua`a. The project consists of the construction of five separate areas: 1) a proposed wastewater treatment plant; 2) a proposed Effluent Reuse Area (ERA); 3) a possible water tank; 4) Detention Pond A; and 5) Detention Pond B (see Figure 1).

The proposed wastewater treatment plant site is located at the northeast corner of the intersection of Honoapiilani Highway and Kuihelani Highway. It is roughly rectangular with its long axis oriented North-South. Its eastern boundary is Honoapiilani Highway and its southern

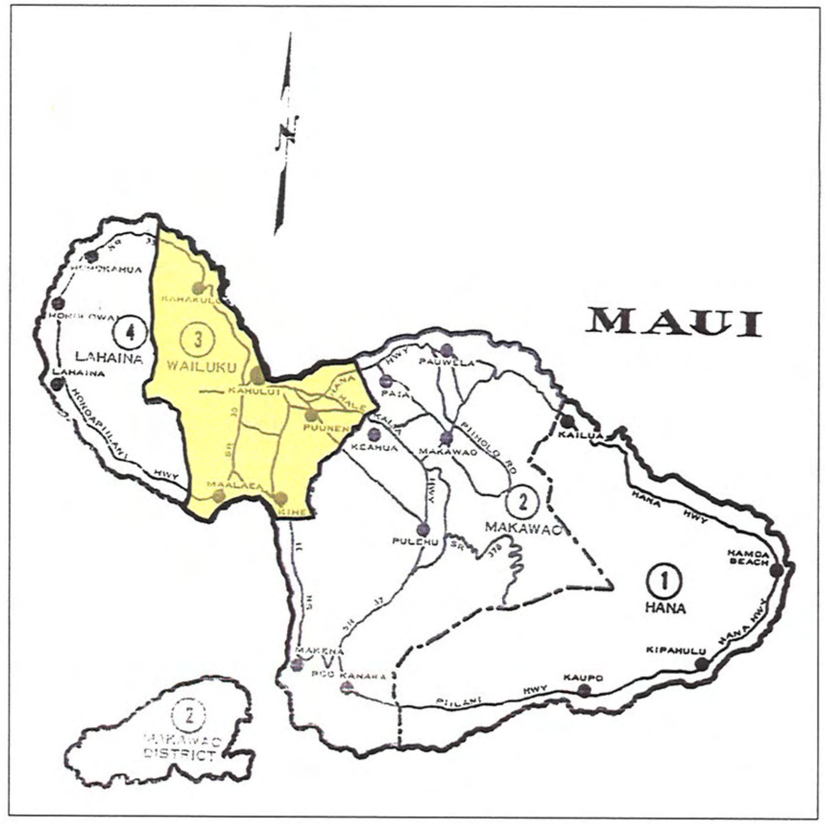

Figure 4: Map of the Island of Maui Showing Location of Wailuku District.

boundary is a paved road leading from Honoapiilani Highway to the Pohakea Quarry. The northern and western sides are bounded by fallow pineapple fields. The entire treatment plant site is located in the southeast corner of the effluent reuse area.

The majority of the project area consists of the ERA (approximately 85 acres), which is roughly rectangular in shape. Its long axis extends north-south. The boundaries of the ERA are as follows: its eastern boundary is the Honoapi`ilani Highway; its southern boundary is a paved road leading from Honoapi`ilani Highway up to the Pohakea Quarry; the northern boundary is a dirt cane haul road next to a ditch that crosses Honoapi`ilani Highway to the east; and the western boundary is an arbitrary line that runs approximately north-south, roughly paralleling the eastern boundary. Approximately 20 acres within the northernmost portion of the ERA are currently under cultivated commercial sugarcane which, according to an unidentified HC&S field worker, is due to be harvested sometime next year (2007). Most of the rest of the ERA is in fallow pineapple fields.

An approximately five acre portion of the southwest corner of the ERA is an uncultivated empty lot which probably was also used for commercial agriculture at one time, but more recently has been used as a cattle holding area; however, it does not appear to be in use at present. This area is rhomboidal in shape. Its southwestern side is bounded by a boulder wall which also serves as the boundary for the Pohakea Quarry. An historic water ditch (Site 50-50-09-6251, T-1) runs parallel to this rock wall. The southeastern boundary is the road leading up to the quarry. The northeastern side is a berm and ditch complex (Site 50-50-09-6257, T-7) which separates this empty lot from the pineapple field to the north and the northwest boundary is an unmarked line. Two large agricultural clearing piles (bulldozed and stacked boulders and soil), Sites -6252 (T-2) and -6253 (T-3), are in the surveyed portion of the empty lot. One additional clearing pile lies to the northwest of the project area; however, this feature was not recorded as it is outside the project area.

This part of the effluent reuse area also overlaps with the center portion of Detention Pond B. From this central portion, Pond B also extends about five acres northwest and another five acres southeast. The northwest portion of Pond B is a junkyard full of abandoned vehicles and heavy equipment, empty barrels, machine parts, and old construction supplies and equipment. This area is located just southeast of the existing reservoir and wellhead, and northwest of the Pohakea Quarry. The southeastern portion of Pond B is southeast of the road leading up to the quarry, just outside its main entrance. It has been heavily disturbed by bulldozer activity and appears to have been used as a borrow pit. Another large clearing pile (Site 50-50-09-6256, T-6) is located in this area.

The possible water tank site is located adjacent to the existing reservoir and slightly to its northwest. It is a roughly pork chop shaped area about five acres in area. It is bounded on the southeast by the reservoir, on its west side by an unimproved Maui Electric Company (MECO) road, and on its north side by the Waikapu golf course and an empty lot. A small natural drainage runs along the western edge of the pork chop. Portions of this drainage have been

modified along its eastern bank (Site 50-50-09-6255, T-5) to form a retaining wall for what appears to be an old water control or *`auwai* (ditch, canal) system. Another water transportation ditch, currently in use and leading up to the existing reservoir is located at the easternmost point of the pork chop (Site 50-50-09-6254, T-4). This possible water tank area has also been heavily impacted by previous bulldozer activity.

Detention basin A is located north of the road leading up to the Waikapu Golf Courses. It is rectangular in shape and is an estimated 15 acres in area. It is also currently under sugarcane cultivation.

CLIMATE AND SOILS

The project area receives 10 to 200 inches of rainfall annually (Foote 1972:115). This area is much drier than higher elevations to the west. Due to the lower, coastal elevation, air temperatures are consistently slightly warmer than Maui's seasonal averages.

According to Foote *et al.* (1972:100–101), soils in the project area fall into mainly two categories: the Pulehu Series (approximately 75 percent of the project area) and the Ewa Series (approximately 20 percent). The remaining portion (approximately 5 percent) of the project area is in Stony Alluvial Land (rSM) (Figure 5).

Roughly 75 percent of the project area consists of soils of the Pulehu Series. These soils are known to occur on four of the five major Hawaiian Islands (O`ahu, Maui, Lana`i, and Moloka`i). In general, these are well-drained soils are found on "alluvial fans, stream terraces, and basins" at elevations ranging from around sea level to 300 feet amsl. They are formed from alluvium eroded from basic igneous rock and are almost level to slightly sloping. Soils of the Pulehu Series are utilized for agricultural purposes such as growing sugarcane and truck crops, as well as for pasture lands, homes, and for wildlife habitation. (Foote *et al.*1972:115).

Pulehu Clay Loam (PsA) occurs on 0 to 3 percent slopes and is found on alluvial fans, stream terraces, and basins. This type of soil is characterized by slow runoff and a very slight erosional hazard. Pulehu Cobbly Clay Loam (PtA) is comparable to PsA, except that this soil contains cobbles. Pulehu Cobbly Clay Loam (PtB) is found throughout the project area (see Figure 5). The PtB soil, like PsA and PtA also exhibits slow runoff and a slight erosion hazard. However, unlike those soil types, PtB has a slope range of three to seven percent (Foote *et al.* 1972: 116).

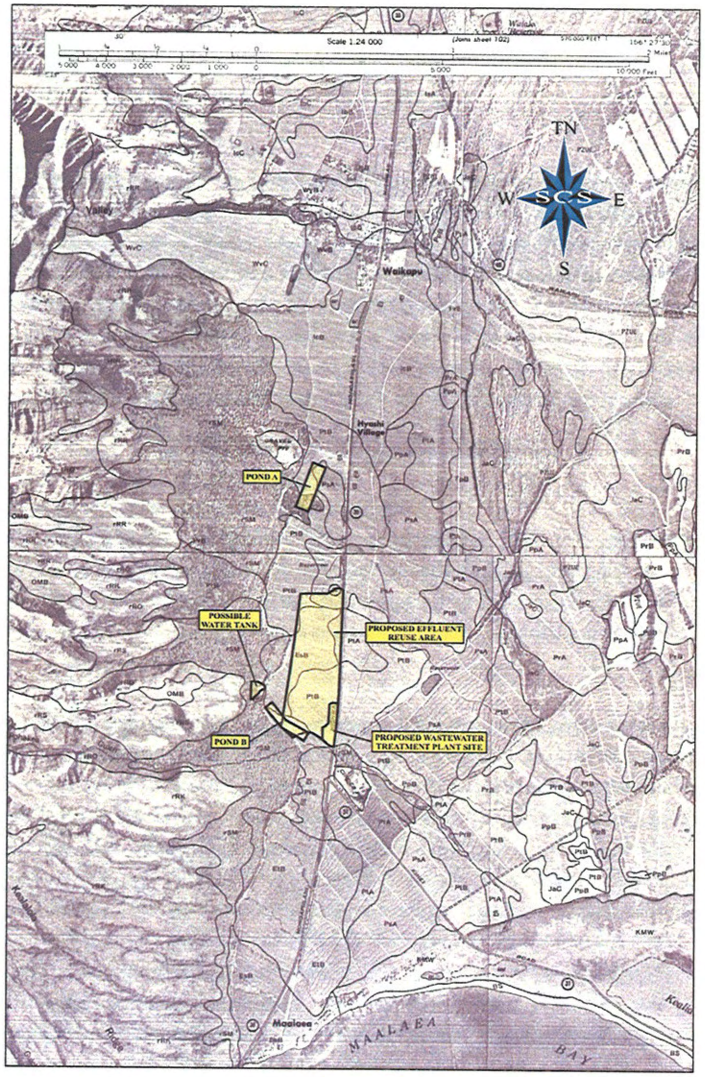

Figure 5: USDA Soil Survey Map Showing Soil Types within Project Area.

Approximately 20 percent of the project area lies in soils of the Ewa Series. The Ewa Series consists of well-drained soils that occur on alluvial fans located at elevations ranging from around sea level to 150 feet amsl within O`ahu and Maui. They are derived from igneous rock, are moderately sloping, and are best suited for sugarcane, truck crops, and pasture (Foote *et al.* 1972:29–30). Two soils of the Ewa Series are present in the project area: Ewa Silty Clay (EsA) has three to six percent slopes and exhibits slow runoff and s slight erosion hazard and Ewa Silty Clay (EsB) also has three to six percent slopes.

The rSM soils are comprised of boulders, stones, and soil which has been deposited by streams along the bottoms of gulches and alluvial fans with slopes ranging from 3 to 15 percent. Areas where this soil type is found have elevations ranging from around sea level to 1000 feet above mean sea level (amsl). Given the rocky nature of this soil, improvements to the land are difficult (Foote *et al* 1972:120).

PROJECT AREA LANDFORM AND VEGETATION

The wastewater treatment area, the ERA, and Detention Pond A are in a relatively level area covered with fallow pineapple and/or cultivated sugarcane. Dirt roads extend southwest-northeast between the pineapple rows and east-west through the sugarcane. Various weeds indicative of a highly disturbed ecosystem are growing throughout the fields. These include giant guinea grass (*Panicum maximum*), balsam pear (*Momordica charantia*), sourgrass (*Digitaria insularis*), swollen finger grass (*Chloris barbata*), hairy horseweed (*Conyza bonariensis*), coat buttons (*Tridax procumbens*), and the weedy natives *alena* (*Boerhavia repens*), and *`uhaloa* (*Waltheria indica*).

The proposed water tank site is also mostly level, but has undergone extensive ground alterations due to prior bulldozing. Large boulders have been displaced and bulldozer berms are scattered throughout the area, making the terrain very uneven, rocky, and extremely difficult to traverse. The vegetation is 100 percent coverage of moderate to dense kiawe (*Prosopis pallida*) woodland with bufflegrass (*Cenchrus ciliaris*) and giant guinea grass understory, scattered *koa haole* (*Leucanena leucocephala*), *klu* (*Acacia farnesiana*), and slender mimosa (*Desmanthus virgatus*). Several mature endemic *wiliwili* (*Erythrina sandwichensis*) trees are growing in a small drainage running North-South along the west side of the proposed water tank site, probably representing a remnant pocket of a once more widespread native ecosystem.

The center and southeast portions of Detention Pond B are level have been entirely razed by bulldozer activity. The presence of large agricultural clearing piles in both areas indicates the extent of clearing and earth moving activities. The southeast portion appears to have been heavily used as a borrow site, as well. Both areas are characterized by the presence of broken saprolitic rock on the surface as well as large boulders with bulldozer scars, broken rocks, and chunks of broken concrete throughout. Both areas are covered by bufflegrass grassland and *koa haole* shrub land and other invasive weedy species such as *klu*, slender mimosa, sticky foxtail grass (*Setaria verticillata*), giant guinea grass, sourgrass, lion's ear (*Leonotis nepetifolia*), indigo (*Indigofera suffruticosa*), hairy abutilon (*Abutilon grandifolium*), castor bean (*Ricinus communis*), glycine vine (*Glycine wightii*), and false mallow (*Malvastrum coromandelianum*). A few young endemic *wiliwili* saplings are located in the eastern corner of the central part of the pond area, but appear to have died. The entire center area has been burned in a previous brush fire. The grassland appears to have since grown back but dried up in this summer's drought, but the *koa haole* and other shrubs as well as the *wiliwili* saplings and nearby coconut trees, do not appear to have recovered. The southeast portion of Pond B does not have the same evidence of extensive damage from brush fire, but the vegetation is not as dense, probably due to the borrow activity.

The northwest portion of Pond B is currently being used as a junkyard. It is level and probably also has been bulldozed. The area is thickly overgrown by moderate *kiawe* woodland and a thick understory of bufflegrass and giant guinea grass, making it difficult to examine the terrain. It is highly unlikely that this area would have escaped the ubiquitous bulldozer activities prevalent in all areas immediately surrounding this one.

TRADITIONAL AND HISTORIC SETTING

Archaeological settlement pattern data indicates that the initial colonization and occupation of the Hawaiian Islands first occurred on the windward shoreline areas of the main islands between the A.D. 4th and 11th centuries, with populations eventually settling into drier leeward areas at later periods (Kirch 1985). Coastal settlement was still dominant, but populations began exploiting and living in the upland (*kula*) zones. Greater population expansion to inland areas did not occur until about the A.D. 12th century, but continued through the 16th century. Large scale or intensive agricultural endeavors were implemented in association with habitation. Coastal lands were used for settlement and taro was cultivated in near-coastal reaches and in the uplands.

TRADITIONAL SETTING OF WAILUKU DISTRICT

Wailuku District, is frequently mentioned in historical texts and oral tradition as being politically, ceremonially, and geographically important during traditional times (Cordy 1981,

1996; Kirch 1985). Wailuku was considered a "chiefly center" (Sterling 1998:90) with many of the chiefs and much of the area's population residing near or within portions of `Iao Valley and lower Wailuku. The importance of the district is reflected by the relatively large number of *heiau* that were reportedly present in pre-Contact times. Oral tradition accounts surrounding these *heiau* provide examples of how religion tied into political power in the traditional Wailuku setting. Indeed, the period immediately preceding contact with the Europeans was one of considerable upheaval and conflict. *Wailuku*, meaning 'water of destruction' (Pukui, *et al.* 1974), succinctly describes the area in the late 1700s. Political power emanating from Moloka`i was an active element during the mid-eighteenth century. The resulting battle at Kalae`ili`ili (A.D. 1765) led to the expulsion of Keeaumoku and the Moloka`i *ali`i* and the beginning of Kahekili's reign (Kamakau 1992). Kahekili successfully defended his capital in Wailuku throughout the 1770s, until his defeat at the hands of Kamehameha's forces.

Closer to the current project area, in the southwest corner of Wailuku District, pre-Contact settlement was not as dense as concentrations to the north. Climate had much to do with the trend, as the Ma`alaea area is a more arid environment than the rain-soaked fields to the north. According to Tomonari-Tuggle and Tuggle (1991), the majority of the pre-Contact population was located southwest of the project area, near what is now Ukumehame Beach State Park. Settlement was also probable north of Keālia Pond in Waikapū Ahupua`a. Handy and Handy report (1972: 496) that before the historic sugarcane plantations in this region, water from Waikapū Stream ". . . was diverted into lo`i and its overflow was dissipated on the dry plains of the broad isthmus between West and East Maui."

Wailuku District would see drastic change after Captain James Cook's 1778 arrival in Kahului Bay. The reign of Kamehameha I was intertwined with the increasing presence of Europeans within the Hawaiian Islands. By 1821, American missionaries had established a foothold in Lahaina and arrived in Wailuku the following year. The religion of the Hawaiian people began to wane under the influence of Christianity. Fredericksen and Fredericksen (2002:4) point to a girls' seminary school (Central Female Boarding School), established in Wailuku in 1836, as one of the initial steps in the conversion of Hawaiian language and customs in Maui.

TRADITIONAL SETTING OF WAIKAPŪ

Waikapū Ahupua`a is located in the land division (`*okana*) which was once known as "Nā Wai Eha" (The Four Streams). This area is "...comprised the four great valleys [Waihe`e, Waiehu, Wailuku, and Waikapū] which cut far back into the slopes of West Maui and drain the eastward watershed of Pu`u Kukui and the ridges radiating northeastward, eastward, and southeastward from it" (Handy and Handy 1972). This area once was renowned for "…its majesty and splendid living, whose native songs gather flowers in the dew and weave wreaths of ohelo berries" (S.W. Nailiili in Sterling 1998:93).

According to Handy and Handy (1972:497) and Pukui *et al.* (1976:223), the name "Waikapū" (Water of the Conch) refers to an ancient cave in the area where a famous conch shell (*pū*) was hidden until it was stolen by Puapua-lenalena (a supernatural dog). Sterling (1998) offers two alternative origins of the name "Waikapū." In one account, the area, known as "Nā Wai Eha," was renowned for the battles fought there; the name Waikapū (the water where the conch was blown) referred to a conch shell which was blown to announce the commencement of a battle (C. W. Stoddard 1894 in Sterling 1998). In another account (H. T Cheever 1851 in Sterling 1998:63), "Waikapū" (Forbidden Water) refers to the time Kamehameha I, the Conqueror, beached his canoes at Kalepolepo and placed a *kapu* (taboo, restriction) on the nearest stream (Stoddard in Sterling 1998:63). Although Waikapū Stream is not the closest stream to Kalepolepo, it does drain into Keālia Pond, and it may have been the closest stream with flowing water at the time of Kamehameha's landing (Sterling 1998:63).

W. D. Alexander (in Sterling 1998: 63) also states that "…the lands of Waikapū and Wailuku appropriated almost the whole of the isthmus so as to cut off half of the lands in the district of Kula from access to the sea. These two *ahupua`as,* together with Waiehu and Waihe`e, which were independent, belonging to no *Moku*, were called 'Na Poko,' and have been formed into a district in modern times."

Waikapū once was the setting of vast wet-land taro fields. Evidence of the widespread *lo`i* (irrigated terrace) planting is provided by the Land Commission Awards (LCA) which indicate there once were more than 1,300 wet-land taro patches extending along the boundaries of Waikapū Stream (Creed 1993). Handy and Handy (1972: 497) describe the general Waikapū area as follows:

> Spreading north and south from the base of Waikapu to a considerable distance below the below the valley are the vestiges of extensive wet-taro plantings, now almost obliterated by sugar-cane cultivation; a few here and there are preserved in plantation camps and under house and garden sites along the roads. Among these gardens there were, in 1934, a few patches of Japanese taro. Far on the north side, just above the main road and at least half a mile below the entrance to the canyon, an extensive truck garden on old terrace ground showed the large area and the distance below and away from the valley

> that was anciently developed in terraced taro culture. On the south side there are likewise several sizable *kuleana* where in 1934 old terraces were used for truck gardening. In the largest of these a few old patches were flooded and planted with Hawaiian wet taro. Several terraces were used as ponds planted with lotus for their edible seed. There were probably once a few small terraces on the narrow of valley bottom in the lower canyon.

TRADITIONAL SETTING OF UKUMEHAME

Ukumehame Ahupua`a is located immediately adjacent to and southeast of Waikapū Ahupua`a. It primarily lies within the boundaries of Lahaina District. However, a small portion of Ukumehame is located in Wailuku District. Handy and Handy (1972:492) suggest that at least portions of Ukumehame were wet enough to cultivate crops during traditional times:

> Southeast along the coast…were a number of areas where dispersed populations grew taro, sweet potato, breadfruit, and coconuts on slopes below and in the sides of valleys which had streams with constant flow. All this area like that around and above Lahaina is now sugar-cane land. Ukumehame had extensive terraces below its canyon, some of which were still planted in 1934; these terrace systems used to extend well down below the canyon.

Literature also indicates that Ukumehame supported a sizable population during the traditional period. During his survey of the island in the early 1930s, Walker (in Sterling 1998:21) noted at least 45 permanent and temporary house sites along a two mile stretch from Ma`alaea Village to McGregor Point. These house sites included low-walled semi-circular and/or oval enclosures, platforms, and sites that may have been used as *ko`as* (fishing shrines). Walker documented two unmanned *heiau* in Ukumehame. He describes one as "…a large walled heiau" located a quarter mile from Ma`alaea village at the base of the foothills of the West Maui Mountains (Walker 1931:105). The second unnamed *heiau is* located, "…on the west side of Ukumehame Gulch, just above the ditch at the edge of the cane lands (*ibid*: 107). Walker described this structure as an irregularly-shaped, walled *heiau* which was partially destroyed and used as a cattle pen. He also documented Hikii Heiau (*ibid*: 106), which he described as a "good sized heiau built of rough blocks of red basalt" located on the east side of Ukumehame Gulch. In addition to *heiau*, Walker also recorded a series of petroglyph panels located at the south end of the West Maui Mountains approximately one-quarter mile from Ma`alaea Bay (Walker in Sterling 1998:22).

Ukumehame is said to refer to using the wood of the *mehame* (*Antidesma bunius*) tree as payment. The wood was traditionally used for making anvils which were used to process *olonā* (*Touchardia latifolia*). The fruit of the *mehame* tree was used as a red dye for coloring kapa cloth

(Samuel Mookini in Sterling 1998:20). Ukumehame is mentioned in several legends including the Legend of the Battle of the Owls (W.H. Uaua in Sterling 1998:20). This legend mentions Manawaipueo (in Ukumehame), which is the place where the owls gathered with all of the owls of West Maui after flying from Molokai, Lanai, and Kaho`olawe. Another legend refers to Kaiaupe, the renowned female robber, who lived in Ukumehame and "…enticed men to lay with her at the edge of the pali then kick them over the edge with her foot…" (T. Kelsey Collection in Sterling 1998:20).

THE MĀHELE

In 1848, commissioners of the Māhele instigated an extreme modification to traditional land tenure on all islands that resulted in a division of lands and a system of private ownership. The Māhele was based upon the principles of Western law. While this land division remains a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian society into that of a market economy (Kuykendall Vol. I 1938:145, footnote 47, *et passim*; Daws 1968:111; Kame`eleihiwa 1992:169–170, 176). The dramatic shift from a redistributive economy to a market economy resulted in drastic changes to land tenure, among other things. As a result, foreigners demanded private ownership of land to ensure their investments (Kuykendall Vol. I, 1938:145, *et passim*; Kame`eleihiwa 1992:178).

Once lands were made available and private ownership was instituted, native Hawaiians, including the *maka`āinana* (commoners), were able to claim land plots upon which they had been cultivating and living. Oftentimes, foreigners were simply just given lands by the *ali`i* (chief, ruler). However, commoners would often only make claims if they had first been made aware of the foreign procedures (*kuleana* lands, or land commission awards). These claims could not include any previously cultivated or currently fallow land (*okipu*) stream fisheries, or many other natural resources necessary for traditional survival (Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). Awarded parcels were labeled as Land Commission Awards (LCAs). If occupation could be established through the testimony of witnesses, the petitioners were issued a Royal Patent (RP) number and could then take possession of the property. Commoners claiming house lots in Honolulu, Hilo, and Lahaina were required to pay commutation to the government before obtaining an RP number for their awards (Chinen 1961:16).

During the Māhele, Wailuku District was declared Crown Land and numerous Land Commission Awards; approximately 180 were awarded within Wailuku Ahupua`a alone (Creed 1993). A handful of foreigners (*i.e.*, Anthony Catalena, James Louzada, E. Bailey) gained

control of large parcels of lands that would later be used for mass cultivation of sugar. Significantly, the majority of LCAs were awarded to Hawaiians, a gauge that can be used to measure pre-Contact settlement, since there was little overall change in traditional land use among Hawaiians prior to 1853 (Creed 1993:38).

During the Māhele, 44 Land Court Awards were issued in Ukumehame Ahupua`a, Lahaina District and one was issued to a claimant in Ukumehame, Wailuku District. However, no land claims were awarded within the current project area. This fact may be attributed to the sparse pre-1848 Hawaiian population within the parcel, a result of settlement conditions within these *ahupua`a* favoring the coastal area.

THE LATE HISTORIC PERIOD AND GROWTH OF THE SUGAR INDUSTRY

Another influence that brought change to Maui was foreign commercialism. Two Chinese brothers, Ahung and Atai, of Honolulu's Hungtai Company arrived in Wailuku to explore the possibility of setting up one of its earliest sugar mills in 1828. Atai soon created a plant that processed sugarcane cultivated by Hawaiians, named the Hungtai Sugar Works (Dorrance and Morgan 2000:15–16). Ahung later joined Kamehameha III's sugar producing enterprise, although both operations had ceased by 1844. The Wailuku Sugar Company opened operations in 1862 and expanded sugar production over the next 126 years of its existence.

As it expanded its territory, the Wailuku Sugar Company first appeared on maps of the project area in the in the 1920s (Bureau of Conveyances, Grant 9794); however, their acquisition of the project area land may have been as early as the turn of the century (Kennedy and Trimble 1992:4). Successive grants (Grant 10294 through to Grant S-13975) would follow in decades following and fully encompass the Ukumehame Ahupua`a side of the project area in Wailuku Sugar land. Kennedy and Trimble (1992:4) summarize the history of the Waikapū Ahupua`a (*makai*) portion of the project area by detailing its acquisition from the state government on November 18, 1875 by Henry Cornwell (Grant 3152). Cornwell subsequently sold to Claus Spreckels, and by the turn of the century, the entire project area was under sugarcane cultivation.

Wailuku Sugar Company ended production in 1988, having averaged over 30,000 tons of sugar produced annually at its pinnacle in the 1970s (Dorrance and Morgan 2000:66). Owner C. Brewer & Company, Ltd. shut down sugar cultivation on the project area, which was then used almost entirely for pineapple cultivation starting no later than 1992 (Kennedy and Trimble 1992:1). The lands were under pineapple for at least the next three years (Tomonari-Tuggle 1994:11) (and probably slightly longer) before transitioning to smaller-scale "garden" plots.

RANCHING

Livestock was introduced to the Hawaiian Islands in 1793 when Captain Vancouver transported cattle and sheep aboard his ship the *Discovery* with the intention of giving the four cows, two bulls, four ewes, and two rams to Kamehameha I as a gift of goodwill. The rough seas and intense heat of the journey took its toll on the health of the cattle and several of the animals died as a result. In order to ensure that the cattle population would increase, a 10 year *kapu* was placed on slaughtering them. Eventually the cattle did increase. However, once the 10 year *kapu* on cattle slaughter had been lifted the number of cattle increased so dramatically they became a dangerous nuisance. As they were allowed to roam, wild gardens were destroyed and the Native Hawaiians were terrified of being attacked. Managing and controlling the unruly animals became a necessity. In order to solve this problem, Kamehameha I employed "a varied crew with unsavory reputations who had immigrated to the islands to escape their pasts" as bullock *hunters* to capture the animals (Cowan-Smith and Stone 1988:8).

Captain Richard Cleveland and his partner Captain William Shaler introduced horses to the Islands in 1803. Several horses, including a stallion and a mare with foal, were brought aboard their ship, the HMS *Lelia Byrd*, and presented as gifts to Kamehameha. Soon the horses, like the cattle, were roaming freely across the Islands. The horses (*lio*) adapted rapidly to the rough terrain where the cattle grazed and "their ability to work the livestock [did not] go unnoticed" (Cowan-Smith and Stone 1988:12).

Around 1830, Kamehameha III brought Mexican *vacqueros* from Vera Cruz to the Big Island to teach the local men how to rope and handle the animals. As the cattle and horse populations proliferated, the animals were transferred to the various Hawaiian Islands and the *vacqueros*, which now included local cowboys, were needed on the outer islands.

Cattle were on the Island of Maui as early as 1806. Amaso Delano (in Brennan 1995:97) provides the following account of the effect cattle had on traditional life on Maui:

> They had recently brought to this island, one of the bulls the Captain Vancouver landed at Owhyee (Hawaii). He had made very great destruction amongst their sugarcane and gardens, breaking them and their cane patches and tearing them to pieces with his horns and tearing them with his feet. He would run after and frighten the natives and appeared to have the disposition to do all the mischief he could, so much so that he was an unwelcome guest among them.

As sandalwood and *koa* were diminishing, cattle became an important resource to the Hawaiian economy. By 1820, the number of cattle had increased to such a degree that they were aggressively being hunted for their hides. In addition, their tallow and meat became important commodities of local and international trade. Soon cattle and their importance in the trade industry flourished to such an extent that Hawai`i became a major supplier of beef to California during the Gold Rush and subsequently to the visiting whaling ships (Cowan-Smith and Stone 1988:6).

PREVIOUS ARCHAEOLOGY IN THE WAIKAPŪ AREA

A number of studies on file at the State Historic Preservation Division, Kapolei archives summarize the most relevant previous archaeology within the vicinity of the current project area. Figure 6 shows the locations of these studies in relation to the current project area.

In 1989, PHRI conducted an Archaeological Inventory Survey of over 600 acres within the Waikapū Mauka Partners Golf Resort located to the north of the current project area (Brisbin, *et al.*1991). The report documenting the findings of this survey (Haun 1989 in Brisbin, *et al.* 1991) does not appear to be available to the public at this time. Based on the findings and recommendations of Haun's Inventory Survey, Archaeological Data Recovery was subsequently conducted at the nine sites (comprised of over 46 features) newly identified during the initial survey report (Haun in Brisbin, *et al.* 1991) (see Figure 6). These nine sites indicated that this area was utilized for extensive traditional dryland agriculture with limited habitation and some historic ranching activities. The findings of this survey indicate that only a few habitation sites were located below 500 feet amsl and that the agricultural sites were "continuously distributed" throughout the project area.

Fifteen radiocarbon samples collected from data recovery excavations conducted at several of the features yielded sufficient amounts of charcoal suitable for providing reliable dates. The range of the radiocarbon dates suggests initial occupation of the project area occurred during the early 1500s and continued through the historic period (Brisbin *et al.* 1991).

During 1989 and 1990, Archaeological Consultants of Hawaii (ACH) conducted an Archaeological Inventory Survey of the lands immediately adjacent and *mauka* (west) of the above-mentioned PHRI project area (Kennedy 1994) (see Figure 6). During this survey a total of 18 sites, comprised of 74 features, were newly identified. These sites also indicated that the area was primarily utilized for traditional agriculture, although there was some evidence of limited habitation, including burials and ceremonial use. Kennedy (1994) concluded that these sites can

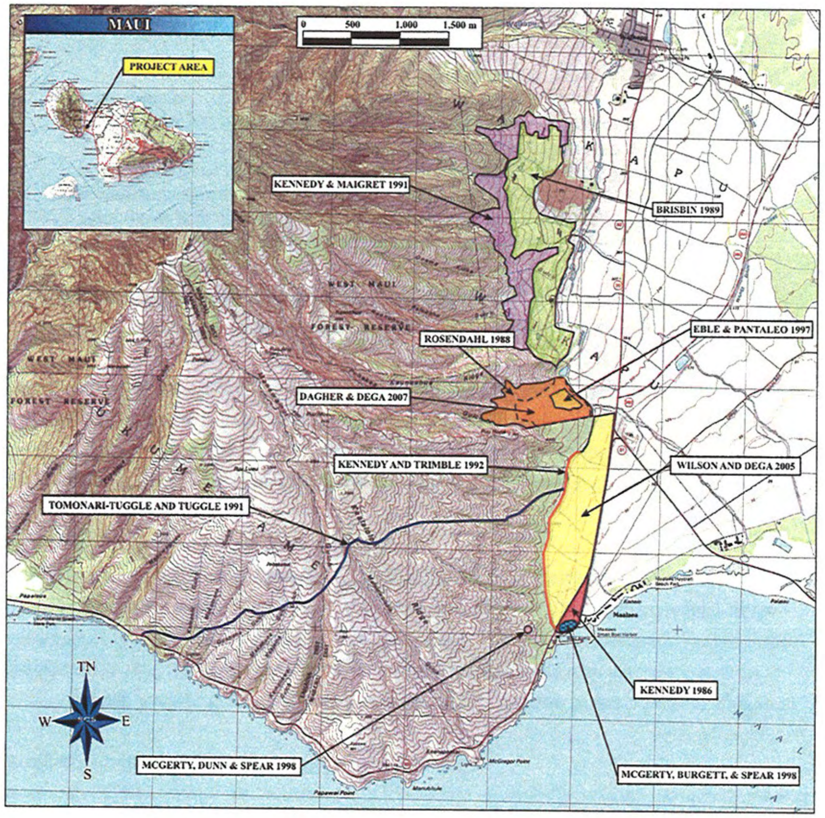

Figure 6: SGS Quadrangle (Ma`alaea and Wailuku) Map Showing Previous Archaeology.

only be a continuation of the occupation described by Brisbin *et al.* (1991). Five charcoal samples collected from test excavations of several of the features were submitted for radiocarbon dating. These samples yielded dates ranging from A.D. 1040 through 1950.

In 1997, Aki Sinoto Consulting (ASC), in association with Garcia and Associates (GANDA), conducted an Archaeological Inventory Survey of 15 acres of land north of Pōhākea Gulch. One structural feature was documented during this survey. Given the description of this feature and the site location map this may be in association with Site 50-50-09-6062 (PHRI T-6)

or 50-50-09-6063 (PHRI T-11) which were initially documented by PHRI in 1988 (Eble and Pantaleo 1997) (see Figure 6). This site is believed to have been subsequently destroyed during the construction of Pohakea Quarry (Dagher and Dega 2007).

Kennedy and Trimble (1992) surveyed an area to the south of the current project area. This survey overlaps State Site 50-50-09-5659 (historic dirt road), first recorded in the Wilson and Dega (2005) study (see Figure 6). While Kennedy and Trimble also note the lack of archaeological features in their project area due to the obvious history of intense agriculture, their 1992 report does not consider the road upon which their survey takes place to be a potential historic agricultural feature. The project area detailed in their study is no more than 5.0 meters wider than the dirt road itself, and concludes that "No artifacts, midden, or structures of historic or prehistoric significance were identified on the subject property" (1992:11).

An earlier Kennedy report entitled *Letter Report: Walk-Through Examination of the Proposed Ma`alaea Triangle, Maui (TMK: 3-6-01:1)* (1986) also concluded with negative results. This was the first archaeological study done on this parcel and Kennedy does mention (1986:2) nearby sites that are detailed in later studies. This project area is located on the *makai* (southeast) side of Honoapi`ilani Highway and extends to the coastline (see Figure 6).

Monitoring within a smaller section of the same project area described by Kennedy (1986) resulted in a single site (a previously disturbed historic burial: State Site 50-50-09-4480) (McGerty, Burgett, and Spear 1998). McGerty *et. al*'s report, entitled *Draft: Monitoring Report on Earth Moving and Construction Excavations, Maui Ocean Center Site, Maui, Hawaii, (TMK: 3-6-01:001 and 019)*, describes a pearl shell button found with the burial. As subsequent subsurface testing would prove, however, the sandy matrix McGerty, *et. al* experienced in the Maui Ocean Center monitoring contrasted the reddish clay of the Wilson and Dega (2005) project area, rendering the likelihood of encountering burials much less. Nonetheless, the McGerty *et. al* (1998) study also mentions two more burials found not far to the north from Site -4480.

McGerty, Dunn, and Spear (1998) conducted Data Recovery in an area of five traditional sites documented by Moore and Kennedy (1995). These sites (50-50-09-3555, -4022, -4137, -4138, -4139) consisted of 28 features, including petroglyphs, subsurface firepits, agricultural terracing, rock mounds, and a C-shape. McGerty *et. al*'s testing at Sites -4138, and -4139 did not produce any significant artifacts, however, radiocarbon analysis of a charcoal sample produced a date of A.D. 1390 to 1650. This sample was recovered from the C-shape (Site 4139, Feature C) which was determined to be a prehistoric temporary habitation.

In 2005, SCS (Wilson and Dega 2005) conducted an Archaeological Inventory Survey of the 259.903-acre property immediately adjacent to the south of the current project area (see Figure 6). Three historic sites, all related to sugarcane cultivation, were newly identified and documented: Site 50-50-09-5657 (clearing mounds), Site 50-50-09-5658 (irrigation modifications), and Site 50-50-09-5659 (dirt road). These three sites were the only archaeological sites found within the project area. Subsurface testing consisting of 20 stratigraphic trenches (a volume of approximately 292.0 cubic meters) was conducted, but did not reveal any subsurface historic, or prehistoric, cultural material. Rather, excavation confirmed the extent, both in physical and temporal depth, of historic and modern agricultural activity within the project area.

However, there is no doubt that the area discussed in Wilson and Dega (2005) was utilized as a segment of an important trail system in the early 1800s, and probably prehistorically as well. The Lahaina Pali Trail is five miles long and crosses the southern slopes of the West Maui Mountains between Olowalu and Ma`alaea. The start of this trail, now a demonstration trail as part of the Na Ala Hele Trail System, borders the Wilson and Dega 2005 project area near the center of the *mauka* border. By the Historic Period, in which the trail's significance as a probable prehistoric route was realized, the portion *makai* of the current trail head had already been destroyed by sugarcane cultivation. Thus, the trail starts immediately outside the project area, within the State-owned lands. A 1991 study by Tomonari-Tuggle and Tuggle documented 18 sites upon the trail, the majority of historic origin (see Figure 6).

In 2000, SCS (Dega and Dagher 2007) conducted an Archaeological Inventory Survey of approximately 60 acres of land for the proposed Pohakea Quarry expansion project. A total of seven sites comprised of 23 features were recorded and documented during this study. Five of these sites (Sites 50-50-09-6061 through 50-50-09-6065) were previously identified by PHRI in 1988, and two of these sites were newly identified (50-50-09-6066 and 50-50-09-6067). An additional segment of Site 50-50-09-6065 (PHRI T-13) was also identified and documented during the survey. All of these sites were interpreted as historic ranching sites.

SETTLEMENT PATTERN

Archaeological settlement data indicates that initial colonization and occupation of the Hawaiian Islands first occurred on the windward sides of the main islands, with populations eventually settling into drier leeward areas at later periods (Kirch 1985). Archaeological dates for initial occupation of the Hawaiian Islands far pre-date accepted ranges gathered from palynological data. A more conservative estimate for initial occupation of the islands is the A.D. 9th century (Athens 1997), if one is to lay more credibility with the pollen record than the archaeological record. In the Waihe`e and Wai`ehu areas of Wailuku, Kirch (1985:87) notes that "a number of coastal dune midden sites have been reported, and at least one of these contained pearl-shell fishhooks similar to those from the Bellows Site, eroding from the wave-cut midden." (The Bellows site, located on the windward coast of O`ahu, has yielded the controversial data of occupation dates from A.D. 300 to 600 [Pearson *et al.* 1971], one of the earliest dated sites in the Hawaiian Islands. For the most part, these dates have now been diagnosed as problematic and are no longer considered valid.)

More recent research within Wailuku District indicates that Wailuku Ahupua`a was likely settled between *c.* A.D. 1100 (Kirch 1985:142) and A.D. 1200 (Fredericksen and Fredericksen 1996), whereas *ahupua`a* to the northeast have produced slightly earlier date ranges and *ahupua`a* to the southwest have later settlement dates. The earliest populations purportedly used local resources and seldom ventured into upland valleys. Cordy (in Creed 1993) suggests, however, that upper valley areas on windward coasts were likely populated before the A.D. 1100s. Coastal settlement was still dominant, but populations began exploiting and living in more upland *kula* zones. Population expansion to inland areas did not occur until the *c.* A.D. 12th century but continued through the 16th century. Large scale or intensive agricultural endeavors were implemented in association with habitation. Coastal lands were used for settlement and taro was cultivated in near-coastal reaches and in the uplands. Upland areas of Maui such as the Waiohuli-Kula area contained large garden enclosures, ceremonial structures, and permanent habitation sites by *c.* A.D. 1600.

Nearer the coast in lands like the current project area (*c.* 40–85 meters amsl), taro was cultivated along stream courses, dryland taro was grown on *kula* lands, and populations settled there as well. In the current parcel, however, no LCA records exist that might link prehistoric agriculture to historically documented practice.

EXPECTED FINDINGS

Based on all available physiographic, archaeological, and historical evidence, the following expectations guided this study:

- Historically-significant surface features were expected, particularly those pertaining to historic period sugarcane agriculture. SCS staff conducted an Archaeological Inventory Survey of the property immediately adjacent and to the south of the current project area (Wilson and Dega 2005) which reported the presence of the large clearing mounds and other features related to historic sugarcane cultivation. Thus, the probability of documenting additional historic agricultural features during Archaeological Inventory Survey was considered high.

- A variety of traditional Hawaiian sites have been documented at locations within nearby studies. Although the probability of encountering prehistoric archaeological surface features within the project area was considered low, a moderate possibility of encountering subsurface cultural layers from a prehistoric period remained. The latter would depend largely on the existence of a previously undisturbed matrix stratigraphically lower (*i.e.*, older) than historically tilled soils.

- The probability of discovery of historic or prehistoric unmarked burials, or marked burials, was considered low. A slightly higher, yet still low, probability existed in regards to the discovery of scattered human remains during subsurface testing. While burials have been located within the sandy matrix of the adjacent parcels *makai* of Honoapi`ilani Highway (*i.e.*, during construction activities at the Maui Ocean Center; see McGerty, Burgett, and Spear 1998), SHPD records contain no documented burials *mauka* of Honoapi`ilani Highway (including on, or within a kilometer, of the current project area). The lack of burial sites immediately *mauka* of the highway can be attributed to two main factors: (1) the types of soils found here were generally less favored in prehistoric burial practices, and (2) the lands have been subject to continual agricultural activity for nearly a century, and in some cases, longer.

METHODOLOGY

FIELD METHODOLOGY

Fieldwork was conducted between September 14 and October 5, 2006 by Allison Chun, Ph.D. and D. Dillon, B.A. under the direct supervision of Principal Investigator Michael F. Dega, Ph.D. All aspects of the work were photographed and archived on the SCS computer database. Likewise, all field notes, sketches, plan views, profiles, and maps are archived in SCS's Honolulu office.

During the fieldwork, 100 percent of the project area was surveyed, with the exception of the portions currently under sugarcane cultivation. A 100 percent survey was not possible in the cane fields due to the thick cane growth and the fact that it was under current cultivation. Every effort was made to avoid disturbing the cane growth and that precluded machete-cutting swaths though the fields for transects. However, the roads within the sugarcane fields were walked

during the survey. Thus, examination of the areas within and alongside the roads was conducted as was a cursory survey inside some of the cultivated areas where it was easier to get inside the cane growth. Given the level of ground disturbance, it is highly unlikely that there are any significant surface features hiding inside the cane fields. However, in order to preclude that small possibility, it is recommended that the areas currently under cane cultivation should be re-examined after the cane is harvested next year.

STRATIGRAPHIC TRENCHING

A total of 26 stratigraphic trenches were excavated in the project area, with the exception of the areas currently under commercial sugarcane. These excavations were conducted over a period of three days between October 2 through 5, 2006.

Methodology regarding stratigraphic trench excavation and recordation are as follows: first, the selected trench location was flagged by a field archaeologist. All of the subsequent stratigraphic trench excavations were conducted with an archaeological monitor present. Post excavation, a 1.0 m wide column stratigraphic profile sketch was prepared for each trench and photographs were taken of a representative section of the selected profile wall of each trench. All measurements, including detailed soil descriptions, were recorded in field notes, and potential cultural material was screened from *in situ* matrix, or backfill, and thoroughly examined. Finally, the trenches were mechanically filled in by the backhoe.

Three factors played a role in trench positioning. First was the desire to excavate at the locations of the clearing mounds (Sites 50-50-09-6252, T-2; and 50-50-09-625, T-3) which were identified during the pedestrian survey. These areas have previously undergone extensive ground alterations making it inaccessible to the backhoe. Second was the desire to gain an understanding of subsurface stratigraphy at locations evenly distributed throughout the project area. The third reason for trench positioning was based on the desire to place a higher number of trenches in an area deemed slightly likelier to contain subsurface prehistoric cultural material. Trench excavation locations were recorded using tape and compass and were documented on a project area map (Figures 7 and 8). Trench numbers indicate the chronological order in which they were excavated.

Maximum depth of individual trench excavation ranged from 100 to 240 centimeters below surface (cmbs), and averaged 180 cmbs deep. Bedrock was reached in all of the 26 trenches. The shallowest depth at which bedrock was reached was at 100 cmbs in ST-15 and the deepest was at 280 cmbs in ST-20; average depth bedrock was first encountered was 190 cmbs.

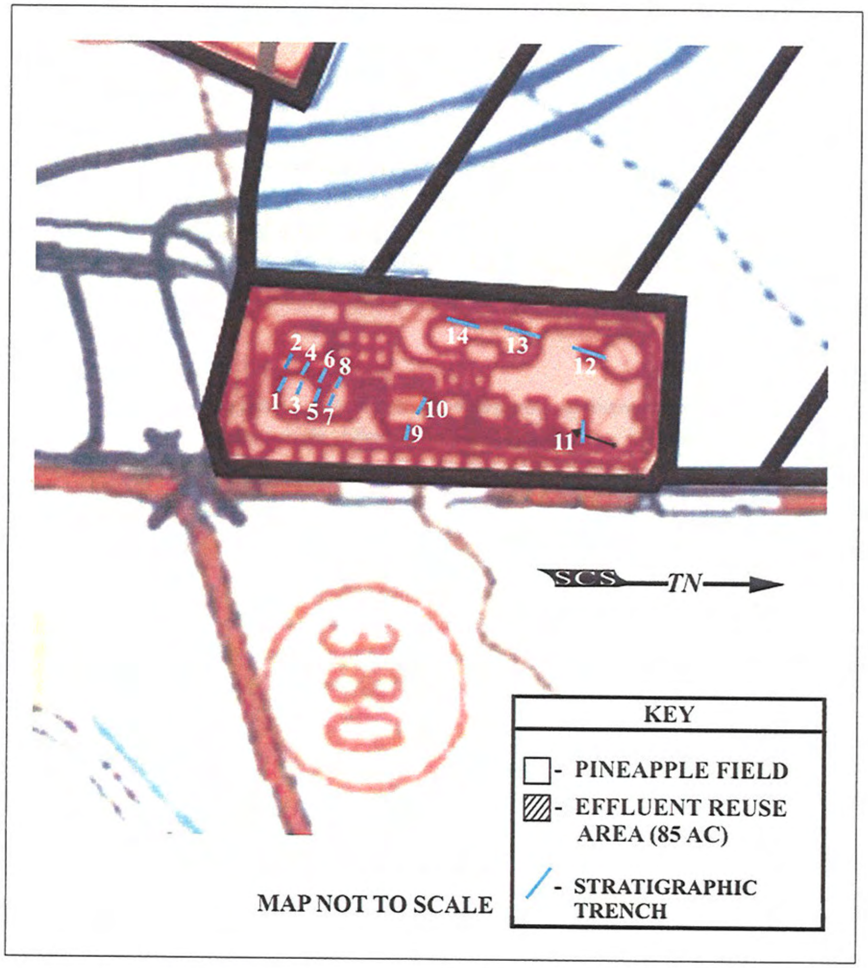

Figure 7: Detail Map of Wastewater Treatment Plant Area Showing Locations of BT 1 through 14.

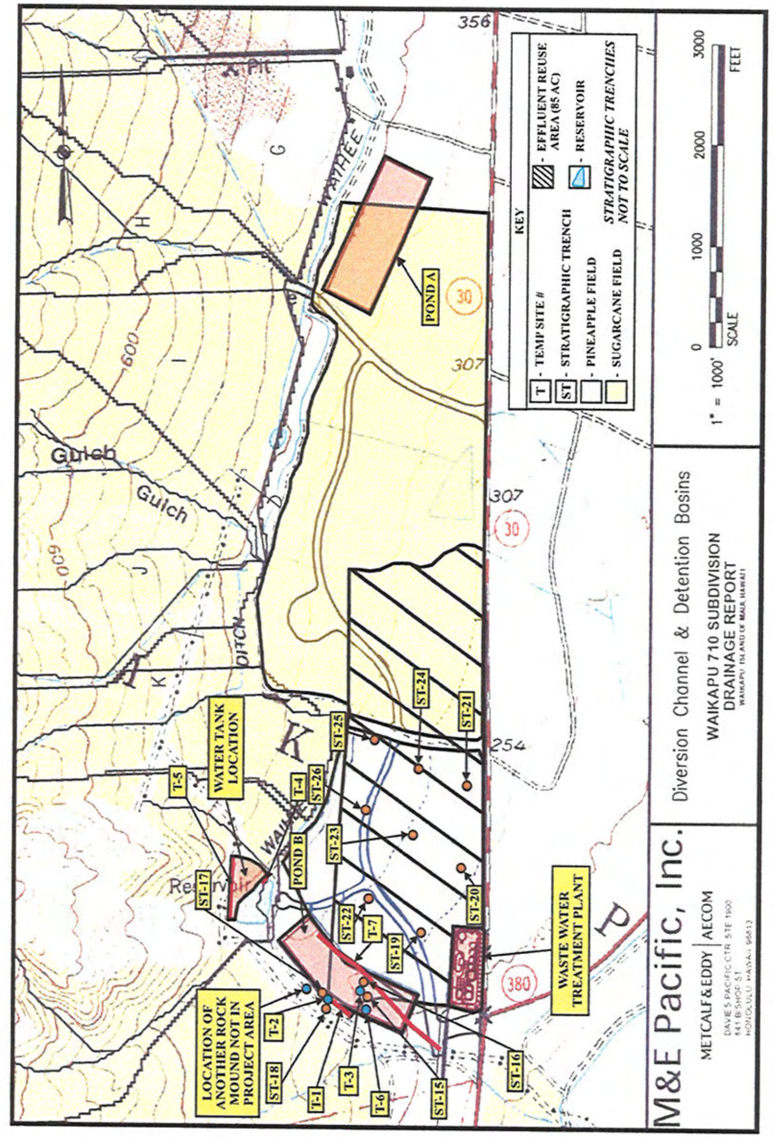

Figure 8: Project Area Map Showing Backhoe Trench and Site Locations.

ARCHAEOLOGICAL INVENTORY SURVEY RESULTS SUMMARY

During the survey a total of seven archaeological sites were newly identified and documented in the project area (see Figure 8). Based on the methods of construction and the type of features identified during the survey (large mounds and ditches), we believe that all of the identified sites (50-50-09-6251 through 50-50-09-6257) relate to the historic commercial agriculture. These historic commercial agriculture sites consist of three historic irrigation ditches (Sites 50-50-09-6251, T-1; 50-50-09-6254, T-4; and 50-50-09-6257, T-7) three clearing mounds (Sites 50-50-09-6252, T-2; 50-50-09-6253, T-3, and 50-50-09-6256, T-6), and a modified stream drainage (Site 50-50-09-6255, T-5). One additional clearing pile lies to the northwest of the project area; however, this feature was not recorded as it is outside the project area.

SITE DESCRIPTIONS

SITE 50-50-09-6251 (T-1)

Site 50-50-09-6251 (T-1) is located in a level bulldozed field (Figure 9) (see Figure 8). It consists of an excavated, concrete-lined ditch which runs along the entire length of, and parallel to, the modern Pohakea Quarry boundary wall. The concrete appears to have been poured over sub-angular and sub-rounded medium-sized boulders with large cobbles along the top. The ditch extends along a northwest-southeast axis with a bearing of 126/306° and measures 0.90 m wide at the top by 0.30 m deep. Wall thickness varies from 0.20 to 0.45 meters, with an average wall thickness of 0.20 m. The ditch has been filled with sand and PVC pipe (30.5 cm diameter) has been placed down the center. This site appears to be in fair to poor physical condition; modern trash litters the ground surface and the original ditch appears to have been repaired several times. Site 6251is currently in use and has been interpreted as an historic irrigation ditch associated with historic agriculture.

SITE 50-50-09-6252 (T-2)

Site 50-50-09-6252 (T-2) consists of an irregularly-shaped mound measuring 32.0 m east-west by 23.0 m north-south by 5.50 m high (Figure10) (see Figure 8). The mound appears to have been mechanically constructed of roughly piled sub-angular to sub-rounded cobbles and boulders and is situated along an east-west axis. This site appears to be good to fair physical condition and appears to be unaltered. Site 6252 has been interpreted as an historic agricultural clearing mound.

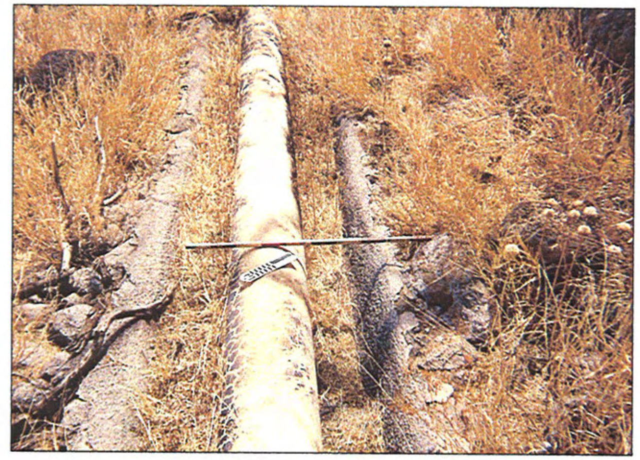

Figure 9: Photographic Detail of Site 50-50-09-6251 (T-1) View to Southeast.

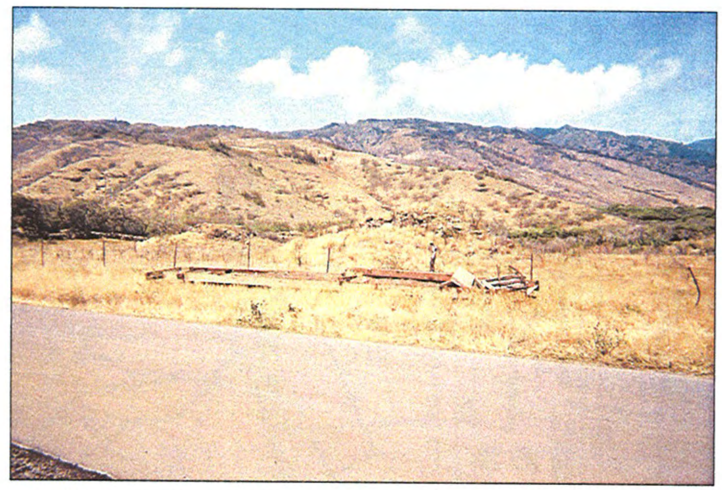

Figure 10: Sites 50-50-09-6252 (T-2) (left) and 50-50-09-6253 (T-3) (right) View to West.

SITE 50-50-09-6253 (T-3)

Site 50-50-09-6253 (T-3) is located in a level bulldozed field and modern trash litters the ground surface. This site consists of an irregularly shaped rock mound measuring approximately 20.0 by 20.0 by 5.0 m high (see Figures 8 and 10). The mound appears to have been mechanically constructed of roughly piled sub-angular to sub-rounded cobbles. The overall physical condition of the site is good to fair. Site 6253 has been interpreted as an historic agricultural clearing mound.

SITE 50-50-09-6254 (T-4)

Site 50-50-09-6254 (T-4) consists of a concrete lined ditch which is oriented on a 40/220° axis. This ditch is located at the boundary between the pineapple and sugarcane fields to the east and the golf course to the west and modern trash litters the ground surface (Figure 11). This ditch measures 2.08 m along the top and 1.17 m wide at the bottom. Unlike Site 6251 (T-1), boulders and cobbles were not utilized in construction of this ditch; instead, it was constructed of "formed" concrete. The length of this ditch was not provided as it extends well past the project area boundaries and is also visible on maps (see Figure 8). Exterior wall height is flush with the ground surface while the interior of the ditch is 0.88 m deep and the overall wall thickness is 0.15 m. The overall physical condition of this site is good. Site 6254 has been interpreted as an historic irrigation ditch associated with historic agriculture with use extending into modern times.

SITE 50-50-09-6255 (T-5)

Site 50-50-09-6255 (T-5) is located in a small natural drainage and consists of a modified stream drainage system which is oriented along a northwest/southeast axis (50/230°) (see Figure 8). The length of this site was not provided as it is at least as long as the western edge of the water tank site area. Site 6255 measures 0.60 to 0.80 m wide by 1.30 m in height (Figure 12). Modifications of stacked basalt boulders and cobbles have been constructed along its eastern bank to form a roughly faced retaining wall. Most of the modifications to the stream channel occur near the upper half along the side of the drainage, although there have been some modifications along the bottom next to the streambed. This site appears to have been altered by natural forces including, gravity, erosion, and vegetation. Site 6255 also exhibits evidence of mechanical alterations (*i.e.*, bulldozer activity). The overall site integrity of Site 6255 is fair to poor. Site 6255 has been interpreted as an old water control or `*auwai* system associated with historic agriculture.

Figure 11: Site50-50-09-6254 (T-4) View to Northeast.

Figure 12: Site 50-50-09-6255 (T-5) View to West.

SITE 50-50-09-6256 (T-6)

Site 50-50-09-6256 (T-6) consists of roughly piled basalt boulders and cobbles that form an irregularly-shaped mound that measures approximately 50.0 by 20.0 by 5.0 to 6.0 m (see Figure 8). Site 6256is oriented along an east-west axis (100/280°). The mound appears to have been mechanically constructed by bulldozer. The relatively flat top of the mound forms a ramp which slopes downward towards the east (Figure 13). This site, which appears to be unaltered and exhibits good to fair site integrity, has been interpreted as an historic agricultural clearing mound.

Figure 13: Site 50-50-09-6256 (T-6) View to West.

SITE 50-50-09-6257 (T-7)

Site 50-50-09-6257 (T-7) is located in a relatively level area near the southern boundary of a pineapple field (see Figure 8). Site 6257 consists of two mechanically (bulldozer) constructed rock and soil berms located on either side of an unlined drainage ditch (Figure 14). This ditch, which is currently not in use, is oriented along a southeast-northwest axis (10/290°). It extends along the entire southern boundary of the above-mentioned pineapple field. Given the extent of this drainage, only the portion of it extending through the southwest corner of the ERA was recorded as a representative section. The ditch measures approximately 5.0 m wide by approximately 2.50 m wide and the berms are approximately 4.0 m wide. The overall site integrity is fair to poor, as the site has been altered by natural forces including erosion, gravity, and vegetation. Site 625 has been interpreted as an irrigation ditch associated with historic agriculture.

Figure 14: Site 50-50-09-6257 (T-7) View to Southeast.

STRATIGRAPHIC TRENCH EXCAVATION SUMMARY

A total of twenty-six trenches (ST-1 through ST-26) were mechanically excavated by backhoe over the project area between October 2 through 5, 2006 (see Figures 7 and 8). Stratigraphic Trenches 1 through 14 were excavated within the proposed wastewater treatment area. These trenches were positioned on a west-northwest to east-southeast axis and were spaced 18.0 to 20.0 m apart. A higher density of stratigraphic trench excavations were concentrated in this area as it was thought that this portion of the project area would be the most heavily impacted by construction-related ground disturbance. ST-15 through ST-18 were excavated on either side of the large agricultural clearing piles (Sites 50-50-09-6252, T-2, and 50-50-09-6253, T-3) in the central portion of Pond B, as a representative sample of the subsurface deposits within this area. Stratigraphic Trenches 19 through 26 were positioned throughout the ERA to achieve a representative sample of the stratigraphic deposits of the area.

All the trenches in the pineapple field, both in the wastewater treatment area and in the ERA, exhibited similar stratigraphy. Two layers were revealed: a top plow zone layer of previously disturbed soil invariably with scattered debris from pineapple cultivation in the profiles (black plastic, black tube hosing used for irrigation), and a lower layer of supposedly intact soil. Two of the trenches in Detention Pond B (ST-15 and ST-17) had only one layer – an extremely rocky disturbed layer of very fine silty soil. The other two trenches (ST-16 and ST-

18) had another undisturbed layer underneath the top disturbed layer. None of these trenches were very deep and all terminated when reaching bedrock. All trenches were culturally sterile, save for modern debris and items associated with commercial agriculture. Given the similar stratigraphic deposits exhibited within the various areas of excavation, representative samples of each of the stratigraphic deposits have been selected and are presented below.

Please note that stratigraphic trench excavations were not conducted at several areas including: the irrigation ditches [Sites -6252 (T-1), 6254(T-4), and -6255 (T-5)] as they are currently in use. Detention Pond A and the surrounding area is currently in active sugarcane cultivation (see Figures 7 and 8). Thus, no excavation was conducted of Detention Pond A. In addition, excavations were not conducted at Site -6256 (T-6), the proposed water tank site, and Site -6257 (T-7), the junkyard and borrow pit sites for Detention Pond B. These areas have previously been subjected to extensive bulldozer disturbance, as evidenced by large displaced boulders and high berms, making them inaccessible to bulldozers at present. The northwestern portion of Detention Pond B is currently a junkyard and is covered with abandoned vehicles, heavy equipment, empty barrels, machine parts, and old construction materials and equipment. Thus, excavation was not conducted in this section of the pond, either.

STRATIGRAPHIC TRENCH 1 (ST-1)

Stratigraphic Trench 1 (ST-1) was positioned within the area proposed for the waste water treatment plant. This trench measured 5.0 m long by 0.75 m wide with a maximum depth of 1.60 m below surface. ST-1 was oriented along a northwest-southeast axis with a bearing of 115/295° (see Figure 7). ST-1 exhibited two stratigraphic layers. Layer I (0–150 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam. Layer I contained several pieces of modern black plastic, evidence of the disturbed nature of the deposit. Layer II (150–160 cmbs) was composed of dark brown (7.5 YR 3/3) silty loam. ST-1 was culturally sterile and terminated at 160 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 2 (ST-2)

Stratigraphic Trench 2 (ST-2) was positioned within the area proposed for the wastewater treatment plant. This trench measured 5.5 m long by 0.75 m wide with a maximum depth of 1.50 m below surface. ST-2 was oriented along a northwest-southeast axis with a bearing of 115/295° (see Figure 7) (Figure 15). This trench exhibited two stratigraphic layers. Layer I (0–130 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam and contained several pieces of modern black plastic and irrigation hose/tubing, evidence of the disturbed nature of the deposit. Layer II (130–

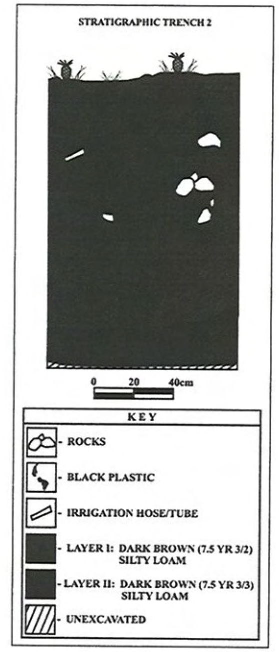

Figure 15: Backhoe Trench 2 Southwest Wall Profile.

150 cmbs) was composed of dark brown (7.5 YR 3/3) silty loam. ST-2 was culturally sterile and terminated at 150 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 3 (ST-3)

Stratigraphic Trench 3 (ST-3) was positioned within the area proposed for the wastewater treatment plant. This trench measured 5.5 by 0.75 by 1.50 m and is oriented along a northwest-southeast axis with a bearing of 115/295° (see Figure 7). ST-3 exhibited two stratigraphic layers. Layer I (0-134 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam and contained several pieces of irrigation hose/tubing, evidence of the disturbed nature of the deposit. Layer II (134 - 150 cmbs) was composed of dark brown 7.5 YR 3/3) silty loam. ST-3 was culturally sterile and terminated at 150 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 4 (ST-4)

Stratigraphic Trench 4 (ST-4) was positioned within the area proposed for the waste water treatment plant. This trench measured 5.5 by 0.75 by 1.90 m and is oriented along a northwest/southeast axis with a bearing of 115/295° (see Figure 7). ST-4 exhibited two stratigraphic layers. Layer I (0-144 cmbs) consists of dark brown (7.5 YR 3/2) silty loam. Layer I contained several pieces of modern black plastic - evidence of the disturbed nature of the deposit. Layer II (144-190 cmbs) is composed of dark brown silty (7.5 YR 3/3) silty loam. ST-4 was culturally sterile and was terminated at 190 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 5 (ST-5)

Stratigraphic Trench 5 (ST-5) was positioned within the area proposed for the wastewater treatment plant. This trench measured 5.5 by 0.75 by 1.90 m and was oriented along a northwest-southeast axis with a bearing of 115/295° (see Figure 7). ST-5 exhibited two stratigraphic layers. Layer I (0–145 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam and contained several pieces of modern black plastic and several pieces of irrigation hose/tubing, evidence of the disturbed nature of the deposit. Layer II (145–190 cmbs) was composed of dark brown (7.5 YR 3/3) silty loam. ST-5 was culturally sterile and terminated at 190 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 6 (ST-6)

Stratigraphic Trench 6 (ST-6) was positioned within the area proposed for the wastewater treatment plant. This trench measured 6.0 by 0.75 by 2.40 m and was oriented along a northwest-southeast axis with a bearing of 115/295° (Figure 16) (see Figure 7). ST-6 exhibited two stratigraphic layers. Layer I (0–124 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam and contained several pieces of modern black plastic and several pieces of irrigation hose/tubing, evidence of the disturbed nature of the deposit. Layer II (124–240 cmbs) was composed of dark brown (7.5 YR 3/3) silty loam. ST-6 was culturally sterile and was terminated at 240 cmbs upon reaching the bedrock.

STRATIGRAPHIC TRENCH 7 (ST-7)

Stratigraphic Trench 7 (ST-7) was positioned within the area proposed for the wastewater treatment plant. This trench, which was oriented along a northwest-southeast axis with a bearing of 115/295°, measured 5.0 by 0.75 by 2.40 m (see Figure 7). ST-7 exhibited two stratigraphic layers. Layer I (0–118 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam and contained several pieces of modern black plastic and several pieces of irrigation hose/tubing, evidence of the disturbed nature of the deposit. Layer II (118–240 cmbs) was composed of dark brown (7.5

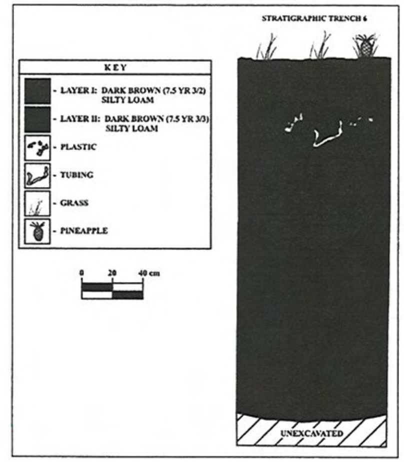

Figure 16: Backhoe Trench 6 Southwest Wall Profile.

YR 3/3) silty loam. ST-7 was culturally sterile and terminated at 240 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 8 (ST-8)

Stratigraphic Trench 8 (ST-8) was positioned within the area proposed for the wastewater treatment plant. This trench measured 6.0 by 0.75 by 2.10 m and was oriented along a northwest-southeast axis with a bearing of 115/295° (Figure 17) (see Figure 7). ST-8 exhibited two stratigraphic layers. Layer I (0–102 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam and contained several pieces of modern black plastic and several pieces of irrigation hose/tubing, evidence of the disturbed nature of the deposit. Layer II (102–210 cmbs) was composed of dark brown (7.5 YR 3/3) silty loam. ST-8 was culturally sterile and terminated at 210 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 9 (ST-9)

Stratigraphic Trench 9 (ST-9) was positioned within the area proposed for the wastewater treatment plant, slightly more to the north than ST-1 through ST-8, and located adjacent to Honoapi`ilani Highway(Figure 18). The physical properties of ST-9 are slightly different than those

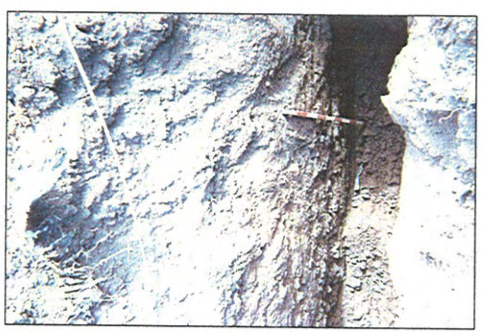

Figure 17: Backhoe Trench 8 Northwest Wall Profile View to Northwest.

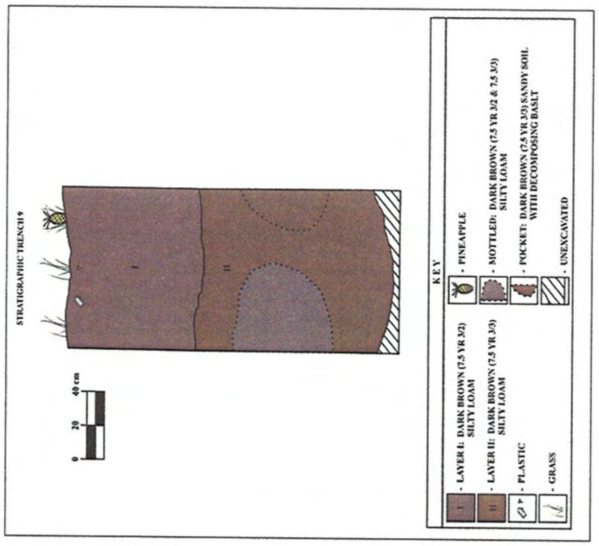

Figure 18: Backhoe Trench 9 Northwest Wall Profile.

apparent in ST-1 through ST-8 – the deposits and overall depth of the trench were shallower and large boulders were present on the ground surface. This trench measured 5.5 by 0.75 by 2.0 m and was oriented along a northwest-southeast axis with a bearing of 110/290° (see Figure 7). ST-9 exhibited two stratigraphic layers with the mottling of Layers I and II. Layer I (0–80 cmbs) consists of dark brown (7.5 YR 3/2) silty loam and contained several pieces of modern black plastic, evidence of the disturbed nature of the deposit. Layer II (80–200 cmbs) was composed of dark brown (7.5 YR 3/3) silty loam. A single large boulder was encountered at approximately 110 cmbs. When this boulder was removed a pocket of sandy soil and decomposing basalt remained. ST-9 was culturally sterile and terminated at 200 cmbs, when bedrock was encountered.

STRATIGRAPHIC TRENCH 10 (ST-10)

Stratigraphic Trench 10 (ST-10) was positioned within the area proposed for the wastewater treatment plant. ST-10 was located slightly northwest of ST-9 and north of ST-1 through ST-8. This trench measured 5.5 by 0.75 by 2.10 m and was oriented along a northwest-southeast axis with a bearing of 110/290° (see Figure 7). ST-10 exhibited two stratigraphic layers. Layer I (0–84 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam. Layer I contained several pieces of irrigation hose/tubing, which is evidence of the disturbed nature of the deposit. Layer II (84–210 cmbs) was composed of dark brown (7.5 YR 3/3) silty loam. ST-10 was culturally sterile and terminated at 210 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 11 (ST-11)

Stratigraphic Trench 11 (ST-11) was positioned within the area proposed for the wastewater treatment plant. ST-11 was positioned in the northeastern corner of the ERA adjacent to Honoapi`ilani Highway. This trench, which measured 9.0 by 0.75 by 2.40 m, was oriented along a northeast-southwest axis with a bearing of 15/195° (see Figure 7). ST-11 exhibited two stratigraphic layers. Layer I (0–88 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam. This layer contained several pieces of modern black plastic, several pieces of irrigation hose/tubing, and some pieces of concrete, evidence of the disturbed nature of the deposit. Layer II (88–240 cmbs) was composed of dark brown (7.5 YR 3/3) silty loam. ST-11 was culturally sterile and terminated at 240 cmbs upon reaching bedrock.

STRATIGRAPHIC TRENCH 12 (ST-12)

Stratigraphic Trench 12 (ST-12) was positioned within the area proposed for the wastewater treatment plant, and to the west of ST-11. ST-12 measured 10.0 by 0.75 by 2.40 m and was oriented along a northeast-southwest axis with a bearing of 20/200° (see Figure 7). ST-12 exhibited two stratigraphic layers. Layer I (0–80 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam and contained several pieces of modern black plastic, several pieces of irrigation hose/tubing, concrete chunks, and PVC pipe, evidence of the disturbed nature of the deposit. Layer II (80–240 cmbs) was composed of dark brown (7.5 YR 3/3) silty loam. ST-12 was culturally sterile and terminated at 240 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 13 (ST-13)

Stratigraphic Trench 13 (ST-13) was positioned within the area proposed for the wastewater treatment plant and was located just southwest of ST-12. This trench measured 10.0 by 0.75 by 1.90 m and was oriented along a northeast-southwest axis with a bearing of 20/200° (see Figure 7). ST-13 exhibited two stratigraphic layers. Layer I (0– 68 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam. Layer I contained several pieces of modern black plastic, several pieces of irrigation hose/tubing, and cement pieces, evidence of the disturbed nature of the deposit. Layer II (68–190 cmbs) is composed of dark brown (7.5 YR 3/3) silty loam. Also present within Layer II was a sandy lens which appeared at 124 cmbs and extended to 152 cmbs (Figure 19). ST-13 was culturally sterile and terminated at 190 cmbs when bedrock was encountered.

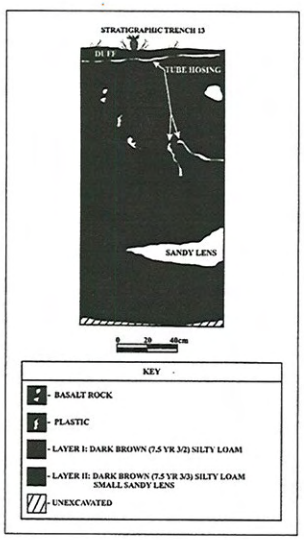

Figure 19: Backhoe Trench 13 Southeast Wall Profile.

STRATIGRAPHIC TRENCH 14 (ST-14)

Stratigraphic Trench 14 (ST-14) was positioned within the area proposed for the wastewater treatment plant, southwest of ST-13. This trench measured 9.0 by 0.75 by 1.90 m and was oriented along a northeast-southwest axis with a bearing of 20/200° (see Figure 7). ST-14 exhibited two stratigraphic layers. Layer I (0–73 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam and contained several pieces of modern black plastic, several pieces of irrigation hose/tubing, concrete chunks, and a Bud Lite can, evidence of the disturbed nature of the deposit. Layer II (73–190 cmbs) was composed of dark brown (7.5 YR 3/3) silty loam. ST-14 was culturally sterile and terminated at 190 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 15 (ST-15)

Stratigraphic Trench 15 (ST-15) was positioned along the southeastern edge of Site – 6253 (T-3) in the central portion of the area proposed for Detention Pond B (see Figure 8). ST-15 was oriented along a 20/200° axis and measured 7.0 by 0.75 by 1.0 m. This trench exhibited one stratigraphic layer. Layer I (0–100 cmbs) consisted of an extremely rocky previously disturbed layer of very fine brown (7.5 YR 4/2) silt. Black tube hosing, which is used for irrigation, was present within then upper portion of Layer I (0–40 cmbs). ST-15 was culturally sterile and excavation terminated at 100 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 16 (ST-16)

Stratigraphic Trench 16 (ST-16) was located along the northeastern edge of Site -6253 (T-3) in the central portion of the area proposed for Detention Pond B (see Figure 8). ST-16 was oriented along a 110/290° axis and measured 6.5 by 0.75 by 1.7 m. This trench exhibited two stratigraphic layers. Layer I (0–90 cmbs) consisted of an extremely rocky previously disturbed layer of very fine brown (7.5 YR 4/2) silt. Layer II (90–170 cmbs) consisted of an undisturbed deposit of dark reddish brown (5 YR 3/3) silty loam which contained fewer rocks than Layer I (Figure 20). ST-16 was culturally sterile and excavation terminated at 170 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 17 (ST-17)

Stratigraphic Trench 17 (ST-17) was positioned along the western edge of Site – 6252 (T-2) within the central portion of the area proposed for Detention Pond B (see Figure 8). ST-17 was oriented along a 35/215° axis and measured 7.5 by 0.75 by 1.5 m. This trench exhibited one stratigraphic layer (Figure 21). Layer I (0–100 cmbs) consisted of an extremely rocky (50–60%) deposit comprised of medium- to large-sized cobbles and medium-sized boulders. This deposit was a previously disturbed layer of very fine brown (7.5 YR 4/2) silt. ST-17 was culturally sterile and excavation terminated at 150 cmbs when bedrock was encountered.

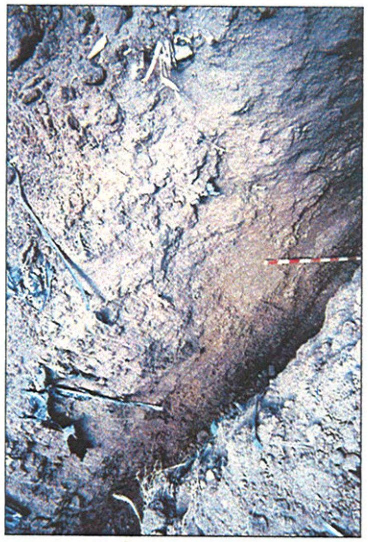

Figure 21: Backhoe Trench 17 West Wall Profile View to West.

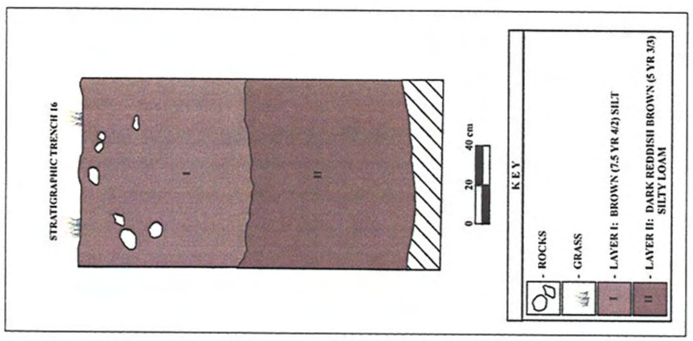

Figure 20: Backhoe Trench 16 South Wall Profile.

STRATIGRAPHIC TRENCH 18 (ST-18)

Stratigraphic Trench 18 (ST-18) was placed along the southern edge of Site -6252 (T-2), northeast of the Pohakea Quarry boundary wall (see Figure 8). ST-18 was oriented along a 100/280° axis and measured 10.0 by 0.75 by 1.2 m. This trench exhibited two stratigraphic layers. Layer I (0–46 cmbs) consisted of an extremely rocky previously disturbed layer of very fine brown (7.5 YR 4/2) silt. Layer II (46–120 cmbs) consisted of an undisturbed deposit of dark reddish brown (5 YR 3/3) silty loam which contained fewer rocks than Layer I (Figure 22). ST-18 was culturally sterile and excavation terminated at 120 cmbs when bedrock was encountered.

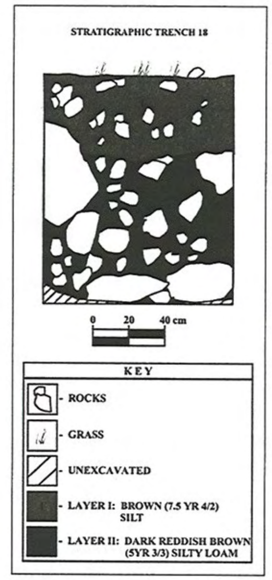

Figure 22: Backhoe Trench 18 North Wall Profile.

STRATIGRAPHIC TRENCH 19 (ST-19)

Stratigraphic Trench 19 (ST-19) was located to the west of the wastewater treatment plant in the pineapple field in the proposed ERA (see Figure 8). ST-19 was positioned at bearing of 115/295° and measured 8.5 by 0.75 by 2.0 m. This trench exhibited two stratigraphic layers. Layer I (0–95 cmbs) consists of dark brown (7.5 YR 3/2) silty loam and contained pieces of black plastic and irrigation tube/hose, indications of the disturbed nature of this deposit. Layer II (95– 200 cmbs) consisted of dark brown (7.5 YR 3/3) silty loam. Layer II contained a mottled grayish sandy pocket which extended from 128 to 148 cmbs. Few rocks were present within this trench. ST-19 was culturally sterile and terminated at 200 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 20 (ST-20)

Stratigraphic Trench 20 (ST-20) was located north of the of the wastewater treatment plant northeast of ST-19 in the pineapple field in the proposed ERA (see Figure 8)(Figure 23). This trench was oriented along a 110/290° axis and measured 6.5 by 0.75 by 2.8 m. This trench exhibited two stratigraphic layers. Layer I (0–100 cmbs) and was composed of dark brown (7.5 YR 3/2) silty loam. Layer I contained pieces of black plastic and irrigation tube/hose – demonstrating the disturbed nature of this deposit. Layer II (100– 280 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam. ST-20 was culturally sterile and terminated at 280 cmbs when bedrock was encountered.

Figure 23: Backhoe Trench 20 West Wall Profile View to West.

STRATIGRAPHIC TRENCH 21 (ST-21)

Stratigraphic Trench 21 (ST-21) was located slightly northeast of ST-20 in the pineapple field in the proposed ERA (see Figure 8). This trench measured 6.0 by 0.75 by 2.0 m and was oriented along a 110/290° axis. ST-21 exhibited two stratigraphic layers. Layer I (0–88 cmbs) was composed of dark brown (7.5 YR 3/2) silty loam. Layer I contained chunks of concrete, pieces of black plastic, and irrigation hose/tubing and boulders, suggesting the disturbed nature of this deposit. Layer II (88–200 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam. ST-21 was culturally sterile and terminated at 200 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 22 (ST-22)

Stratigraphic Trench 22 (ST-22) was located slightly northwest of ST-19 in the pineapple field in the proposed ERA (see Figure 8). This trench measured 6.0 by 0.75 by 2.1 m and was oriented along a 110/290° axis. ST-22 exhibited two stratigraphic layers. Layer I (0–70 cmbs) was composed of dark brown (7.5 YR 3/2) silty loam. Layer I contained pieces of black plastic and irrigation tubing/hose, indicators of the disturbed nature of this deposit. Layer II (70–210 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam. Both Layer I and Layer II contained large cobbles and small boulders. ST-22 was culturally sterile and terminated at 210 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 23 (ST-23)

Stratigraphic Trench 23 (ST-23) was located slightly northwest of ST-20 in the pineapple field proposed for the ERA (see Figure 8). This trench measured 6.0 by 0.75 by 2.2 m and was oriented along a 105/285° axis. ST-23 exhibited two stratigraphic layers. Layer I (0–74 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam. Layer I contained pieces of irrigation hose/tubing which indicates this layer has been previously disturbed. Layer II (74–220 cmbs) consisted of dark brown (7.5 YR 3/3) silty loam. ST-23 was culturally sterile and terminated at 220 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 24 (ST-24)

Stratigraphic Trench 24 (ST-24) was placed in the pineapple field proposed for the ERA, slightly northeast of ST-23 (see Figure 8). ST-24 measured 6.5 by 0.75 by 1.9 m and was positioned along a 120/300° axis. Two stratigraphic layers were revealed. Layer I (0–160 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam and contained pieces of black plastic and irrigation hose/tubing, which suggests the previously disturbed nature of this deposit. Layer I also contained a mottled grayish sandy deposit which extends from 104 to 160 cmbs. Layer II (160–190 cmbs) consisted of a dark brown (7.5 YR 3/3) silty loam. Both Layers I and II were rocky deposits (30–40%) containing small- to medium-sized cobbles. ST-24 was culturally sterile and terminated at 190 cmbs when bedrock was encountered (Figure 24).

STRATIGRAPHIC TRENCH 25 (ST-25)

Stratigraphic Trench 25 (ST-25) was placed along the western boundary of the pineapple field proposed for the ERA, slightly northwest of ST-24 (see Figure 8). ST-25 measured 6.0 by 0.75 by 1.5 m and was positioned along a 110/290° axis. This trench exhibited two stratigraphic layers. Layer I (0–70 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam. Layer I contained pieces of black plastic and irrigation hose/tubing, suggesting the previously disturbed nature of

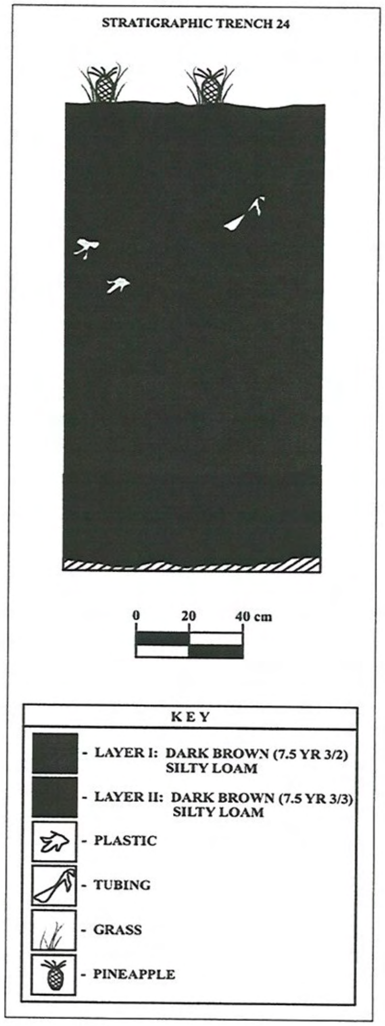

Figure 24: Backhoe Trench 24 North Wall Profile.

this deposit. Layer II (70–150 cmbs) consisted of a dark brown (7.5 YR 3/3) silty loam. ST-25 was culturally sterile and terminated at 150 cmbs when bedrock was encountered.

STRATIGRAPHIC TRENCH 26 (ST-26)

Stratigraphic Trench 26 (ST-26) was also located along the western boundary of the pineapple field, which is the proposed site of the ERA (see Figure 8). ST-26, which was situated south of ST-25 along an axis of 100/280°, measured 6.0 by 0.75 by 1.5 m. ST-26 contained two stratigraphic layers. Layer I (0–56 cmbs) consisted of dark brown (7.5 YR 3/2) silty loam. Layer I contained pieces of black plastic – suggesting the previously disturbed nature of this deposit. Layer II (56–150 cmbs) consisted of a dark brown (7.5 YR 3/3) silty loam. ST-26 was culturally sterile and terminated at 150 cmbs when bedrock was encountered.

DISCUSSION AND CONCLUSIONS

This survey resulted in the identification and documentation of seven newly identified sites. These sites consist of three historic irrigation ditches (Sites 50-50-09-6251, T-1; 50-50-09-6254, T-4; and 50-50-09-6257, T-7), three clearing mounds (Sites 50-50-09-6252, T-2; 50-50-09-6253, T-3; and 50-50-09-6256, T-6), and a modified stream drainage (Site 50-50-09-6255, T-5). Based on the method and style of construction and context, all of these sites appear to be associated with historic commercial agriculture. No historic sites and/or cultural materials were present in the subsurface deposits.

SITE SIGNIFICANCE ASSESSMENTS

The seven newly identified sites have been evaluated for significance according to the criteria established for the Hawai`i State Register of Historic Places §13-275-6. The five criteria are presented below:

Criterion A: Site is associated with events that have made a significant contribution to the broad patterns of our history

Criterion B: Site is associated with the lives of persons significant to our past

Criterion C: Site is an excellent site type; embodies distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual construction

Criterion D: Site has yielded or has the potential to yield information important in prehistory or history

Criterion E: Site has cultural significance to an ethnic group; examples include religious structures, burials, major traditional trails, and traditional cultural places

All of the sites identified during the Inventory Survey have been found to be significant for information content only (Criterion D) and have yielded adequate information. Based on the results of the Inventory Survey, it is unlikely that additional research would contribute significantly to furthering our understanding of Hawaiian prehistory or history (Table 1).

RECOMMENDATIONS

No further archaeological work is recommended in the project area and the planned undertaking may proceed within this parcel without endangering significant historic or cultural resources.

Due to the limited visibility resulting from extensive ground cover, however a program of limited Archaeological Monitoring is recommended as a precautionary measure during the initial construction phase (grading and grubbing), as it is possible additional sites may be present. Monitoring would only be limited to initially observing the surface of heavily vegetated areas to assess the presence/absence of archaeological sites. No Monitoring is warranted for any other ground altering activities or excavation in the project area, primarily due to the lack of soil in the area.

Table 1: Significance and Recommendations:

State Site 50-50-09-	Temp. Site Number	# of Fe.	Form	Function	Time Period	Sig.	Recommend
6251	T-1	1	Historic Water Ditch	Commercial Agriculture	Historic	D	No Further Work
6252	T-2	1	Large Clearing Pile	Commercial Agriculture	Historic	D	No Further Work
6253	T-3	1	Large Clearing Pile	Commercial Agriculture	Historic	D	No Further Work
6254	T-4	1	Historic Water Ditch	Commercial Agriculture	Historic	D	No Further Work
6255	T-5	1	Modified Stream Drainage	Commercial Agriculture	Historic	D	No Further Work
6256	T-6	1	Large Clearing Pile	Commercial Agriculture	Historic	D	No Further Work
6257	T-7	2	Berm and Historic Ditch	Commercial Agriculture	Historic	D	No Further Work

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APPENDIX G-1.

Letters from State Historic Preservation Division Approving Archaeological Inventory Survey Reports

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

June 29, 2005

Michael Dega, Ph.D.
Scientific Consultant Services
711 Kapiolani Blvd. Suite 975
Honolulu, HI 96813

LOG NO: 2005.1191
DOC NO: 0506MK18

Dear Dr. Dega:

SUBJECT: **Historic Preservation Review - 6E-42 - Archaeological Inventory Survey 259.903 Acres in Ma'alaea, prepared for AFK Development Ukumehame, and Waikapu Ahupua'a, Wailuku District, Maui Island TMK (2) 3-6-01:18**

Thank you for the opportunity to review this report which our staff received on April 18, 2005 (Wilson and Dega 2005, *An Archaeological Inventory Survey Report on 259.903 Acres in Ma'alaea, Ukumehame and Waikapu Ahupua'a, Wailuku District, Maui Island, Hawai'i [TMK (2) 3-6-01:18]*)...Scientific Consultant Services, Inc. ms.

The background section acceptably establishes the ahupua'a settlement pattern and predicts the likely site pattern in the project area. The historical information provided summarizes the history of the post-contact period land uses. The summary of previous archaeological work in the area provides a baseline for the current work. The project area has been utilized for commercial agriculture for probably over a century, and the report suggests that Henry Cornwell was in possession of the land in 1875, and subsequently sold it to Claus Spreckels. By the turn of the 19th century to the 20th, the parcel was under sugarcane production. The parcel was more recently used for commercial pineapple production followed by smaller scale truck garden plots.

The survey has adequately covered the project area documenting three historic properties. All three sites related to the historic use of the property for agriculture. SIHP 50-50-09-5657 consists of 13 "clearing mound", the ubiquitous piles of large boulders and cobbles scattered throughout the agriculturally used areas on Maui. The mounds on the subject parcel are confined to the area of the subject parcel comprised of the Pulehu Series Soil. SIHP 50-50-09-5658 consists of historic field irrigation modifications associated with sugarcane production. The features are modified drainages radiating from the perennial water courses. The drainages show alteration by hand tools. Finally, SIHP 50-50-09-5659 is an historic dirt road paralleling the *mauka* project area boundary. It is currently used by vehicles approaching the Ma'alaea terminus of the Lahaina Pali Trail. The trail ends at the project boundary, although it is assumed that the terminus formerly crossed or skirted portions of the subject parcel. Subsurface testing

(twenty backhoe trenches) were negative for evidence of cultural deposits. The stratigraphy within the trenches exhibited comparability within the two soil series evident on the parcel (Pulehu Series and Ewa Series). The site descriptions are acceptable.

We concur that all three sites are significant under Criterion "D" and have the potential to yield information important to understanding the history of the region. We also concur that the SIHP -5658 and -5659 have yielded adequate information and no further archaeological work is necessary. We also agree that SIHP -5657, the clearing mounds, warrant some additional work. It has been suggested that the mounds may contain historic/cultural materials that were placed there during initial clearance, or that the mounds utilized pre-existing "built" areas in the environment. As such, we concur with the mitigation recommendations detailed below.

We agree that some monitoring on the parcel is appropriate, especially in the vicinity of the rock mounds/piles. We also agree that an initial "sampling" of this area during initial earthmoving, will allow a better assessment of the probability for historic properties being identified beneath the piles. We concur with the general recommendation that during deconstruction, an archaeological monitor will be present. Based on the initial findings, and in consultation with the Maui SHPD office, a determination will be made regarding how many of the mounds merit such a monitoring program. We also believe that because of the proximity of the project area to the Ma'alaea coastal zone, any submitted monitoring plan should include a pre-consultation meeting between the construction crew and the SHPD office to alert the workers of the importance of halting work during construction in the event of inadvertent finds. This meeting will facilitate a relationship between our office, the construction crew, and your archaeologist, to ensure no historic properties are inadvertently impacted. We recog e that this is a relatively unusual approach, but given the paucity of findings in an area in which we know prehistoric activity would have occurred merits a special approach.

We find this report to be acceptable. We will await a monitoring plan detailing the innovative measures suggested in your report and above. As always, if you disagree with our comments or have questions, please contact Dr. Melissa Kirkendall (Maui/Lana'i SHPD 243-5169) as soon as possible to resolve these concerns.

Aloha,

Melanie A. Chinen

MELANIE A. CHINEN, Administrator
State Historic Preservation Division

MK: kf

c: Bert Ratte, DPWEM, County of Maui
Michael Foley, Director, Dept of Planning, 250 S. High Street, Wailuku, HI 96793
Maui Cultural Res Commission, Dept. of Plng, 250 S. High Street, Wailuku, HI 96793

(736)

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
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CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

January 31, 2008

Dr. Michael F. Dega
Scientific Consultant Services, Inc.
711 Kapiolani Blvd., Suite 975
Honolulu, Hawaii 96793

LOG NO: 2007.1066
DOC NO: 0801TD20
Archaeology

Dear Dr. Dega:

Subject: **Chapter 6E-42 Historic Preservation Review of an Archaeological Inventory Survey Report for the Proposed Ma'alaea Water Treatment Plant and Associated Infrastructure, Waikapu Ahupua'a, Wailuku District, Island of Maui**
TMK: (2) 3-6-04:03 (por.)

Thank you for submitting the subject archaeological inventory survey report for three disconnected land parcels comprising approximately 115 acres (*An Archaeological Inventory Survey of an Approximately 115 Acre Property for the Proposed Ma'alaea Water Treatment Plant Effluent Reuse Area Including the Potential Water Tank Location and Detention Ponds A and B, Waikapu Ahupua'a, Wailuku District, Island of Maui, Hawai'i*, M. F. Dega and C. A. Dagher March 2007). The report was submitted to the Kapolei office for review March 22, 2007. We apologize for the delay in responding to your submittal, and we recognize that the statutory review period has lapsed.

The project area includes a rectangular 85-acre effluent reuse area, located along the west side of Honoapiilani Highway; a 15-acre rectangular detention basin (Pond A) area, located to the northwest of the effluent reuse parcel; a 5-acre detention basin (Pond B) area, adjoining the south end of the effluent reuse area; a c. 5-acre potential tank site, located to the west of the Pond B area; and a water treatment facility, to be located at the southeast corner of the effluent reuse area, along Honoapiilani Highway.

The report contains the appropriate background information, maps, and discussion of methods, as specified in Hawaii Administrative Rule §13-276-5 regarding inventory survey reports. Seven newly identified historic properties were documented (SIHP 50-50-09-6251 through 6256). All of these sites are associated with historic/modern commercial agriculture and include three concrete ditches, three large mechanized clearing mounds/piles, and one stone-faced drainage feature. Subsurface testing was conducted in accessible portions of the project area, where 26 backhoe trenches were excavated. No subsurface findings are reported.

We note that surface visibility was severely limited in portions of the project area, particularly the Pond A area which was under sugar cane cultivation at the time of the survey. Subsurface testing was not conducted in the 15-acre area, due to the sugar cane. We concur with the recommendation made in the report (page 23) that, "...areas currently under sugar cane cultivation should be re-examined after the cane is harvested next year".

We concur with the preliminary significance assessments provided for the recorded commercial agricultural sites, which are determined to be significant under HRHP criterion "d", and we agree that no further work is needed to mitigate the project impacts to these sites.

Regarding the recommendations for further work, we agree that archaeological monitoring should occur during initial grubbing and grading, due to the poor visibility in general within the project area. If additional pedestrian survey work is conducted in cane fields after harvesting, while the ground surface is clear, the extent of subsequent monitoring can be limited to the fallow cane field areas only. We also recommend that removal of the stone clearing piles be monitored, due to the possibility that intact or remnant structural features could be present at the base of these piles. Such findings have been documented for other project areas on Maui. We also recommend that the monitoring plan include monitoring of subsurface excavation within the Pond A area, as this area was not subjected to subsurface testing. The Pond A area is closest to known pre-contact era agricultural and habitation complexes, and could contain remnant subsurface features beneath the plow zone.

If you have the opportunity to conduct additional pedestrian survey in harvested cane areas, please submit an addendum report of this activity and any findings. Otherwise, we look forward receiving to a monitoring plan that will include these cane field areas as well as the fallow fields for monitoring during grubbing and grading. The monitoring plan should also include measures as outline above, and should be consistent with specifications as listed in HAR §13-279-4 regarding monitoring plans.

Please direct any questions or comments regarding this review to Theresa K. Donham (808-281-4620) or Jenny L. Pickett (808-243-4641).

Aloha,

Nancy A. McMahon

Nancy A. McMahon
Acting Archaeology Branch Chief

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

APPENDIX G-2.

Archaeological Monitoring Plans

SCS Project Number 948-AMP-1

AN ARCHAEOLOGICAL MONITORING PLAN FOR 259.903 ACRES IN MĀ`ALAEA, UKUMEHAME, AND WAIKAPŪ AHUPUA`A, WAILUKU DISTRICT, MAUI ISLAND, HAWAI`I [TMK (2) 3-6-001:018]

Prepared by:
Donna Shefcheck, B.A.
and
Michael F. Dega, Ph.D.
April 2008

Prepared For:
Mark Roy
Munekiyo and Hiraga, Inc.
305 High Street Ste. 104
Wailuku, Hawaii 96793

SCIENTIFIC CONSULTANT SERVICES Inc.
711 Kapiolani Blvd. Suite 975 Honolulu, Hawai`i 96813

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INTRODUCTION

Scientific Consultant Services (SCS), Inc. has prepared this Archaeological Monitoring Plan (AMP) in advance of subsurface construction activities on a 259.903 acre lot in Mā`alaea, Ukumehame and Waikapū Ahupua`a, Wailuku District, Maui Island, Hawai`i [TMK: (2) 3-6-001:018] (Figures 1 and 2). An Archaeological Inventory Survey was conducted on this parcel (Wilson and Dega 2005), in which three historic archaeological sites were documented and catalogued under SIHP numbers 50-50-09-5657 (clearing mounds), -5658 (irrigation modifications) and -5659 (dirt road). Subsurface testing yielded negative results. The project area being former industrial farm land, Archaeological Monitoring was recommended for grubbing and grading activities on the property that extend beneath the plow-zone, as well as for the removal of Site -5657, where significant cultural deposits, including human remains, may be present within the lower levels of the rock mounds.

The present Monitoring program will ensure that any human remains found during this work are identified and appropriately mitigated, as deemed appropriate and lawful under Hawai`i State Law for the Inadertant Discovery of Human Remains (pursuent to 13-300-40a, b, c, HAR). Archaeological Monitoring will also ensure that significant cultural resources identified in the project area are adequately sampled, documented, and evaluated for their Historical significance.

This AMP will require the approval of the State Historic Preservation Division prior to the commencement of any ground altering activities. The following text provides more detailed information on the reasons for monitoring, previous archaeology both within and near the current project area, potential site types to be encountered during excavation, monitoring conventions and methodology for both field and laboratory work, as well as discusses curation and reporting.

ENVIRONMENTAL SETTING

PROJECT AREA DESCRIPTION AND LOCATION

Maui's Wailuku District encompasses an area from the eastern half of the West Maui Mountains, north to Kahului Bay, south to Mā`alaea Bay, and includes the entire Kahului Isthmus. Near the southwestern corner of Wailuku District, the boundary separating Ukumehame Ahupua`a and Waikapū Ahupua`a runs from *mauka* to *makai* (roughly west to east). At an elevation of approximately 55 meters (180 feet) the *ahupua`a* boundary sharply angles south toward Mā`alaea Bay. This sharp angle between the two *ahupua`a* demarcates the northeastern boundary of the current project area. The *ahupua`a* boundary then divides the project area as it

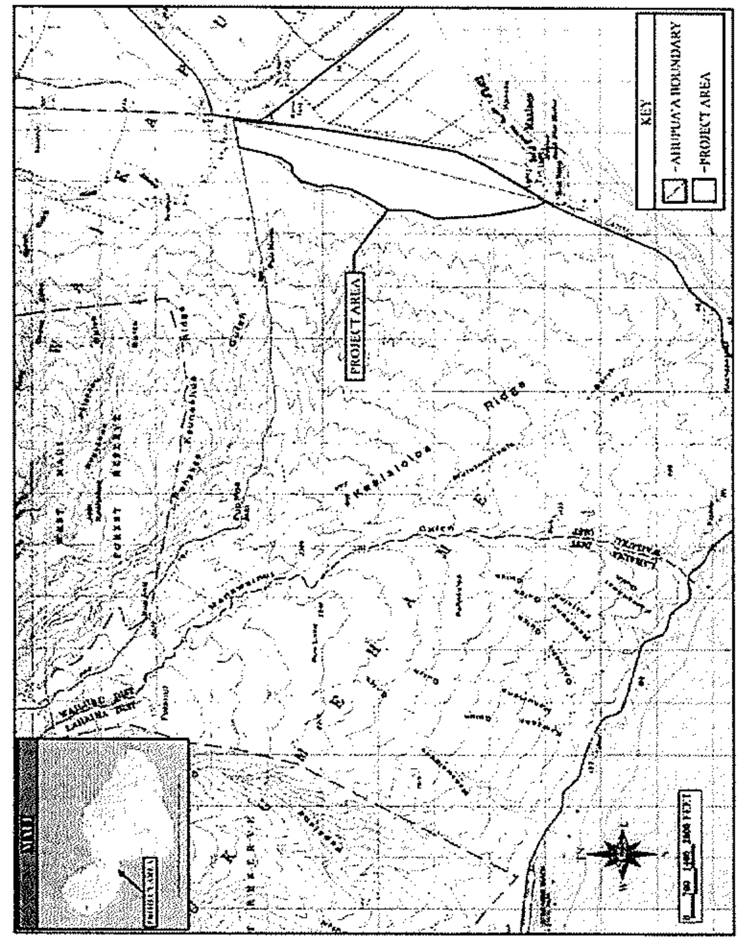

Figure 1: USGS Mā`alaea Quadrangle Showing the Project Area.

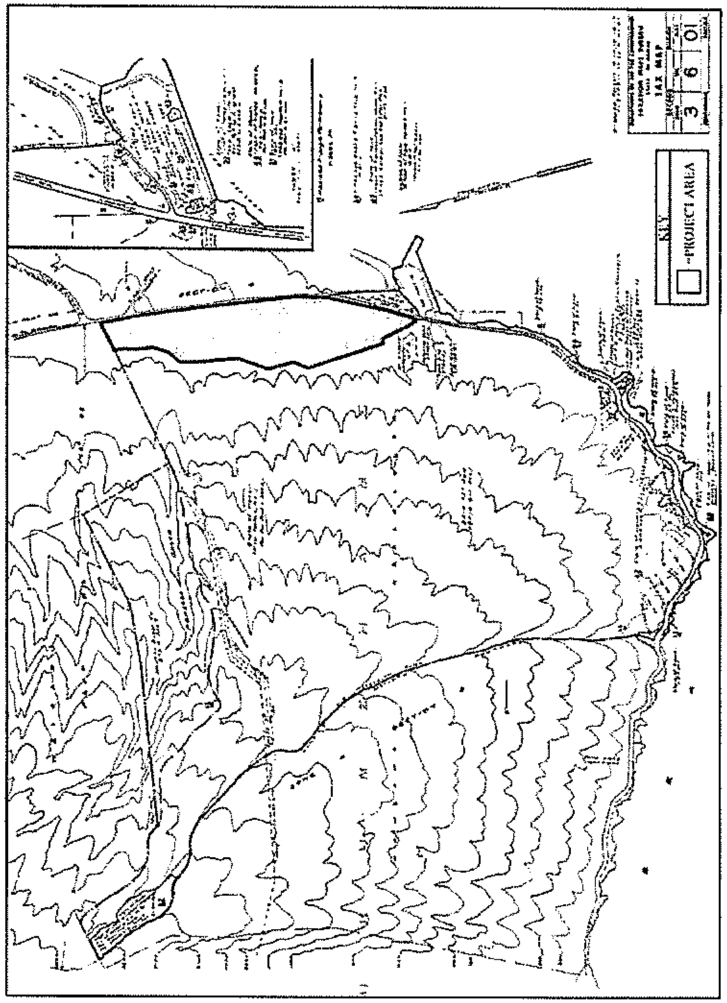

Figure 2: Tax Map Key [TMK] Showing the Project Area.

continues south, leaving roughly 65 percent of the parcel in Ukumehame Ahupua`a, and 35 percent of the parcel in Waikapū Ahupua`a.

The "Mā`alaea Mauka" project area consists of one contiguous 259.903-acre parcel that uses the Hono`api`ilani Highway as its *makai* border. The three-sided project area's southern terminus is a triangular point *mauka* of Mā`alaea Small Boat Harbor. The northern boundary line extends *mauka* from a point 183 m (600 feet) south of the Kuihelani Highway's intersection with Hono`api`ilani Highway. The long, narrow project area runs 2.7 kilometers (1.7 miles) along the Hono`api`ilani Highway, and at it widest is 579 m (1900 feet).

PROJECT AREA LANDFORM

The sharp transition from valley floor to mountain slope is the most distinct visual feature of the nearby terrain. This dramatic elevation increase, however, occurs just northwestof the relatively flat project area. With the southeastern end of the project area having an elevation of 12 m (40 feet), and the northwestern perimeter high point of 61 m (200 feet), the maximum elevation difference throughout the project area is only 49 m (160 feet). The average elevation gained from walking the width of the project area (about half a kilometer) is only 24m (80 feet). The average elevation gained from climbing the next half kilometer beyond the project area's northwest border is 146 m (480 feet).

The gently-sloping terrain of the project area has been made more flatly uniform through decades of agricultural activity. Few distinct naturally-occurring landmarks remain within the project area's topography. Certain points within the project area afford an uninterrupted view of its entire expanse. The four perennial east-west running drainages that cross the project area remained dry at the time of survey. It is likely that these narrow water courses that span the parcel's width only flow in times of heavy rains. Two of the four drainages are fairly shallow and narrow, and do not originate much farther upslope than the base of the mountains. The two more significant drainages appear on the USGS topographical map, and are currently diverted under Hono`api`ilani Highway, eventually emptying into Mā`alaea Bay. Of these two, the southern drainage originates at an elevation of 335 m (1100 feet), and the northern drainage originates near Pu`u Moe at 640 m (2100 feet). However, at a maximum width of less than four meters, it is likely that even these two more significant water sources served to irrigate the project area only in times of heavy rainfall.

CLIMATE AND VEGETATION

The project area receives 25 to 38 centimeters (10 to 15 inches) of rainfall annually (Armstrong 1983). This area is much drier than higher elevations to the west that receive as much as twenty times the level of precipitation. Air temperatures are consistently slightly warmer here than the Maui seasonal high and low averages, mostly due to the lower, coastal elevation. At the time of survey, project area vegetation consisted of a mix of introduced grasses and trees, few native species, and a variety of small garden plots with a mix of planted crop species. The only areas not covered by vegetation were the multiple dirt road segments that transect the property. Introduced grasses, ranging from 0.5 to 1.0 m tall, covered roughly 85 percent of the project area. Few *kiawe* trees (*Prosopis pallida*) were found outside of drainage perimeters, but along and within the drainages these introduced trees were abundant. *Kiawe* also lines the *mauka* side of the *mauka* perimeter road, and grows very dense within the State-owned lands at the base of the mountains. Overall, few trees exist within the former agriculture fields. Recent *koa haole* (*Leucaena leucocephala*) trees have grown to a height of no more than 1.5 m within the fields, but grow to a height of over 3.0 m along the *mauka* perimeter roads. Other species include lantana (*Lantana camarara*), sparse sisal (*Agave sisalana*), and the native *'ilima* (*Sida* sp.).

Over twenty different patches of recently abandoned garden crops are scattered throughout the southern 80 percent of the project area. None are larger than one acre, and none of these patches exist within the rockier northern soils. Two local informants spoke of "renting" land for small-scale farming within the "past couple of years," be it through a formal contract with the previous land owner or not. Rows of banana trees occur in at least five different areas. One banana patch also includes gourds; papaya trees are interspersed throughout. At the center of the property, surface plastic irrigation pipes appear to be recently constructed and lead to a square sod field. The most elaborate small-scale farming remnant is what appears to be a *Ficus* sp. nursery at the center of the project area's northern half. Here, three rows of identically-sized trees are paralleled by what appear to be recently constructed concrete walkways and irrigation piping.

SOILS

As the project area extends north, its soils contain a greater concentration of basalt cobble and boulder. According to Foote *et al.* (1972:101), soils in the project area fall into mainly two categories: the Ewa Series (80 percent of the project area) and the Pulehu Series (most of the northern 20 percent). The Ewa Series consists of well-drained soils occurring on alluvial fans within Oahu and Maui. They are derived from igneous rock, moderately sloping, and best suited

for sugar cane, truck crops, and pasture. The southern third of the project area consists entirely of Ewa Silty Clay (EsB), ideal for sugarcane. Bordering EsB soil to the north is a large contiguous section of Ewa Cobbly Silty Clay (EtB), covering roughly 50 percent of the project area. Foote *et al.* note that the removal of a surface layer of cobble renders this soil equally suitable to sugarcane cultivation as the less rocky soil to the south (1972:29–30, 115–116).

Roughly 20 percent of the project area, entirely concentrated at the northern end, consists of a Pulehu Series soil—specifically, Pulehu Cobbly Clay Loam (PtB). This soil is very similar to the Ewa Series in almost every aspect except its greater surface rock concentration. Thus, a direct correlation can be seen between the location of PtB soil and the 13 large, agricultural clearing mounds (State Site 50-50-09-5657) concentrated in the northern end of the project area. In an effort to create sugarcane fields equally productive as lands to the south, decades of tilling have deposited these enormous mounds of concentrated boulders.

REASON FOR MONITORING

Archaeological Monitoring is being conducted on this parcel due to the potential for discovery of significant cultural deposits, including human remains, in subsurface contexts below the plow-zone and within the lower levels of the rock mounds identified during Inventory Survey (Site 50-50-09-5657). There is a potential for discovery of buried cultural deposits throughout the project area. The subsurface contexts, though heavily disturbed by industrial farming practices, may contain *in situ* deposits below the plow line. While the mounds documented under Site -5657 were identified as clearing mounds associated with the Historic Period (Wilson and Dega 2005), there is also a chance that these mounds were traditional Hawaiian structures that were modified as clearing mounds in Historic times. Removal of these features from their present context may yield undocumented cultural deposits, especially in the lower levels of the features.

In preparation of the Environmental Impact Statement for this project, public testimony expressed concerns relevant to undocumented cultural deposits that may be revealed during the subsurface portion of the planned project. Archaeological Monitoring will mitigate the damage to any such deposits, and will ensure the appropriate and legal handling of such deposits, if any are identified.

TRADITIONAL AND HISTORIC SETTING

PRE-CONTACT TO EARLY HISTORIC ERA

Wailuku District, is frequently mentioned in historical texts and oral tradition as being politically, ceremonially, and geographically important during traditional times (Cordy 1981, 1996; Kirch 1985). Wailuku was considered a "chiefly center" (Sterling 1998:90) with many of the chiefs and much of the area's population residing near or within portions of `Ĩao Valley and lower Wailuku. The importance of the district is reflected by the relatively large number of *heiau* that were reportedly present in pre-Contact times. Oral tradition accounts surrounding these *heiau* provide examples of how religion tied into political power in the traditional Wailuku setting. Indeed, the period immediately preceding contact with the Europeans was one of considerable upheaval and conflict. *Wailuku*, meaning 'water of destruction,' succinctly describes the area in the late 1700s. Political power emanating from Moloka`i was an active element during the mid-eighteenth century. The resulting battle at Kalae`ili`ili (A.D. 1765) led to the expulsion of Keeaumoku and the Moloka`i *ali`i* and the beginning of Kahekili's reign (Kamakau 1992). Kahekili successfully defended his capital in Wailuku throughout the 1770s, until his defeat at the hands of Kamehameha's forces.

Closer to the current project area, in the southwest corner of Wailuku District, prehistoric settlement was not as dense as concentrations to the north. Climate had much to do with that trend, as the Mā`alaea area is a more arid environment than the rain-soaked fields to the north. According to Tomonari-Tuggle and Tuggle (1991), the majority of the pre-Contact population was located southwest of the project area, near what is now Ukumehame Beach State Park. Settlement was also probable north of Kealia Pond in Waikapū Ahupua`a. Handy and Handy report that before the historic sugarcane plantations in this region, water from Waikapū Stream ". . . was diverted into lo`i and its overflow was dissipated on the dry plains of the broad isthmus between West and East Maui" (1972:496).

Wailuku District would see drastic change after Captain James Cook's 1778 arrival in Kahului Bay. The reign of Kamehameha I was intertwined with the increasing presence of Europeans within the Hawaiian Islands. By 1821, American missionaries had established a foothold in Lahaina and first arrived in Wailuku a year later. The religion of the Hawaiian people began to wane under the influence of Christianity. Fredericksen and Fredericksen (2002:4) point to a girls' seminary (Central Female Boarding School), established in Wailuku in 1836, as one of the initial steps in the conversion of Hawaiian language and customs in Maui.

THE MĀHELE

In 1848, commissioners of the Mahele instigated an extreme modification to traditional land tenure on all islands that resulted in a division of lands and a system of private ownership. The Mahele was based upon the principles of Western law. While a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian society into that of a market economy (Kuykendall Vol. I 1938:145, footnote 47, *et passim*; Daws 1968:111; Kame`eleihiwa 1992:169–170, 176). The dramatic shift from a redistributive economy to a market economy resulted in drastic changes to land tenure, among other things. As a result, foreigners demanded private ownership of land to ensure their investments (Kuykendall Vol. I, 1938:145, *et passim*; Kame`eleihiwa 1992:178; Kelly 1998:4).

Once lands were made available and private ownership was instituted, native Hawaiians, including the *Maka `ainana*(commoners), were able to claim land plots upon which they had been cultivating and living. Oftentimes, foreigners were simply just given lands by the *ali`i*. However, commoners would often only make claims if they had first been made aware of the foreign procedures (*kuleana* lands, or land commission awards). These claims could not include any previously cultivated or currently fallow land, *okipu*, stream fisheries, or many other natural resources necessary for traditional survival (Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). Awarded parcels were labeled as Land Commission Awards (LCAs). If occupation could be established through the testimony of witnesses, the petitioners were issued a Royal Patent number and could then take possession of the property. Commoners claiming house lots in Honolulu, Hilo, and Lahaina were required to pay commutation to the government before obtaining a Royal Patent for their awards (Chinen 1961:16).

During the Māhele, Wailuku District was declared Crown Land and numerous Land Commission Awards, approximately 180, were awarded within Wailuku Ahupua`a alone (Creed 1993). A handful of foreigners (*i.e.*, Anthony Catalena, James Louzada, E. Bailey) gained control of large parcels of lands that would later be used for mass cultivation of sugar. Significantly, the majority of LCAs were awarded to Hawaiians, a gauge that can be used to measure pre-Contact settlement, since there was little overall change in traditional land use among Hawaiians prior to 1853 (Creed 1993:38).

During the Mahele, there were no land claims within the current project area. This fact may be attributed to the sparse pre-1848 Hawaiian population within the parcel, a result of settlement conditions within these *ahupua`a* favoring the coastal area.

THE LATE HISTORIC PERIOD AND GROWTH OF THE SUGAR INDUSTRY

Another influence that brought change to Maui was foreign commercialism. Two Chinese brothers, Ahung and Atai, of Honolulu's Hungtai Company arrived in Wailuku to explore the possibility of setting up one of its earliest sugar mills in 1828. Atai soon created a plant that processed sugar cane cultivated by Hawaiians, named the Hungtai Sugar Works (Dorrance and Morgan 2000:15–16). Ahung later joined Kamehameha III's sugar producing enterprise, although by 1844 both operations had ceased. The Wailuku Sugar Company was the next to follow, in 1862, and would expand sugar production over the next 126 years of its existence—4,450 acres by 1939, still more than three decades before its maximum production levels.

As it expanded its territory, the Wailuku Sugar Company first appeared on maps of the project area in the in the 1920s (Bureau of Conveyances, Grant 9794), although their acquisition of the project area land may have been as early as the turn of the century (Kennedy and Trimble 1992:4). Successive grants (Grant 10294 through to Grant S-13975) would follow in decades following and fully encompass the Ukumehame Ahupua`a side of the project area in Wailuku Sugar land. Kennedy and Trimble (1992:4) summarize the history of the Waikapū Ahupua`a (*makai*) portion of the project area by detailing its acquisition from the state government on November 18, 1875 by Henry Cornwell (Grant 3152). Cornwell subsequently sold to Claus Spreckels, and by the turn of the century the entire project area was under sugarcane cultivation.

Wailuku Sugar Company ended production in 1988, having averaged over 30,000 tons of sugar produced annually at its pinnacle in the 1970s (Dorrance and Morgan 2000:66). Owner C. Brewer & Company, Ltd. shut down sugar cultivation on the project area, which was then used almost entirely for pineapple cultivation starting no later than 1992 (Kennedy and Trimble 1992:1). The lands were under pineapple for at least the next three years (Tomonari-Tuggle 1995:11)—probably slightly longer—before transitioning to smaller-scale "garden" plots.

PREVIOUS ARCHAEOLOGY

Seven studies on file within the State Historic Preservation Division (SHPD)- Kapolei archives summarize the most relevant previous archaeology within the vicinity of the current project area (Figure 3).

Wilson and Dega conducted Archaeological Inventory Survey of the present study parcel in 2005. Three historic sites, three historic archaeological sites were documented and catalogued under SIHP numbers 50-50-09-5657 (clearing mounds), -5658 (irrigation modifications) and -5659 (dirt road). Subsurface testing yielded negative results.

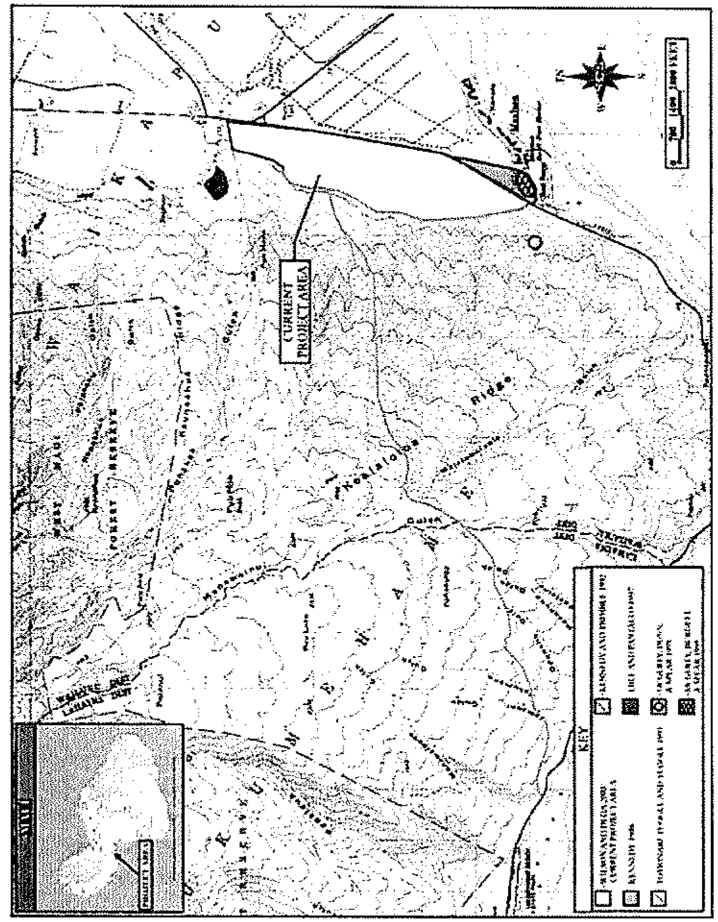

Figure 3: USGS Mā`alaea Quadrangle Showing the Previous Archaeology in the Vicinity of the Present Study Parcel.

Kennedy and Trimble (1992) surveyed an area that overlaps State Site 50-50-09-5659 (historic dirt road), first recorded in the present study. While Kennedy and Trimble also note the lack of archaeological features in their project area due to the obvious history of intense agriculture, their 1992 report does not consider the road upon which their survey takes place to be a potential historic agricultural feature (as discussed below under "RESULTS"). The project area detailed in their study is no more than 5 meters wider than the dirt road itself, and concludes that "No artifacts, midden, or structures of historic or prehistoric significance were identified on the subject property" (1992:11).

Seven historic sites, consisting of 23 features, were documented in a 60-acre parcel just north of the present study parcel (Dagher and Dega 2007: *in review*). These features included walls, enclosures, C-shape, and modified outcrops. All these sites were assessed as significant under Criterion D, and Archaeological Monitoring was recommended for the project area.

An earlier Kennedy report (1986) entitled *Letter Report: Walk-Through Examination of the Proposed Mā`alaea Triangle, Maui (TMK: 3-6-01:1)* also concluded with negative results. This project area is located on the *makai* side of Hono`api`ilani Highway and extends to the coastline. This was the first archaeological study performed on this parcel and Kennedy does mention (1986:2) nearby sites that are detailed in later studies.

Monitoring within a smaller section of the same project area described by Kennedy (1986) resulted in a single site—a previously disturbed historic burial: State Site 50-50-09-4480 (McGerty, Burgett, and Spear 1998). McGerty *et. al*'s report, entitled *Draft: Monitoring Report on Earth Moving and Construction Excavations, Maui Ocean Center Site, Maui, Hawaii, (TMK: 3-6-01:001 and 019)* describes a pearl shell button found with the burial. The location of Site -4480 is of interest to the current study as its position is approximately 200 m *makai* of the current project area's southern corner. As subsequent subsurface testing would prove, however, the sandy matrix McGerty *et. al* experienced in the Maui Ocean Center monitoring contrasted the reddish clay of the current project area, rendering the likelihood of encountering burials much less. Nonetheless, the McGerty *et. al* (1998) study also mentions two more burials found not far to the north from Site -4480. While these (Sites -3553 and -3554) are even less spatially related to the current project area, their presence will later call for increased testing in the southern portion of the current project area (closest to the sandy coastal matrices).

McGerty, Dunn, and Spear (1998) conducted Data Recovery in an area of five traditional sites documented by Moore and Kennedy (1995). These sites (50-50-09-3555, -4022, -4137, -

4138, -4139) consisted of 28 features, including petroglyphs, subsurface fire pits, agricultural terracing, rock mounds, and a C-shape. McGerty et. al's testing at Sites -4138, and -4139 did not produce any significant artifacts, however, radiocarbon analysis of a charcoal sample produced a date of A.D. 1390 to 1650. This sample was recovered from the C-shape (Site 4139, Feature C) which was determined to be a prehistoric temporary habitation. This site is less than 300 m *mauka* of the current project area's southern point.

There is no doubt that the current project area was utilized as a segment of an important trail system in the early 1800s, and probably prehistorically as well. The Lahaina Pali Trail is five miles long and crosses the southern slopes of the West Maui Mountains between Olowalu and Mā`alaea. The start of this trail, now a demonstration trail as part of the Na Ala Hele Trail System, borders the current project area near the center of the *mauka* border. By the historic period in which the trail's significance as a probable prehistoric route was realized, the portion *makai* of the current trail head (*i.e.* the portion transecting the width of the current project area) was already destroyed by sugarcane cultivation. Thus, the trail starts immediately outside the project area, within the State-owned lands. A 1991 study by Tomonari-Tuggle and Tuggle documented 18 sites upon the trail, the majority of historic origin.

In an Inventory Survey of the present study parcel (Wilson and Dega 2005), three historic sites, all related to sugarcane agriculture, were identified. These sites were designated under SIHP numbers 50-50-09-5657 (clearing mounds), -5658 (irrigation modifications), and Site -5659 (dirt road). These three sites were the only archaeological sites found within the project area, and all three are considered significant under Criterion D of the Hawaii State and National Register of Historic Places.

SETTLEMENT PATTERN

Archaeological settlement data indicates that initial colonization and occupation of the Hawaiian Islands first occurred on the windward sides of the main islands, with populations eventually settling into drier leeward areas at later periods (Kirch 1985). Archaeological dates for initial occupation of the Hawaiian Islands far pre-date accepted ranges gathered from palynological data. A more conservative estimate for initial occupation of the islands is the A.D. 9th century (Athens 1997), if one is to lay more credibility with the pollen record than the archaeological record. In the Waihe`e and Wai`ehu areas of Wailuku, Kirch (1985:87) notes that "a number of coastal dune midden sites have been reported, and at least one of these contained pearl-shell fishhooks similar to those from the Bellows Site, eroding from the wave-cut midden." (The Bellows site, located on the windward coast of O`ahu, has yielded the controversial data of occupation dates from A.D. 300 to 600 [Pearson *et al.* 1971], one of the earliest dated sites in the Hawaiian Islands. For the most part, these dates have now been diagnosed as problematic and are no longer considered valid.)

More recent research within Wailuku District indicates that Wailuku Ahupua'a was likely settled between *c.* A.D. 1100 (Kirch 1985:142) and A.D. 1200 (Fredericksen and Fredericksen 1996), whereas *ahupua'a* to the northeast have produced slightly earlier date ranges and *ahupua'a* to the southwest have later settlement dates. The earliest populations purportedly used local resources and seldom ventured into upland valleys. Cordy (in Creed 1993) suggests, however, that upper valley areas on windward coasts were likely populated before the A.D. 1100s. Coastal settlement was still dominant, but populations began exploiting and living in more upland *kula* zones. Population expansion to inland areas did not occur until the *c.* A.D. 12th century but continued through the 16th century. Large scale or intensive agricultural endeavors were implemented in association with habitation. Coastal lands were used for settlement and taro was cultivated in near-coastal reaches and in the uplands. Upland areas of Maui such as the Waiohuli-Kula area contained large garden enclosures, ceremonial structures, and permanent habitation sites by *c.* A.D. 1600.

Nearer the coast in lands like the current project area (*c.* 40–85 meters amsl), taro was cultivated along stream courses, dry land taro was grown on *kula* lands, and populations settled there as well. In the current parcel, however, no LCA records exist that might link prehistoric agriculture to historically documented practice.

EXPECTED FINDINGS

Based on all available physiographic, archaeological, and historical evidence, the following expectations guided this study:

- Historically-significant surface features were expected, particularly those pertaining to historic period commercial sugarcane production. SCS conducted a brief reconnaissance (prior to AIS) which reported the presence of the large clearing mounds. The reconnaissance did not report any other historic or pre-Contact surface features, however, the probability of documenting additional historic agricultural features during Monitoring is considered high.
- A variety of traditional Hawaiian sites have been documented at several adjacent properties. While the probability of encountering pre-Contact archaeological surface features within the project area was considered low, there remains a moderate possibility of encountering subsurface cultural layers from a prehistoric period. The latter would depend largely on the existence of a previously undisturbed matrix stratigraphically lower (*i.e.*, older) than historically tilled soils.

The probability of discovery of historic or prehistoric unmarked burials, or marked burials, is considered low. A slightly higher, yet still low, probability exists in regards to the discovery of scattered human remains during subsurface testing. While burials have been located within the sandy matrix of the adjacent parcels *makai* of Hono'api'ilani Highway (*i.e.*, during construction activities at the Maui Ocean Center; see McGerty, Burgett, and Spear 1998), SHPD records contain no documented burials *mauka* of Hono'api'ilani Highway (including on, or within a kilometer, of the current project area). The lack of burial sites immediately *mauka* of the highway can be attributed to two main factors: (1) the types of soils found here are generally less favored in prehistoric burial practices, and (2) the lands have been subject to continual agricultural activity for nearly a century, and in some cases, longer.

Based on all of the above background information expected findings during Monitoring include:

(1) A variable subsurface stratigraphy that could indicate agricultural horizons and/or long-term habitation use of the area through post holes, fire features, and even burials, the latter of which would show some permanency in occupation in this geographic area.

(2) Historic sites have been previously documented. Monitoring will allow for additional observation at these sites, which may lead to improved discussions of them, new portions not previously described, or even new features found. Monitoring the parcel will contribute to greater understanding of the areas history and prehistory.

MONITORING CONVENTIONS AND METHODOLOGY

This AMP has been outlined in accordance with DLNR/SHPD administrative rule ' 13-279. Archaeological monitors will adhere to the following guidelines during monitoring procedures:

1. A qualified archaeologist familiar with the project area and the results of previous archaeological work conducted in the general area, will monitor subsurface construction activities on the parcel. If significant deposits or features are identified and additional field personnel are required, the archaeologist will notify the contractor or representatives before additional personnel are brought to the site.
2. If features or cultural deposits are identified during Archaeological Monitoring, the on-site archaeologist will have the authority to temporarily suspend construction activities at the significant location so that the cultural feature(s) or deposit(s) may be fully evaluated

and appropriate treatment of the cultural deposit(s) is conducted. SHPD will be consulted to establish feature significance and potential mitigation procedures. Treatment activities primarily include documenting the feature/deposit through plotting its location on an overall site map, illustrating a plan view map of the feature/deposit, profiling the deposit in three dimensions, photographing the finds (with the exception of human burials), artifact and soil sample collection, and triangulation of the finds. Construction work will only continue in the significant location when all documentation has been completed.

3. Control stratigraphy in association with subsurface cultural deposits will be noted and photographed, particularly those containing significant quantities or qualities of cultural materials. If deemed significant by SHPD and the archaeologist, these deposits will be sampled.

4. In the event that human remains are encountered, all work in the immediate area of the find will cease; the area will be secured from further activity until burial protocol has been completed. The SHPD island archaeologist and SHPD Culture and History Branch will both be immediately notified about the inadvertent discovery of human remains on the property. Notification of the inadvertent discovery will also be made to the Maui/Lanai Islands Burial Council by either SHPD or by the contracting archaeologist. A determination of minimum number of individuals (MNI), age(s), and ethnicity of the burial(s) will be ascertained in the field, following standard osteological procedures (*e.g.*, White 2000). Rules outlined in Chapter 6E, Section 43 shall be followed. Profiles, plan view maps, and illustrative documentation of skeletal parts will be recorded to document the burial(s). The burial location will be identified and marked. If a burial is disturbed, materials excavated from the vicinity of the burial(s) will be manually screened through 1/8-inch wire mesh screens in order to recover any displaced skeletal material. If the remains are to be removed, the work will be in compliance with HRS 6.E-43.6, Procedures Relating to Inadvertent Discoveries after approval from all parties (SHPD, Burial Council). All remains recovered from the site will be temporarily stored in a secure, on-site location until final disposition is determined and completed.

5. To ensure that contractors and the construction crew are aware of this AMP and possible site types to be encountered on the parcel, a brief coordination meeting will be held between the construction personnel and monitoring archaeologist prior to initiation of the project. The construction crew will also be informed as to the possibility that human burials could be encountered and how they should proceed if they observe such remains.

6. The archaeologist will provide all coordination with the contractor, SHPD, and any other group involved in the project. The archaeologist will coordinate all monitoring and sampling activities with the safety officers for the contractors to ensure that proper safety regulations and protective measures meet compliance. Close coordination will also be maintained with construction representatives in order to adequately inform personnel of the possibility that open archaeological units or trenches may occur in the project area.

7. As necessary, verbal reports will be made to SHPD and any other agencies as requested.

LABORATORY ANALYSIS

All samples collected during the project, except human remains, will undergo analysis at the SCS laboratory in Honolulu. In the event that human remains are identified and the SHPD authorizes their removal, these remains and all associated cultural materials will be curated at an appropriate location on Maui. Photographs, illustrations, and all notes accumulated during the project will be curated at the Honolulu laboratory of SCS. All retrieved artifact and midden samples will be sent to the SCS laboratory in Honolulu to be cleaned, sorted, and analyzed. Significant artifacts will be photographed, sketched, and classified (qualitative analysis). All metric measurements and weights will be recorded (quantitative analysis). This data will be presented in tabular form within the final monitoring report. Midden samples will be minimally identified to major 'class' (e.g., bivalve, gastropod mollusk, echinoderm, fish, bird, and mammal). All data will be clearly recorded on standard laboratory forms which also include number and weight (as appropriate) of each constituent category. These counts will also be included in the final report.

Should any samples amenable to dating be collected from a significant cultural deposit, they will be prepared in the SCS laboratory and submitted for specialized radiocarbon analysis. While primary emphasis for dating is placed on charcoal samples, we do not preclude the use of other materials such as marine shell or nonhuman bone materials. SCS will consult with SHPD and the client if radiocarbon dates are deemed necessary.

All stratigraphic profiles will be drafted for presentation in the final report. Representative plan view sketches showing the location and morphology of identified sites/features/deposits will be compiled and illustrated.

CURATION

If requested by the landowner, SCS will curate all recovered materials in Honolulu (except human remains, which would remain on-island) until a permanent, more suitable curation locale is identified. The land owner(s) may request to curate all recovered materials once analysis has been completed.

REPORTING

An Archaeological Monitoring report documenting the project findings and interpretation, following SHPD guidelines for Archaeological Monitoring reports, will be submitted within 180 days of the completion of fieldwork. This time line is requested to account for any radiocarbon age determinations (typically 60 days), if necessary.

If cultural features or deposits are identified during fieldwork, the sites will be evaluated for historical significance and assessed under State and Federal Significance Criteria. The Archaeological Monitoring report will be drafted until accepted by SHPD and will be submitted to both SHPD and to the client.

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AN ARCHAEOLOGICAL MONITORING PLAN FOR THE PROPOSED MĀ`ALAEA WASTEWATER TREATMENT PLANT, EFFLUENT REUSE AREA, INCLUDING THE POTENTIAL WATER TANK LOCATION AND DETENTION PONDS A AND B, WAIKAPŪ AHUPUA`A, WAILUKU DISTRICT, ISLAND OF MAUI, HAWAI`I [TMK: (2) 3-6-004: 003 (por.)]

Prepared By:
Elizabeth Pestana, B.A.
and
Michael Dega, Ph.D.
February 2008

Prepared for:
Maalaea Properties, LLC
255 West Waiko Road
Wailuku, Hawaii 96793

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INTRODUCTION

Scientific Consultant Services, Inc. (SCS) has prepared this Archaeological Monitoring Plan (AMP) in advance of construction work for the proposed Wastewater Treatment Facility, effluent reuse area, water tank site, and two detention basins. The project area is located in Mā'alaea, Waikapū Ahupua'a, Wailuku District, Maui Island, Hawai'i [TMK: (2) 3-6-004: 003 (por.)] at an elevation ranging from approximately 190 to 400 feet above mean sea level (amsl) (Figures 1 and 2).

Based on State Historic Preservation Division (SHPD) recommendations, Archaeological Monitoring is neccesary on the parcel due to the potential for the possible inadvertent discovery of traditional or historic cultural deposits and because multiple known historic sites are present in the vicinity of the parcel. The subject parcel itself does not represent a Land Commission Award (LCA).

Archaeological Monitoring will be conducted to ensure that if significant cultural resources are identified during subsurface work, they will be sampled, adequately documented, and evaluated for their historical significance, per SHPD recommendations. If human remains are identified, appropriate and lawful protocol concerning the Inadvertant Discovery of Human Remains (pursuent to 13-300-40a, b, c, HAR) will be followed.

Prior to the initiation of any subsuface construction activity, this AMP will require approval from the SHPD (Jenny Pickett, SHPD-Maui). Details on the reasons for monitoring, potential site types that may be encontered during excavation, monitoring conventions and methodologies for both fieldwork and laboratory work, and curation and reporting follow in the text below.

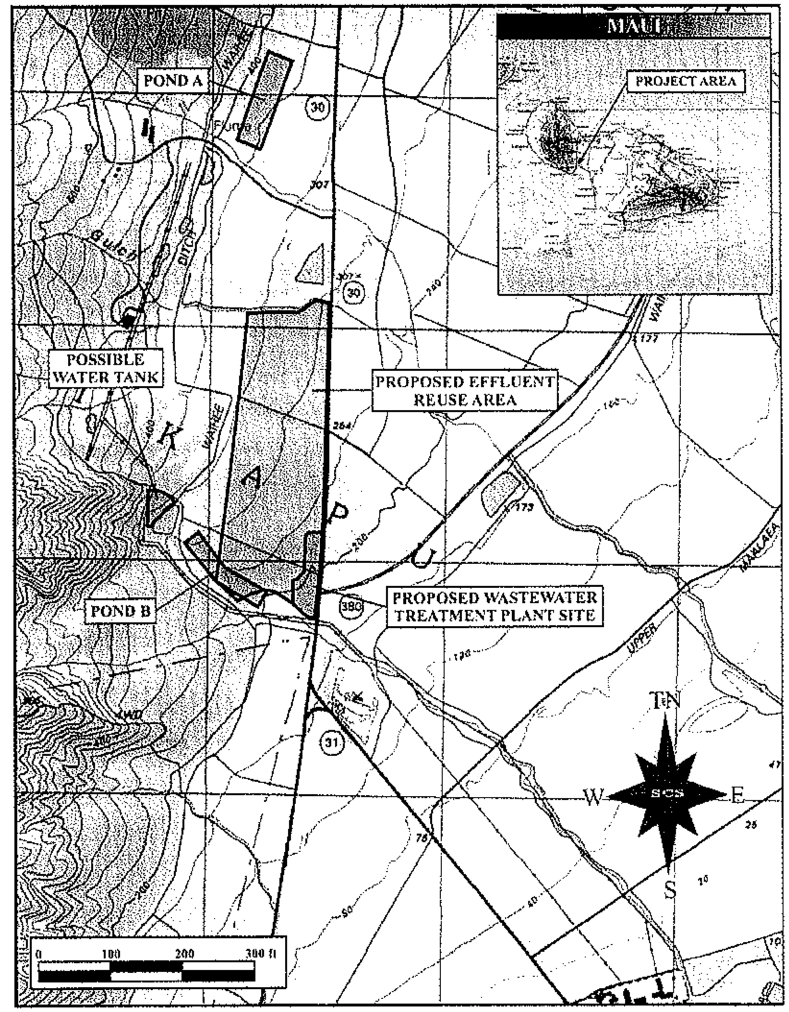

Figure 1: USGS Quadrangle (Ma'alaea and Wailuku) Map Showing Project Areas.

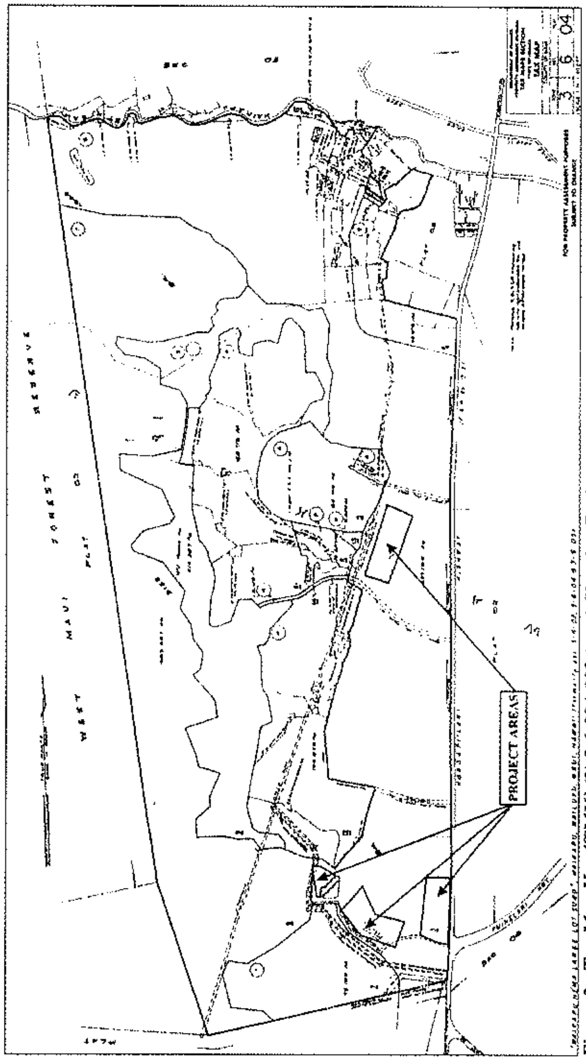

Figure 2: Tax Map Key [TMK] (2) 3-6-004:003 (por.) Showing Project Area.

REASONS FOR MONITORING

The present project area is situated entirely within a coastal environmental zone, an area subject to many traditional and historic activities. It is these coastal areas that were first thought to have been settled and also subject to sustained settlement (see Cordy 1981).

Based on all available physiographic, archaeological, and historical evidence, the following expectations guided this study:

- Historically-significant surface features were expected, particularly those pertaining to historic period sugarcane agriculture. SCS staff conducted an Archaeological Inventory Survey of the property to the south of the current project area (Wilson and Dega 2005) which reported the presence of the large clearing mounds and other features related to historic sugarcane cultivation. Thus, the probability of documenting additional historic agricultural features during Archaeological Inventory Survey was considered high.

- A variety of traditional Hawaiian sites have been documented at locations within nearby studies. Although the probability of encountering prehistoric archaeological surface features within the project area was considered low, a moderate possibility of encountering subsurface cultural layers from the prehistoric period remained. The latter would depend largely on the existence of a previously undisturbed matrix stratigraphically lower (*i.e.*, older) than historically tilled soils.

- The probability of discovery of historic or prehistoric unmarked burials, or marked burials, was considered low. A slightly higher, yet still low, probability existed in regards to the discovery of scattered human remains during subsurface testing. While burials have been located within the sandy matrix of the adjacent parcels *makai* of Honoapi'ilani Highway (*i.e.*, during construction activities at the Maui Ocean Center; see McGerty, Burgett, and Spear 1998), SHPD records contain no documented burials *mauka* of Honoapi'ilani Highway (including on, or within one kilometer of the current project area). The lack of burial sites immediately *mauka* of the highway can be attributed to two main factors: (1) the types of soils found here were generally less favored in prehistoric burial practices, and (2) the lands have been subject to continual agricultural activity for nearly a century, and in some cases, longer.

PREVIOUS ARCHAEOLOGY AND POTENTIAL SITE TYPES TO BE ENCOUNTERED

A number of studies on file at the State Historic Preservation Division, Kapolei archives summarize the most relevant previous archaeology within the vicinity of the current project area.

In a recent Archaeological Inventory Survey (Dega and Dagher 2007) conducted by SCS Inc. on the approximately 115 acres of the current project area, seven sites were newly identified and documented during the survey. All of the identified sites (50-50-09-6251 through 50-50-09-6257 related to historic commercial agriculture. These sites consisted of three historic irrigation ditches (Sites 50-50-09-6251, T-1; 50-50-09-6254, T-4; and 50-50-09-6257, T-7), three clearing mounds (Sites 50-50-09-6252, T-2; 50-50-09-6253, T-3; and 50-50-09-6256, T-6), and one modified stream drainage (Site 50-50-09-6255, T-5). A single additional clearing pile feature lies to the northwest of the project area; however, as this was located outside the project area boundaries this feature was not recorded.

In 1989, PHRI conducted an Archaeological Inventory Survey of over 600 acres within the Waikapū Mauka Partners Golf Resort located to the north of the current project area (Brisbin, *et al.* 1991). The report documenting the findings of this survey (Haun 1989 in Brisbin, *et al.* 1991) does not appear to be available to the public at this time. Based on the findings and recommendations of Haun's Inventory Survey, Archaeological Data Recovery was subsequently conducted at the nine sites (comprised of over 46 features) newly identified during the initial survey report (Haun in Brisbin, *et al.* 1991). These nine sites indicated that this area was utilized for extensive traditional dryland agriculture with limited habitation and some historic ranching activities. The findings of this survey indicate that only a few habitation sites were located below 500 feet amsl and that the agricultural sites were "continuously distributed" throughout the project area.

Fifteen radiocarbon samples collected from data recovery excavations conducted at several of the features yielded sufficient amounts of charcoal suitable for providing reliable dates. The range of the radiocarbon dates suggests initial occupation of the project area occurred during the early 1500s and continued through the historic period (Brisbin *et al.* 1991).

During 1989 and 1990, Archaeological Consultants of Hawaii (ACH) conducted an Archaeological Inventory Survey of the lands immediately adjacent and *mauka* (west) of the above-mentioned PHRI project area (Kennedy 1994). During this survey a total of 18 sites, comprised of 74 features, were newly identified. These sites also indicated that the area was primarily utilized for traditional agriculture, although there was some evidence of limited habitation, including burials and ceremonial use. Kennedy (1994) concluded that these sites can only be a continuation of the occupation described by Brisbin, *et al.* (1991). Five charcoal samples collected from test excavations of several of the features were submitted for radiocarbon dating. These samples yielded dates ranging from A.D. 1040 through 1950.

In 1997, Aki Sinoto Consulting (ASC), in association with Garcia and Associates (GANDA), conducted an Archaeological Inventory Survey of 15 acres of land north of Pōhākea Gulch. One structural feature was documented during this survey. Given the description of this feature and the site location map this may be in association with Site 50-50-09-6062 (PHRI T-6) or 50-50-09-6063 (PHRI T-11) which were initially documented by PHRI in 1988 (Eble and Pantaleo 1997). This site is believed to have been subsequently destroyed during the construction of Pohakea Quarry (Dagher and Dega 2007).

Kennedy and Trimble (1992) surveyed an area to the south of the current project area. This survey overlaps State Site 50-50-09-5659 (historic dirt road), first recorded in the Wilson and Dega (2005) study. While Kennedy and Trimble also note the lack of archaeological features in their project area, due to the obvious history of intense agriculture, their 1992 report does not consider the road upon which their survey takes place to be a potential historic agricultural feature. The project area detailed in their study is no more than 5.0 meters wider than the dirt road itself, and concludes that "No artifacts, midden, or structures of historic or prehistoric significance were identified on the subject property" (1992:11).

An earlier Kennedy report entitled *Letter Report: Walk-Through Examination of the Proposed Ma'alaea Triangle, Maui (TMK: 3-6-01:1)* (1986) also concluded with negative results. This was the first archaeological study done on this parcel and Kennedy does mention (1986:2) nearby sites that are detailed in later studies. This project area is located on the *makai* (southeast) side of Honoapi'ilani Highway and extends to the coastline.

Monitoring within a smaller section of the same project area described by Kennedy (1986) resulted in a single site (a previously disturbed historic burial; State Site 50-50-09-4480) (McGerty, Burgett, and Spear 1998). The McGerty, *et. al* report, entitled *Draft: Monitoring Report on Earth Moving and Construction Excavations, Maui Ocean Center Site, Maui, Hawaii. (TMK: 3-6-01:001 and 019)*, describes a pearl shell button found with the burial. As subsequent subsurface testing would prove, however, the sandy matrix McGerty, *et. al* experienced in the Maui Ocean Center monitoring contrasted the reddish clay of the Wilson and Dega (2005) project area, rendering the likelihood of encountering burials much less. Nonetheless, the McGerty *et. al* (1998) study also mentions two more burials found not far to the north from Site -4480.

McGerty, Dunn, and Spear (1998) conducted Data Recovery in an area of five traditional sites documented by Moore and Kennedy (1995). These sites (50-50-09-3555, -4022, -4137, -

4138, -4139) consisted of 28 features, including petroglyphs, subsurface firepits, agricultural terracing, rock mounds, and a C-shape. Testing done by McGerty *et. al* at Sites -4138 and -4139 did not produce any significant artifacts; however, radiocarbon analysis of a charcoal sample produced a date of A.D. 1390 to 1650. This sample was recovered from the C-shape (Site -4139, Feature C), which was determined to be a prehistoric temporary habitation.

In 2005, SCS (Wilson and Dega 2005) conducted an Archaeological Inventory Survey of the 259.903-acre property immediately adjacent to the south of the current project area. Three historic sites, all related to sugarcane cultivation were newly identified and documented: Site 50-50-09-5657 (clearing mounds), Site 50-50-09-5658 (irrigation modifications), and Site 50-50-09-5659 (dirt road). These three sites were the only archaeological sites found within the project area. Subsurface testing consisting of 20 stratigraphic trenches (a volume of approximately 292.0 cubic meters) was conducted, but did not reveal any subsurface historic, or prehistoric, cultural material. Rather, excavation confirmed the extent, both in physical and temporal depth, of historic and modern agricultural activity within the project area.

However, there is no doubt that the area discussed in Wilson and Dega (2005) was utilized as a segment of an important trail system in the early 1800s, and probably prehistorically as well. The Lahaina Pāli Trail is five miles long and crosses the southern slopes of the West Maui Mountains between Olowalu and Mā'alaea. The start of this trail, now a demonstration trail as part of the Na Ala Hele Trail System, borders the Wilson and Dega 2005 project area near the center of the *mauka* border. By the Historic Period, in which the trail's significance as a probable prehistoric route was realized, the portion *makai* of the current trail head had already been destroyed by sugarcane cultivation. Thus, the trail starts immediately outside the project area, within the State-owned lands. A 1991 study by Tomonari-Tuggle and Tuggle documented 18 sites upon the trail, the majority of historic origin.

In 2000, SCS (Dega and Dagher 2007) conducted an Archaeological Inventory Survey of approximately 60 acres of land for the proposed Pōhākea Quarry expansion project. A total of seven sites comprised of 23 features were recorded and documented during this study. Five of these sites (Sites 50-50-09-6061 through 50-50-09-6065) were previously identified by PHRI in 1988, and two of these sites were newly identified (50-50-09-6066 and 50-50-09-6067). An additional segment of Site 50-50-09-6065 (PHRI T-13) was also identified and documented during the survey. All of these sites were interpreted as historic ranching sites.

MONITORING CONVENTIONS AND METHODOLOGY

This Archaeological Monitoring Plan has been prepared in accordance with the DLNR-SHPD Hawai'i Administrative Rules "Governing Standards for Archaeological Monitoring Studies and Reports" (§13-279). Archaeological monitors will adhere to the following guidelines during monitoring procedures:

1. A qualified archaeologist familiar with the project area and familiar with the results of previous archaeological work conducted in the general area will monitor subsurface construction activities on the parcel. If significant deposits or features are identified and additional field personnel are required, the archaeologist will notify the contractor or representatives before additional personnel are brought to the site. One Monitor will be required for each piece of ground altering equipment in operation during this project.

2. If features or cultural deposits are identified during Archaeological Monitoring, the on-site archaeologist will have the authority to temporarily suspend construction activities at the significant location so that the cultural feature(s) or deposit(s) may be fully evaluated and appropriate treatment of the cultural deposit(s) is conducted. SHPD will be contacted to establish feature significance and potential mitigation procedures. Treatment activities primarily include documenting the feature/deposit through plotting its location on an overall site map, illustrating a plan view map of the feature/deposit, profiling the deposit in three dimensions, photographing the finds (with the exception of human burials), artifact and soil sample collection, and triangulation of the finds. Construction work will only continue in the significant location when all documentation has been completed.

3. Control stratigraphy in association with subsurface cultural deposits will be noted and photographed, particularly those containing significant quantities or qualities of cultural materials. If deemed significant by SHPD and the archaeologist, these deposits will be sampled.

4. In the event that human remains are encountered, all work in the immediate area of the find will cease; the area will be secured from further activity until burial protocol has been completed. The SHPD island archaeologist and SHPD Culture and History Branch will both be immediately notified about the inadvertent discovery of human remains on the property. Notification of the inadvertent discovery will also be made to the Maui/Lanai Islands Burial Council by either SHPD or by the contracting archaeologist. A determination of minimum number of individuals (MNI), age(s), and ethnicity of the burial(s) will be ascertained in the field, following standard osteological procedures (*e.g.*, White 2000). Rules outlined in Chapter 6E, Section 43 shall be followed. Profiles, plan view maps, and illustrative documentation of skeletal parts will be recorded to document the burial(s). The burial location will be identified and marked. If a burial is disturbed, materials excavated from the vicinity of the burial(s) will be manually screened through 1/8-inch wire mesh screens to recover

any displaced skeletal material. If the remains are to be removed, the work will be in compliance with HRS 6.E-43.6, Procedures Relating to Inadvertent Discoveries after approval from all parties (SHPD, Burial Council). All remains recovered from the site will be temporarily stored in a secure, on-site location until final disposition is determined and completed

5. To ensure that contractors and the construction crew are aware of this Archaeological Monitoring Plan and possible site types to be encountered on the parcel, a brief coordination meeting will be held between the construction personnel and monitoring archaeologist prior to initiation of the project. The construction crew will also be informed as to the possibility that human burials could be encountered and how they should proceed if they observe such remains.

6. The archaeologist will provide all coordination with the contractor, SHPD, and any other group involved in the project. The archaeologist will coordinate all monitoring and sampling activities with the safety officers for the contractors to ensure that proper safety regulations and protective measures meet compliance. Close coordination will also be maintained with construction representatives in order to adequately inform personnel of the possibility that open archaeological units or trenches may occur in the project area.

7. As necessary, verbal reports will be made to SHPD and any other agencies as requested.

LABORATORY ANALYSIS

All samples collected during the project, except human remains, will undergo analysis at the SCS laboratory in Honolulu. In the event that human remains are identified and their removal authorized, they will be curated on Maui. Photographs, illustrations, and all notes accumulated during the project will be curated at the Honolulu laboratory. All retrieved artifact and midden samples will be thoroughly cleaned, sorted, and analyzed. Significant artifacts will be photographed, sketched, and classified (qualitative analysis). All metric measurements and weights will be recorded (quantitative analysis). These data will be presented in tabular form within the final monitoring report. Midden samples will be minimally identified to major class (*e.g.*, bivalve, gastropod mollusk, echinoderm, fish, bird, mammal). All data will be clearly recorded on standard laboratory forms which also include number and weight (as appropriate) of each constituent category. These counts will also be included in the final report.

Should any samples amenable to dating be collected from a significant cultural deposit, they will be prepared in the SCS laboratory and submitted for specialized radiocarbon analysis. While primary emphasis for dating is placed on charcoal samples, we do not preclude the use of

other material such as marine shell or nonhuman bone materials. SCS will consult with SHPD and the client if radiocarbon dates are deemed necessary.

All stratigraphic profiles will be drafted for presentation in the final report. Representative plan view sketches showing the location and morphology of identified sites/features/deposits will be compiled and illustrated.

CURATION

If requested by the landowner, SCS will curate all recovered materials in Honolulu (except human remains, which would remain on-island) until a permanent, more suitable curation center is identified. The landowner may request to curate all recovered cultural materials once analysis has been completed.

REPORTING

An Archaeological Monitoring Report documenting the project findings and interpretation, following SHPD guidelines for Archaeological Monitoring reports, will be prepared and submitted 45 days after the completion of fieldwork. This time line is requested to account for any radiocarbon age determinations (typically 30–45 days), if necessary.

If cultural features or deposits are identified during fieldwork, the sites will be evaluated for historical significance and assessed under State and Federal Significance Criteria. The Archaeological Monitoring report will be drafted until accepted by SHPD and will be submitted to both SHPD and the client.

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APPENDIX G-3.

Letters from State Historic Preservation Division Approving Archaeological Monitoring Plans

(948)

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

May 22, 2008

Michael F. Dega, Ph.D.
Scientific Consultant Services, Inc.
711 Kapiolani Boulevard, Suite 975
Honolulu, Hawai'i 96813

LOG NO: 2008.1558
DOC NO: 0805PC40
Archaeology

Dear Dr. Dega:

SUBJECT: Chapter 6E-42 Historic Preservation Review of an Archaeological Monitoring Plan for ca. 260 Acres (104 Hectare) of Wailuku Agribusiness Property, Ma'alaea/Ukumehame/Waikapu Ahupua'a, Wailuku District, Maui Island, Hawai'i TMK: (2) 3-6-001: 018

Thank you for the opportunity to review this plan, which our staff received on April 22, 2008 (Shefcheck and Dega 2008): *Archaeological Monitoring Plan for 259.903 Acres in Ma'alaea, Ukumehame and Waikapu*...Scientific Consultant Services, Inc.

The plan was prepared upon review of a 2005 archaeological inventory survey conducted by your firm and concurrence from this office that precautionary archaeological monitoring is warranted during future ground altering disturbance associated with development of the subject parcel (SHPD LOG: 2005.1191; DOC NO: 0506MK18). Precautionary monitoring was recommended for ground altering disturbance associated with the destruction of the 13 large clearing mounds which comprise SIHP #50-50-09-5657, because of the possibility that they may contain historically significant cultural materials displaced during previous large scale field clearing activities related to commercial agriculture. It is also possible that culturally significant subsurface deposits may be identified below the plow zone at the base of the clearing piles once the piles have been removed.

As specified in the plan, an archaeologist will be on-site for all ground altering disturbance within the parcel. *However, we wish to recommend that given the size of the clearing piles, if more than one pile is dismantled at the same time, there should be one archaeologist on site at each location.* The plan also states that a coordination meeting with the construction crew and all other pertinent parties to explain monitoring procedures and that the monitoring archaeologist has the authority to halt work in the vicinity of a culturally significant find will be undertaken. Further, if human remains are inadvertently exposed, both the SHPD and Maui/Lana'i Islands Burial Council (MLIBC) will be notified and appropriate protocol followed. A report detailing the findings of the monitoring will be prepared and submitted to our office for review within the required 180 days after the completion of the project.

The plan contains the required information as specified in HAR §13-279-4(a) regarding the contents of monitoring plans in general and is acceptable.

Should you have any questions or comments regarding this letter, please contact Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

Nancy McMahon, Deputy SHPO/State Archaeologist
State Historic Preservation Division

c: Jeff Hunt, Director, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793
Lance Nakamura, Engineer, DPWEM, 250 S. High Street, Wailuku, Hawai'i 96793
Maui CRC, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

April 25, 2008

Michael F. Dega, Ph.D.
Scientific Consultant Services, Inc.
711 Kapiolani Boulevard, Suite 975
Honolulu, Hawai'i 96813

LOG NO: 2008.0423
DOC NO: 0804PC24
Archaeology

Dear Dr. Dega:

SUBJECT: Chapter 6E-8 Historic Preservation Review of an Archaeological Monitoring Plan for the Proposed Ma'alaea Water Treatment Plant, Effluent Refuse Area, Potential Water Tank Location and Detention Ponds A and B
Waikapu Ahupua'a, Wailuku District, Island of Maui, Hawai'i
TMK: (2) 3-6-004: 003 por.

Thank you for the opportunity to review this plan, which our staff received on February 19, 2008 (Pestana and Dega 2008): *An Archaeological Monitoring Plan for the Proposed Maalaea Water Treatment Plant, Effluent Refuse Area...*Scientific Consultant Services, Inc. Please accept our apologies for the lengthy delay in commenting.

The plan was prepared as a result of a recommendation from our office that precautionary monitoring be undertaken during ground altering disturbance related to the subject parcel. The recommendation for precautionary monitoring within affected portions (115 of 657.195 acres) of the subject parcel was made primarily because of its location within a coastal-environmental zone and the belief that these were the areas settled upon initial colonization of the Hawaiian Islands, greatly increasing the chance that remnant subsurface cultural deposits from the traditional period will be found. Previously identified sites known in the current project area include SIHP #50-50-09-6251 through -6257, all of which are related to post-Contact era commercial agricultural activities. Results of other inventory survey level work in the vicinity also establishes the surrounding area's use during the traditional period for agricultural, habitation and ceremonial activity.

As specified in the plan, there will be one archaeological monitor on site for each piece of ground disturbing equipment in use, a coordination meeting with the construction crew and all other pertinent parties to explain monitoring procedures and that the monitoring archaeologist has the authority to halt work in the vicinity of a culturally significant find will be undertaken. The plan also states that in the event culturally significant finds are made, the SHPD will be consulted for mitigation recommendations and further, that if human remains are inadvertently exposed, both the SHPD and Maui/Lana'i Islands Burial Council (MLIBC) will be notified and appropriate protocol followed. A report detailing the findings of the monitoring will be prepared and submitted to our office for review within 180 days after the completion of the project.

Michael F. Dega, Ph.D.
Page 2

The plan contains the required information as specified in HAR §13-279-4(a) regarding the contents of monitoring plans in general and is acceptable. Should you have any questions or comments regarding this letter, please contact Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

Nancy McMahon

Nancy McMahon, Archaeologist and Acting Archaeology Branch Chief
State Historic Preservation Division

c: Jeff Hunt, Director, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793
Lance Nakamura, Engineer, DPWEM, 250 S. High Street, Wailuku, Hawai'i 96793
Maui CRC, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793

APPENDIX H.

Cultural Impact Assessment Report

A CULTURAL IMPACT ASSESSMENT REPORT ON APPROXIMATELY 260 ACRES OF LAND IN UKUMEHAME AND WAIKAPŪ AHUPUA`A, WAILUKU DISTRICT, MAUI ISLAND, HAWAI`I [TMK: 3-6-01:18]

Prepared by:
Leann McGerty, B.A.
and
Robert L. Spear, Ph.D.
June 2005

Prepared for:
AKF Development
1132 Norman Drive
Manteca, California 95336

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INTRODUCTION

Scientific Consultant Services (SCS), Inc. has been contracted by AKF Development to conduct a Cultural Impact Assessment on approximately 260 acres of land in Ukumehame and Waikapū Ahupua'a, Wailuku District, Maui Island, Hawai'i [TMK: 3-6-01:18] (Figure 1). According to information provided by the developers, a residential project that includes a mix of single-family and multi-family housing types. Amenities also include an open-space buffer along the highway and a 15-acre community oriented park connected to the neighborhoods by a pedestrian/bicycle path.

The Constitution of the State of Hawai'i clearly states the duty of the State and its agencies is to preserve, protect, and prevent interference with the traditional and customary rights of native Hawaiians. Article XII, Section 7 requires the State to "protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778" (2000). Beginning in 1850 with establishment of Hawai'i Revised Statutes (HRS) 7-1, native Hawaiians were given access rights to undeveloped private property and waterways in order to gather specific natural resources for customary uses. In 1992, the State of Hawai'i Supreme Court, reaffirmed HRS 7-1 and expanded it to include, "native Hawaiian rights…may extend beyond the ahupua'a in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner" (Pele Defense Fund v. Paty, 73 Haw.578, 1992).

Act 50, enacted by the Legislature of the State of Hawaii (2000) with House Bill 2895, relating to Environmental Impact Statements, proposes that:

> …there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawaii's culture, and traditional and customary rights…[H.B. No. 2895].

Act 50 requires state agencies and other developers to assess the effects of proposed land use or shoreline developments on the "cultural practices of the community and State" as part of the HRS Chapter 343 environmental review process (2001). Its purpose has broadened, "to promote and protect cultural beliefs, practices and resources of native Hawaiians [and] other

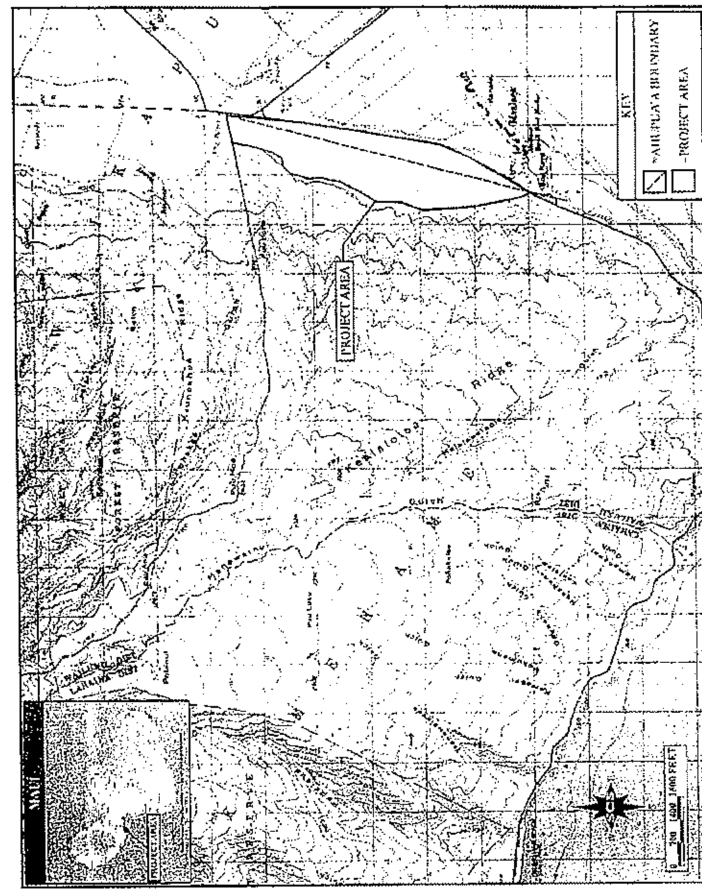

Figure 1: USGS Quadrangle Map Showing the Project Area.

ethnic groups, and it also amends the definition of 'significant effect' to be re-defined as "the sum of effects on the quality of the environment including actions that are…contrary to the State's environmental policies…or adversely affect the economic welfare, social welfare, or cultural practices of the community and State" (H.B. 2895, Act 50, 2000). Thus, not only are properties evaluated for impact to Native Hawaiians, but also for other ethnic groups as well.

Act 50 requires an assessment of cultural practices to be included in the Environmental Assessments and the Environmental Impact Statements, and to be taken into consideration during the planning process. The concept of geographical expansion is recognized by using, as an example, "the broad geographical area, e.g. district or *ahupua'a*" (OEQC 1997). It was decided that the process should identify 'anthropological' cultural practices, rather than 'social' cultural practices. For example, *limu* (edible seaweed) gathering would be considered an anthropological cultural practice, while a modern-day marathon would be considered a social cultural practice.

According to the Guidelines for Assessing Cultural Impacts established by the Hawaii State Office of Environmental Quality Control (OEQC 1997):

> The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religions and spiritual customs. The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both manmade and natural which support such cultural beliefs.

This Cultural Impact Assessment involves evaluating the probability of impacts on cultural values and rights within the project area and its vicinity.

METHODOLOGY

This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). In outlining the "Cultural Impact Assessment Meodology", the OEQC state:

> …information may be obtained through scooping, community meetings, ethnographic interviews and oral histories…[1997].

This report contains archival and documentary research, as well as communication with organizations having knowledge of the project area, its cultural resources, and its practices and beliefs. This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). The assessment concerning cultural impacts should address, but not be limited to, the following matters:

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

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

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

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

(5) a discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken, as well as the particular perspective of the authors, if appropriate, any opposing views, and any other relevant constraints, limitations or biases;

(6) a discussion concerning the cultural resources, practices and beliefs identified, and for the resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site;

(7) a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project;

(8) an explanation of confidential information that has been withheld from public disclosure in the assessment;

(9) a discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs;

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

(11) the inclusion of bibliography of references, and attached records of interviews which were allowed to be disclosed.

Based on the inclusion of the above information, assessments of the potential effects on cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

ARCHIVAL RESEARCH

Archival research focused on a historical documentary study involving both published and unpublished sources. These included legendary accounts of native and early foreign writers; early historical journals and narratives; historic maps and land records such as Land Commission Awards, Royal Patent Grants, and Boundary Commission records; historic accounts, and previous archaeological project reports.

INTERVIEW METHODOLOGY

When appropriate, interviews are conducted in accordance with Federal and State laws and guidelines. Individuals and/or groups who have knowledge of traditional practices and beliefs associated with a project area or who know of historical properties within a project area are sought for consultation. Individuals who have particular knowledge of traditions passed down from preceding generations and a personal familiarity with the project area are invited to share their relevant information. Often people are recommended for their expertise or can be located by visiting the area. Organizations, such as Hawaiian Civic Clubs, the Island Branch of Office of Hawaiian Affairs, historical societies, Island Trail clubs, and Planning Commissions are invited to contribute their input and suggest further avenues of inquiry, as well as specific individuals to interview.

When interviewees are identified, a standard procedure follows. Personal interviews are taped and then transcribed. These draft transcripts are returned to each of the participants for their review and comments. After corrections are made, each individual signs a release form, making the information available for this study. Key topics discussed with the interviewees vary from project to project, but usually include: personal association to the *ahupua'a*, land use in the project's vicinity; knowledge of traditional trails, gathering areas, water sources, religious sites;

place names and their meanings; stories that were handed down concerning special places or events in the vicinity of the project area; evidence of previous activities identified while in the project vicinity.

In this case, the project area had been used for ranching and agriculture for over 100 years. Letters, briefly outlining the development plans along with maps of the project area, were sent to organizations whose jurisdiction includes knowledge of the area with an invitation for consultation. Consultation was sought from the Maui Office of Hawaiian Affairs, Community Resource Coordinator, Maui; the Office of Hawaiian Affairs, O'ahu; Cultural Resource Planner for the Maui Planning Department; and the Central Maui Civic Club. Based on this research, an assessment of the potential effects on cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

PROJECT AREA AND VICINITY

The project area comprises approximately 260 acres of land situated *mauka* of Honoapi'ilani Highway from Ma'alaea Harbor to near the Kuihelani Highway on the lower eastern slope of Pu'ū Kukui in the *ahupua'a* of Ukumehame, with its eastern most section in the *ahupua'a* of Waikapū, West Maui (Figure 2). Ukumehame is bounded on the west by Olowalu Ahupua'a and on the east by Waikapū Ahupua'a. The *makai* portion of the project area is bounded on the east by Ma'alaea Harbor, on the west by rocky, uncultivated abandoned ranch land, and to the south by more abandoned ranch land.

CULTURAL HISTORICAL CONTEXT

The island of Maui ranks second in size of the eight main islands in the Hawaiian Archipelago. Pu'u Kukui, forming the west end of the island (1,215 m above mean sea level), is composed of large, heavily eroded amphitheater valleys that contain well-developed permanent stream systems that watered fertile agricultural lands extending to the coast. The deep valleys of West Maui and their associated coastal regions have been witness to many battles in ancient times and were coveted productive landscapes. Waikapū was the most southwestern valley of the Na Wai Eha (The Four Streams), a region that was famous as the largest continuous area of wet taro cultivation in the islands (Handy 1940:107).

PAST POLITICAL BOUNDARIES

Traditionally, the division of Maui's lands into districts (*moku*) and sub-districts was performed by a *kahuna* (priest, expert) named Kalaiha'ōhia, during the time of the *ali'i* Kaka'alaneo (Beckwith 1940:383; Fornander places Kaka'alaneo at the end of the 15th century or

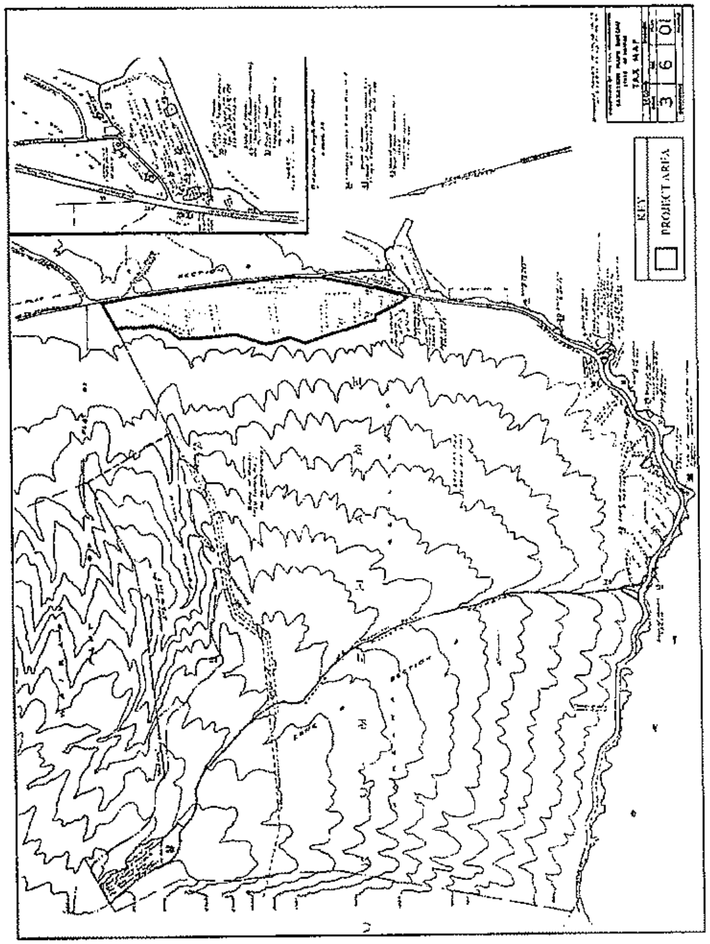

Figure 2: Tax Map Key [TMK] Showing Project Area Location.

the beginning of the 16th century [Fornander 1919–20, Vol. 6:248]). Land was considered the property of the king or *ali'i 'ai moku* (the *ali'i* who eats the island/district), which he held in trust for the gods. The title of *ali'i 'ai moku* ensured rights and responsibilities to the land, but did not confer absolute ownership. The king kept the parcels he wanted, his higher chiefs received large parcels from him and, in turn, they distributed smaller parcels to lesser chiefs. The *maka'āinana* (commoners) worked the individual plots of land.

In general, several terms, such as *moku*, *ahupua'a*, *'ili* or *'ili' āina* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua'a*) that customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua'a* were therefore able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua'a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *'ili 'āina* or *'ili* were smaller land divisions next in importance to the *ahupua'a* and were administered by the chief who controlled the *ahupua'a* in which it was located (Lyons 1875:33; Lucas 1995:40). The *mo'o'āina* were narrow strips of land within an *'ili*. The land holding of a tenant or *hoa 'āina* residing in an *ahupua'a* was called a *kuleana* (Lucas 1995:61). The project area is located in the *ahupua'a* of Ukumehame, meaning literally *paid mehame wood* (most likely referring to the prevalence of the *mehame* [*Antidesma Platyphyllum*] tree prized in ancient times for anvils on which to pound *olonā* [*Touchardia* sp.] and for the red dye made from its fruits), and Waikapū, or *water of the conch* (referring to a special conch shell in the legend of Puapua-lenalena; Pukui *et al.*:214, 223, Rock 1974).

TRADITIONAL SETTLEMENT PATTERNS

The Hawaiian economy was based on agricultural production and marine exploitation, as well as raising livestock and collecting wild plants and birds. Extended household groups settled in various *ahupua'a*. During pre-Contact times, there were primarily two types of agriculture, wetland and dry land, both of which were dependent upon geography and physiography. River valleys, like those present in the western portion of Ukumehame, provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) agriculture, which included pond fields and irrigation canals. Other cultigens, such as *kō* (sugar cane, *Saccharum officinarumo*) and *mai'a* (banana, *Musa* sp.), were also grown and, where appropriate, such crops as *'ualo* (sweet potato, *Ipomoea batatas*) were produced. This was the typical agricultural pattern seen during traditional times on all the Hawaiian Islands (Kirch and Sahlins 1992, Vol. 1:5, 119; Kirch 1985). Agricultural development on the leeward side of Maui was likely to have begun early in what is known as the Expansion Period (A.D. 1200–1400 [Kirch 1985]).

WAHI PANI (LEGENDARY PLACES)

Scattered amongst the agricultural and habitation sites were other places of cultural significance to the *kama'āina* of the district. At least three *heiau* were recorded in Ukumehame Ahupua'a. Fishing *ko'a* (shrine) were present at Pā Ko'a beach (presently known as Ukumehame Beach Park) and petroglyphs were inscribed on mountain boulders, the meanings of which have yet to be fully understood (Thrum 1908, 1916, 1917; Walker 1930).

Trails extended from the coast to the mountains, linking the two for both economic and social reasons. A trail known as the *alanui* (or, *King's Trail*), which was built by Kihapi'ilani, extended along the coast passing through all the major communities between Lāhainā and Mākena. A path along Kealaloa ridge leads to the summit of Pu'u Kukui, the headwaters of the Pohakea and Ukumehame streams, and beyond. The Lahaina Pali Trail, constructed in 1841, provided access to other parts of the island.

Most of the *ahupua'a* on the coast have been overshadowed by the famous roadstead and village of Lāhainā, which served as the capitol of the Hawaiian Kingdom after the conquest of Kamehameha until 1855. The ethnographic and historic literature, often our only link to the past, reveals that the lands around Lāhainā were rich agricultural areas irrigated by aqueducts originating in well-watered valleys with permanent occupation predominately on the coast. Handy and Handy have stated the space cultivated by the natives of Lāhainā (district) at about "...three leagues [9 miles] in length, and one in its greatest breadth. Beyond this all is dry and barren; everything recalls the image of desolation" (1972:593). Crops cultivated included coconut, breadfruit, paper mulberry, banana, taro, sweet potato, sugar cane, and gourds.

Ukumehame Valley, with its permanent stream was one of the sources along with Olowalu, Launiupoko, and Kaua'ula, providing agricultural opportunities for the growing leeward population. Handy and Handy reported:

> Southeastward along the coast from the *ali'i* settlement were a number of areas where dispersed populations grew taro, sweet potato, breadfruit and coconut on the slopes below and in the sides of valleys which had streams with constant flow. All this area, like that around and above Lahaina, is now sugar-cane land. Ukumehame had extensive terraces below its canyon, some of which were still planted with taro in 1934; these terrace systems used to extend well down below the canyon...[1972].

The western portion of Ukumehame Ahupua'a offered beach and mountain habitation, as well as agricultural areas along the stream banks and in the southern marshy section close to the coast. Land was valuable in this section and 44 claims for land were made during the Great Māhele (Waihona 'Aina 2004). Claimants for some parcels included several illustrious individuals who, although living in Lāhainā, claimed Ukumehame resources (David Malo, Charles Kanaina, etc.; McGerty and Spear 2005). Unlike the typical settlement, reflecting patterns of upland agriculture and coastal house sites, Ukumehame appears to have no distinct activity zones. House lots are found throughout the *ahupua'a* and *lo'i* are not only found along the stream, but continue into the plains fed by *'auwai* that is still extant (Devereux *et al* 1999).

However, the slope where the present project area is located faces east and is much drier than higher elevations to the west that receive as much as twenty times the level of precipitation. Air temperatures are consistently slightly warmer here than the Maui seasonal high and low averages, mostly due to the lower, coastal elevation. Four *mauka-makai* drainages cross the project area. In traditional times, it is likely that these narrow watercourses only flowed in times of heavy rains providing some moisture for marginal agriculture.

Closer to the current project area, in the southwest corner of Wailuku District, prehistoric settlement was not as dense as concentrations to the north. Climate had much to do with that trend, as the Ma'alaea area is a more arid environment than the rain-soaked fields to the north. According to Tomonari-Tuggle and Tuggle (1991), the majority of the pre-Contact population was located southwest of the project area, near what is now Ukumehame Beach State Park. Settlement was also probable north of Kealia Pond in Waikapu Ahupua'a. Handy and Handy report that before the historic sugar cane plantations were established in this region, water from Waikapu Stream "was diverted into lo'i and its overflow was dissipated on the dry plains of the broad isthmus between West and East Maui" (1972:496).

THE GREAT MĀHELE

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on Western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian economy to that of a market economy (Kame'eleihiwa 1992:169–70, 176; Kelly 1983:45, 1998:4; Daws 1962:111; Kuykendall 1938 Vol. I:145). The Great Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were thus made available and private ownership was instituted, the *maka'āinana* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims did not include any previously cultivated but presently fallow land, *'okipū* (on O'ahu), stream fisheries, or many other resources necessary for traditional survival (Kelly 1983; Kame'eleihiwa 1992:295; Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent, after which they could take possession of the property (Chinen 1961:16). There were 44 claims for land in Ukumehame during the Māhele, but none were in or near the project area (Waihona 'Aina 2004). Seventeen *'ili* were also named and some of the *ahupua'a* became government land to sell as they saw fit.

Sugar was to be the economic future of Hawai'i and as early as 1828, two Chinese brothers, Ahung and Atai, of Honolulu's Hungtai Company, arrived in Wailuku to explore the possibility of setting up one of its earliest sugar mills. Atai soon created a plant that processed sugar cane cultivated by Hawaiians, named the Hungtai Sugar Works (Dorrance and Morgan 2000:15–16). Ahung then joined Kamehameha III's sugar producing enterprise, although by 1844 both operations had ceased. The Wailuku Sugar Company was the next to follow, in 1862, and would expand sugar production over the next 126 years of its existence—4,450 acres by 1939, still more than three decades before its maximum production levels.

As it expanded its territory, the Wailuku Sugar Company first appeared on maps of the project area in the in the 1920s (Bureau of Conveyances, Grant 9794), although their acquisition of the project area land may have been as early as the turn of the century (Kennedy and Trimble 1992:4). Successive grants (Grant 10294 through to Grant S-13975) would follow in decades following and fully encompass the Ukumehame Ahupua'a side of the project area to Wailuku sugar land. Kennedy and Trimble (1992:4) summarize the history of the Waikapu Ahupua'a (*makai*) portion of the project area by detailing its acquisition from the state government on November 18, 1875 by Henry Cornwell (Grant 3152). Cornwell subsequently sold to Claus Spreckels, and by the turn of the century, the entire project area was under sugar cane cultivation.

Wailuku Sugar Company ended production in 1988, having averaged over 30,000 tons of sugar produced annually at its pinnacle in the 1970s (Dorrance and Morgan 2000:66). Owner C. Brewer and Company, Ltd. shut down sugar cultivation on the project area, which was then used almost entirely for pineapple cultivation starting no later than 1992 (Kennedy and Trimble 1992:1). The lands were under pineapple for at least the next three years (Tomonari-Tuggle

1995:11)—probably slightly longer—before shifting to smaller-scale 'garden' plots. Recently, a few plots of land in the southern portion of the project area were leased. These agricultural ventures have included banana trees, gourds, and papaya. Portions of the upper valley of Ukumehame have been used for cattle grazing and, from the 1970s to the present time, there have been a number of families cultivating plants along the stream gulch. The traditional Hawaiian *'auwai* has been repaired and is now utilized for *lo'i kalo* irrigation. Now that sugar is longer an issue, the stream has found its way to the coast, reviving the stream's ecosystem.

The current project area was utilized as a segment of an important trail system in the early 1800s, and probably prehistorically as well. The Lahaina Pali Trail is five miles long and crosses the southern slopes of the West Maui Mountains between Olowalu and Ma'alaea. The start of this trail, now a demonstration trail as part of the Na Ala Hele Trail System, borders the current project area near the center of the *mauka* border. By the historic period in which the trail's significance as a probable prehistoric route was realized, the portion *makai* of the current trail head (*i.e.*, the portion transecting the width of the current project area) was already destroyed by sugarcane cultivation. Thus, the trail starts immediately outside the project area, within the state-owned lands. A 1991 study by Tomonari-Tuggle and Tuggle documented 18 archaeological sites upon the trail, the majority of historic origin (Figure 3).

SUMMARY ANDCULTURAL ASSESSMEMNT

As suggested in the "Guidelines for Accessing Cultural Impacts" (OEQC 1997), CIAs incorporating personal interviews should include ethnographic and oral history interview procedures, circumstances attending the interviews, as well as the results of this consultation. It is also permissible to include organizations with individuals familiar with cultural practices and features associated with the project area.

The "level of effort undertaken" (OEQC 1997) has not been officially defined and is left up to the investigator. To SCS, a good faith effort means contacting agencies by letter, interviewing people who may be affected by the project or who know its history, researching sensitive areas and previous land use, holding meetings in which the public is invited to testify, notifying the community through the media, and other appropriate strategies based on the type of project being proposed and its impact potential. In the case of the present parcel that has been agricultural for over 100 years, letters of inquiry were sent to organizations whose expertise would include the project area. Consultation was sought from the Maui Office of Hawaiian Affairs, Community Resource Coordinator, Maui; the Office of Hawaiian Affairs, O'ahu;

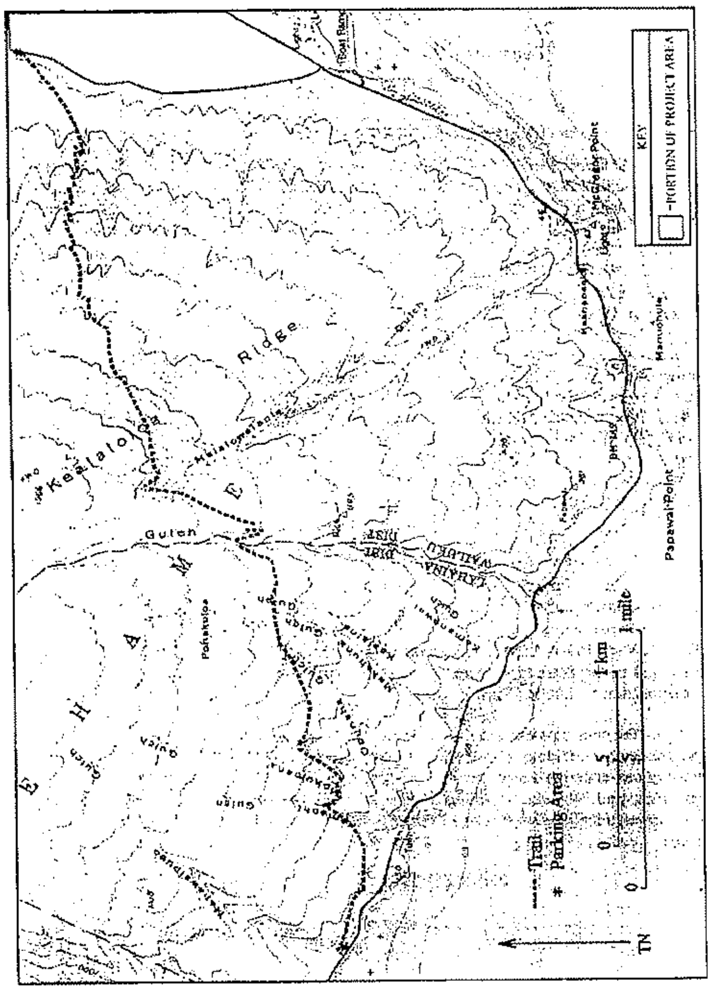

Figure 3: Map Showing Trail and Portion of Project Area.

Cultural Resource Planner for the Maui Planning Department; and the Central Maui Civic Club. Archival research included historical and cultural resources.

Additionally, historical and cultural source materials were also consulted were extensively used and can be found listed in the References Cited portion of the report. Such scholars as Thrum (1908, 1916 1917), Fornander (1919, 1969), Walker (1930), Kuykendall (1938), Beckwith (1940), Chinen (1961), Handy and Handy (1972), Puku`i *et al.* (1974), Kelly (1983, 1998), and Kame`eleihiwa (1992) have contributed, and continue to contribute, to our knowledge and understanding of Hawai`i, past and present. The works of these and other authors were consulted and incorporated in the report where appropriate. Land use document research was supplied by the Waihona `Aina Data base (2004).

Analysis of the potential effect of the project on cultural resources, practices or beliefs, the potential to isolate cultural resources, maintain practices or beliefs in their original setting, and the potential of the project to introduce elements that may alter the setting in which cultural practices take place is a requirement of the OEQC (No. 10, 1997). The project area has not been used for traditional cultural purposes within recent times. Based on historical research and the responses of the Maui Office of Hawaiian Affairs; Community Resource Coordinator, Maui; the Office of Hawaiian Affairs, O`ahu; the Cultural Resource Planner for the Maui Planning Department; and the Central Maui Civic Club, it is reasonable to conclude that Hawaiian rights related to gathering, access or other customary activities will not be affected and there will be no direct adverse effect upon cultural practices or beliefs.

However, the visual impact of the project from surrounding vantage points, for example, the highway, mountain trails, and the ocean is intrinsically more difficult to evaluate. Indirectly, each development may not seem to necessarily impose a negative cultural impact, especially when located on parcels that had been in agriculture for a century. But it is important to recognize that native Hawaiian cultural beliefs and practices are continually affected by the loss of land to development that intrudes into the natural setting and alters the landscape. These changes may affect certain cultural practices outside the project area. The custom of fishermen using certain landforms to triangulate secret, family fishing *ko`a* at sea, is an example of this affect. Maui has seen the development process intensify dramatically in the last 30 years, a trend that suggests the eventual permanent loss of traditional landscapes.

Documents submitted to SCS by AKF Development propose a residential project that will include a mix of single-family and multi-family housing types. Amenities also include an open-space buffer along the highway and a 15-acre community-oriented park linked to the neighborhoods with a pedestrian/bicycle path. Based on the response from various organizations and through archival research, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawaiian rights, or any ethnic group, related to gathering, access or other customary activities will not be affected by development activities on Parcel 18. It is recommended that Cultural Advisors be consulted during the planning process. In this way, appropriate mitigation measures, if needed, can be put in place before development occurs. However, because there were no activities identified, there are likely no adverse effects.

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APPENDIX I.

Economic and Fiscal Impact Assessment Report

PREPARED FOR: **MR. JESSE SPENCER**
MVI LLC
P.O. Box 97
Kihei, Hawaii 96753

EFFECTIVE DATE: **May 20, 2009**

ASSESSMENT OF ECONOMIC AND FISCAL IMPACTS, OHANA KAI VILLAGE SUBDIVISION, WAILUKU, ISLAND OF MAUI, HAWAII

ACM CONSULTANTS, INC.

ACM CONSULTANTS, INC.
A Real Estate Appraisal, Research & Advisory Group

September 25, 2009 09-9060

MR. JESSE SPENCER
MVI LLC
P.O. Box 97
Kihei, Hawaii 96753

Re: An Assessment of Economic and Fiscal Impacts for the proposed Ohana Kai Village Subdivision in Wailuku, Island and County of Maui

Dear Mr. Spencer:

In accordance with your request, we have analyzed the proposed Ohana Kai Village Subdivision, in Maʻalaea, District of Wailuku, Island and County of Maui, in order to provide a study of its potential economic and fiscal impacts. This *counseling report*, and the conclusions herein, are based on the on-site inspection of the property, a study of current political and economic conditions, and a historical review of the real estate market in the Central Maui and South Maui regions.

The subject consists of approximately 257 acres of land and is currently zoned Agricultural District. The project, which is still in its preliminary planning stage, is identified as the Ohana Kai Village Subdivision and will be located mauka of the Honoapiilani Highway. It will possess views of the ocean and off-shore islands.

The focus of this assignment essentially has three parts: (1) to define and delineate the subject and its market area; (2) to identify and analyze potential economic impacts with regard to the project; and (3) identify and analyze potential fiscal impacts with regard to the project.

The following report presents a narrative review of the assessment and our analysis of data along with other pertinent materials on which this report is predicated. It contains data and exhibits gathered in our investigations, and will include a description of the analytical process and our conclusions, as of May 20, 2009.

2073 Wells Street, Suite 100 ◆ Wailuku, Maui, HI 96793 ◆ Telephone: (808) 242-6481 ◆ Fax: (808) 242-1852

Thank you for allowing us the opportunity to work on this interesting assignment.

Respectfully submitted,
ACM Consultants, Inc.

Glenn K. Kunihisa, MAI, CRE
Certified General Appraiser,
State of Hawaii, CGA-039
Expiration: December 31, 2009

Shane M. Fukuda
Certified General Appraiser,
State of Hawaii, CGA-810
Expiration: December 31, 2009

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PART I – INTRODUCTION

A. EXECUTIVE SUMMARY

Background

The proposed Ohana Kai Village Subdivision is located on the mauka side of Honoapiilani Highway in Ma'alaea, District of Wailuku, Island and County of Maui. The subject is currently zoned Agricultural District and consists of approximately 257 acres of land. The project, which is still in its planning stage, will consist of approximately 1,100 single family residential units, a village town center, a charter school site, park areas, and an on-site wastewater treatment facility. Potable and non-potable water for the project will be provided by three water wells and associated infrastructure. According to the Developer, the proposed land use is as follows:

Proposed Land Use	Acreage
Single-Family Homes	197 acres
Village Town Center (Commercial)	7 acres
Wastewater Treatment Facility	7 acres
Retention/Open Space Areas	20 acres
Public/Quasi-Public Uses	16 acres
Major Roads	10 acres
Total:	± 257 acres

Preliminary plans called for three-bedroom homes with an average living area of 1,584 square feet, in addition to four-bedroom homes averaging 1,811 square feet. Early indications were for 60 percent of the units to be provided within the affordable housing price range, with the Developer stating he will strive to also offer the remaining 40 percent as affordable units. The Developer has estimated an 8-year build out for Ohana Kai Village.

Study Objectives

ACM Consultants, Inc. has been retained by Mr. Jesse Spencer of MVI LLC to assess the potential economic and fiscal impacts related to this proposed project. In particular, we studied economic trends and demographics, in addition to supply and demand factors for residential property, which includes single family house lots and residences.

The objectives of the economic and fiscal impact assessment were as follows: (1) to define and delineate the subject and its market area; (2) to identify and analyze potential economic impacts with regard to the project; and (3) identify and analyze potential fiscal impacts with regard to the project.

Conclusion

The development of this project will generate significant expenditures by the developer of this subdivision, in addition to the eventual homeowners. These investments are expected to favorably impact the Maui economy on a broad scale, and in a multitude of ways.

- Site work and infrastructure construction for this subdivision will immediately infuse capital into the Maui economy. Numerous consultants will be involved in the initial planning stages, and the construction trades will benefit from the job creation of this project.
- Advertising for the project and marketing of the units will benefit graphic artists, advertising companies, newspapers, real estate sales agents, escrow companies, etc.
- Individual site development will again result in additional work for engineers, architects, material suppliers, equipment rentals and sales, landscaping companies, and other related industries.
- The new homes will have an indirect affect on retail businesses, restaurants and service establishments as the expanded work force purchases goods and services. This should pass through the entire community, causing a ripple effect and increase the amount of capital flowing through Maui.
- Upkeep of the residential subdivision and commercial buildings will also translate into work for maintenance companies, painting companies, real estate management and leasing groups, etc.
- Fiscal benefits of this development will include increases in real estate taxes collected by the County of Maui, and additional income tax and general excise tax inflow for the State of Hawaii.

SUMMARY OF ECONOMIC IMPACTS

Total Construction Expenditures	$371,730,000
Annual Indirect Sales from Project Development	$58,455,000
Revenue from Home Sales	$378,739,000
Home Values at Full Build-Out	$533,500,000
Annual Taxable Expenditures and Sales	$129,319,000
Annual Profits from Taxable Expenditures and Sales	$15,255,000
Employment from Project Development	838 jobs
Payroll from Project Development	$40,609,000
Residents Supported by Project Development	1,777 residents
Housing Supported by Project Development	604 homes

SUMMARY OF FISCAL IMPACTS, COUNTY OF MAUI

Cumulative Net Revenues from Development	Not available
Net Annual Revenues at Full Build-Out	$407,000

SUMMARY OF FISCAL IMPACTS, STATE OF HAWAII

Cumulative Net Revenues from Development	$47,926,000
Net Annual Revenues at Full Build-Out	$(5,782,000)

B. PURPOSE OF THE REPORT

The purpose of this report, as of May 20, 2009, is to generate an economic and fiscal impact assessment with respect to the proposed Ohana Kai Village subdivision.

C. INTENDED USE OF THE REPORT

The intended use or function of this report is to provide potential economic and fiscal information and real estate market data to our client to be used in the entitlement process for Ohana Kai Village.

D. SCOPE OF THE REPORT

The Consultant has agreed to provide a current economic and fiscal impact assessment of this project by (1) defining and delineating the market area; (2) identifying and analyzing potential economic impacts with regard to the project; and (3) identifying and analyzing potential fiscal impacts with regard to the project. The assessment will be developed and prepared in conformity with, and subject to, the requirements of the Code of Professional Ethics and the Standards of Appraisal Practice of the Appraisal Institute, and the Uniform Standards of Professional Appraisal Practice.

E. STATEMENT OF COMPETENCY

ACM Consultants, Inc. (formerly ACM Real Estate Appraisers, Inc.) has been actively involved in the real estate appraisal and consulting business since 1982. Our business emphasis has focused mainly on the research, consultation and valuation of residential and commercial properties located within the State of Hawaii. The company considers itself competent to conduct an economic and fiscal impact assessment for a proposed subdivision in Wailuku, Island and County of Maui.

F. EXTRAORDINARY ASSUMPTIONS AND HYPOTHETICAL CONDITIONS

As of May 2009, the subject was still in the preliminary stages of planning. A land use map from the Developer provided a visual indication of the proposed layout of the project district. Several discussions were held with the Developer to better understand the housing products and complementary land uses planned for the subject. The Consultant is not liable for any changes in the project plan past this date, nor for information that has not been released or communicated to the Consultant.

The Consultant has no control over economic conditions and other international events that could have an affect upon Hawaii's economy and the Maui real estate market. As a result, this report has not made any assumptions regarding potential conflicts with other nations, or global external factors affecting economic conditions here.

Estimated construction costs, multipliers, tax rates, interest rates, earnings estimates, demographic information and per capita government expenditures were utilized by the Consultant in determining the economic and fiscal impacts of this proposed residential subdivision. These figures and statistics were obtained through conversations with those active in the construction industry, in addition to the review of various construction budgets, demographic and governmental reports. This consulting report has been based on the assumption that all information gleaned from third party sources is accurate for analytical purposes.

All conclusions in this counseling report have been stated in 2009 dollars, rounded to the nearest $1,000. In doing so, the Consultant has assumed that all construction costs, multipliers, tax rates, interest rates, earnings estimates, demographic information and per capita government expenditures will remain constant throughout the 8-year build-out forecasted by the Developer. Although the cyclical nature of the real estate market would undoubtedly produce varied annual assessments and impacts, for the purposes of this report, they have been reported as unweighted averages.

The counseling report is also subject to standard "Limiting and Contingent Conditions" located in the pages following.

G. CONFIDENTIALITY PROVISION

The contents of this economic and fiscal impact assessment are confidential. Release of this counseling report by ACM Consultants, Inc. is limited to you and for your preparation and submission of an Environmental Impact Statement for the proposed Ohana Kai Village subdivision. The intended users of this report include MVI LLC, Munekiyo and Hiraga, Inc. and the appropriate government agencies to which this report will be submitted. Any further release of this report, or portions herein, is strictly prohibited and you shall accept the risk and liability for any such release without the previous written consent of ACM Consultants, Inc. Further, you shall indemnify and defend ACM Consultants, Inc., and its individual consultants/appraisers, from any claims arising out of any such unauthorized disclosure.

H. CERTIFICATION

The undersigned does hereby certify that except as otherwise noted in this appraisal report:

1. The Consultants' compensation is not contingent upon the reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value estimate, the attainment of a stipulated result, or the occurrence of a subsequent event.

2. The Consultants have no present or prospective interest in the property that is the subject of this report, and no personal interest or bias with respect to the parties involved. Any "Estimate(s) of Market Value" in the consulting report is not based in whole or in part upon the race, color, or national origin of the prospective owners or occupants of the properties in the vicinity of the property appraised.

3. The Consultants have personally inspected the property, and are signatories of this Certification.

4. To the best of the Consultants' knowledge and belief, all statements of fact and information in this report are true and correct, and the Consultants have not knowingly withheld any significant information.

5. No other person provided significant professional assistance to the person(s) signing this report.

6. The reported analyses, opinions and conclusions are limited only by the reported assumptions and limiting conditions, and are the Consultants' personal unbiased professional analyses, opinions and conclusions.

7. All analyses, opinions and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Appraisal Practice.

8. This counseling report is subject to and in conformance with the Code of Professional Ethics and Standards of Professional Conduct of the Appraisal Institute. The analyses, opinions and conclusions of this counseling report have been made in conformity with, and is subject to, the requirements of Title XI of the Federal Financial Institutions Reform, Recovery, and Enforcement Act of 1989.

9. This counseling report is to be used only in its entirety and no part is to be used without the whole report. All conclusions and opinions concerning the real estate are set forth in the counseling report were prepared by the Consultants whose signatures appears on the counseling report. No change of any item in the counseling report shall be made by anyone other than the Consultants, and the Consultants shall have no responsibility for any such unauthorized change.

10. The Appraisal Institute, of which the Consultants are members, has a legal right to review this report.

11. The qualifications of the Consultants, including completed educational requirements of their candidacy are located in the Addendum to this report. Any member signing the report has completed the requirements of the Appraisal Institute's continuing education program.

ACM Consultants, Inc.

Glenn K. Kunihisa, MAI, CRE
Certified General Appraiser,
State of Hawaii, CGA-039
Expiration: December 31, 2009

Shane M. Fukuda
Certified General Appraiser,
State of Hawaii, CGA-810
Expiration: December 31, 2009

I. LIMITING AND CONTINGENT CONDITIONS

1) This is a Counseling Report which is intended to comply with the reporting requirements set forth under Standards Rule 5 of the Uniform Standards of Professional Appraisal Practice for a Counseling Report. The information contained in this report is specific to the needs of the client and for the intended use stated in this report. The Consultant is not responsible for unauthorized use of this report.

   This report has <u>not</u> been prepared for federally-related mortgage financing purposes, and has <u>not</u> been prepared in compliance with the requirements of Title XI of the Federal Financial Institutions Reform, Recovery, and Enforcement Act of 1989.

2) No responsibility is assumed for legal or title considerations. Title to the property is assumed to be good and marketable unless otherwise stated in this report.

3) The property analyzed is free and clear of any or all liens and encumbrances unless otherwise stated in this report.

4) Responsible ownership and competent property management are assumed unless otherwise stated in this report.

5) The information furnished by others is believed to be reliable. However, no warranty is given for its accuracy.

6) All engineering is assumed to be correct. Any plot plans and illustrative material in this report are included only to assist the reader in visualizing the property.

7) It is assumed that there are no hidden or unapparent conditions of the property, subsoil, or structures that render it more or less valuable. No responsibility is assumed for such conditions or for arranging for engineering studies that may be required to discover them.

8) It is assumed that there is full compliance with all applicable federal, state, and local environmental regulations and laws unless otherwise stated in this report.

9) It is assumed that all applicable zoning and use regulations and restrictions have been complied with, unless a nonconformity has been stated, defined, and considered in this counseling report.

10) It is assumed that all required licenses, certificates of occupancy or other legislative or administrative authority from any local, state, or national governmental or private entity or organization have been or can be obtained or renewed for any use on which the value estimates contained in this report are based.

11) Any sketch in this report may show approximate dimensions and is included to assist the reader in visualizing the property. Maps and exhibits found in this report are provided for reader reference purposes only. No guarantee as to accuracy is expressed or implied unless otherwise stated in this report. No survey has been made for the purpose of this report.

12) It is assumed that the utilization of the land and improvements is within the boundaries or property lines of the property described and that there is no encroachment or trespass unless otherwise stated in this report.

13) The Consultant is not qualified to detect hazardous waste and/or toxic materials. Any comment by the Consultant that might suggest the possibility of the presence of such substances should not be taken as confirmation of the presence of hazardous waste and/or toxic materials. Such determination would require investigation by a qualified expert in the field of environmental assessment. The presence of substances such as asbestos, urea-formaldehyde foam insulation, or other potentially hazardous materials may affect the value of the property. The Consultant's value estimate is predicated on the assumption that there is no such material on or in the property that would cause a loss in value unless otherwise stated in this report. No responsibility is assumed for any environmental conditions, or for any expertise or engineering knowledge required to discover them. The Consultant's descriptions and resulting comments are the result of the routine observations made during the analysis process.

14) Unless otherwise stated in this report, the subject property is evaluated without a specific compliance survey having been conducted to determine if the property is or is not in conformance with the requirements of the Americans with Disabilities Act. The presence of architectural and communications barriers that are structural in nature that would restrict access by disabled individuals may adversely affect the property's value, marketability, or utility.

15) Any proposed improvements are assumed to be completed in a good workmanlike manner in accordance with the submitted plans and specification.

16) The distribution, if any, of the total valuation in this report between land and improvements applies only under the stated program of utilization. The separate allocations for land and buildings must not be used in conjunction with any other appraisal and are invalid if so used.

17) Possession of this report, or a copy thereof, does not carry with it the right of publication. It may not be used for any purpose by any person other than the party to whom it is addressed without the written consent of the consultant, and in any event, only with property written qualification and only in its entirety.

18) Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the Consultant, or the firm with which the Consultant is connected) shall be disseminated to the public through advertising, public relations, news sales, or other media without prior written consent and approval of the Consultant.

PART II – DESCRIPTION OF THE PROPOSED DEVELOPMENT

A. LAND USE

The proposed Ohana Kai Village Subdivision is located on the mauka side of Honoapiilani Highway in Maʻalaea, District of Wailuku, Island and County of Maui. The subject is currently zoned Agricultural District and consists of approximately 257 acres of land. The project, which is still in its planning stage, will consist of approximately 1,100 single family residential units, a village town center, a charter school site, park areas, and an on-site wastewater treatment facility. Potable and non-potable water for the project will be provided by three water wells and associated infrastructure. According to the Developer, the proposed land use is as follows:

Proposed Land Use	Acreage
Single-Family Homes	197 acres
Village Town Center (Commercial)	7 acres
Wastewater Treatment Facility	7 acres
Retention/Open Space Areas	20 acres
Public/Quasi-Public Uses	16 acres
Major Roads	10 acres
Total:	± 257 acres

B. UNIT TYPES

Preliminary plans called for three-bedroom homes with an average living area of 1,584 square feet, in addition to four-bedroom homes averaging 1,811 square feet. Early indications were for 60 percent of the units to be provided within the affordable housing price range, with the Developer stating he will strive to also offer the remaining 40 percent as affordable units.

C. AFFORDABLE PRICE UNITS

According to the County of Maui's Workforce Housing Ordinance, affordable housing units are based on the following minimum allocation:

Gap Income (141 to 160% of Maui median income)	20 percent
Above Moderate Income (121 to 140%)	20 percent
Moderate Income (101 to 120%)	30 percent
Below Moderate Income (81 to 100%)	30 percent

As of the effective date, the Developer's intention was to offer all of the 660 affordable units at prices below the Gap Income range set by the County of Maui Department of Housing and Human Concerns. According to the Developer, the affordable units will consist of the following unit breakdown:

Above Moderate Income	165 homes (15 percent)
Moderate Income	165 homes (15 percent)
Below Moderate Income	165 homes (15 percent)
Low Income	165 homes (15 percent)

It is the intent of the Developer to offer the remaining 440 market homes (40 percent) within the Gap Income Group price range.

D. VILLAGE TOWN CENTER

Based on a preliminary land use map, Ohana Kai Village will have a 7-acre village town center. As of the effective date, there were no plans for this area; therefore, it is uncertain as to what will be built.

The Consultant acknowledges that the economic and fiscal impacts of the project could vary greatly, depending on construction costs, density and use of the village town center. For example, the village town center could consist of buildings with commercial condominium units for sale or leasable multi-tenant structures. Furthermore, the general excise tax to be paid from ongoing sales in the village town center cannot be gauged. Without knowing how this area will be utilized, it is impossible to determine an accurate estimate of its economic and fiscal impact. In this light, this report has focused primarily on the impacts of the residential component of the project.

PART III – ECONOMIC IMPACTS OF THE PROPOSED DEVELOPMENT

A. ECONOMIC IMPACTS RELATED TO DEVELOPMENT ACTIVITIES

Construction of the Subdivision Improvements
Site work for the project was estimated by the Developer to be $98,000,000, while the subdivision's wastewater treatment plant will cost approximately $5,000,000.

The Developer has stated that vertical construction costs for the homes would likely fall within a range of $125 to $175 per square foot. Research of projects offering similar entry level housing units revealed this range to be reasonable. In this light, the Consultant considered a $150 per square foot unit cost for the residential vertical construction costs. On average, the three-bedroom homes will have approximately 1,584 square feet of living area, while the four-bedroom homes will have around 1,811 square feet of living area. Vertical construction expenditures for the 1,100 homes totaled $268,730,000.

The above construction expenditures totaled $371,730,000, with an average of $46,466,250 per year.

Indirect Costs
The Developer had not yet determined indirect costs, as Ohana Kai Village is still in the initial design stage. These expenditures typically involve project design, planning, permitting, governmental fees, and construction bond, among others.

Indirect Sales
Development activities will also generate indirect sales, through the supply of goods and services to the various construction companies, in addition to the families of their employees. By the same token, these suppliers and their families will purchase goods and services from other companies. This chain reaction continues over and over, with some of the revenues leaking out of Hawaii's economy with each cycle. Based on State economic multipliers, off-island indirect sales were estimated at $34,385,000 per year. Meanwhile, Maui indirect sales were at $24,070,000 per year.

Sales of Single-Family Residences
Based on current evidence, the market price of the 3-bedroom homes will average approximately $475,000. Meanwhile, the 4-bedroom homes will have an average price of around $525,000. It should be noted that at these price points, the market price homes would still fall within the County of Maui 2009 Affordable Sales Price Guideline's "Gap Income" category, assuming a 6.00 percent interest rate. Gross sales revenue from the 440 market price homes is calculated to be $213,400,000.

To determine the expected sales revenue from the affordable price homes, the Consultant first averaged the low and high price from each affordable category range.

Category	Affordable Price Range	Average Price (rounded)
Above Moderate Income	$397,101 to $463,300	$430,200
Moderate Income	$330,901 to $397,100	$364,000
Below Moderate Income	$264,801 to $330,900	$297,900
Low Income	$260,000 to $264,800	$262,400

After applying the average price to each category's allotted units, the gross sales revenue for the affordable price homes amounted to $174,339,000.

Based on the preceding figures, the aggregate retail sales revenue of the 1,100 homes in the proposed Ohana Kai Village subdivision was forecasted to be $378,739,000, with an average of $48,467,000 per year.

Home Values at Full Build-Out
As determined in the previous section, the average **market price** for the 3-bedroom homes (880 units) was $475,000, while the average **market price** for the 4-bedroom homes (220 units) was $525,000. Based on the unit breakdown provided by the Developer, the property values of the 1,100 units, as of the effective date, calculated to be $533,500,000.

Taxable Expenditures and Sales
Final sales generated by the development of the project totaled $70,802,000 per year and were considered to be from sales of the homes, in addition to the personal consumption expenditures of the construction workers and indirect employees. These are sales that are subject to the State of Hawaii General Excise Tax of 4.166 percent.

Intermediate sales, taxed at 0.5 percent, were determined to be from construction expenditures and indirect sales related to construction. After deducting the personal consumption expenditures from the previous section, the intermediate sales were forecasted to be $58,516,000 per year. When added to the final sales, the taxable expenditures and sales amounted to $129,319,000.

Profits Realized from Project Development
The Consultant has forecast profit and risk premium from the construction of the project to be $15,255,000 per year, over the 8-year project build-out. It should be noted that this figure considers both direct and indirect sales at all levels of business. For example, in addition to the profit to the Developer, there will be profit expectancies by subcontractors, service vendors, supply companies, and supportive goods and services providers.

Direct and Indirect Employment
New job opportunities created by this development will start with the design and entitlement process, employing architects, engineers, surveyors, and land use planners. Site work, road work and the installation of utility and drainage lines typically utilize heavy equipment operators, tractor-trailer drivers and utility personnel. Vertical construction of the homes, commercial buildings, wastewater treatment facility and the charter school will employ masons, carpenters, sheet metal workers, roofers, drywall installers, plumbers, electricians and painters. Finish work will require cabinet makers, carpet and tile installers, interior decorators, and landscapers. Application of State economic multipliers resulted in a forecasted 335 jobs directly related to the construction of this subdivision.

The increase in construction will also create the need for supplementary companies to strengthen their labor force. These jobs may be from building supply companies, hardware stores, equipment rental companies, and shipping/warehousing companies. In addition, the construction laborers and their families will patronize local goods and services providers. Grocers, restaurants, service stations, auto repair shops, financial institutions, recreational venues, medical facilities and personal care businesses could be considered potential companies that would need to bolster their employee count. Based on State economic multipliers, indirect jobs on Maui were forecasted to be 337 jobs, resulting in a total of 672 Maui jobs directly and indirectly tied to the development of the project. Meanwhile, indirect employment on Oahu could possibly add 166 jobs, for an overall tally of 838 jobs during the 8-year project build out.

Direct and Indirect Payroll
Payroll directly related to the development of the project was estimated to be $20,324,000 per annum, based on statistics gleaned from the State of Hawaii Department of Labor and Industrial Relations (DLIR) and job counts determined in the previous section. It should be noted that most construction positions are expected to be filled by Maui laborers.

Indirect Maui payroll came out to $13,258,000 per year, while indirect Oahu payroll was $7,027,000 annually. Total direct and indirect payroll attributed to the development of the subject was forecasted to be $40,609,000 per year.

Population Supported by Project Development
Statistical information obtained from the DLIR indicated Maui residents supported by construction jobs attributed to this development are expected to be 704 residents, while residents supported by indirect jobs amounted to 708 residents.

Oahu residents supported by indirect jobs created by this development were estimated to be 365 residents. In all, 1,777 residents on Maui and Oahu will potentially be supported by the development of this project.

Housing for Supported Population
Statistical information obtained from the DLIR indicated Maui homes supported by construction jobs attributed to this development are expected to be 239 homes, while homes supported through indirect jobs amounted to 241 homes.

Oahu homes supported through indirect jobs created by this development were estimated to be 124. In all, 604 on Maui and Oahu will potentially be supported by the development of this project. It should be noted that this category does not necessarily represent additional housing units needed for direct and indirect employees, but indicates the potential number of households that would be financially linked to monies earned by such workers.

B. ECONOMIC IMPACTS AT FULL BUILD-OUT

Housing Characteristics and Assumptions
According to the Developer, there will be a total of 352 three-bedroom **market price homes.** It was concluded that 100 percent of these homes would be owner-occupied, with an average of 3.1 residents per household. Average household income was estimated to be $100,000 per year. As previously stated, the average market value for each three-bedroom home was $475,000.

There will be a total of 88 four-bedroom **market price homes.** It was concluded that 100 percent of these homes would be owner-occupied, with an average of 3.2 residents per household. Average household income was estimated to be $100,000 per year. As previously stated, the average market value for each four-bedroom home was $525,000.

Since the Developer had not determined the breakdown of the models in the **affordable price** categories, the Consultant utilized an average of 3.15 residents per household and average property values of $485,000 per home. Annual household income for the Above Moderate, Moderate, and Below Moderate Groups was determined by averaging the high and low median income from their respective range. In the case of the Low Income Group, 80 percent of median income was utilized. All 660 affordable priced homes were assumed to be owner-occupied. For both the affordable price homes and market price homes, it was assumed that annual consumption expenditures would equal 50 percent of household income.

Project Demographics and Related Economic Activities
At full build-out, project demographics and related economic activities for Ohana Kai Village are as follows:

Residents	2,933 residents
Student Population	440 students
Workforce Residents	1,467 workers
Annual Aggregate Household Income	$83,811,000
Annual Sales Revenues, Consumption Expenditures	$41,906,000
Annual Profit Generation, Consumption Expenditures	$4,191,000
Property Values	$533,500,000

PART IV – FISCAL IMPACTS, COUNTY OF MAUI

A. FISCAL IMPACTS RELATED TO DEVELOPMENT ACTIVITIES

Net Taxable Value, Project Homes
Ohana Kai Village will feature 1,100 single-family residential homes, slated to be built over an 8-year period. In the previous section, it was assumed that 100 percent of the homes will be owner-occupied. As such, all 1,100 homeowners would qualify for the County of Maui homeowner exemption, which currently stands at $300,000 per qualified home. After deduction of this exemption, the net taxable value of the homes amounted to $203,500,000.

Development Activities
Typically, the County accumulates revenue from developments in the form of fees, such as for building permits and impacts attributed to the development. As of the effective date, the Developer did not have an estimate of these indirect costs to analyze their fiscal impact.

Cumulative expenditures typically include the County's share of infrastructure and facility improvements, which may include interior roads, water sources, drainage and sewer systems, and recreational areas. In the case of the subject, the Developer will bear the majority of these improvement costs. Furthermore, as of the effective date, the Developer was not planning to dedicate the park area to the County. Instead, ownership of the park area would be held by the homeowner's association; although open to the public. Costs for the vertical improvements, in the form of playground equipment and general park structures, were assumed to be included in the Project Site Work line item.

B. FISCAL IMPACTS AT FULL BUILD-OUT

At full build-out, County revenue would primarily be generated in the form of real property taxes. As previously discussed, the net taxable value of the homes was determined to be $203,500,000. Residential owner-occupants who qualify for the County homeowner exemption are assessed at PITT Code 900 (Homeowner). Currently, this tax class has a mill rate of $2.00 per $1,000 of assessed value. Therefore, the tax burden for the project homes equated to $407,000 per year. However, to determine the net impact to the County, the current property tax of $324 per year must be deducted.

Since the County would not receive the park from the Developer, annual expenditures related to its upkeep were assumed to be the burden of the homeowner's association. As such, there were no annual County expenditures; therefore, the net annual revenue to the County at full build-out was $407,000.

The Consultant notes that should the park area be dedicated to the County, annual maintenance expenditures would occur. It is possible that this would result in negative net annual revenue. This would not be unexpected, since this project consists of entry level, owner-occupant homes. As such, its property tax base is significantly reduced by the homeowner exemption. Furthermore, the County of Maui's property tax system is structured in a way that workforce subdivisions such as the subject are essentially subsidized by revenue received in other property classes. The majority of Maui's property tax revenue is generated by time share, hotel/resort, industrial and commercial properties, which have substantially higher mill rates.

PART V – FISCAL IMPACTS, STATE OF HAWAII

A. FISCAL IMPACTS RELATED TO DEVELOPMENT ACTIVITIES

The majority of the revenues to the State of Hawaii will be recognized through various taxes, including Conveyance Tax, Excise Tax, Corporate Income Tax, and Personal Income Tax. Currently, the conveyance tax on owner-occupied homes below $600,000 is 0.1 percent of sales. Based on the aggregate retail revenue expected for this project, the conveyance tax due to development is $534,000.

Excise tax is based on two rates, 4.166 percent for final sales and 0.5 percent for intermediate sales. The cumulative tax expectancy for final sales amounted to $23,297,000, while intermediate sales should equal $2,341,000.

Corporate Income Tax is realized on profits gained through the development of this project, which was estimated to be $7,811,000. Meanwhile, personal income tax was forecasted to be $13,645,000. As such, cumulative revenues related to development activities were $47,926,000.

Lacking any cumulative expenses, the total net revenue to the State from development of this project amounted to $47,926,000, or an average of $5,991,000 per year, over the 8-year build out.

B. FISCAL IMPACTS AT FULL BUILD-OUT

At full build-out, State revenue was estimated to be from Personal Income Tax, Excise Tax, and Other Revenues. On an annual basis, personal income tax amounted to $3,520,000, while excise tax on consumption expenditures was estimated to be $1,536,000 per year. Other revenue expectancy was forecasted to be $6,453,000 per year. These other revenues may come from fuel taxes, registration taxes, accommodations, tobacco and liquor, and rental vehicles, etc. Total annual revenues at full build-out amounted to $11,509,000.

Annual expenditures to the State were said to be from the ongoing operation of the charter school, in addition to other services to residents, and debt service attributed to general improvements. The educational expenditure was calculated to be $5,676,000 per year. At the same time, annual expenditure for services to residents was estimated to be $10,559,000 and debt service came out to $1,056,000. Examples of services to residents include operation of civic, health and social services; as well as maintenance to highways, parks and recreational areas. General improvement debt service was based on typical per-capita figures currently carried by residents in Hawaii. Total annual expenditure at full build-out was $17,291,000. When deducted from the total annual revenues from the previous paragraph, the net annual revenue at full build-out was forecasted to be negative $5,782,000.

The negative net annual revenue at full build-out was primarily attributed to the household income levels within this subdivision. Since Ohana Kai Village will be geared toward the workforce market segment, annual household income is expected to be on the lower side of the range. As personal income tax and excise tax estimates were based on percentages of household income, it is not surprising that total annual revenues were outpaced by total annual expenditures. In general, State services to workforce residential communities are subsidized by revenues received from the visitor industry, businesses and communities with higher annual household incomes.

Furthermore, as previously discussed, this assessment has not considered the potential impact of the village town center. There were no plans that could be reviewed for this 7-acre area; however, the building area-to-lot ratio for commercial retail/office projects generally ranges from 40 to 60 percent. Hypothetically speaking, after deducting 20 percent (1.4 acres) for roads and supportive infrastructure (i.e. sidewalks, curbs, gutters, etc.), the subject's village town center would have approximately 122,000 square feet of buildable area, at 50 percent density. As a point of reference, Maui's newest retail center, Lahaina Gateway, is approximately 137,000 square feet in size.

There will need to be a significant number of employees in this commercial center, which would increase State's personal income tax revenues. Granted, many of these positions would be filled by those already in the workforce, yet those coming of working age and transplants from off-island would also be potential employees. With regard to general excise tax, some sales generated by the subject's village town center may take away from sales of existing businesses. However, new sales will also contribute to the amount of general excise tax collected by businesses.

PART VI – REFERENCES

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EXHIBITS

EXHIBIT A
Copy of County of Maui
Residential Workforce Housing Policy

Chapter 2.96

RESIDENTIAL WORKFORCE HOUSING POLICY

Sections:

2.96.010 Purpose.

The purpose of this chapter is to enhance the public welfare by ensuring that the housing needs of the County are addressed. The council finds that there is a critical shortage of affordable housing, making home acquisition by the majority of County resident workers extremely difficult, and creating a shortage of affordable rental units. The resident workforce is leaving the County in search of affordable housing, and new employees are being deterred by the high cost of living. To maintain a sufficient resident workforce in all fields of employment, and to ensure the public safety and general welfare of the residents of the County, resident workforce housing needs must be addressed. It is the intent of this chapter to encourage the provision and maintenance of residential workforce housing units, for both purchase and rental, to meet the needs of income-qualified households for the workforce, students, and special housing target groups. (Ord. 3418 § 1 (part), 2006)

2.96.020 Definitions.

Whenever used in this chapter, unless a different meaning clearly appears from the context:

"Community land trust" means a nonprofit organization that acquires land that:

1. Is held in perpetuity;
2. Is primarily for conveyance under a long-term ground lease for the creation of dwelling units that shall be sold or rented to applicants within the income-qualified groups established by this chapter; and
3. Retains an option to purchase any dwelling unit at a price determined by formula that is designed to ensure that the dwelling unit remains affordable in perpetuity.

"Council" means the Maui County council.

"Density bonus" means a density increase over the otherwise allowed residential density under the applicable zoning and land use designation, without the need for further council approval, subject to enabling legislation.

"Department" means the department of housing and human concerns.

"Director" means the director of housing and human concerns, County of Maui.

"Disabled" means a person who is determined, by a medical doctor, to have a physical, mental, or emotional impairment that:

1. Is expected to be of long-continued and indefinite duration;
2. Substantially impedes his or her ability to live independently; and
3. Is of such a nature that the ability to live independently could be improved by more suitable housing conditions.

"Division" means the housing division of the department of housing and human concerns, County of Maui.

"Elderly" means a person who has attained the age of sixty-two years.

"Employed" means working for compensation in the County for any number of hours.

"Homeless" means:

1. An individual or family who lacks a fixed, regular, and adequate nighttime residence; or
2. An individual or family who has a primary nighttime residence that is:
    a. A supervised shelter designed to provide temporary living accommodations; or
    b. A place not designed for or ordinarily used as sleeping accommodations for human beings.

"HUD" means the United States Department of Housing and Urban Development.

"Improved land" means land that has necessary infrastructural improvements to support a public use project or a use density of at least a single-family or a two-family residential building per acre, in conformity with state and County zoning laws and building permit requirements.

"Lot" means any improved or unimproved land that has been subdivided.

"Median family income" means the middle income in a series of incomes ranked from smallest to largest as determined by HUD for the County, or as adjusted by the department, for Hana, Lanai, and Molokai.

"Prevailing interest rate" means the average interest rate of two mortgage lenders in the County, acceptable to the director, for a thirty year fixed loan with no discount points.

"Qualified housing provider" means a community land trust, nonprofit agency, or other private or public organization, agency, or entity authorized and designated by the department in accordance with section 2.96.150 to own, develop, construct, administer, operate or otherwise provide residential workforce housing required under this chapter.

"Resident" means a person who meets one of the following criteria:

1. Currently employed in the County;
2. Retired from employment in the County, having worked in the County immediately prior to retirement;
3. A full-time student residing in the County;
4. A disabled person residing in the County who was employed in the County prior to becoming disabled;
5. The parent or guardian of a disabled person residing in the County;
6. A spouse or dependent of any such employee, retired person, student, or disabled person residing in the County; or
7. In the event of the death of the employee, retired person, student, or disabled person, the spouse or dependent of any such person residing in the County.

"Residential workforce housing unit" means a unit or lot to be sold or rented to residents within one of the following income groups as established by the department:

1. "Very low income," which are those households whose gross annual family income is fifty per cent or less of the area median income as established by HUD, or as adjusted by the department, for Hana, Lanai, and Molokai;
2. "Low income," which are those households whose gross annual family income is more than fifty per cent, but not more than eighty per cent of the area median income as established by HUD, or as adjusted by the department, for Hana, Lanai, and Molokai;
3. "Below-moderate income," which are those households whose gross annual family income is more than eighty per cent, but not more than one hundred per cent of the area median income as established by HUD, or as adjusted by the department, for Hana, Lanai, and Molokai;
4. "Moderate income," which are those households whose gross annual family income is more than one hundred per cent, but not more than one hundred twenty per cent of the area median income as established by HUD, or as adjusted by the department, for Hana, Lanai, and Molokai;
5. "Above-moderate income," which are those households whose gross annual family income is more than one hundred twenty per cent, but not more than one hundred forty per cent of the area median income as established by HUD, or as adjusted by the department, for Hana, Lanai, and Molokai; and
6. "Gap income," which are those households whose gross annual family income is more than one hundred forty per cent, but not more than one hundred sixty per cent of the area median income as established by HUD, or as adjusted by the department, for Hana, Lanai, and Molokai.

"Special housing target group" means a group of residents that can be demographically defined as having a special or unique housing need, including but not limited to, the elderly, homeless, and disabled.

"Unimproved land" means land not classified as "improved land."

"Wait list area" means Hana, Lanai, Maui (excluding Hana), or Molokai. (Ord. 3512 § 1, 2007; Ord. 3418 § 1 (part), 2006)

2.96.030 Applicability.

A. Any development, including the subdivision of land and/or the construction of single-family dwelling units, two-family dwelling units, multifamily dwelling units, or hotels, as defined in section 19.04.040 of this code, whether constructed at one time or over several years, shall be subject to this chapter upon final subdivision or building permit approval, whichever is applicable and occurs first, if it will result in the creation of the following:

1. Five or more dwelling units, excluding farm labor dwellings or a second farm dwelling, as defined in section 19.04.040 of this code; provided that, such farm labor dwelling or farm dwelling is in full compliance with chapter 205, Hawaii Revised Statutes, and is not part of a condominium property regime, as set forth in chapter 514A, Hawaii Revised Statutes;
2. Five or more new lots;
3. A combination of dwelling units and new lots totaling five or more;
4. Three or more lodging, dwelling, or time share units in a hotel;
5. A conversion of one or more hotel units to dwelling units or time share units; or
6. Any hotel redevelopment or renovation project that increases the number of lodging or dwelling units in a hotel.

B. Exemptions. This chapter shall not apply to any development that falls into one or more of the following categories:

1. A development subject to an affordable housing requirement, evidenced by an executed affordable housing agreement with the County, currently in effect and approved prior to the effective date of this chapter;
2. A development subject to a change in zoning condition that requires affordable or residential workforce housing, unless the condition expressly allows for the application of the affordable housing or residential workforce housing policy set forth herein;
3. A subdivision granted preliminary subdivision approval prior to the effective date of this chapter;
4. A building permit application submitted prior to the effective date of this chapter;
5. A family subdivision, for immediate family members, as described in sections 18.20.280.B.1 and B.2 of this code; or
6. A development by a government entity; a project pursuant to section 201H-H, Hawaii Revised Statutes; a community land trust; or an affordable housing project with more than the residential workforce housing units, in-lieu fees, or in-lieu land required by section 2.96.040 of this chapter, as approved by the director.

C. Adjustment.

1. A developer of any development subject to this chapter may appeal to the council for a reduction, adjustment, or waiver of the requirements based upon the absence of any reasonable relationship or nexus between the impact of the development and the number of residential workforce housing units or in-lieu fees/land required.
2. Any such appeal shall be made in writing and filed with the County clerk prior to final subdivision approval or issuance of a building permit for the development, whichever is applicable. Any such appeal shall administratively stay the processing of the development's subdivision or building permit, whichever is applicable, until a decision on the appeal is rendered. The appeal shall set forth in detail the factual and legal basis for the claim of reduction, adjustment, or waiver, and the developer shall bear the burden of presenting substantial evidence to support the appeal, including comparable and relevant technical information.
3. The council, or if the appeal is assigned to a council committee, the council committee, shall convene a meeting within forty-five days of the County clerk's receipt of the appeal,

to consider the appeal. The council shall approve or disapprove the appeal by resolution within forty-five days from the date the developer has concluded its presentation of evidence supporting the appeal in a council or committee meeting.

4. If the council or a council committee has not convened a meeting within forty-five days of the County clerk's receipt of the appeal, or if the council does not approve or disapprove the appeal by resolution within forty-five days from the date the developer has concluded its presentation of evidence at the council or council committee meeting, the appeal, as submitted by the developer, shall be deemed approved by the council.

5. If a reduction, adjustment, or waiver is granted by the council, any subsequent substantive change or modification in use within the development, as determined by the director, shall invalidate the reduction, adjustment, or waiver previously granted. (Ord. 3546 § 1, 2008; Ord. 3418 § 1 (part), 2006)

2.96.040 Residential workforce housing requirements.

A. Prior to final subdivision approval or issuance of a building permit for a development subject to this chapter, the department shall require the developer to enter into a residential workforce housing agreement that requires the following:

1. When more than fifty per cent of the dwelling units and/or new lots in the development are offered for sale for less than $600,000, forty per cent of the total number of units and/or lots shall be sold or rented to residents within the income-qualified groups established by this ordinance;

2. When fifty per cent or more of the dwelling units and/or new lots in the development are offered for sale for $600,000 or more, fifty per cent of the total number of units and/or lots shall be sold or rented to residents within the income-qualified groups established by this ordinance; or

3. When three or more new lodging, dwelling, or time share units in a hotel are created, when there is a conversion of one or more hotel units to dwelling units or time share units, when any hotel redevelopment or renovation project increases the number of lodging or dwelling units in the hotel, or when five or more new dwelling units for rental purposes are created, then forty per cent of the total number of new, additional and/or converted units shall be sold or rented to residents within the income-qualified groups established by this ordinance.

B. The requirement may be satisfied by one or a combination of the following, which shall be determined by the director and stated in the residential workforce housing agreement:

1. Offer for sale, single-family dwelling units, two-family dwelling units, or multi-family dwelling units as residential workforce housing within the community plan area;

2. Offer for rent, multi-family dwelling units within the community plan area. A developer may partner with a nonprofit organization or community land trust on a specific affordable project to either construct new multi-family dwelling units or renovate existing nonhabitable multi-family dwelling units, paying an amount that represents the difference in unit costs for a family of four at one hundred per cent and one hundred forty per cent of median income pursuant to HUD affordable sales price guidelines as adjusted by the department by wait list area. The developer's requirement shall be deemed satisfied upon receipt of payment. Moneys shall be deposited into the affordable housing fund;

3. In lieu of directly selling or renting units pursuant to subsection B.1 or B.2, the developer may convey such units to a qualified housing provider subject to department approval pursuant to section 2.96.150; or

4. In lieu of providing residential workforce housing units, the residential workforce housing requirement may be satisfied by payment of a fee, by providing improved land, or by providing unimproved land. Any fee must be approved by council resolution. Any donation of land must be approved by the council pursuant to section 3.44.015 of this code.

a. The in-lieu fee per unit for sale/ownership units shall be equal to thirty per cent of the average projected sales price of the market rate dwelling units and/or new lots in the development. The in-lieu fee per unit for hotel, time share, converted or rental units shall be an amount that represents the difference in unit costs for a family of four at one hundred per cent and one hundred sixty per cent of median income pursuant to HUD affordable sales price guidelines, or as adjusted by the department, for Hana, Lanai, and Molokai. The in-lieu fee shall be designated in the residential workforce housing agreement, and be secured by a lien on the units if not paid before the units are constructed or converted. The in-lieu fee shall accrue to the affordable housing fund, which shall be established in the County budget for the purpose of enhancing and supporting housing needs and programs of income-qualified households and special housing target groups; and

b. The value of the improved land shall not be less than the in-lieu fee that would otherwise have been required under this chapter. The value of the unimproved land shall be at least equal to twice the value of the improved land. The in-lieu land shall be used to address the housing needs of income-qualified households and special housing target groups. Such land shall have a minimum lot size of six thousand square feet or the minimum lot size allowed by the applicable zoning, whichever is greater. Such land must be acceptable to the department and may be used by the County or others approved by the County to develop residential workforce housing, resource centers for the homeless, day care centers for seniors, or other public use projects that address the housing needs of income-qualified households and special housing target groups. (Ord. 3438 § 1, 2007: Ord. 3418 § 1 (part), 2006)

2.96.050 Residential workforce housing credits.

A. Credits may be given under the following circumstances:

1. One residential workforce housing credit shall be given for every single-family dwelling unit, two-family dwelling unit, or multifamily dwelling unit constructed in excess of the residential workforce housing required by section 2.96.040 of this chapter; and

2. One residential workforce housing credit shall be given for every ten market rate units that contain a deed restriction requiring an owner to occupy the unit for a minimum of three years, and share with the County fifty per cent of any profits realized from a sale of that unit within the three-year owner-occupancy period.

B. The credit must be used in the same community plan area in which the unit was constructed.

C. The credit must be applied toward the same type of unit constructed.

D. The credit must be used for the same income group in which the credit was earned, when the credit is earned by constructing more residential workforce housing units than required.

E. The credit must be used for the "gap income" group when the credit is earned by creating a deed restriction.

F. The credit may be used for a future development, but may not be used for an affordable housing or residential workforce housing unit owed at the time the credit is given. (Ord. 3418 § 1 (part), 2006)

2.96.060 Residential workforce housing restrictions--ownership units.

A. Ownership units shall be subject to this chapter for twenty-five years from the initial sale of the unit.

B. Unless an exemption is granted by the director, the percentage of ownership units within each income group shall be as follows:

1. Thirty per cent of the ownership units shall be for "below-moderate income" residents;
2. Thirty per cent of the ownership units shall be for "moderate income" residents;
3. Twenty per cent of the ownership units shall be for "above-moderate income" residents; and
4. Twenty per cent of the ownership units shall be for "gap income" residents.

C. Timing of Completion.

1. Residential workforce housing units shall be made, available for occupancy either before or concurrently with market rate units at the same ratio required of the development; and
2. Certificates of occupancy shall not be issued and/or final inspections shall not be passed for the market rate units unless certificates of occupancy are issued and/or final inspections are passed for the residential workforce housing units concurrently or sooner.

D. Deed Restrictions.

1. The unit must be owner-occupied;
2. The unit must remain affordable for twenty-five years from the initial sale, with the owner notifying the department upon a decision to sell; and
3. Under special circumstances an owner of a residential workforce housing unit may appeal to the department for a waiver of the owner-occupancy deed restriction; these circumstances would include, but are not limited to, assignment to active duty military or short-term contracts for off-island employment.

E. Sales Price--Single-Family Dwelling Units. The sales price of a new single-family dwelling unit shall be set by the department, at the time the developer is ready to market the unit, using the following guidelines:

1. A down payment of five per cent shall be assumed;
2. The prevailing interest rate shall be used;
3. The price of a one-bedroom unit shall be based upon seventy per cent of the median income of the wait list area, adjusted to the respective target income group;
4. The price of a two-bedroom unit shall be based upon eighty-five per cent of the median income of the wait list area, adjusted to the respective target income group;
5. The price of a three-bedroom unit shall be based upon one hundred per cent of the median income of the wait list area, adjusted to the respective target income group;
6. The price of a four-bedroom unit shall be based upon one hundred fifteen per cent of the median income of the wait list area, adjusted to the respective target income group; and
7. Applicants in each income group shall be assumed to pay no more than thirty per cent of the gross annual income of the highest percentage in the applicant's group.

F. Sales Price--Two-Family or Multifamily Dwelling Units. The sales price of a new two-family or multifamily dwelling unit shall be ninety per cent of the price of a single-family dwelling unit, as established in subsection E of this section.

G. Resale Price. The maximum resale price shall be established by the department using the following guidelines:

1. An appraisal of the property shall be required before occupancy;
2. A second appraisal shall be required upon a decision to sell the unit; and
3. Twenty-five per cent of the difference between the two appraisals shall be added to the owner's purchase price.

H. Foreclosures.

1. The County shall have the first option to purchase the unit; and
2. If the County does not exercise its right to purchase, the units may be offered at an affordable price, set by the director, with the same deed restrictions. (Ord. 3418 § 1 (part), 2006)

2.96.070 Residential workforce housing restrictions--rental units.

A. Rental units shall be subject to this chapter for the life of the unit, as determined by a building inspector with the development services administration of the department of public works and environmental management.

B. Unless an exemption is granted by the director, the percentage of rental units within each income group shall be as follows:

1. One-third of the rental units shall be for "very low income" and "low income" residents;
2. One-third of the rental units shall be for "below-moderate income" residents; and
3. One-third of the rental units shall be for "moderate income" residents.

C. Timing of Completion.

1. Except when the developer is partnering with a nonprofit organization or community land trust as allowed in section 2.96.040.B.2 of this chapter, residential workforce housing units shall be made available for occupancy either prior to or concurrently with market rate units at the same ratio required of the development. Certificates of occupancy shall not be issued and/or final inspections shall not be passed for the market rate units unless certificates of occupancy are issued and/or final inspections are passed for the residential workforce housing units concurrently or sooner; and
2. When the developer is partnering with a nonprofit organization or community land trust, the payment to the nonprofit organization or community land trust must be made prior to final subdivision approval or issuance of a building permit for the market rate units. The residential workforce housing units must be constructed within three years of the date the certificates of occupancy are issued and/or the final inspections are passed for the market rate units.

D. Vacancies. Any rental unit vacancy must be filled by an applicant in the appropriate income group to better maintain an equal distribution of rentals across the "very low income" and "low income," "below-moderate income," and "moderate income" groups.

E. Deed Restrictions.

1. The rental unit must remain affordable for the life of the unit;
2. The owner must notify the department upon a decision to sell the rental development; and
3. Any new owner must comply with the deed restrictions.

F. Rental Rates. The monthly rental rates shall be set by the department based on HUD income limits.

G. Foreclosures.

1. The County will have the first option to purchase the rental development; and
2. If the County does not exercise its right to purchase, the rental development may be sold with the same deed restrictions. (Ord. 3418 § 1 (part), 2006)

2.96.080 Residential workforce housing agreement.

A. Before final subdivision approval or issuance of a building permit, the developer shall enter into a residential workforce housing agreement that sets forth the detailed terms and conditions of compliance with the residential workforce housing policy, including but not limited to:

1. Sales or rental periods for the residential workforce housing units, which specify procedures for the release of units from the residential workforce housing requirements should units not be sold or rented following the expiration of the sales or rental periods;
2. Identification of the number, type, and location of units;
3. Designation of units for specific income and/or special housing target groups;
4. Marketing process for the residential workforce housing units;
5. Eligibility of income-qualified households;
6. Provision for residential workforce housing credits, as applicable;
7. Payment of in-lieu fees or provision of in-lieu land; and
8. Resale restrictions, which may include buy-back provisions, shared equity, and encumbrances.

B. The residential workforce housing agreement shall be recorded with the bureau of conveyances of the State of Hawaii or the land court of the State as the case may be, so that the terms and conditions of the agreement run with the land and bind and constitute notice to all subsequent grantees, assignees, mortgagees, lienors, and any other persons who claim an interest in such property. The agreement shall be enforceable by the County by appropriate action at law or suit in equity, against the developer, its successors, and assignees. (Ord. 3418 § 1 (part), 2006)

2.96.090 Applicant selection process--ownership units.

A. Wait List Procedure.

1. The developer, its partner, or its management company shall establish wait lists of interested applicants by development;
2. Prior to initiating the wait list, the developer, its partner, or its management company shall publish in at least five issues of a newspaper of general circulation within the County, a public notice that shall contain all information that is relevant to the establishment of the wait list. The public shall also be informed in a like manner, of any decision that would substantially affect the maintenance and use of the wait list; and
3. Selection for purchase shall be made by a lottery administered by the developer, its partner, or its management company and overseen by the department, subject to the applicant meeting the eligibility criteria established in subsection B of this section.

B. Eligibility Criteria. In order to be eligible for a residential workforce housing unit, an applicant must meet the following criteria:

1. Be a citizen of the United States or a permanent resident alien who is a resident of the County;
2. Be eighteen years of age or older;
3. Have a gross annual family income (not to include the income of minors) which does not exceed one hundred sixty per cent of the County's area median income as established by HUD, or as adjusted by the department, for Hana, Lanai, and Molokai. Initial determination for compliance with the maximum gross annual family income provision shall be made by the developer, its partner, or its management company for the initial sale of residential workforce housing units, on the basis of the information provided on the ownership application. The ownership application will be completed when a specific unit is being considered. Final determination for compliance with the maximum gross annual family income provision shall be made by the prospective lender at the time the applicant's income verification data is received;
4. Have assets that do not exceed one hundred sixty per cent of the County's area median income as established by HUD, or as adjusted by the department, for Hana, Lanai, and Molokai. Assets shall include all cash, securities, stocks, bonds and real property. Real property shall be valued at fair market value less liabilities on such real property;
5. For a period of three years before the submittal of the ownership application, have not had an interest of fifty per cent or more in real property in fee or leasehold in the United States, where the unit or land is deemed suitable for dwelling purposes, unless the applicant is selling an affordable unit and purchasing a different affordable unit that is more appropriate for the applicant's family size; and
6. Pre-qualify for a loan with the applicant's choice of lender.

C. Notification of Change. Each applicant shall be responsible for notifying the developer, its partner, or its management company in writing of any changes in mailing address, telephone number, fax number, and/or e-mail address. If an applicant fails to properly notify the developer, its partner, or its management company of such changes and the developer, its partner, or its management company is unable to contact the applicant, the developer, its partner, or its management company shall remove the applicant's name from the wait list.

D. Selection Priority.

1. Residents on the wait list shall receive first priority for the available units. Nonresidents on the wait list may purchase a residential workforce housing unit once the wait list has been exhausted of all residents;
2. The developer, its partner, or its management company may do a mass mailing of housing applications to applicants on the wait list;
3. The residential workforce housing units must be offered to residents in the order in which their names were drawn in the lottery, provided that there is a unit available in the income group for which they qualify. Nonresidents will be offered residential workforce housing units in the order in which their names were drawn in the lottery; and
4. In the event that units are not sold within the first ninety days after they are offered for sale, and the developer has made a good faith effort, as determined by the director, to contact and qualify applicants on the wait list, the sale of remaining units shall be conducted as follows:
   a. For the next ninety-day period, units shall be offered for sale to the next-higher income preference group, at the original sales price. For example, units targeted for families earning up to one hundred twenty per cent of the median income may be sold to families earning up to one hundred forty per cent of the median income. All other eligibility criteria shall apply;
   b. Units shall be offered to the next higher income group every ninety days until the units are sold or there are no more income groups available;
   c. Units shall then be offered to nonresidents on the wait list in the order in which their names were drawn in the lottery, for the next ninety-day period, provided that the applicant's income is within the residential workforce housing income groups; and
   d. Any units that remain unsold may be offered at market rate without deed restrictions. Upon the sale of the unit, the County shall receive fifty per cent of the difference between the original sales price of the unit and the actual market rate sales price, for deposit into the affordable housing fund. In this event, the developer shall still be deemed to have satisfied the requirement for producing a residential workforce housing unit.

5. The developer shall submit copies of the following information to the department to verify the sale of residential workforce housing units to eligible buyers:

a. Applicant's completed ownership application;

b. Executed sales contract;

c. Pre-qualification notice from lender;

d. All signed federal and state tax returns used to determine eligibility, or any other documents used to determine eligibility by the lender; and

e. Escrow company's settlement statement.

6. An owner of a residential workforce housing unit that is being resold must sell the unit to an income-qualified household and notify the department of the sale. The department shall verify the sales price. (Ord. 3418 § 1 (part), 2006)

2.96.100 Applicant selection process—rental units.

A. Wait List Procedure.

1. The developer, its partner, or its management company shall establish wait lists of interested applicants by rental development;

2. Prior to initiating the wait list, the developer, its partner, or its management company shall initiate the wait list process by publishing in at least five issues of a newspaper of general circulation within the County, a public notice that shall contain all information that is relevant to the establishment of the wait list. The public shall also be informed in a like manner, of any decision that would substantially affect the maintenance and use of the wait list; and

3. Selection for rental units shall be made by a lottery administered by the developer, its partner, or its management company and overseen by the department, subject to the applicant meeting the eligibility criteria established in subsection B of this section.

B. Eligibility Criteria. The eligibility criteria for rentals shall be established on a project-by-project basis by the director in the following manner:

1. If the project is receiving federal and/or state assistance, the applicable federal and/or state eligibility criteria shall apply; and

2. If the project is not receiving federal and/or state assistance, all eligibility criteria in section 2.96.090.B of this chapter shall apply, except for section 2.96.090.B.6 of this chapter.

C. Notification of Change. Each applicant shall be responsible for notifying the developer, its partner, or its management company in writing of any changes in mailing address, telephone number, fax number, and/or e-mail address. If an applicant fails to properly notify the developer, its partner, or its management company of such changes and the developer, its partner, or its management company is unable to contact the applicant, the applicant's name shall be removed from the applicable wait list.

D. Selection Priority.

1. Residents on the wait list shall receive first priority for the available units. Nonresidents on the wait list may rent a residential workforce housing unit once the wait list has been exhausted of all residents.

2. The developer, its partner, or its management company may do a mass mailing of housing applications to applicants on the wait list.

3. The residential workforce housing units shall be offered to residents in the order in which their names were drawn in the lottery, provided that there is a unit available in the income group for which they qualify. Nonresidents will then be offered residential workforce housing units in the order in which their names were drawn in the lottery, provided that there is a unit available in the income group for which they qualify.

4. The developer, its partner, or its management company shall submit copies of the following information to the department to verify the rental of residential workforce housing units to eligible renters:

a. Applicant's completed final rental application;

b. Executed rental lease; and

c. All signed federal and state tax returns used to determine eligibility, or any other documents used to determine eligibility by the developer, its partner, or its management company.

5. The developer, its partner, or its management company shall maintain a wait list for the development after all of the units are rented, which shall be used to fill any vacancy.

6. Any rental unit vacancy shall be filled by an applicant in the same income group as the original tenant to maintain an equal distribution of rentals across the "very low income" and "low income," "below-moderate income," and "moderate income" groups.

7. An owner of a residential workforce housing rental development intending to sell the development shall notify the department in writing prior to the closing of the sale, and shall provide documentation to the department that the prospective new owner acknowledges and is aware of the terms, conditions, and restrictions encumbering the development as set forth in section 2.96.070. (Ord. 3546 § 2, 2008; Ord. 3418 § 1 (part), 2006)

2.96.110 Review requirements.

A. The council shall review this chapter every two years.

B. The director shall provide an annual report to the council on the status of the housing policy that shall include the following:

1. The number of units built for sale and rent, categorized by number of bedrooms, income group, and sales price if for sale;

2. The number of purchasers who resold units, categorized by number of bedrooms, income group, and sales price; and

3. The number of developers, their partner(s), or their management companies maintaining a wait list, and the number of applicants on each wait list.

C. For rental developments, the developer, its partner, or its management company shall submit an annual report of rental units to the department that includes the following:

1. The tenant's move-in date; and

2. The income group of the tenant or family.(Ord. 3418 § 1 (part), 2006)

2.96.120 Rules.

The director shall adopt administrative rules to implement this chapter, pursuant to chapter 91, Hawaii Revised Statutes, within one hundred eighty days after the effective date of the ordinance codified in this chapter. (Ord. 3418 § 1 (part), 2006)

2.96.130 Property assessment value.

The annual tax assessed value, as determined by the County, will take into account the limited resale value of the residential workforce housing property. (Ord. 3418 § 1 (part), 2006)

2.96.140 Incentives.

A. For developments subject to this chapter, and under the jurisdiction of the development services administration of the department of public works and environmental management, decisions on permits will be made by all departments within sixty days of the date the permit application is deemed complete by the development services administration. Decisions on permits that require review by any outside agency will be made within thirty days of receipt by the development services administration of the last approval from an outside agency; provided, that decisions on applications that require special management area permit review, or environmental review pursuant to chapter 343, Hawaii Revised Statutes, shall be issued within ninety days of completion of the applicable review.

B. For developments subject to this chapter, and if applicable, the council will schedule the initial meeting for such application within six months of the referral to the appropriate committee. The council will vote to approve or deny the application within one year of the referral to committee.

C. Developments that include on-site residential workforce housing units may be entitled to a density bonus, subject to enactment of enabling legislation. (Ord. 3418 § 1 (part), 2006)

2.96.150 Qualified housing providers.

Where the department determines that such an agreement will further the purposes of this chapter, the department shall enter into an agreement, on a project-by-project basis, with a qualified housing provider. Such an agreement may provide, without limitation, that the qualified housing provider shall:

A. Receive, own, manage, rent, operate and sell residential workforce housing units provided by developers pursuant to section 2.96.040 of this chapter;

B. Enter into agreements with developers pursuant to section 2.96.040.B.2 of this chapter, subject to the department's approval, pursuant to which residential workforce housing units are developed, constructed, renovated, or otherwise made available to satisfy the purposes of this chapter;

C. Receive land and in-lieu fees provided by developers pursuant to section 2.96.040.B.4 of this chapter;

D. Receive disbursements from the affordable housing fund and other funds provided for the purposes of this chapter; and/or

E. Administer the selection processes under sections 2.96.090 and 2.96.100 of this chapter, subject to the department's oversight.

1. Where a qualified housing provider receives, owns, develops, rents, operates or sells residential workforce housing units, such units shall be rented or sold to applicants qualified under this chapter, as set forth in the qualified housing provider's agreement with the department;
2. Selection of purchasers or renters for a qualified housing provider's units shall be made in accordance with sections 2.96.090 and 2.96.100 of this chapter or with other selection processes permitted under the qualified housing provider's agreement with the department;
3. All qualified housing provider rentals or sales shall be on terms, conditions and restrictions set forth in the agreement, which shall be at least as restrictive as the terms, conditions and restrictions applicable to developer rentals or sales under this chapter, and may be more restrictive; and
4. All qualified housing provider agreements shall require detailed reports to the department, on no less than an annual basis, of the qualified housing provider's implementation of, and compliance with, the agreement. This report shall include an annual financial audit. (Ord. 3418 § 1 (part), 2006)

EXHIBIT B

Selected Page from County of Maui 2009 Affordable Sales Price Guidelines

Prepared by:
HOUSING DIVISION
DEPARTMENT OF HOUSING AND HUMAN CONCERNS (DHHC)
COUNTY OF MAUI

Effective: March 20, 2009

2009
AFFORDABLE SALES PRICE GUIDELINES

MAUI (EXCEPT HANA)

SINGLE FAMILY

		Percent of Median Income											
		Very Low 50% & Below	Low Income (51% to 80%)			Below Moderate (81% to 100%)		Moderate (101% to 120%)		Above Moderate (121% to 140%)		Gap Income (141% to 160%)	
Prevailing Int. Rate	No. of Bedrooms	50% $37,700	60% $45,240	70% $52,780	80% $60,320	90% $67,860	100% $75,400	110% $82,940	120% $90,480	130% $98,020	140% $105,560	150% $113,100	160% $120,640
5.500%	1	$122,290	$146,790	$171,220	$195,720	$220,150	$244,650	$269,080	$293,580	$318,010	$342,440	$366,940	$391,370
	2	$148,495	$178,245	$207,910	$237,660	$267,325	$297,075	$326,740	$356,490	$386,155	$415,820	$445,570	$475,235
	3	$174,700	$209,700	$244,600	$279,600	$314,500	$349,500	$384,400	$419,400	$454,300	$489,200	$524,200	$559,100
	4	$200,905	$241,155	$281,290	$321,540	$361,675	$401,925	$442,060	$482,310	$522,445	$562,580	$602,830	$642,965
5.625%	1	$120,610	$144,760	$168,910	$192,990	$217,140	$241,290	$265,440	$289,520	$313,670	$337,820	$361,900	$386,050
	2	$146,455	$175,780	$205,105	$234,345	$263,670	$292,995	$322,320	$351,560	$380,885	$410,210	$439,450	$468,775
	3	$172,300	$206,800	$241,300	$275,700	$310,200	$344,700	$379,200	$413,600	$448,100	$482,600	$517,000	$551,500
	4	$198,145	$237,820	$277,495	$317,055	$356,730	$396,405	$436,080	$475,640	$515,315	$554,990	$594,550	$634,225
5.750%	1	$119,000	$142,800	$166,600	$190,400	$214,200	$238,000	$261,800	$285,600	$309,400	$333,200	$357,000	$380,800
	2	$144,500	$173,400	$202,300	$231,200	$260,100	$289,000	$317,900	$346,800	$375,700	$404,600	$433,500	$462,400
	3	$170,000	$204,000	$238,000	$272,000	$306,000	$340,000	$374,000	$408,000	$442,000	$476,000	$510,000	$544,000
	4	$195,500	$234,600	$273,700	$312,800	$351,900	$391,000	$430,100	$469,200	$508,300	$547,400	$586,500	$625,600
5.875%	1	$117,390	$140,910	$164,360	$187,810	$211,330	$234,780	$258,300	$281,750	$305,270	$328,720	$352,170	$375,690
	2	$142,545	$171,105	$199,580	$228,055	$256,615	$285,090	$313,650	$342,125	$370,685	$399,160	$427,635	$456,195
	3	$167,700	$201,300	$234,800	$268,300	$301,900	$335,400	$369,000	$402,500	$436,100	$469,600	$503,100	$536,700
	4	$192,855	$231,495	$270,020	$308,545	$347,185	$385,710	$424,350	$462,875	$501,515	$540,040	$578,565	$617,205
6.000%	1	$115,850	$139,020	$162,190	$185,360	$208,530	$231,630	$254,800	$277,970	$301,140	$324,310	$347,480	$370,650
	2	$140,675	$168,810	$196,945	$225,080	$253,215	$281,265	$309,400	$337,535	$365,670	$393,805	$421,940	$450,075
	3	$165,500	$198,600	$231,700	$264,800	$297,900	$330,900	$364,000	$397,100	$430,200	$463,300	$496,400	$529,500
	4	$190,325	$228,390	$266,455	$304,520	$342,585	$380,535	$418,600	$456,665	$494,730	$532,795	$570,860	$608,925
6.125%	1	$114,310	$137,130	$160,020	$182,840	$205,730	$228,620	$251,440	$274,330	$297,150	$320,040	$342,860	$365,750
	2	$138,805	$166,515	$194,310	$222,020	$249,815	$277,610	$305,320	$333,115	$360,825	$388,620	$416,330	$444,125
	3	$163,300	$195,900	$228,600	$261,200	$293,900	$326,600	$359,200	$391,900	$424,500	$457,200	$489,800	$522,500
	4	$187,795	$225,285	$262,890	$300,380	$337,985	$375,590	$413,080	$450,685	$488,175	$525,780	$563,270	$600,875
6.250%	1	$112,770	$135,380	$157,920	$180,460	$203,000	$225,610	$248,150	$270,690	$293,230	$315,840	$338,380	$360,920
	2	$136,935	$164,390	$191,760	$219,130	$246,500	$273,955	$301,325	$328,695	$356,065	$383,520	$410,890	$438,260
	3	$161,100	$193,400	$225,600	$257,800	$290,000	$322,300	$354,500	$386,700	$418,900	$451,200	$483,400	$515,600
	4	$185,265	$222,410	$259,440	$296,470	$333,500	$370,645	$407,675	$444,705	$481,735	$518,880	$555,910	$592,940
6.375%	1	$111,300	$133,560	$155,820	$178,080	$200,340	$222,600	$244,930	$267,190	$289,450	$311,710	$333,970	$356,230
	2	$135,150	$162,180	$189,210	$216,240	$243,270	$270,300	$297,415	$324,445	$351,475	$378,505	$405,535	$432,565
	3	$159,000	$190,800	$222,600	$254,400	$286,200	$318,000	$349,900	$381,700	$413,500	$445,300	$477,100	$508,900
	4	$182,850	$219,420	$255,990	$292,560	$329,130	$365,700	$402,385	$438,955	$475,525	$512,095	$548,665	$585,235
6.500%	1	$109,900	$131,880	$153,790	$175,770	$197,750	$219,730	$241,710	$263,690	$285,670	$307,650	$329,630	$351,610
	2	$133,450	$160,140	$186,745	$213,435	$240,125	$266,815	$293,505	$320,195	$346,885	$373,575	$400,265	$426,955
	3	$157,000	$188,400	$219,700	$251,100	$282,500	$313,900	$345,300	$376,700	$408,100	$439,500	$470,900	$502,300
	4	$180,550	$216,660	$252,655	$288,765	$324,875	$360,985	$397,095	$433,205	$469,315	$505,425	$541,535	$577,645
6.625%	1	$108,430	$130,130	$151,830	$173,530	$195,230	$216,930	$238,630	$260,330	$281,960	$303,660	$325,360	$347,060
	2	$131,665	$158,015	$184,365	$210,715	$237,065	$263,415	$289,765	$316,115	$342,380	$368,730	$395,080	$421,430
	3	$154,900	$185,900	$216,900	$247,900	$278,900	$309,900	$340,900	$371,900	$402,800	$433,800	$464,800	$495,800
	4	$178,135	$213,785	$249,435	$285,085	$320,735	$356,385	$392,035	$427,685	$463,220	$498,870	$534,520	$570,170
6.750%	1	$107,100	$128,520	$149,870	$171,290	$192,710	$214,130	$235,550	$256,970	$278,390	$299,810	$321,230	$342,650
	2	$130,050	$156,060	$181,985	$207,995	$234,005	$260,015	$286,025	$312,035	$338,045	$364,055	$390,065	$416,075
	3	$153,000	$183,600	$214,100	$244,700	$275,300	$305,900	$336,500	$367,100	$397,700	$428,300	$458,900	$489,500
	4	$175,950	$211,140	$246,215	$281,405	$316,595	$351,785	$386,975	$422,165	$457,355	$492,545	$527,735	$562,925

ADDENDA

DEFINITIONS

The purpose of this Glossary is to assist the reader in understanding specific terminology used in this report.

Appraisal — (noun) the act or process of developing an opinion of value; an opinion of value (adjective) of or pertaining to appraising and related functions such as appraisal practice or appraisal services.

Cash Equivalent — A price expressed in terms of cash, as distinguished from a price expressed totally or partly in terms of the face amounts of notes or other securities that cannot be sold at their face amounts.

Counseling — Providing competent, disinterested, and unbiased advice and guidance on diverse problems in the broad field of real estate; may involve any or all aspects of the business such as merchandising, leasing, management, acquisition/disposition planning, financing, development, cost-benefit studies, feasibility analysis, and similar services. Counseling services are often associated with evaluation, but they are beyond the scope of appraisal.

Discounting — A procedure used to convert periodic incomes, cash flows, and reversions into present value; based on the assumption that benefits received in the future are worth less than the same benefits received now.

Extraordinary Assumption — An assumption, directly related to a specific assignment, which, if found to be false, could alter the consultant's opinions or conclusions. Extraordinary assumptions presume as fact otherwise uncertain information about physical, legal, or economic characteristics of the subject property; or about conditions external to the property such as market conditions or trends; or about the integrity of data used in an analysis. An extraordinary assumption may be used in an assignment only if:

- It is required to properly develop credible opinions and conclusions;
- The consultant has a reasonable basis for the extraordinary assumption;
- Use of the extraordinary assumption results in a credible analysis; and
- The consultant complies with the disclosure requirements set forth in USPAP for extraordinary assumptions.

Fair Value — The cash price that might reasonably be anticipated in a current sale under all conditions requisite to a fair sale. A fair sale means that buyer and seller are each acting prudently, knowledgeably, and under no necessity to buy or sell-, i.e., other than in a forced or liquidation sale. The consultant should estimate the cash price that might be received upon exposure to the open market for a reasonable time, considering the property type and local market conditions. ***When a current sale is unlikely-i.e., when it is unlikely that the sale can be completed within 12 months-the consultant must discount all cash flows generated by the property to obtain the estimate of fair value.*** These cash flows include, but are not limited to, those arising from ownership, development, operating, and sale of the property. The discount applied shall reflect the consultant's judgment of what a prudent, knowledgeable purchase under o necessity to buy would be willing to pay to purchase the property in a current sale.

Fee Simple Estate

Absolute ownership encumbered by any other interest or estate, subject only to the limitations imposed by the governmental powers of taxation, eminent domain, police power, and escheat.

Hawaiian Terms

The Hawaiian words "mauka" and "makai" are commonly used in the islands as indicators of direction. The word "mauka" means toward the mountain, and "makai" means toward the ocean.

Highest and Best Use

The reasonably probable and legal use of vacant land or an improved property, which is physically possible, appropriately supported, financially feasible, and that results in the highest value. The four criteria the highest and best use must meet are legal permissibility, physical possibility, financial feasibility, and maximum profitability.

Highest and Best Use of Land or a Site as Though Vacant

Among all reasonable, alternative uses, the use that yields the highest present land value, after payments are made for labor, capital, and coordination. The use of a property based on the assumption that the parcel of land is vacant or can be made vacant by demolishing any improvements.

Highest and Best Use of Property as Improved

The use that should be made of a property as it exists. An existing improvement should be renovated or retained as is so long as it continues to contribute to the total market value of the property, or until the return from a new improvement would more than offset the cost of demolishing the existing building and constructing a new one.

Hypothetical Condition

That which is contrary to what exists, but is supposed for the purpose of analysis. Hypothetical conditions assume conditions contrary to known facts about physical, legal, or economic characteristics of the subject property; or about conditions external to the property, such as market conditions or trends; or about the integrity of data used in an analysis. A hypothetical condition may be used in an assignment only if:

- Use of the hypothetical condition is clearly required for legal purposes, for purposes of reasonable analysis, or for purposes of comparison;
- Use of the hypothetical condition results in a credible analysis; and
- The consultant complies with the disclosure requirements set forth in USPAP for hypothetical conditions

Leased Fee Interest

An ownership interest held by a landlord with the rights of use and occupancy conveyed by lease to others. The rights of the lessor (the leased fee owner) and the lessee are specified by contract terms contained within the lease.

Leasehold Interest

The interest held by the lessee (the tenant or renter) through a lease transferring the rights of use and occupancy for a stated term under certain conditions.

Market Rent

The most probable rent that a property should bring in a competitive and open market reflecting all conditions and restrictions of the specified lease agreement including term, rental adjustment and revaluation, permitted uses, use restrictions, and expense obligations; the lessee and lessor each acting prudently and knowledgeably, and assuming consummation of a lease contract as of a specified date and the passing of the leasehold from lessor to lessee under conditions whereby:

- Lessee and lessor are typically motivated.
- Both parties are well informed or well advised, and acting in what they consider their best interests.
- A reasonable time is allowed for exposure in the open market.
- The rent payment is made in terms of cash in United States dollars, and is expressed as an amount per time period consistent with the payment schedule of the lease contract.
- The rental amount represents the normal consideration for the property leased unaffected by special fees or concessions granted by anyone associated with the transaction.

Market Value

The major focus of most real property appraisal assignments. Both economic and legal definitions of market value have been developed and refined. Continual refinement is essential to the growth of the appraisal profession.

The most widely accepted components of market value are incorporated in the following definition:

"The most probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms, for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to a fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress."

Market value is defined in the Uniform Standards of Professional Appraisal Practice (USPAP) as follows:

"A type of value, stated as an opinion, that presumes the transfer of a property (i.e., a right of ownership or a bundle of such rights), as of a certain date, under specific conditions set forth in the definition of the term identified by the consultant as applicable in an appraisal."

The following definition of market value is used by agencies that regulate federally insured financial institutions in the United States:

"The most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:"

- Buyer and seller are typically motivated;
- Both parties are well informed or well advised, and acting in what they consider their best interests;
- A reasonable time is allowed for exposure in the open market;
- Payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and

- The price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.

Prospective Market Value Upon Completion of Construction

The prospective future value of a property on the date that construction is completed, based upon market conditions forecast to exist as of the completion date.

Prospective Value Opinion

A forecast of the value expected at a specified future date. A prospective value opinion is most frequently sought in connection with real estate projects that are proposed, under construction, or under conversion to a new use, or those that have not achieved sellout or a stabilized level of long-term occupancy at the time the appraisal report is written.

Report

Any communication, written or oral, of an appraisal, appraisal review, or appraisal consulting service that is transmitted to the client upon completion of an assignment. The types of written reports listed below apply to real property appraisals:

Self-Contained Appraisal Report: A written appraisal report prepared under Standards Rule 2-2(a) of the Uniform Standards of Professional Appraisal Practice. A self-contained appraisal report sets forth the data considered, the appraisal procedures followed, and the reasoning employed in the appraisal, addressing each item in the depth and detail required by its significance to the appraisal and providing sufficient information so that the client and the users of the report will understand the appraisal and not be misled or confused.

Summary Appraisal Report: A written report prepared under Standards Rule 2-2(b) or 8-2(b). A summary appraisal report contains a summary of all information significant to the solution of the appraisal problem. The essential difference between a self-contained appraisal report and a summary appraisal report is the level of detail of presentation.

Restricted Appraisal Report: A written report prepared under Standards Rule 2-2(c), 8-2(c), or 10-2(b). A restricted use appraisal report is for client use only. The restricted use appraisal report should contain a brief statement of information significant to the solution of the appraisal problem.

Uniform Standards of Professional Appraisal Practice

Current standards of the appraisal profession, developed for consultants and the users of appraisal services by the Appraisal Standards Board of The Appraisal Foundation. The Uniform Standards set forth the procedures to be followed in developing an appraisal, analysis, or opinion and the manner in which an appraisal, analysis, or opinion is communicated. They are endorsed by the Appraisal Institute and by other professional appraisal organizations.

LIMITING AND CONTINGENT CONDITIONS
ACM Consultants, Inc.

1. The property is appraised as though free and clear of any or all liens and encumbrances unless otherwise stated in this report. The Consultant will not be responsible for matters of a legal nature that affect either the property being appraised or the title to it. The Consultant assumes that the title is good and marketable, and therefore, will not render any opinions about the title.

2. Legal descriptions referenced in the report were obtained from public documents from the State of Hawaii, Bureau of Conveyances, or were furnished by the client, and were assumed to be correct.

3. It is assumed that all applicable zoning and use regulations and restrictions have been complied with, unless a nonconformity has been stated, defined, and considered in this appraisal report.

4. It is assumed that all required licenses, certificates of occupancy or other legislative or administrative authority from any local, state, or national governmental or private entity or organization have been or can be obtained or renewed for any use on which the value estimates contained in this report are based.

5. It is assumed that the utilization of the land and improvements is within the boundaries or property lines of the property described and that there is no encroachment or trespass unless otherwise stated in this report. Responsible ownership and competent property management are assumed unless otherwise stated in this report.

6. The Consultant has inspected as far as possible, by observation, the land and the improvements; however, it was not possible to personally observe conditions beneath the soil or hidden structurally or by other components. The appraisal assumes that there are no hidden, unapparent, or apparent conditions of the property site, subsoil, or structures or toxic material which would render it more or less valuable. The Consultant and firm have no responsibility for any such conditions or for any expertise or engineering to discover them. All mechanical components are assumed to be in operable condition and status standard for properties of the subject type. Conditions of heating, cooling, ventilation, electrical and plumbing equipment is considered to be commensurate with the conditions of the balance of the improvements unless otherwise stated. No judgment may be made by us as to adequacy of insulation, type of insulation, or energy efficiency of the improvements or equipment, and no representations are made herein as to these matters unless specifically stated and considered in the report.

7. Information provided by third parties including government agencies, financial institutions, realtors, buyers, sellers, property owners and others and contained in this report were obtained from sources considered reliable and believed to be true and correct. However, no warranty is assumed for possible misinformation.

8. All engineering is assumed to be correct. Any plot plans and illustrative material in this report are included only to assist the reader in visualizing the property. Any sketch in this report may show approximate dimensions and is included to assist the reader in visualizing the property. Maps and exhibits found in this report are provided for reader reference purposes only. No guarantee as to accuracy is expressed or implied unless otherwise stated in this report. No survey has been made for the purpose of this report.

9. The Consultant is not qualified to detect hazardous waste and/or toxic materials. Any comment by the Consultant that might suggest the possibility of the presence of such substances should not be taken as confirmation of the presence of hazardous waste and/or toxic materials. Such determination would require investigation by a qualified expert in the field of environmental assessment. The presence of substances such as asbestos, urea-formaldehyde foam insulation, or other potentially hazardous materials may affect the value of the property. The Consultant's value estimate is predicated on the assumption that there is no such material on or in the property that would cause a loss in value unless otherwise stated in this report. No responsibility is assumed for any environmental conditions, or for any expertise or engineering knowledge required to discover them. The Consultant's descriptions and resulting comments are the result of the routine observations made during the appraisal process.

10. If analysis contained in this appraisal involves partial interests in real estate, the value of the fractional interest plus the value of all other fractional interests may or may not equal the value of the entire fee simple estate considered as a whole.

11. Unless otherwise stated in this report, the subject property is appraised without a specific compliance survey having been conducted to determine if the property is or is not in conformance with the requirements of the Americans with Disabilities Act. The presence of architectural and communications barriers that are structural in nature that would restrict access by disabled individuals may adversely affect the property's value, marketability, or utility.

12. Possession of this report, or a copy thereof, does not carry with it the right of publication. It may not be used for any purposed by any person other than the party to whom it is addressed without the written consent of the Consultant, and in any event, only with proper written qualification and only in its entirety.

13. The Consultant(s) or those assisting in preparation of the report will not be asked or required to give testimony in court or hearing because of having made the appraisal, in full or in part, nor engage in post appraisal consultation with client or third parties except under separate and special arrangement and at additional fee. If testimony or deposition is required because of subpoena, the client shall be responsible for any additional time, fees, and charges regardless of issuing party.

14. Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the Consultant, or the firm with which the Consultant is connected) shall be disseminated to the public through advertising, public relations, news sales, or other media without prior written consent and approval of the Consultant.

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PROFESSIONAL QUALIFICATIONS

Glenn K. Kunihisa, MAI, CRE

STATE LICENSING

State Certified General Appraiser,
State of Hawaii, License No. CGA 39, July 17, 1991
Expiration: December 31, 2009

PROFESSIONAL AFFILIATIONS

Member, Appraisal Institute, MAI Designation, Hawaii Chapter No. 67
Member, The Counselors of Real Estate, CRE Designation, Hawaii Chapter
Member, International Right of Way Association
Appraiser-Realtor, National Association of Realtors, Maui Board of Realtors

PROFESSIONAL INVOLVEMENT

President – Hawaii Chapter of the Appraisal Institute – 2009
Vice President – Hawaii Chapter of the Appraisal Institute - 2008
Education Chairperson – Hawaii Chapter of the Appraisal Institute – 2004 and 2005
Former Island of Maui Representative – Hawaii Chapter of the Appraisal Institute
Former Multiple Listing Service (MLS) Committee Member – Realtors Association of Maui

COMMUNITY AFFILIATIONS

St. Anthony Parish School Board
Board Member 1995 to Present
Board President 1997 and 1998
Alii Community Care, Inc. – A non-profit health care corporation
Board Member 2004 to 2006

EMPLOYMENT

President
ACM Consultants, Inc.
May, 1997 to present

Previously associated with the following:
ACM, Real Estate Appraisers, Inc. - 1986 to 1997
A&B Commercial Company; a division of Alexander & Baldwin, Inc. - 1979 to 1985
Bank of Hawaii - 1976 to 1979

GENERAL EDUCATION

University of Hawaii at Manoa
Master of Business Administration (MBA) - Executive MBA Program V, 1988
Bachelor of Business Administration (BBA), 1976
Iolani School, 1971

LEGAL & CONSULTING

Qualified as an expert witness in the Second Circuit Court of the State of Hawaii
Qualified as an expert in testimony to the State Land Use Commission
Experienced in real estate arbitration assignments in the State of Hawaii

APPRAISAL EDUCATION

Appraisal Institute

Seminar — Appraisal Challenges: Declining Markets and Sales Concessions
Cambria, California – October 2008

Course	*7-Hour National USPAP Update Course* Honolulu, Hawaii – September 2008
Course	*Online 7-Hour National USPAP Equivalent Course* Chicago, Illinois – October 2007
Course	*Valuation of Conservation Easements* Denver, Colorado – October 2007
Seminar	*Uniform Standards for Federal Land Acquisitions ("Yellow Book")* *Practical Applications for Fee Appraisers* Honolulu, Hawaii – December 2006
Seminar	*California Conservation Easements* Sacramento, California – November 2005
Course 400	*7-Hour National USPAP Update Course* Honolulu, Hawaii – October 2005
Seminar	*Case Studies in Limited Partnership and Partial Interest Valuation* Honolulu, Hawaii – May 2005
Seminar	*Appraisal Consulting: A Solutions Approach for Professionals* Honolulu, Hawaii – February 2005
Seminar	*Real Estate Finance, Value and Investment Performance* Honolulu, Hawaii – February 2005
Seminar	*Fannie Mae Residential Presentation* Honolulu, Hawaii - July 2004
Seminar	*Subdivision Analysis* Chicago, Illinois - August 2003
Seminar	*Supporting Capitalization Rates* Chicago, Illinois - August 2003
Seminar	*The Technology Assisted Appraiser* Chicago, Illinois - August 2003
Seminar	*Scope of Work: Expanding Your Range of Services* Chicago, Illinois - August 2003
Course 400	*National Uniform Standards of Professional Practice* Honolulu, Hawaii - May 2003
Course 420	*Business Practices and Ethics* Honolulu, Hawaii - May 2003
Seminar	*The Private Conservation Market* Honolulu, Hawaii - July 2002
Seminar	*Finance Reporting Valuations Parts I and II* Honolulu, Hawaii - July 2002
Seminar	*Future of Appraisal Profession from a Global Perspective* Honolulu, Hawaii - July 2002
Seminar	*Appraisal Office Management* Honolulu, Hawaii - July 2002
Course 540	*Report Writing* Denver, Colorado - December 2000
Seminar	*Partial Interests: Theory and Case Law* Las Vegas, Nevada - July 2000
Seminar	*Easement Valuation* Las Vegas, Nevada - July 2000
Seminar	*Bridging the Gap: Marketability Discounts for Real Estate Interests* Las Vegas, Nevada - July 2000

Course 430	*Standards of Professional Practice, Part C* Honolulu, Hawaii - September 1999
Seminar	*Litigation Skills for the Appraiser: An Overview* Honolulu, Hawaii - May 1998
Seminar	*Special Purpose Properties* Honolulu, Hawaii - September 1997
Seminar	*Highest and Best Use Applications* Honolulu, Hawaii - September 1997
Seminar	*Detrimental Conditions* Honolulu, Hawaii - July 1997
Seminar	*The Appraiser As Expert Witness* Honolulu, Hawaii - August, 1995
Seminar	*How to Appraise FHA-Insured Property* Los Angeles, California - January, 1995
Seminar	*Understanding Limited Appraisals and Reporting Options* Honolulu, Hawaii - August, 1994
Seminar	*Valuation of Leasehold Interests* Honolulu, Hawaii - May, 1993
Seminar	*Valuation of Leased Fee Interests* Honolulu, Hawaii - May, 1993
Seminar	*Valuation Considerations: Appraising Non-Profits* Boston, Massachusetts - July, 1992
Seminar	*Americans With Disabilities Act* Boston, Massachusetts - July, 1992
Seminar	*Valuation in Today's Capital and Financing Markets* Honolulu, Hawaii - June 1992
Seminar	*Arbitration Principles, Procedures and Pitfalls* Honolulu, Hawaii - June, 1992
Seminar	*Institutional Real Estate in the 1990's* Honolulu, Hawaii - June, 1992
Seminar	*FIRREA and its Impact on Appraisers* Honolulu, Hawaii - June, 1992
Course 410/420	*Standards of Professional Practice, Parts A & B* Honolulu, Hawaii - April, 1991

<u>The American Society of Farm Managers and Rural Appraisers, Inc.</u>

Seminar	*Agricultural Lease Valuation* Honolulu, Hawaii – March 2006

<u>Maui Coastal Land Trust</u>

Seminar	*Understanding the New Tax Incentives: Conservation Easements & Other Charitable Contributions* Wailuku, Hawaii – June 2007

<u>Society of Real Estate Appraisers</u>

Course 101	*Introduction to Appraising Real Property* Dallas, Texas - 1987
Course 102	*Applied Residential Property Valuation* Honolulu, Hawaii - July 1990

Course 201	*Principles of Income Property Appraising* Chicago, Illinois, 1987
Course 202	*Applied Income Property Valuation* San Diego, California - 1988
Seminar	*Professional Practice and the Society of Real Estate Appraisers* Honolulu, Hawaii - 1988
Seminar	*Appraisal Standards Seminar - Federal Home Loan Bank Board Guidelines, Regulations and Policies* Honolulu, Hawaii - April, 1988
Seminar	*Appraisal Standards Seminar - Federal Home Loan Bank Board Guidelines, Regulations and Policies* Honolulu, Hawaii - April, 1988

<u>American Institute of Real Estate Appraisers</u>

Seminar	*Rates, Ratios and Reasonableness* Honolulu, Hawaii - 1989
Seminar	*Discounted Cash Flow Analysis* Honolulu, Hawaii - 1989
Seminar	*Highest and Best Use* Honolulu, Hawaii - 1989
Seminar	*Capitalization Overview - Part A* Honolulu, Hawaii - 1990
Seminar	*Capitalization Overview - Part B* Honolulu, Hawaii – 1990
Seminar	*Accrued Depreciation* Honolulu, Hawaii - 1990

<u>International Right of Way Association</u>

Course 101	*Appraisal* Las Vegas, Nevada - October, 1998
Course 101	*Negotiation* Las Vegas, Nevada - October 1998

<u>National Business Institute, Inc.</u>

Seminar	*Commercial Real Estate Leasing In Hawaii* Honolulu, Hawaii - 1989

<u>American Arbitration Association</u>

Seminar	*Real Estate Dispute Resolution - Mediation and Arbitration* Kahului, Maui, Hawaii - October, 1990

PROFESSIONAL QUALIFICATIONS

Shane M. Fukuda

STATE LICENSING

State Certified General Appraiser
State of Hawaii, License No. CGA-810, July 1, 2007
Expiration: December 31, 2009

PROFESSIONAL AFFILIATIONS

None

EMPLOYMENT

ACM Consultants, Inc.
July 1, 2007 to Present
Position: Staff Appraiser
October 2004 to July 2007
Positions held: Appraiser Assistant; Appraiser Trainee

Previously associated with the following:

Dollar Thrifty Automotive Group, Inc.
1994 to 2004
Positions held: Rental Agent; Lead Rental Agent; Station Manager; Senior Station Manager

GENERAL EDUCATION

Maui Community College, 1989-1990
Henry Perrine Baldwin High School, 1989

APPRAISAL EDUCATION

Appraisal Institute

Course 320	*General Applications* San Diego, California – July 2006
Course 310	*Basic Income Capitalization* San Diego, California – July 2006
Course 101	*Basic Appraisal Procedures* Denver, Colorado – April 2005
Course 100	*Basic Appraisal Principles* Denver, Colorado – April 2005

Lincoln Graduate Center

Course 405	*Residential Sales Comparison & Income Approaches* Honolulu, Hawaii – November 2006
Course 404	*Residential Appraiser Site Valuation & Cost Approach* Honolulu, Hawaii – November 2006
Course 403	*Residential Market Analysis & Highest & Best Use* Honolulu, Hawaii – November 2006
Course 772	*National USPAP Course* Honolulu, Hawaii – October 2006
Course 772	*National USPAP Course* Honolulu, Hawaii – January 2005

MISCELLANEOUS EDUCATION

REALM Business Solutions Argus 12.0
Honolulu, Hawaii – July 2005

APPENDIX J.

Traffic Impact Analysis Report

Traffic Impact Analysis Report

for

Ohana Kai Village
Ma'alaea, Island of Maui, Hawai'i

Tax Map Key Number *(2)3-6-001: 018*

SEPTEMBER 2009

Prepared for:

Spencer Homes Property
67 East Waiko Road
Wailuku, HI 96793

Prepared by:

AECOM Pacific, Inc.

Davies Pacific Center, 841 Bishop Street
Suite 1900, Honolulu, Hawai'i 96813

Ohana Kai Village
Ma'alaea, Island of Maui, Hawai'i

Traffic Impact Analysis Report

TMK (2)3-6-001: 018

September 2009

WARREN M. YAMAMOTO
LICENSED PROFESSIONAL ENGINEER
NO. 3893-C
HAWAII, U.S.A.

Expiration Date:
April 30, 2010

This work was prepared by me or under my direct supervision.

Signature
AECOM Pacific, Inc.
AECOM

14 SEP 2009
Date

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TRAFFIC IMPACT ANALYSIS REPORT
for the
OHANA KAI VILLAGE

A residential subdivision is being planned for Ma'alaea, Maui, Hawai'i. This report identifies the traffic impacts of the proposed project and recommends traffic mitigation measures.

PROJECT DESCRIPTION

Spencer Homes, Inc., proposes to develop a residential subdivision in Ma'alaea, Maui, Hawai'i, to be called the Ohana Kai Village. The proposed project would consist of 1,100 single family homes; a commercial area with a 20,000 square foot grocery store, a gas station with eight (8) pumps and convenience store, and a 2,000 sf fast food restaurant; a public/quasi-public area; and a wastewater treatment plant. The public/quasi-public area would include parks, a Maui Fire Department station, and a Charter School with 400 students.

The proposed project site is situated *mauka* of Honoapi'ilani Highway approximately between the North Kihei Road and the Ma'alaea Road (south) intersections, as shown on **Figure 1**. The project site is on a 257 acre parcel identified as TMK: (2)3-6-001:018. The project would be divided into three sections: North, Middle, and South. The North and South sections would consist of residential units. The Middle section would include residential units, the commercial area, and the public/quasi-public area. The wastewater treatment plant would be south of the South section.

Construction of the project is expected to begin in 2010 from the northern end of the project site and proceed south. The projected start and completion dates for each section of the residential project are:

- North Section, Phases 1 and 2 (350 units) - start 2010, completion 2012
- Middle Section, Phases 3 and 4 (450 units) - start 2012, completion 2015
- South Section, Phases 5 and 6 (300 units) – start 2015, completion 2018

The proposed project is expected to be fully occupied by 2019.

The commercial area would be developed with the Middle Section starting in 2012 and completion in 2016. The Charter School would also be developed with the Middle Section starting in 2012 and completion in 2014. The wastewater treatment plant would be developed in stages to correspond with the expansion of the project. Construction is scheduled to start in 2010, with the plant operational in 2011. Completion of the full build-out is expected to be completed in 2016.

Figure 1 shows the site plan and roadway network for the proposed project. Two access roads would connect into Honoapi'ilani Highway at the existing signalized intersections of North Kihei Road and Kapoli Street. A new traffic signal controlled access road will connect to the highway midway between the two access roads. The new signalized access road would service the proposed commercial area as well as the residents in the Middle section of the project. There would be a spine roadway running approximately north-south through the project that would connect these three access roads. The intersections on Honoapi'ilani Highway analyzed in the study include Kuihelani Highway, North Kihei Road with the proposed north access road, the proposed Middle section access roadway, Ma'alaea Road (north), and Kapoli Street with the proposed south access road.

The Ma'alaea Village Mixed Use Commercial and Residential Project is another proposed project; this development is located in the parking lot of the Ma'alaea Triangle commercial area south of Kapoli Street. The traffic generation forecast for this project was included in the ambient traffic forecasts of this study.

Two previously proposed projects are not expected to be built in the time frame of this proposed project. The Waikapu Mauka project site is immediately north of the proposed project site and would have consisted of 20 single family homes. A second proposed project also named Ma'alaea Village would be situated *makai* of Honoapi'ilani Highway and the proposed project site. The project's developer, A&B Properties, Inc., does not expect to develop the Village within the next 20 years due to their other project commitments.

EXISTING CONDITIONS

A survey of the existing roadway and traffic conditions was made in April and May 2009.

Existing Roadways

The proposed project is at the juncture of several major roadways on Maui, including Honoapi'ilani Highway, Kuihelani Highway, and North Kihei Road. These three highways are under the jurisdiction of the State of Hawai'i Department of Transportation (State DOT). Other local roads in the area include Ma'alaea Road and Kapoli Street.

Honoapi'ilani Highway provides primary access between West Maui and Wailuku. It is a primary arterial and is designated as Route 30. Most of the intersections on the highway are channelized with separate turning lanes, as discussed further in this section. The posted speed limit is 45 miles per hour (mph) in the vicinity of the project site. Honoapi'ilani Highway is a two-lane highway that is widened to four lanes in the southbound (toward Lahaina) direction north of Kuihelani Highway which is in the vicinity of the project site. The southbound approach of the highway transitions from two lanes to one lane south of Ma'alaea Road (north). The northbound (toward Wailuku) approach of the highway has a single lane until it reaches the south intersection of Ma'alaea Road where the right-turn out lane becomes the second northbound through lane.

Kuihelani Highway is a four-lane major collector (Route 380) that provides access between Kahului and Waikapu/Ma'alaea. The intersection with Honoapi'ilani Highway is signalized. The highway continues *mauka* of the highway as a two-lane local road. The Kuihelani Highway *mauka* (west) bound approach has a left-turn lane, a shared left-turn/through lane and a separate right-turn lane, while the *makai* (east) bound approach

has a shared left-turn/through lane and a separate right-turn lane. Both Honoapi'ilani Highway approaches have two through lanes and separate left-turn and right-turn lanes.

North Kihei Road is a two-lane major collector (Route 310) that connects Honoapi'ilani Highway to South Kihei Road and Pi'ilani Highway. The intersection with Honoapi'ilani Highway is signalized, and there is a park-and-ride lot near the southwest corner. The North Kihei Road approach has two left-turn lanes and a separate right-turn lane. Both highway approaches have two through lanes and separate left-turn (southbound) and right-turn (northbound) lanes.

Ma'alaea Road is a two-lane local road that serves the Ma'alaea Harbor, Ma'alaea Triangle and adjoining land uses. It meets Honoapi'ilani Highway twice, north and south of the Ma'alaea Triangle, as unsignalized intersections. The north intersection approach meets the highway at an angle and is restricted to right-turns out and left-turns in from the highway. The highway at this location has two southbound and two northbound through lanes. The south intersection is restricted to right-turn in and right-turn out movements. The highway at this location has one southbound and one northbound through lane. The right-turn out lane becomes the second northbound highway lane.

Kapoli Street is a four-lane roadway that was improved to serve the visitor-oriented activities at the Ma'alaea Triangle. Its approach to Honoapi'ilani Highway is signalized, and it has a shared left-turn/through lane and a separate right-turn lane. The southbound approach of the highway has a single through lane and a separate left-turn lane, while the northbound approach has two through lanes and a separate right-turn lane.

Traffic Volumes

Traffic turning movement counts were taken at the four existing study intersections on Honoapi'ilani Highway (Kuihelani Highway, North Kihei Road, Ma'alaea Road (north), and Kapoli Street) on April 28 to 30, 2009, and May 5, 2009, during the morning and afternoon peak periods. Traffic turning movement counts require a traffic surveyor to observe traffic flow and record the movements of each vehicle crossing the intersection as through or turning movements by 15 minute intervals. Traffic counts at the Kuihelani Highway intersection do not include the vehicular movements into and from the *mauka* leg since very few vehicles were observed on this roadway. The worksheets from these traffic counts are included in **Appendix A**.

The current morning and afternoon peak hour traffic volumes are shown on **Figure 2**. The volumes are rounded to the nearest five vehicles per hour (vph). The higher direction of traffic flow in the morning (AM) peak hour is toward Lahaina south of North Kihei Road and toward Wailuku north of the Kuihelani Highway. Conversely, the afternoon (PM) peak hour volumes are higher in the northbound direction in the entire study area. There are significant levels of turning volumes at the two north intersections:

- Left-turns from Kuihelani Highway to southbound Honoapi'ilani Highway
- Right-turns from northbound Honoapi'ilani Highway to eastbound Kuihelani Highway
- Left-turns from southbound Honoapi'ilani Highway to eastbound North Kihei Road
- Right-turns from North Kihei Road to northbound Honoapi'ilani Highway
- Left-turns from North Kihei Road to southbound Honoapi'ilani Highway
- Right-turns from northbound Honoapi'ilani Highway to eastbound North Kihei Road

The existing traffic operations at the study intersections are discussed in the **Level of Service Analysis** section of this report.

Traffic counts were taken at the four study intersections in 2005 for another proposed project. The peak hour approach volumes from 2005 and 2009 are compared on **Figure 3**. There is no definite pattern of growth or decline, as the traffic volumes on several approaches have increased while others have declined. For example, southbound traffic volumes on Honoapi'ilani Highway have generally decreased during the morning peak while northbound afternoon volumes have increased.

The State DOT takes traffic meter counts at various roadway locations around the state under their new traffic count program. A traffic count was taken on Honoapi'ilani Highway between North Kihei Road and Ma'alaea Triangle on September 26, 2007. **Figure 4** shows the hourly volumes in each direction of travel on Honoapi'ilani Highway from 6:00 AM to 6:00 PM. Southbound traffic on Honoapi'ilani Highway peaked from 6:00 to 8:00 AM, and then declined until rising to an afternoon high between 1:00 and 5:00 PM. The peak volumes for northbound traffic were attained between 3:00 and 6:00 PM. These trends correspond to commuter traffic traveling from Central Maui to West Maui.

TRAFFIC FORECASTS

The proposed project is expected to be fully occupied by 2019. During the 10 year period from the traffic count date to full occupancy, ambient traffic on the area roadways can be expected to increase due to regional growth and new projects in the area. The traffic that would be generated from the proposed project was added to the ambient traffic forecast to obtain the "total with project" traffic forecast.

Ambient Traffic Forecast

Most of the traffic growth in the project area has been due to growth in other areas; as traffic to/from these areas passes the project site. A smaller project is planned in the immediate vicinity of the proposed project. Therefore, the traffic which would be generated by the planned project was added to the estimate of regional traffic growth to obtain the ambient traffic forecast.

The Ma'alaea Village Mixed-use Commercial and Residential Project would be located in the Ma'alaea Triangle south of Kapoli Street. The traffic forecasts obtained from "Draft Traffic Impact Analysis Report for the Proposed Ma'alaea Village, Waikapu, Wailuku, Maui, Hawaii" (2007) are included on **Figure 5**. Since the study area in the draft report did not extend the entire length of this report's study area, their traffic volumes were extrapolated to the rest of the study area in proportion to the ambient forecast traffic volumes.

The State DOT is planning to widen/realign Honoapi'ilani Highway from Ma'alaea to Launiupoko. The traffic forecasts for their study, "Honoapi'ilani Highway Widening/Realignment Ma'alaea to Launiupoko, Technical Memorandum #1, Forecast Travel Demand" (Draft April 2008) by Austin, Tsutsumi and Associates, Inc., were utilized to develop the ambient traffic forecasts for this study. The study provided 30-year forecasts from 2001 to 2030 for two screenlines north of North Kihei Road and south of Kapoli Street. These 30-year growth rates were adjusted for a 10-year forecast time frame to match the 2009-2019 timeframe of this study. Another adjustment was made to remove the trips generated by 767 households in Traffic Analysis Zone 26, which is the location of the proposed project. The initial 30-year and adjusted 10-year growth rates are summarized on the table below:

Peak Hour	Direction of Travel	South Screenline (South of Kapoli Street)		North Screenline (North of N. Kihei Road)	
		Initial 30-yr Growth Rate	Adjusted 10-yr Growth Rate	Initial 30-yr Growth Rate	Adjusted 10-yr Growth Rate
AM	Southbound	38%	11.5%	75%	20.5%
	Northbound	33%	10.1%	50%	14.4%
PM	Southbound	43%	12.8%	50%	14.5%
	Northbound	46%	15.3%	80%	21.7%

The current AM and PM peak hour traffic volumes shown on **Figure 2** were increased using the above factors. The results are summarized on **Figure 6**, with volumes rounded to the nearest five vph. As an adjustment for the *mauka* leg of Kuihelani Highway, volumes of 10 vph were added to the inbound and outbound turning movements of the *mauka* leg. The traffic forecasts from **Figure 5** for the Ma'alaea Village are also included in **Figure 6**.

The ideal (maximum) capacity of a two-way, two-lane highway is 1,700 passenger car equivalents per hour per lane, and 3,200 passenger car equivalents per hour for both directions of travel. It was assumed that there would not be a highway capacity problem by 2019 on the two-lane section of highway south of Ma'alaea. The other study area roadways do not have highway capacity problems. The traffic operations at the study

intersections with the ambient traffic forecasts are discussed in the **Level of Service Analysis** section of this report.

Project Generated Traffic

The traditional three-step process of trip generation, trip distribution, and trip assignment was used to forecast the future traffic which would be generated by the proposed project. The trip generation step forecasts the number of new trips that would be produced in each of the two study periods. The trip distribution step allocates these new trips by direction of travel. Finally, the trip assignment step assigns the trips to the specific turning movements at the study intersections.

The trip generation and distribution analyses are summarized on **Table 1**. The trip generation step forecasts the volume of vehicle trips that would be generated by the proposed project during the morning and afternoon peak periods. The Institute of Transportation Engineers' Trip Generation Report (Seventh Edition, 2003) has trip generation equations or rates to calculate the number of morning and afternoon peak hour trips that would be generated by various land uses.

The following trip generation equations/rates were utilized for the several proposed project land uses:

- Single Family Dwelling (Land Use 210)
  AM Peak Hour - $T = 0.7(X) + 9.43$;
  PM Peak Hour - $Ln(T) = 0.9Ln(X) + 0.53$;
  Where, T = Trips generated by residential units, and
  X = Number of residential units.
- Gas Station with 8 pumps and Convenience Store (Land Use 945)
  AM Peak Hour - 10.06 trips per gas pump
  PM Peak Hour - 13.38 trips per gas pump
- Grocery Store (Land Use 850, supermarket)
  AM Peak Hour - 3.25 trips per thousand square feet of leasable space
  PM Peak Hour - 10.45 trips per thousand square feet of leasable space

- Fast food without drive-thru (Land Use 933)
  AM Peak Hour - 43.87 trips per thousand square feet of leasable space
  PM Peak Hour - 26.15 trips per thousand square feet of leasable space

- Charter School (Land Use 534, Private School, K-8)
  AM Peak Hour - $\ln(T) = 1.0\ln(X) - 0.13$;
  PM Peak Hour - $T = 0.31[0.58(X) + 14.03]$;
  Where, T = Trips generated by school, and
  X = Number of students.

The equation for the Charter School afternoon peak hour is for the peak hour of the generator, which occurs when schools let out before the peak hour of roadway traffic. A factor of 0.31 was included to reduce the number of trips from the peak hour of the generator to the later peak hour of traffic. The factor is based on the ratio of traffic peak hour to peak hour of generator for private high schools.

The wastewater treatment plant and the Public/Quasi-public land uses were excluded from this analysis. Wastewater treatment plants generate very few trips and these trips usually occur during the off-peak hours. This plant also may not have full time employees. The parks within the Public/Quasi-public land areas are expected to attract trips from within the subdivision and would actually reduce the volume of external trips. Fire stations generally do not generate "regular" trips during the peak hours.

The single family homes are expected to generate 779 and 928 morning and afternoon peak hour trips, respectively. The Trip Generation report also lists the percentage of inbound and outbound trips in each peak hour. The number of generated trips was divided into inbound and outbound trips based on the information from the report, as shown on **Table 1**.

The total number of residence-generated trips was then apportioned to the North, Middle, and South sections of the proposed project, each of which would have their own access routes to the highway, based on the number of units in each section: North - 350 units, Middle - 450 units, and South - 300 units

The commercial land uses are expected to serve primarily the future residents of the subdivision and pass-by trips from the highway. Therefore, development of the commercial area would reduce the number of resident-generated trips that would otherwise leave the proposed project for retail purposes, and is not expected to attract additional retail-oriented trips from visitors outside of the project, with the exception of the by-pass trips.

Large portions of the trips generated by commercial centers are pass-by and diverted trips. Pass-by trips are attracted from traffic passing the site on an adjacent roadway and have direct access to the commercial center. Pass-by trips do not add to the through volumes on the adjacent roadway. They are added to the turning movements but are subtracted from the through movements where they turn off to access the commercial center. Diverted trips are attracted from the roadways in the vicinity of but not adjacent to the commercial center. The proposed project is expected to attract pass-by trips from Honoapi'ilani Highway but not divert trips from Kuihelani Highway and North Kihei Road.

The Institute of Transportation Engineers Trip Generation Handbook (Second Edition, 2004) provides average pass-by trip factors for various types of commercial land uses as follows:

	PASS-BY TRIPS	
LAND USE	**AM PEAK**	**PM PEAK**
Gas station with Convenience Store (LU 945)	62%	56%
Fast Food (LU 933)	49%	50%
Supermarket (LU 850)	36%	36%

The number of pass-by trips for each of the commercial land uses was subtracted from the total number of trips generated by the land use to obtain the directly generated trips. It was assumed that 80% to 100% of the directly generated trips would come from future subdivision residents. The trip distribution factors for internal trips (Ma'alaea) were adjusted accordingly. The commercial uses are expected to attract 66 (11%) of the exiting and 34 (17%) of the entering residential trips in the morning peak, and 96 (28%) of the exiting and 95 (16%) of the entering residential trips in the afternoon peak. These represent trips that would not have to be made off-site for retail purposes if there were no commercial uses available.

The Charter School is forecast to generate 351 trips in the AM peak hour and 76 trips in the PM peak hour. The trip generation analysis is summarized on **Table 1**.

The project generated trips were then distributed by direction of travel to and from the project site. A set of trip distribution factors was developed from socio-economic data from the Draft Maui Island Plan (March 2008) and the Maui Long Range Land Transportation Plan (February 1997). The report showed current (1990) and forecasted (2020) population and employment for several large area communities on Maui. The 2020 data was then divided into smaller sub-communities, assuming that Wailuku made up 40% of the Kahului-Wailuku community, and that Kihei made up 90% of the Kihei-Ma'alaea community. The data for the Makawao and Paia-Haiku communities were reduced by 40% to account for their distance from the project site. The Hana data was not included due to the remoteness of the Hana community to the project area. The results for the sub-communities are shown in the second to the last column of **Table 2**.

An "aggregate" growth factor was calculated for each sub-community using 30% of population and 70% of employment in that sub-community. The resultant factors are shown in the last column of **Table 2**. The data for the sub-communities was then assigned to the five highway paths/destinations from the project site as follows:

- Honoapi'ilani Highway (North) – Wailuku
- Kuihelani Highway – Kahului, Makawao, Paia
- North Kihei Road – Kihei
- Ma'alaea – Ma'alaea
- Honoapi'ilani Highway (South) – West Maui

The "aggregate" growth factors for the sub-communities do not add up to 100% as portions of two communities were used and one was not included. The aggregate

growth factors were then normalized so that their sum equaled 100%. The derivation and results of the trip distribution factors are shown on **Table 2.**

The Charter School is expected to attract trips from most of the populated area of Maui, especially from Central Maui. A similar trip distribution analysis was conducted for the Charter School trips. The following trip distribution factors were developed for school trips based on area population and distance from the project site:

- North via Honoapi'ilani Highway - 23%
- South via Honoapi'ilani Highway - 12%
- North Kihei Road - 21%
- Kuihelani Highway - 40%
- Ma'alaea - 4%

The trip distribution factors were then used in the trip distribution analysis on **Table 1**. The same factors were used for the morning and afternoon peak hours. During the morning peak hour, most of the trips leaving the project would be going to Kahului via Kuihelani Highway, with the second highest number going south on Honoapi'ilani Highway to West Maui. The same pattern is repeated during the afternoon peak hour with returning trips. As previously noted, the trip distribution factors were adjusted for the internal trips made to the commercial activities.

The project generated traffic volumes were assigned to the study area network. Most of the trips from the North section of the project were assigned to the access road leading to North Kihei Road. The trips from the South section of the project were assigned to the access road leading to Kapoli Street. Residential trips from the Middle section of the project and directly generated trips from the commercial area and Charter School were assigned to the Middle section access roadway. The results of the traffic assignment analysis are shown on **Figure 7** with the volumes not rounded.

The pass-by trips to the commercial area were added as turning movements to the middle access roadway in proportion to the volume of directional traffic on the highway. The majority of morning peak hour trips came from the southbound direction while the majority of afternoon traffic flow came from the northbound direction. The turning volumes were also subtracted from their respective through movements.

Total Forecast Volumes

The project generated traffic assignment volumes from **Figure 7** were added to the ambient traffic forecasts from **Figure 6** to obtain the total with project traffic forecasts shown on **Figure 8**. The traffic volumes are rounded to the nearest five vehicles per hour.

LEVEL OF SERVICE ANALYSIS

The concept of level of service is used to quantify the quality of traffic flow on roadway facilities. The Transportation Research Board (TRB) has developed procedures to calculate level of service value(s) by measuring traffic volumes against the capacities of different types of roadway facilities. Their Highway Capacity Manual 2000 (HCM2000) describes the various procedures developed for freeways, highways, signalized and unsignalized intersections, etc.

The study intersections include both signalized and unsignalized intersections. The methodology for analyzing signalized intersections calculates the levels of service for individual movements, approaches and the intersection as a whole based on the average stopped delay per vehicle. The results range from level of service A (best with average delays less than 10 seconds) to F (worst with average delays longer than 80 seconds), as described in the following table.

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds/Vehicle)
A	< 10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	> 80.1

Many jurisdictions consider levels of service A to D as acceptable for areas like Maui, with levels of service E and F indicating the need for mitigating measures. For signalized intersections, the major streets can be designed to have a higher level of service than the side streets or turning lanes.

The procedure used for analyzing unsignalized intersections calculates vehicle delays and levels of service based on the distribution of gaps in traffic on the major street and driver judgment in selecting gaps through which to execute turns. For two-way stop intersections where only the minor street traffic is controlled by a stop sign, levels of service are calculated for the critical turning movements including outbound movements from the stop-controlled approach and left-turns from the main road to the minor road. The procedure does not calculate an overall intersection level of service.

The Highway Capacity Manual defines the relationship between level of service and delay (in seconds/vehicle) for unsignalized intersections as shown below:

LEVEL OF SERVICE	DELAY (Seconds/Vehicle)
A	< 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	> 50.1

Levels of service A to D are considered acceptable for unsignalized intersections. Level of service F (with average delays longer than 50 seconds) is considered undesirable for unsignalized intersections and would indicate the possible need for mitigation.

Table 3 summarizes the signalized intersection level of service analysis while **Table 4** summarizes the unsignalized intersection level of service analysis. Each table shows the existing, ambient forecast and total with project forecast levels of service placed side by side for each of the two (AM and PM) study periods. This format facilitates a comparison of levels of service for the different forecast scenarios and can give an indication of the traffic impacts of ambient traffic growth and the proposed project.

Signalized Intersection Analysis

The three existing signalized intersections on Honoapi'ilani Highway include Kuihelani Highway, North Kihei Road, and Kapoli Street. The proposed Middle section access roadway would add a fourth signalized intersection. The results of the analysis of these intersections shown on **Table 3** include the level of service and average delay.

The Kuihelani Highway intersection is currently operating at a level of service C in both morning and afternoon peak hours. With the increase in ambient traffic and traffic generated by the proposed project, the intersection would continue operating at level of service C in both peak hours for both the ambient and total with project forecasts. The traffic signal is currently running in an actuated uncoordinated mode such that the phasing parameters should accommodate the future growth. These results indicate that this intersection would continue to operate at acceptable levels of service, and would not be adversely affected by the forecast traffic volume increases due to ambient traffic growth and traffic generated by the proposed project.

The North Kihei Road intersection is currently operating at level of service C in both the morning and afternoon peak hours. The intersection would continue to operate at level of service C in both peak hours for the ambient forecast conditions, although the south bound left-turn lane on Honoapi'ilani Highway is forecast to operate at level of service E in the afternoon peak hour due to the high volumes of turns. This condition is expected to be tolerated rather than require mitigation in the form of a second southbound left-turn lane.

At a minimum, the proposed project would require a new *mauka* leg (eastbound approach), new northbound left-turn lane, new south bound right-turn lane, and a new *mauka* (west) bound shared through lane to the existing intersection. With these minimal improvements, the intersection would operate at level of service D in both peak periods, with several movements at levels of service E and F. In order to improve traffic

operations to acceptable levels of service, the following improvements would be required:

- The new *mauka* leg (eastbound approach) would have a separate left and a shared through/right-turn lane.
- The current *mauka*- (west-) bound approach of North Kihei Road with double left-turn lanes and a right-turn lane would have to be widened and restriped to provide two left-turn lanes, a through lane, and a right-turn lane.
- A second southbound left-turn lane on Honoapi'ilani Highway would be required with an accompanying new second eastbound lane on the *makai* leg of North Kihei Road.

Sketches of the current and proposed intersection design are shown on **Figure 9**. With these improvements, the intersection is forecast to operate at level of service C in both peak hours. The movements and approaches would operate at level of service D or better with these improvements, indicating acceptable traffic operations. The above improvements would mitigate the impact of the project generated traffic on this intersection. The proposed improvements would be added to the North Kihei Road intersection when construction begins on the North section of the project.

The Kapoli Street intersection is currently operating at level of service B in both the morning and afternoon peak hours, and is forecast to operate at the same level of service for the ambient forecast conditions. The proposed project would require (at minimum) a new *mauka* leg (eastbound approach), new northbound left-turn lane, new southbound right-turn lane, and a shared through lane on the *mauka*- (west-) bound approach. With these minimal improvements, the intersection is forecast to operate at level of service D in both peak hours; however, several movements, including the highway southbound through movement, would be operating at unacceptable level of service E, indicating the need for mitigating measures.

Several improvements could be made to mitigate these forecasted problems:

- Separate left-turn lanes would be needed on all approaches to accommodate the forecast volumes of left-turns. However, only the left-turns from the highway would require separate phases. The left-turns from Kapoli Street could be made on the same phase.
- A second southbound through lane would also be needed to increase the intersection capacity. The second lane could be merged into the first lane south of the intersection, as there would be no other traffic signals to affect the through lane capacity to West Maui.

The recommended mitigation measures and proposed intersection design are shown on **Figures 10** and **11**, respectively. With these improvements, the intersection is forecast to operate at level of service C in both peak hours, with none of the movements at unacceptable levels of service. The proposed improvements would be added to the Kapoli Street intersection when construction begins on the South section of the project. The State DOT is studying alternatives to increase the highway capacity from Ma'alaea to Launiupoko, including widening Honoapi'ilani Highway to four lanes. The proposed southbound through lane could be part of the State's improvements.

The proposed Middle section access roadway would add a fourth traffic signal and the following feature to the current four-lane highway: a new *mauka* leg (eastbound approach) with separate left- and right-turn lanes, a new northbound left-turn lane, and a new southbound right-turn lane. Acceptable intersection levels of service C and B are forecast for the morning and afternoon peak periods, respectively, since this would be a T-intersection with less conflicting movements. The proposed intersection would be added when construction begins on the Middle section of the project.

The three existing traffic signals on Honoapi'ilani Highway are running in an actuated, uncoordinated mode. The Kuihelani Highway and North Kihei Road traffic signals are about 1,320 feet (0.25 miles) apart. The North Kihei Road and Kapoli Street traffic signals are about 6,000 feet (1.1 miles) apart. The proposed fourth traffic signal would be about midway between the latter two, creating traffic signals that are about

3,000 feet (0.6 miles) apart. It would be desirable, but not necessary, to have these four traffic signals interconnected and running on synchronized timing. This would require all of these traffic signals to run on the same traffic signal cycle length with some form of communications between them.

The requirement for the same traffic signal cycle length generally means that all the traffic signals in the system must run at the longest cycle length required for any of the individual traffic signals, which results in less efficient operations and longer delays at the other traffic signals.

The analysis of unsignalized intersections in the next section indicates the need for mitigating measures at the Ma'alaea Road (north) intersection, which could include the addition of a traffic signal. If this traffic signal is installed, then there would be 1,500 feet to 1,700 feet (0.28 miles to 0.32 miles) of spacing between the proposed Middle section access roadway, the Ma'alaea Road (north), and the Kapoli Street traffic signals. At a minimum, these three traffic signals should be interconnected and synchronized.

Unsignalized Intersection Analysis

The only unsignalized study intersection on Honoapi'ilani Highway is at Ma'alaea Street (north). The results of the unsignalized intersection analysis are shown on **Figure 4**.

Levels of service are calculated for only two movements at the Ma'alaea Street (north) intersection: the outbound right-turn from Ma'alaea Road and the inbound left-turn from the highway. It should be noted that the methodology for analyzing unsignalized intersections understates (gives a worse level of service than actual) for the outbound right-turn movement since it does not account for the angled merge which increases the capacity of the right-turn lane. With this note, the outbound right-turn movement is currently operating at level of service B in the morning peak and C in the afternoon peak. With higher volumes of traffic on Honoapi'ilani Highway calculated for the ambient and total with project forecasts, the levels of service are forecast to remain at level of service B in the morning peak but change from level C to D to E in the afternoon peak. This indicates the possible need for mitigating measures for the total with project condition. As noted, the right-turn movement is expected to operate better than analyzed but would probably require mitigating measures.

The inbound left-turn movement from the highway is currently at level of service A in the morning peak and B in the afternoon peak. The morning peak hour level of service would remain at level A for the ambient forecast but change to level B for the total with project forecasts. The afternoon peak hour level of service would change to level C for both forecasts. While levels of service B and C imply acceptable conditions, observations of highway traffic operations elsewhere indicate that left-turns from the highway are difficult to make for levels of service B and C conditions and would require mitigation. The intersection analysis indicates that an unsignalized intersection may not be adequate for the future ambient and total with project conditions.

Possible mitigating measures include the installation of a traffic signal or prohibition of the inbound left-turn movement. A traffic signal could be installed at this intersection if found to be warranted in the future. If installed, the intersection would operate at levels of service A and B in the morning and afternoon peak hours, respectively, as shown on **Table 3**. The inbound left-turn and outbound right-turn movements are forecast to operate at level of service D in both peak periods. As previously discussed, this traffic signal, if installed, would have to be coordinated with the traffic signals at Kapoli Street and the Middle section access roadway to prevent stop-and-go traffic flow.

Prohibiting left-turns into Ma'alaea Road would divert this movement to the Kapoli Street intersection. The additional left-turns would not affect traffic operations at the Kapoli Street traffic signal during the morning peak period since it would be in the same direction of flow as the main traffic flow. The intersection would continue to operate at level of service C and the southbound left-turn at level of service D as shown on **Table 3**. The diversion will have a larger impact during the afternoon peak when the larger volume of southbound left-turns must cross a high volume of northbound through traffic. The intersection and northbound level of service are forecast to change from level of service C to D, although the southbound left-turn movement would remain at level of service D. If the inbound left-turn movement is prohibited at Ma'alaea Road, the

outbound right-turn movement should be allowed to continue with its level of service E operations.

TRANSPORTATION DEMAND MANAGEMENT MEASURES

Transportation demand management (TDM) measures can be used to reduce site generated traffic or spread the traffic over a longer period during the day. Each measure has the potential for reducing site traffic during peak hours at certain types of development and under certain conditions. Each technique can be effective under the right circumstances, and yet may be totally ineffective under inappropriate conditions. The two classes of TDM measures are:

- Physical actions or developer commitments to provide services that can be determined at the time of development approval.
- Non-physical actions or in-kind commitments by the developer that will allow credits for trip generation reduction.

Most of the TDM measures are oriented toward large employment centers with the purpose of generating and sustaining use of alternatives to the single-occupant vehicle. Representative measures include carpooling/vanpooling programs, transit service/subsidies, parking availability restrictions, modified work schedules, and building amenities for alternate mode commuters. Some of these measures have conflicting objectives (i.e., carpooling/vanpooling programs are generally not implemented with modified work schedule programs). Successful programs at the work center eventually lead to reduced trips at the residential end of the trip.

Very few options are applicable to residential areas such as this project. Two TDM measures for residential areas include parking restrictions to limit auto availability and the provision of convenient access to transit service. For the first measure, the driveways of residential units can be designed to limit the number of vehicles that can be parked and on-street parking can be prohibited. This would limit the number of vehicles in the development and theoretically put a cap on the number of trips that would be generated, but would not necessarily reduce the trips generated. Implementation of these options may, however, affect the marketability of these homes.

Providing convenient access to transit service can divert drivers to transit when a frequent level of transit service is provided. The project developer is willing to coordinate with the Maui Department of Transportation to provide bus routes/stops through the project to provide transit service to its residents. There is also an existing park-and-ride lot located at the North Kihei Road intersection which is in the proximity of the project. Project residents could meet non-residents at this lot and share rides.

The developer would be willing to develop a communications media for the residents informing them of alternative transportation opportunities available to them. Since most TDM programs are employer-based, some form of communications media such as a community association newsletter, could provide information on what TDM programs are being offered by different Maui employers. The developer could work with the appropriate agencies to obtain this information. The media could also contain requests for carpool and vanpool partners from the project residents.

CONCLUSIONS

The proposed project is not expected to have an adverse traffic impact on Honoapi'ilani Highway in the vicinity of the project site with adequate mitigation implemented. The additional traffic that would be generated by the proposed project would require resources that can be accommodated. The specific recommended improvements at each study intersection needed to accommodate the proposed project include:

- Kuihelani Highway – the current design is expected to accommodate the additional project generated traffic. Consider interconnect and synchronization with adjacent traffic signals.
- North Kihei Road – add new *mauka* leg with a separate left-turn lane. Widen and restripe the existing *mauka* bound approach to provide two separate left-turn lanes and a through lane. Add a second left-turn lane on the southbound

approach of Honoapi'ilani Highway. Implement an eight-phase traffic signal timing plan.

- Kapoli Street – provide separate left-turn lanes all approaches of the intersection. Add a second southbound through lane on Honoapi'ilani Highway. The State DOT is studying ways to increase the highway capacity from Ma'alaea to Launiupoko, including widening Honoapi'ilani Highway to four lanes as an alternative.
- Middle section access road – add a new *mauka* leg (eastbound approach) with separate left- and right-turn lanes, a new north bound left-turn lane, and a new southbound right-turn lane, to the current four-lane highway.
- Ma'alaea Road (north) – signalize this intersection when warranted or prohibit the inbound left-turn from the highway and divert the left-turns to Kapoli Street.
- Interconnect and synchronize the traffic signals from Kuihelani Highway to Kapoli Street.

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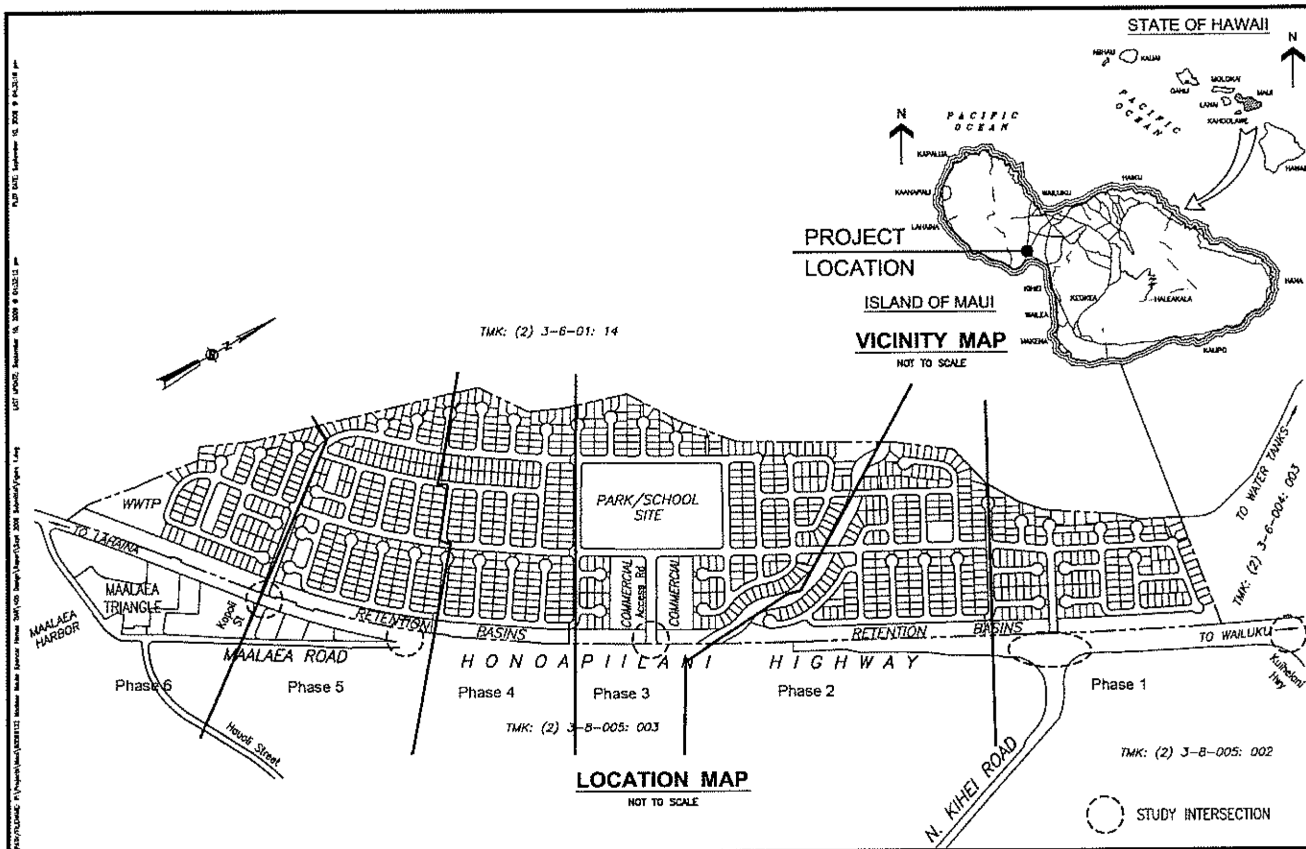

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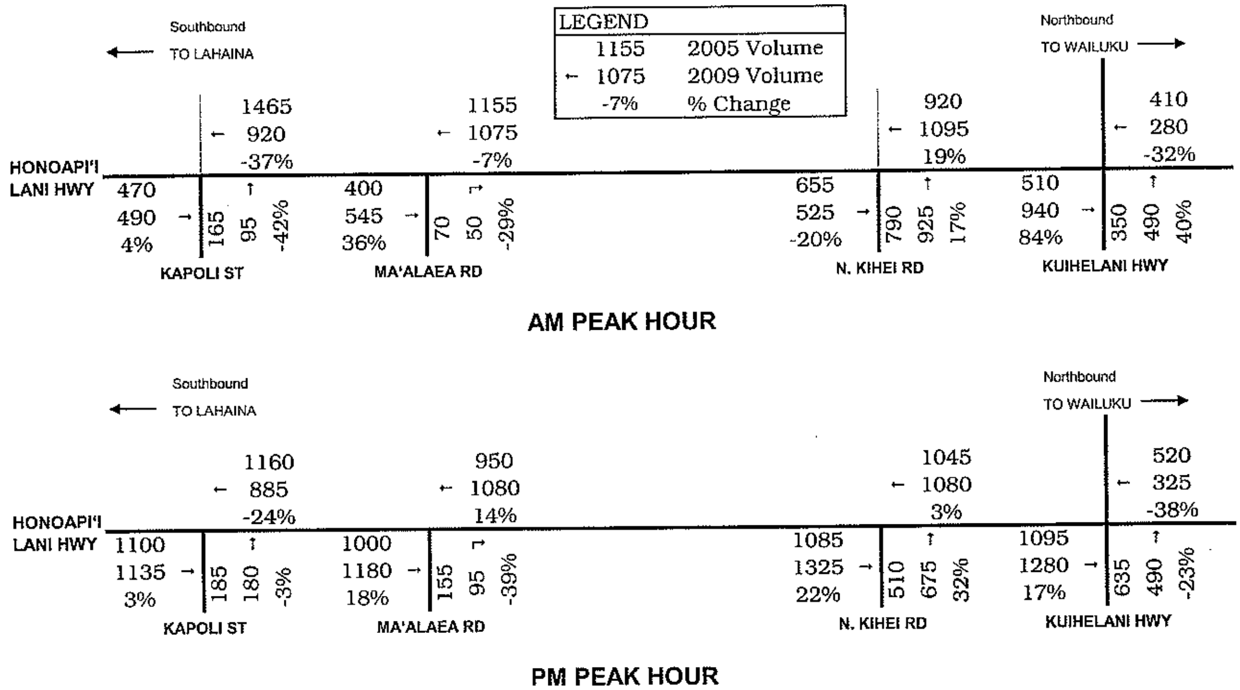
Figure 1
LOCATION MAP
TRAFFIC IMPACT ANALYSIS REPORT
OHANA KAI VILLAGE
MAALAEA, MAUI, HAWAII

SEPTEMBER 2009

Figures



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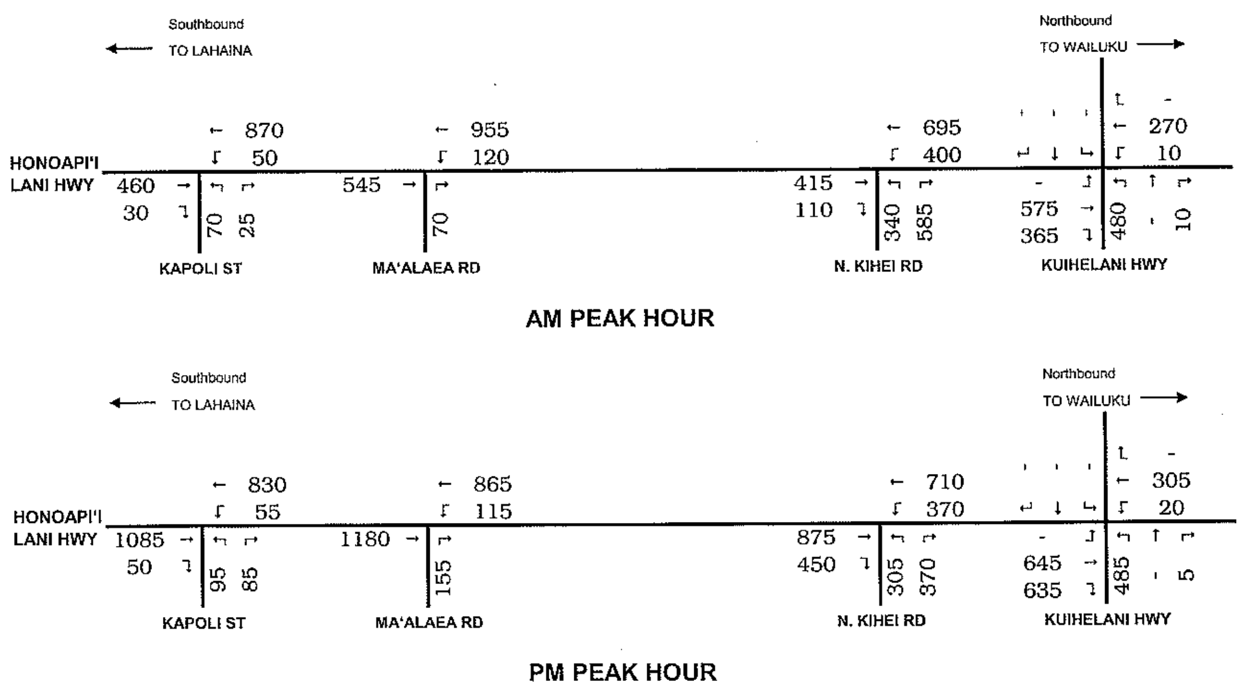
2005 VS. 2009 TRAFFIC VOLUMES

FIGURE 3



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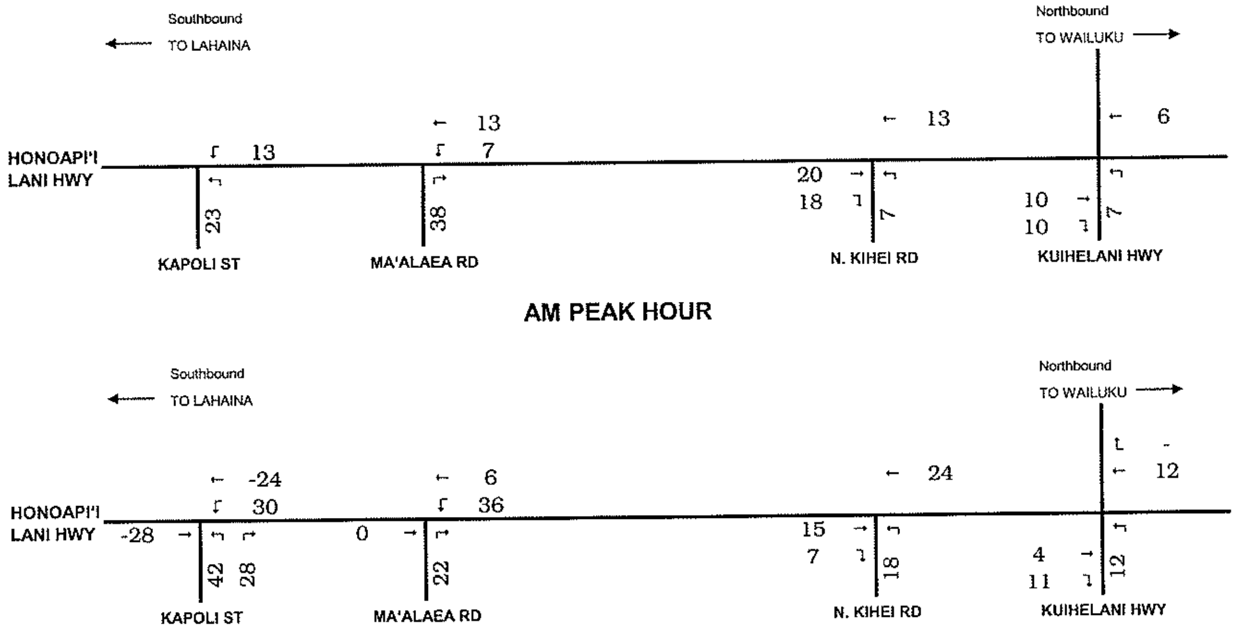
2009 EXISTING TRAFFIC VOLUMES

FIGURE 2



PM PEAK HOUR

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2019 MA'ALAEA VILLAGE MIXED-USE PROJECT TRAFFIC ASSIGNMENT

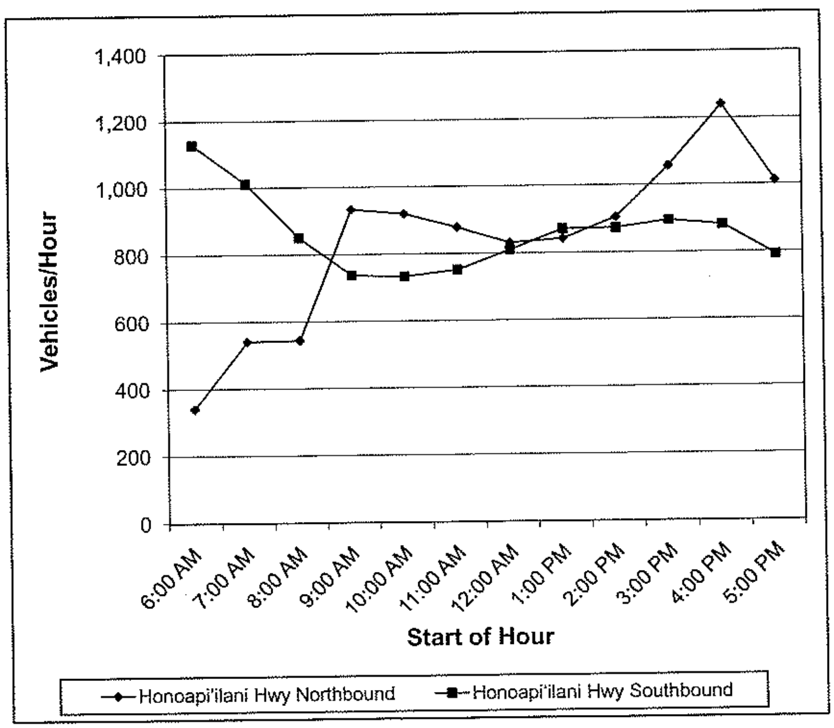
FIGURE 5

HOURLY TRAFFIC VOLUMES at Honoapi'ilani Highway, North of North Kihei Road (September 26, 2007)

Vehicles/Hour

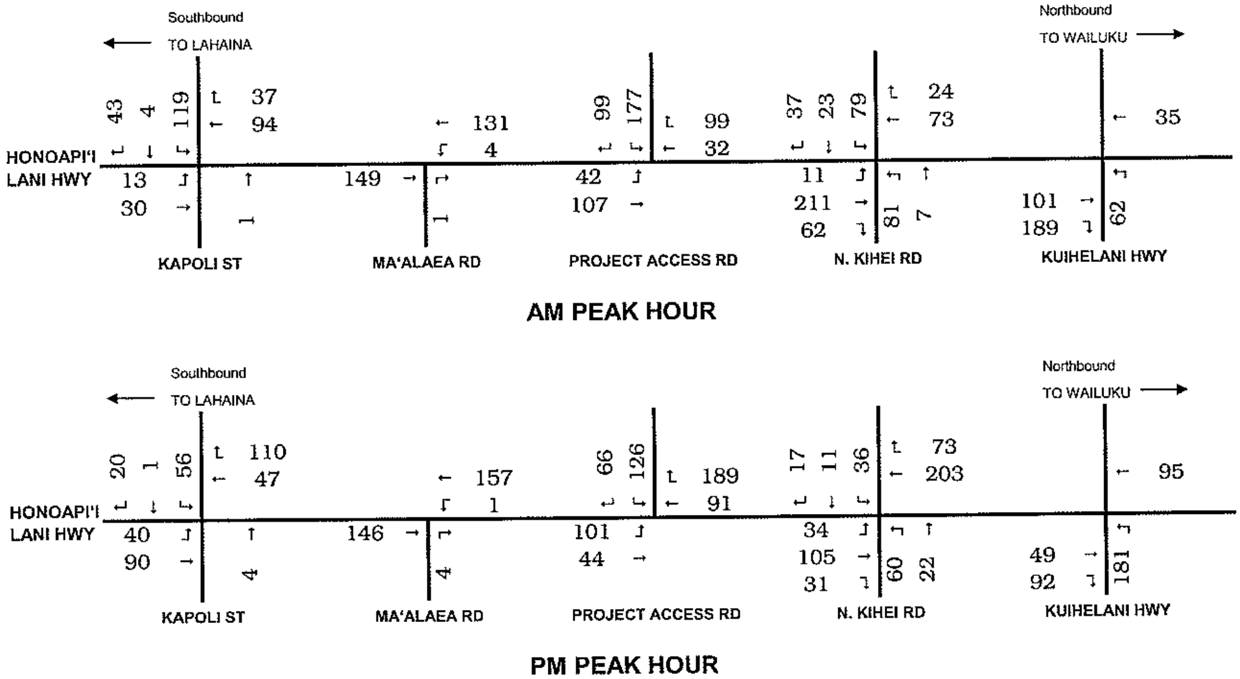
Start of Hour	Honopi'ilani Hwy North Bound	Honopi'ilani Hwy South Bound
6:00 AM	340	1,129
7:00 AM	541	1,011
8:00 AM	544	850
9:00 AM	933	738
10:00 AM	919	733
11:00 AM	877	752
12:00 AM	831	810
1:00 PM	842	871
2:00 PM	904	872
3:00 PM	1,056	894
4:00 PM	1,241	880
5:00 PM	1,011	791

Source: State of Hawai'i Department of Transportation



HOURLY TRAFFIC VOLUMES ON HONOAPI'ILANI HIGHWAY NORTH OF NORTH KIHEI ROAD

FIGURE 4



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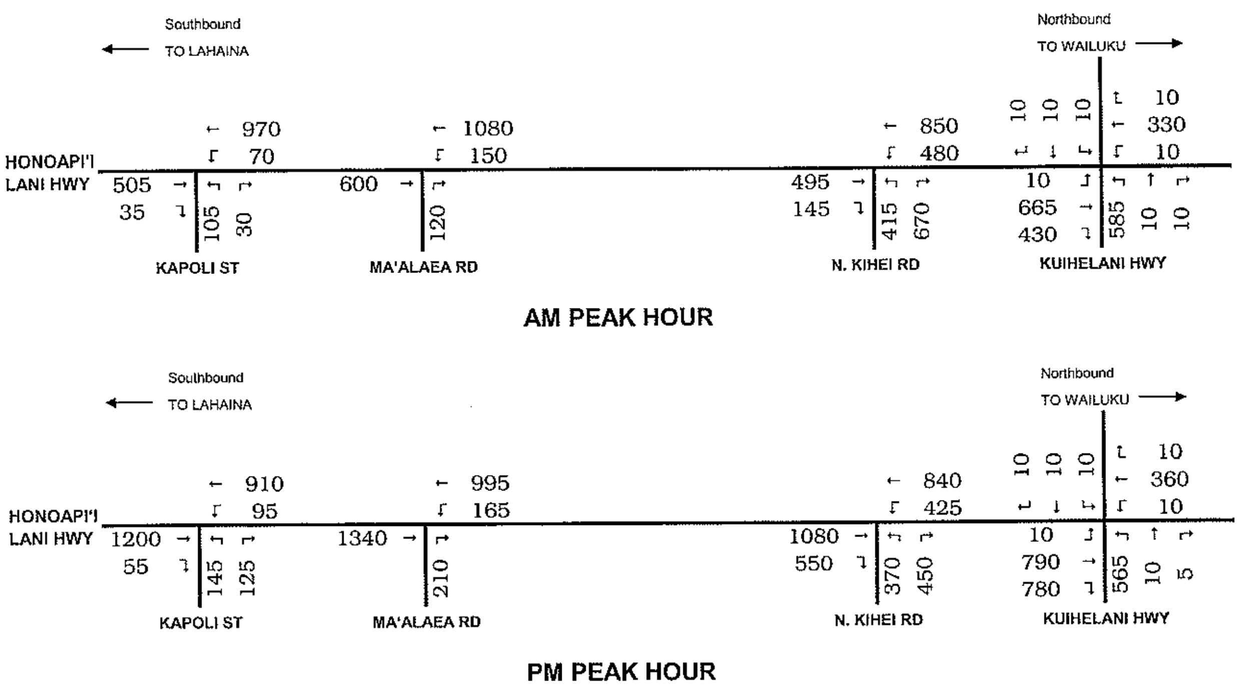
PROJECT GENERATED TRAFFIC ASSIGNMENT

FIGURE 7



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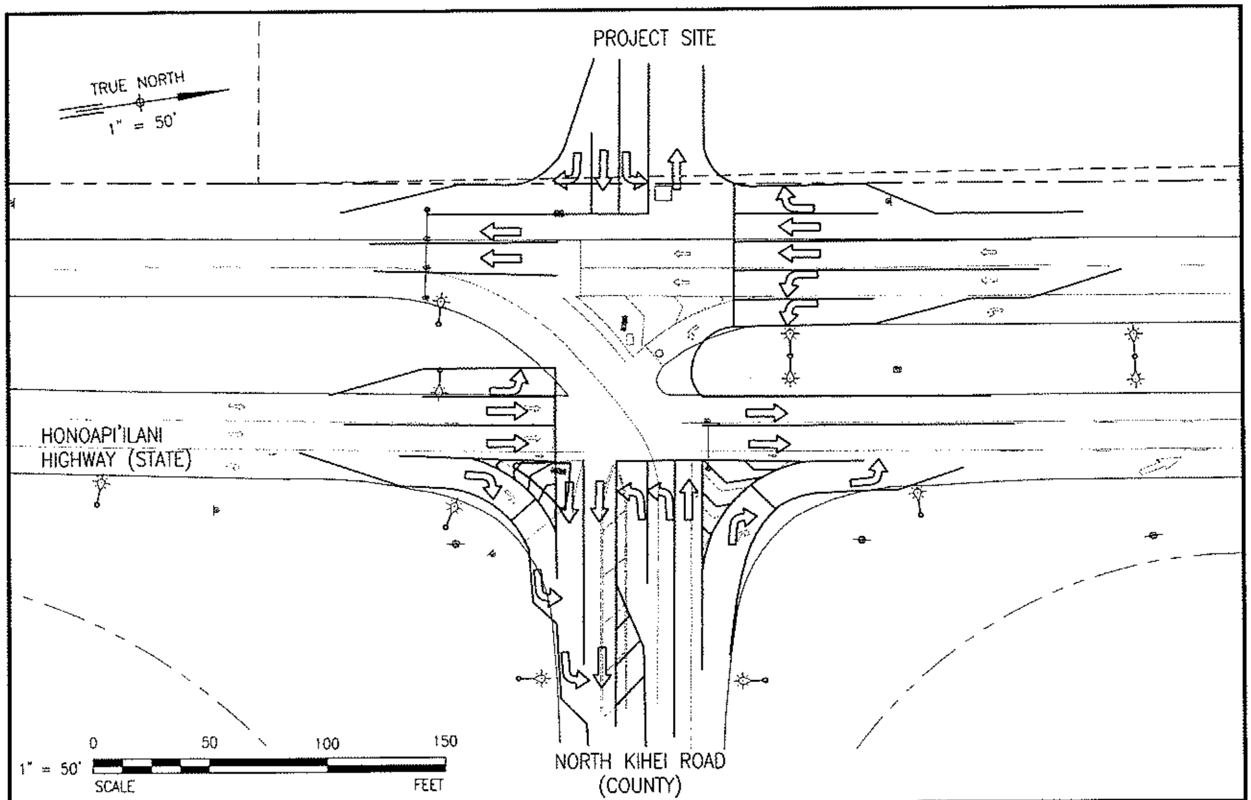
2019 AMBIENT TRAFFIC FORECAST

FIGURE 6



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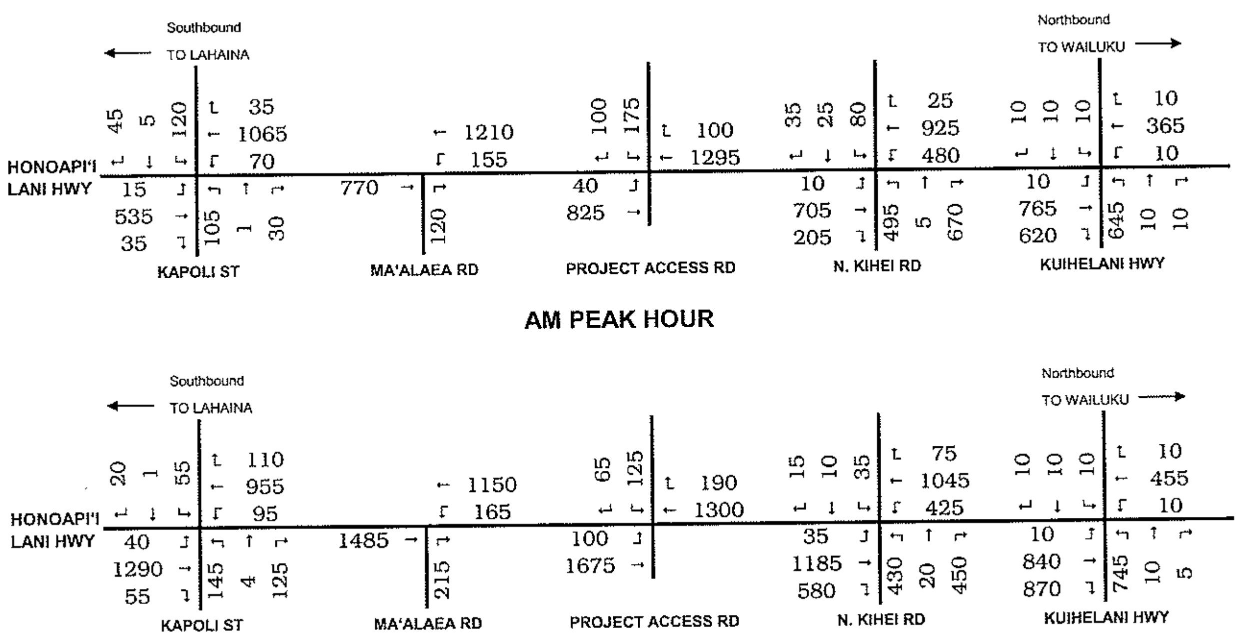
CURRENT AND PROPOSED INTERSECTION DESIGN - HONOAPI'ILANI HIGHWAY AT NORTH KIHEI ROAD

Figure 9
PROPOSED INTERSECTION DESIGN
TRAFFIC IMPACT ANALYSIS REPORT
OHANA KAI VILLAGE
MA'ALAEA, MAUI, HAWAII
SEPTEMBER 2009



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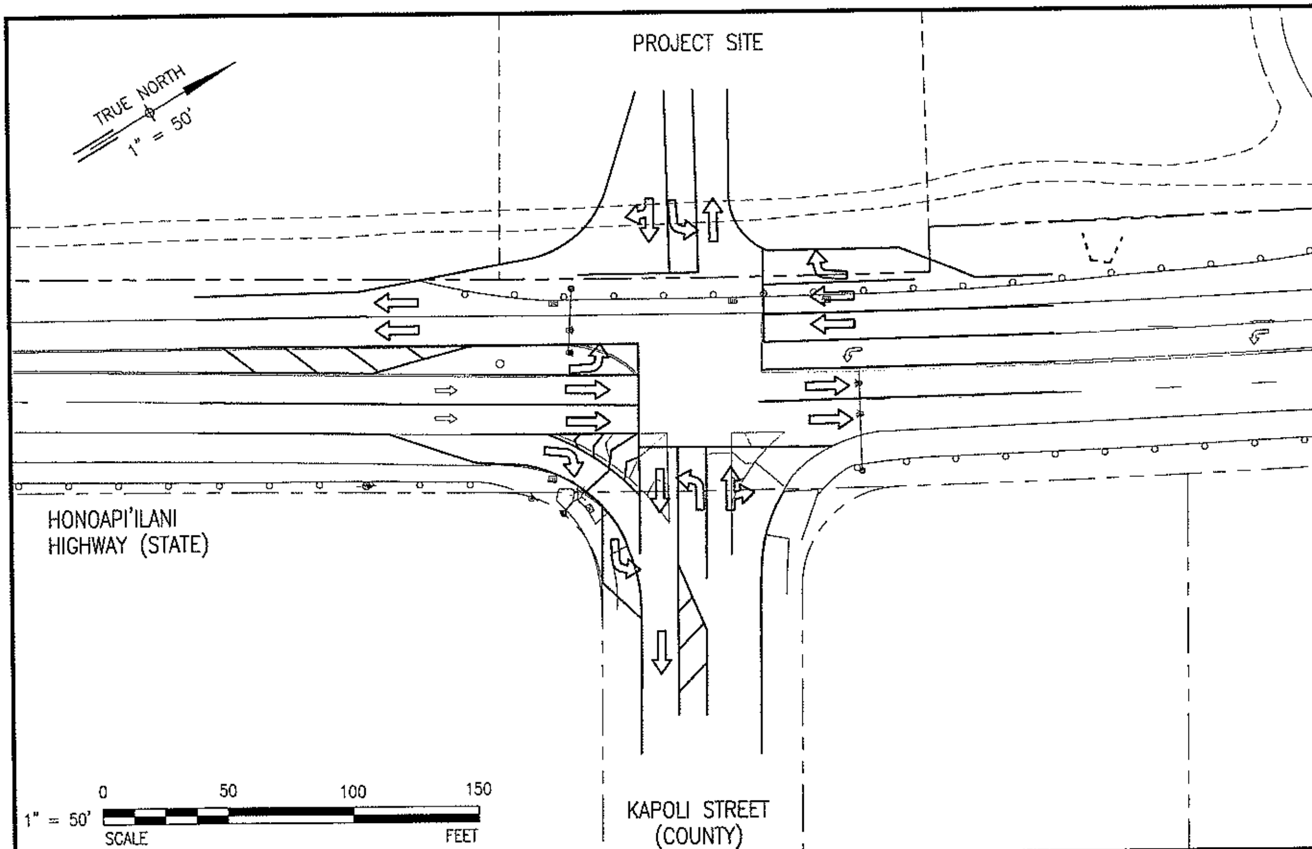
2019 TOTAL WITH PROJECT FORECAST

FIGURE 8



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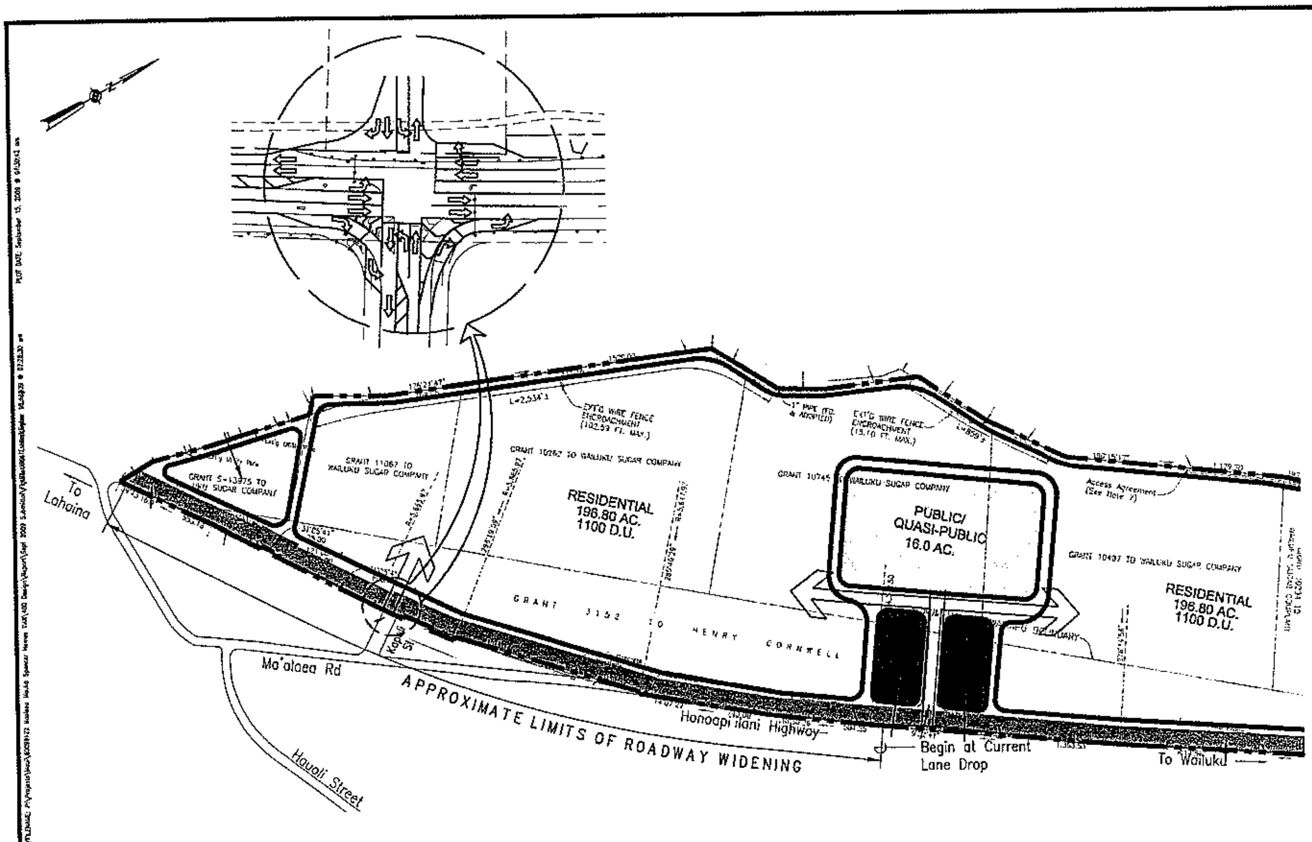
CURRENT AND PROPOSED INTERSECTION DESIGN - HONOAPI'ILANI HIGHWAY AT KAPOLI STREET

Figure 11
PROPOSED INTERSECTION DESIGN
TRAFFIC IMPACT ANALYSIS REPORT
OHANA KAI VILLAGE
MA'ALAEA, MAUI, HAWAII
SEPTEMBER 2009



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PROPOSED WIDENING - ADDITION OF A SECOND SOUTHBOUND LANE TO HONOAPI'ILANI HIGHWAY

NOT TO SCALE

Figure 10
PROPOSED WIDENING
TRAFFIC IMPACT ANALYSIS REPORT
OHANA KAI VILLAGE
MA'ALAEA, MAUI, HAWAII
SEPTEMBER 2009

TABLE 1
TRIP GENERATION AND DISTRIBUTION ANALYSIS

AM TRIP GENERATION

1,100 single family units (LU 210, SF DU)

		Trips	Entering	Exiting
	T = 0.70(X) + 9.43		25%	75%
	T =	779	195	585
for	350 North Section	248	62	186
	450 Middle Section	319	80	239
	300 South Section	213	53	159

Gas Station w/ 8 pumps and convenience store (LU 945)

Middle Section	Trips	Entering	Exiting
T = 10.06*(X)		50%	50%
T =	80	40	40
Pass-by trips (62%)	50	25	25
Directly generated trips (38%)	31	15	15

AM TRIP DISTRIBUTION

Direction	Trips	North via H. Hwy	South via H. Hwy	via N. Kihei Rd	via Kuihelani	Maalaea
		19.1%	25.9%	16.5%	36.6%	1.8%
Entering	195	30	41	26	58	41
Exiting	585	99	135	86	191	75
Entering	62	10	13	8	18	13
Exiting	186	32	43	27	61	23
Entering	80	12	17	11	24	16
Exiting	239	41	55	35	78	30
Entering	53	8	11	7	16	11
Exiting	159	27	37	24	52	20

Direction	Trips	North via H. Hwy	South via H. Hwy	via N. Kihei Rd	via Kuihelani	Maalaea
Entering	40	16	9	0	0	15
Exiting	40	9	16	0	0	15
Entering	25	16	9			
Exiting	25	9	16			
Entering	15					15
Exiting	15					15

Tables

TABLE 1
TRIP GENERATION AND DISTRIBUTION ANALYSIS

TOTAL AM PEAK HOUR		Direction	Trips	North via H. Hwy	South via H. Hwy	via N. Kihei Rd	via Kuihelani	Maalaea
Total Trips		Entering	521	120	89	69	138	105
		Exiting	843	161	198	119	254	111
North Section	Directly Generated Trips	Entering	62	10	13	8	18	13
		Exiting	186	32	43	27	61	23
Middle Section	Directly Generated Trips	Entering	341	61	42	53	104	81
		Exiting	433	79	76	68	141	68
	Pass-by Trips	Entering	65	42	23			
		Exiting	65	23	42			
South Section	Directly Generated Trips	Entering	53	8	11	7	16	11
		Exiting	160	27	37	24	52	20

TABLE 1
TRIP GENERATION AND DISTRIBUTION ANALYSIS

20,000 sf Grocery Store (LU 850, Supermarket)				Direction	Trips	North via H. Hwy	South via H. Hwy	via N. Kihei Rd	via Kuihelani	Maalaea
Middle Section	Trips	Entering	Exiting							
T = 3.25(X)		61%	39%							
T =	65	40	25	Entering	40	11	6	1	1	20
				Exiting	25	6	10	0	0	9
Pass-by trips (36%)	29	14	14	Entering	14	9	5			
				Exiting	14	5	9			
Directly generated trips (64%)	36	25	11	Entering	25	2	1	1	1	20
				Exiting	11	1	1			9

2,000 sf Fast Food (LU 933, Fast Food w/o DT window)				Direction	Trips	North via H. Hwy	South via H. Hwy	via N. Kihei Rd	via Kuihelani	Maalaea
Middle Section	Trips	Entering	Exiting							
T = 43.87(X)		60%	40%							
T =	88	53	35	Entering	53	19	10	1	2	21
				Exiting	35	10	18	0	0	7
Pass-by trips (49%)	52	26	26	Entering	26	17	9			
				Exiting	26	9	17			
Directly generated trips (51%)	36	27	9	Entering	27	2	1	1	2	21
				Exiting	9	1	1			7

400 Student Charter School (LU534, private school K-8)				Direction	Trips	North via H. Hwy	South via H. Hwy	via N. Kihei Rd	via Kuihelani	Maalaea
Middle Section	Trips	Entering	Exiting							
Ln(T) = 1.0Ln(X) - 0.13		55%	45%			23%	12%	21%	40%	4%
Ln(T) = 5.861464547				Entering	193	44	23	41	77	8
T =	351	193	158	Exiting	158	36	19	33	63	6

TABLE 1
TRIP GENERATION AND DISTRIBUTION ANALYSIS

20,000 sf Grocery Store (LU 850, Supermarket)

Middle Section	Trips	Entering	Exiting
T = 10.45(X)		51%	49%
T =	209	107	102
Pass-by trips (36%)	77	38	38
Directly generated trips (64%)	132	68	64

Direction	Trips	North via H. Hwy	South via H. Hwy	via N. Kihei Rd	via Kuihelani	Maalaea
Entering	107	16	28	2	5	55
Exiting	102	27	17	2	5	51
Entering	38	14	25			
Exiting	38	25	14			
Entering	68	2	3	2	5	55
Exiting	64	2	3	2	5	51

2,000 sf Fast Food (LU 933, Fast Food w/o DT window))

Middle Section	Trips	Entering	Exiting
T = 26.15(X)		51%	49%
T =	52	27	26
Pass-by trips (50%)	27	13	13
Directly generated trips (50%)	26	13	12

Direction	Trips	North via H. Hwy	South via H. Hwy	via N. Kihei Rd	via Kuihelani	Maalaea
Entering	27	6	10	0	0	11
Exiting	26	10	6	0	0	10
Entering	13	5	9			
Exiting	13	9	5			
Entering	13	1	1			11
Exiting	12	1	1			10

400 Student Charter School (LU534, private school K-8)

Middle Section	Trips	Entering	Exiting
T = 0.31*[0.58(X) + 14.03]		47%	53%
T =	76	36	40

Direction	Trips	North via H. Hwy	South via H. Hwy	via N. Kihei Rd	via Kuihelani	Maalaea
		23%	12%	21%	40%	4%
Entering	36	8	4	8	14	1
Exiting	40	9	5	8	16	2

TABLE 1
TRIP GENERATION AND DISTRIBUTION ANALYSIS

PM TRIP GENERATION

1,100 single family units (LU 210, SF DU)

		Trips	Entering	Exiting
	Ln(T) = 0.90Ln(X) + 0.53		63%	37%
	Ln(T) = 6.832758913			
	T =	928	584	343
for	350 North Section	295	186	109
	450 Middle Section	380	239	140
	300 South Section	253	159	94

PM TRIP DISTRIBUTION

Direction	Trips	North via H. Hwy	South via H. Hwy	via N. Kihei Rd	via Kuihelani	Maalaea
		19.1%	25.9%	16.5%	36.6%	1.8%
Entering	584	95	129	82	182	98
Exiting	343	48	65	42	92	97
Entering	186	30	41	26	58	31
Exiting	109	15	21	13	29	31
Entering	239	39	53	34	74	40
Exiting	140	20	27	17	38	40
Entering	159	26	35	22	50	27
Exiting	94	13	18	11	25	27

Gas Station w/ 8 pumps and convenience store (LU 945)

Middle Section	Trips	Entering	Exiting
T = 13.38*(X)		50%	50%
T =	107	54	54
Pass-by trips (56%)	60	30	30
Directly generated trips (38%)	47	24	24

Direction	Trips	North via H. Hwy	South via H. Hwy	via N. Kihei Rd	via Kuihelani	Maalaea
Entering	54	17	13	0	0	24
Exiting	54	13	17	0	0	24
Entering	30	17	13			
Exiting	30	13	17			
Entering	24					24
Exiting	24					24

TABLE 2
ESTIMATED TRIP DISTRIBUTION BASED ON MAUI FORECASTS

POPULATION

Community	1990*	2020**	2020%	Sub-Community Breakdown		30% pop+ 70% emp
Wailuku-Kahului	32,717	60,877	37.5%	Wailuku (.4 of w-k)	15.0%	18.0%
Kihei-Makena	15,382	33,227	20.5%	Kahului (.6 of w-k)	22.5%	27.0%
West Maui	14,590	25,096	15.5%	Kihei (.9 of k-m)	18.4%	15.5%
Hana	1,898	2,362	1.5%	Ma'alaea (.1 of k-m)	2.0%	1.7%
Makawao	18,873	27,640	17.0%	West Maui	15.5%	24.3%
Paia-Haiku	7,897	13,168	8.1%	60% of Makawao-Paia	15.1%	7.4%
	91,357	162,370	100.0%		88.5%	93.8%

EMPLOYMENT

Community	1990*	2020*	2020%	Sub-Community Breakdown	
Wailuku-Kahului	24,374	40,119	48.1%	Wailuku (.4 of w-k)	19.2%
Kihei-Makena	7,575	13,183	15.8%	Kahului (.6 of w-k)	28.9%
West Maui	15,436	23,463	28.1%	Kihei (.9 of k-m)	14.2%
Hana	851	970	1.2%	Ma'alaea (.1 of k-m)	1.6%
Makawao	2,354	3,763	4.5%	West Maui	28.1%
Paia-Haiku	1,178	1,902	2.3%	60% of Makawao-Paia	4.1%
	51,768	83,400	100.0%		96.1%

HIGHWAY BREAKDOWN	**Subcommunities**	**Highway Assignment** Unnormalized	Normalized
Honoapi'ilani Hwy (North)	Wailuku	18.0%	19.1%
Kuihelani Hwy	Kahului, Makawao, Paia	34.3%	36.6%
N. Kihei Rd	Kihei	15.5%	16.5%
Ma'alaea	Ma'alaea	1.7%	1.8%
Honoapi'ilani Hwy (South)	West Maui	24.3%	25.9%
		93.8%	100.0%

Source: * Kaku Associates, Inc., "Maui Long-Range Land Transportation Plan" (February 1997)
** Draft Maui Island Plan, Volume II Recommendations (March 2008)

TABLE 1
TRIP GENERATION AND DISTRIBUTION ANALYSIS

TOTAL PM PEAK HOUR		Direction	Trips	North via H. Hwy	South via H. Hwy	via N. Kihei Rd	via Kuihelani	Maalaea
Total Trips		Entering	807	143	183	92	201	189
		Exiting	565	107	111	52	113	183
North Section	Directly Generated Trips	Entering	186	30	41	26	58	31
		Exiting	110	15	21	13	29	31
Middle Section	Directly Generated Trips	Entering	379	51	61	43	93	131
		Exiting	281	33	36	28	59	126
	Pass-by Trips	Entering	82	36	46			
		Exiting	82	46	36			
South Section	Directly Generated Trips	Entering	160	26	35	22	50	27
		Exiting	94	13	18	11	25	27

TABLE 3
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS
ON HONOAPIILANI HIGHWAY

INTERSECTION APPROACH MOVEMENT	AM PEAK HOUR							
	2009		2019					
	EXISTING		AMBIENT		TOTAL		W/ MITIGATION	
	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
HWY at KUIHELANI HWY	C	23.1	C	25.4	C	26.1		
Kuihelani Hwy Ext EB	D	47.5	D	50.1	D	39.0		
Kuihelani Hwy WB	C	32.2	C	34.0	C	27.5		
Honoapi'ilani Hwy NB	B	17.9	B	20.0	C	25.2		
Left Turn Lane	D	49.3	D	51.4	D	39.4		
Through Lanes	C	22.4	C	24.7	D	38.1		
Honoapi'ilani Hwy SB	C	21.1	C	22.5	C	25.6		
Left Turn Lane	D	49.4	D	51.4	D	39.4		
Through Lanes	B	20.0	C	21.6	C	25.3		
							1*	
HWY at N. KIHEI RD	C	23.7	C	26.6	D	51.2	C	34.2
N. Kihei Rd Ext EB					E	74.8	D	52.5
N. Kihei Rd WB	C	25.5	C	28.7	E	69.2	D	36.8
Honoapi'ilani Hwy NB	C	26.7	C	29.7	D	47.2	C	35.0
Left Turn Lane					E	75.8	D	54.7
Through Lanes	C	29.0	B	10.5	E	55.1	D	39.3
Honoapi'ilani Hwy SB	C	21.2	C	24.0	D	40.5	C	30.3
Left Turn Lane	D	44.7	D	52.7	F	84.0	D	50.2
Through Lanes	A	7.6	A	7.7	C	20.9	C	21.6
							2*	
HWY at KAPOLI ST	B	11.3	B	12.6	D	54.9	C	24.5
Kapoli St Ext EB					D	54.6	D	36.3
Kapoli St WB	D	36.0	D	43.7	D	54.7	D	36.3
Honoapi'ilani Hwy NB	B	12.2	B	11.4	B	15.8	B	18.4
Left Turn Lane					E	63.6	D	48.0
Through Lanes	B	12.2	B	11.4	B	15.0	B	18.1
Honoapi'ilani Hwy SB	A	8.3	A	9.2	E	74.9	C	24.9
Left Turn Lane	A	3.4	A	3.2	E	67.2	D	50.2
Through Lane	A	8.6	A	9.6	E	75.4	C	23.5

LEGEND:
NB - Northbound
SB - Southbound
EB - Eastbound
WB - Westbound

MITIGATION NOTES:
1* - 2 SB LT lanes, 1 WB through lane, 8 phase traffic signal
2* - 2 SB Through Lanes

TABLE 3 (Continued)
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS
ON HONOAPI'ILANI HIGHWAY

INTERSECTION APPROACH MOVEMENT	AM PEAK HOUR							
	2009		2019					
	EXISTING		AMBIENT		TOTAL		W/ MITIGATION	
	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
HWY at MIDDLE PROJ. ACC.					C	20.4		
Project Access EB					D	35.4		
Honoapi'ilani Hwy NB					B	13.4		
Left Turn Lane					E	60.7		
Through Lanes					A	9.6		
Honoapi'ilani Hwy SB					C	20.4		
HWY at MAALAEA RD					A	7.6		
Ma'alaea Rd WB Right Turn					D	46.1		
Honoapi'ilani Hwy NB					A	5.2		
Honoapi'ilani Hwy SB					A	6.1		
Left Turn Lane					D	50.0		
Through Lanes					A	0.2		
HWY at KAPOLI ST WITH MAALAEA RD LEFT TURNS					C	23.0		
Kapoli St Ext EB					D	43.7		
Kapoli St WB					D	43.8		
Honoapi'ilani Hwy NB					C	23.5		
Left Turn Lane					D	52.6		
Through Lanes					C	23.3		
Honoapi'ilani Hwy SB					B	18.7		
Left Turn Lane					D	41.8		
Through Lane					B	14.1		

LEGEND:
NB - Northbound
SB - Southbound
EB - Eastbound
WB - Westbound

TABLE 3 (Continued)
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS ON HONOAPIILANI HIGHWAY

INTERSECTION APPROACH MOVEMENT	PM PEAK HOUR							
	2009		2019					
	EXISTING		AMBIENT		TOTAL		W/ MITIGATION	
	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
HWY at KUIHELANI HWY	C	20.5	C	22.0	C	27.8		
Kuihelani Hwy Ext EB	D	48.9	D	49.2	D	44.0		
Kuihelani Hwy WB	C	31.7	C	33.7	C	31.9		
Honoapi'ilani Hwy NB	B	15.2	B	16.9	C	25.2		
Left Turn Lane	D	48.8	D	48.9	D	44.5		
Through Lanes	C	21.9	C	23.4	D	43.4		
Honoapi'ilani Hwy SB	B	21.0	C	20.3	C	29.1		
Left Turn Lane	D	49.2	D	48.9	D	44.5		
Through Lanes	B	19.2	B	19.5	C	28.9		
							1*	
HWY at N. KIHEI RD	C	24.5	C	29.7	D	66.9	C	30.7
N. Kihei Rd Ext EB					E	70.1	D	45.4
N. Kihei Rd WB	C	26.4	C	28.6	D	43.8	D	39.8
Honoapi'ilani Hwy NB	C	28.9	D	35.3	F	95.7	C	32.5
Left Turn Lane					F	93.7	D	44.3
Through Lanes	D	35.4	D	44.3	F	>100	D	38.5
Honoapi'ilani Hwy SB	B	18.8	C	23.7	D	48.4	C	23.5
Left Turn Lane	D	41.1	E	56.1	F	>100	D	47.1
Through Lanes	A	7.1	A	7.3	C	24.1	B	16.0
							2*	
HWY at KAPOLI ST	B	14.8	B	15.9	D	46.5	C	28.8
Kapoli St Ext EB					D	47.4	D	42.4
Kapoli St WB	C	31.0	D	41.9	D	52.6	D	46.5
Honoapi'ilani Hwy NB	B	17.2	B	16.2	C	26.5	C	28.6
Left Turn Lane					D	52.6	D	47.6
Through Lanes	B	17.2	C	16.2	C	25.8	C	28.6
Honoapi'ilani Hwy SB	A	8.3	A	8.5	E	69.0	C	24.5
Left Turn Lane	A	6.7	A	8.0	D	55.0	D	49.5
Through Lane	A	8.4	A	8.6	E	70.4	C	22.9

LEGEND: NB - Northbound
SB - Southbound
EB - Eastbound
WB - Westbound

MITIGATION NOTES:
1* - 2 SB LT lanes, 1 WB through lane, 8 phase traffic signal
2* - 2 SB Through Lanes

TABLE 3 (Continued)
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS ON HONOAPI'ILANI HIGHWAY

INTERSECTION APPROACH MOVEMENT	PM PEAK HOUR							
	2009		2019					
	EXISTING		AMBIENT		TOTAL		W/ MITIGATION	
	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
HWY at MIDDLE PROJ. ACC.					B	16.6		
Project Access EB					D	38.5		
Honoapi'ilani Hwy NB					B	11.8		
Left Turn Lane					D	42.7		
Through Lanes					A	9.8		
Honoapi'ilani Hwy SB					B	19.1		
HWY at MAALAEA RD					A	9.5		
Ma'alaea Rd WB Right Turn					D	46.3		
Honoapi'ilani Hwy NB					A	8.9		
Honoapi'ilani Hwy SB					A	5.0		
Left Turn Lane					D	38.2		
Through Lanes					A	0.3		
HWY at KAPOLI ST WITH MAALAEA RD LEFT TURNS					D	37.6		
Kapoli St Ext EB					D	40.7		
Kapoli St WB					D	45.5		
Honoapi'ilani Hwy NB					D	40.8		
Left Turn Lane					D	54.6		
Through Lanes					D	41.3		
Honoapi'ilani Hwy SB					C	32.5		
Left Turn Lane					D	51.1		
Through Lane					C	28.7		

LEGEND: NB - Northbound
SB - Southbound
EB - Eastbound
WB - Westbound

TABLE 4
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS ON HONOAPI'ILANI HIGHWAY

INTERSECTION APPROACH AND MOVEMENT	AM PEAK HOUR			PM PEAK HOUR		
	2009	2019		2009	2019	
	EXIST	AMB	TOTAL	EXIST	AMB	TOTAL
HWY @ MA'ALAEA RD						
Ma'alaea Rd WB RT	B	B	B	C	D	E
Honoapi'ilani Hwy SB LT	A	A	B	B	C	C

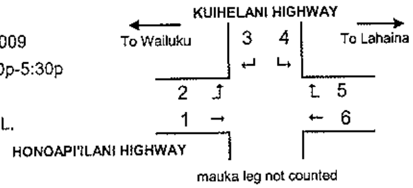
LEGEND: SB - Southbound
EB - Eastbound
WB - Westbound
RT - Right Turn
LT - Left Turn

Appendix A

Traffic Turning Movement Counts

TRAFFIC TURNING MOVEMENT COUNT
MAALAEA MAUKA SUBDIVISION

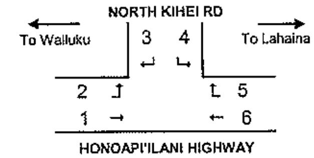
LOCATION: Honoapi'ilani Highway/
Kuihelani Hwy
DATE: TUES, April 28, 2009
TIME: 6:30a-8:30a / 3:30p-5:30p
WEATHER:
RECORDER: Marek T. & Chris L.



TIME PERIOD	1	2	3	4	5	6	TOTAL
6:30-6:45a	81	0	1	131	51	112	376
6:45-7:00a	76	0	1	123	64	103	367
7:00-7:15a	70	1	1	112	67	137	388
7:15-7:30a	79	3	1	131	102	143	459
7:30-7:45a	69	1	3	95	107	168	443
7:45-8:00a	68	3	4	128	63	135	401
8:00-8:15a	52	2	2	127	95	131	409
8:15-8:30a	72	1	2	91	92	133	391
6:30-8:30a	567	11	15	938	641	1062	3234
7:00-8:00a	286	8	9	466	339	583	1691
7:15-8:15a	268	9	10	481	367	577	1712
PHF	0.84		0.93		0.86		
3:30-3:45p	76	6	5	115	169	181	552
3:45-4:00p	68	5	1	135	132	150	491
4:00-4:15p	74	3	0	111	178	185	551
4:15-4:30p	88	7	1	126	154	130	506
4:30-4:45p	82	0	1	142	150	130	505
4:45-5:00p	78	0	1	109	140	131	459
5:00-5:15p	72	1	3	126	158	180	540
5:15-5:30p	83	3	7	103	112	154	462
3:30-5:30p	621	25	19	967	1193	1241	4066
3:45-4:45p	312	15	3	514	614	595	2053
3:30-4:30p	306	21	7	487	633	646	2100
PHF	0.86		0.91		0.88		

TRAFFIC TURNING MOVEMENT COUNT
MAALAEA MAUKA SUBDIVISION

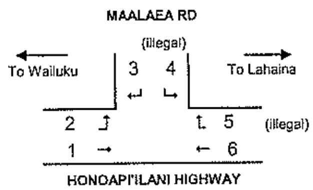
LOCATION: Honoapi'ilani Highway/
North Kihei Rd
DATE: WED, April 29, 2009
TIME: 6:30a-8:30a / 3:30p-5:30p
WEATHER:
RECORDER: Marek T. & Chris L.



TIME PERIOD	1	2	3	4	5	6	TOTAL
6:30-6:45a	211	75	75	97	28	61	547
6:45-7:00a	238	94	81	92	17	75	597
7:00-7:15a	193	101	143	79	28	79	623
7:15-7:30a	169	112	159	98	25	87	650
7:30-7:45a	159	94	161	75	31	121	641
7:45-8:00a	175	92	124	86	26	129	632
8:00-8:15a	156	96	100	60	33	110	555
8:15-8:30a	167	68	93	70	32	123	553
6:30-8:30a	1468	732	936	657	220	785	4798
6:45-7:45a	759	401	544	344	101	362	2511
7:00-8:00a	696	399	587	338	110	416	2546
PHF	0.93		0.90		0.85		
3:30-3:45p	198	102	101	68	82	205	756
3:45-4:00p	213	97	88	56	115	243	812
4:00-4:15p	159	87	119	87	110	183	745
4:15-4:30p	163	87	91	75	114	231	761
4:30-4:45p	177	101	72	85	112	216	763
4:45-5:00p	148	126	72	90	113	209	758
5:00-5:15p	171	86	114	54	96	211	732
5:15-5:30p	180	103	94	58	83	155	673
3:30-5:30p	1409	789	751	573	825	1653	6000
3:30-4:30p	733	373	399	286	421	862	3074
3:45-4:45p	712	372	370	303	451	873	3081 *
PHF	0.87		0.82		0.92		

TRAFFIC TURNING MOVEMENT COUNT
MAALAEA MAUKA SUBDIVISION

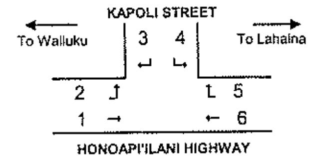
LOCATION: Honoapi'ilani Highway/ Maalaea Rd
DATE: TUES, May 5, 2009
TIME: 6:30a-8:30a / 3:30p-5:30p
WEATHER:
RECORDER: Marek T. & Chris L.



TIME PERIOD	1	2	3	4	5	6	TOTAL
	MOVEMENT NUMBER						
6:30-6:45a	265	54	12			56	387
6:45-7:00a	234	33	9			110	386
7:00-7:15a	285	43	17			110	455
7:15-7:30a	229	35	26			132	422
7:30-7:45a	233	27	11			109	380
7:45-8:00a	208	17	15			192	432
8:00-8:15a	209	43	16			144	412
8:15-8:30a	207	30	13			151	401
6:30-8:30a	1870	282	119	0	0	1004	3275
6:30-7:30a	1013	165	64	0	0	408	1650 *
7:00-8:00a	955	122	69	0	0	543	1689
PHF	0.82		0.66		0.71		
3:30-3:45p	213	23	36			288	560
3:45-4:00p	223	25	24			279	551
4:00-4:15p	220	26	62			315	623
4:15-4:30p	197	33	40			306	576
4:30-4:45p	225	32	28			281	566
4:45-5:00p	175	33	32			257	497
5:00-5:15p	191	28	37			277	533
5:15-5:30p	180	14	25			241	460
3:30-5:30p	1624	214	284	0	0	2244	4366
3:30-4:30p	853	107	162	0	0	1188	2310
3:45-4:45p	865	116	154	0	0	1181	2316
PHF	0.95		0.62		0.94		

TRAFFIC TURNING MOVEMENT COUNT
MAALAEA MAUKA SUBDIVISION

LOCATION: Honoapi'ilani Highway/ Kapoli St
DATE: THUR April 30, 2009
TIME: 6:30a-8:30a / 3:30p-5:30p
WEATHER:
RECORDER: Marek T. & Chris L.



TIME PERIOD	1	2	3	4	5	6	TOTAL
	MOVEMENT NUMBER						
6:30-6:45a	248	10	7	17	16	66	364
6:45-7:00a	269	21	4	13	7	80	394
7:00-7:15a	221	12	8	18	8	85	352
7:15-7:30a	219	19	6	24	8	123	399
7:30-7:45a	215	11	5	24	6	96	357
7:45-8:00a	197	9	10	11	10	102	339
8:00-8:15a	239	12	6	9	5	137	408
8:15-8:30a	201	5	9	10	6	134	365
6:30-8:30a	1809	99	55	126	66	823	2978
7:15-8:15a	870	51	27	68	29	458	1503
6:30-7:30a	957	62	25	72	39	354	1509
PHF	0.88		0.81		0.75		
3:30-3:45p	222	10	36	23	7	282	580
3:45-4:00p	206	16	20	31	14	239	526
4:00-4:15p	212	20	18	20	16	290	576
4:15-4:30p	191	10	13	21	14	274	523
4:30-4:45p	173	17	29	23	16	285	543
4:45-5:00p	182	13	18	21	10	266	510
5:00-5:15p	162	10	30	18	8	222	450
5:15-5:30p	169	17	12	5	9	200	412
3:30-5:30p	1517	113	176	162	94	2058	4120
3:45-4:45p	782	63	80	95	60	1088	2168
3:30-4:30p	831	56	87	95	51	1085	2205
PHF	0.96		0.77		0.93		

Appendix B

Signalized Intersection
Level of Service (LOS) Calculations

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: EX AM 2009
Comment: 2009 EXISTING AM

Site Information

Jurisdiction/Date: 5/30/2009
EB/WB Street: KUIHELANI
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	5	5	5	480	5	10	5	575	365	10	270	5
RTOR volume (veh/h)			5			10			150			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	0	0	0	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR							
WB		LTR						
NB		R	L	TR				
SB			L	TR				
Green (s)	7	32	5	45				
Yellow + All red (s)	5	5	4	5				

Cycle (s): 108 Lost time per cycle (s): 15 Critical v/c Ratio: .393

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LTR		L	LT	R	L	T	R	L	T	R
No. of lanes		1		1	1	1	1	2	1	1	2	1
Flow rate (veh/h)		11		261	266	0	5	625	234	11	293	0
Capacity (veh/h)		120		524	526	469	82	1478	1129	82	1478	660
Adjusted saturation flow (veh/h)		1854		1770	1776	1583	1770	3547	1583	1770	3547	1583
v/c ratio		.09		.498	.506	0	.066	.423	.207	.133	.199	0
g/C ratio		.065		.296	.296	.296	.046	.417	.713	.046	.417	.417
Average back of queue (veh)		.3		7	7.1	0	.2	7.5	2.6	.3	3.1	0
Uniform delay (s)		47.5		31.4	31.5	26.7	49.3	22.3	5.2	49.4	20	18.4
Incremental delay (s)		0		.7	.8	0	0	.1	0	0	0	0
Initial queue delay (s)		0		0	0	0	0	0	0	0	0	0
Delay (s)		47.5		32.1	32.3	26.7	49.3	22.4	5.2	49.4	20	18.4
LOS		D		C	C	C	D	C	A	D	B	B
Approach delay (s)/LOS	47.5	/	D	32.2	/	C	17.9	/	B	21.1	/	C
Intersection delay (s)/ LOS	23.1				/				C			

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMB AM 2019
Comment: 2019 AMBIENT AM

Site Information

Jurisdiction/Date: 5/30/2009
EB/WB Street: KUIHELANI
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	10	10	10	585	10	10	10	665	430	10	330	10
RTOR volume (veh/h)			0			10			200			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	0	0	0	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR							
WB		LTR						
NB		R	L	TR				
SB			L	TR				
Green (s)	7	35	5	46				
Yellow + All red (s)	5	5	4	5				

Cycle (s): 112 Lost time per cycle (s): 15 Critical v/c Ratio: .477

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LTR		L	LT	R	L	T	R	L	T	R
No. of lanes		1		1	1	1	1	2	1	1	2	1
Flow rate (veh/h)		33		318	329	0	11	723	250	11	359	5
Capacity (veh/h)		112		553	555	495	79	1457	1145	79	1457	650
Adjusted saturation flow (veh/h)		1785		1770	1777	1583	1770	3547	1583	1770	3547	1583
v/c ratio		.292		.575	.592	0	.138	.496	.218	.138	.246	.008
g/C ratio		.063		.313	.313	.313	.045	.411	.723	.045	.411	.411
Average back of queue (veh)		1.1		9	9.4	0	.4	9.4	2.8	.4	4.1	.1
Uniform delay (s)		50.1		32.3	32.5	26.5	51.4	24.4	5.1	51.4	21.6	19.5
Incremental delay (s)		0		1.5	1.7	0	0	.3	0	0	0	0
Initial queue delay (s)		0		0	0	0	0	0	0	0	0	0
Delay (s)		50.1		33.8	34.2	26.5	51.4	24.7	5.1	51.4	21.6	19.5
LOS		D		C	C	C	D	C	A	D	C	B
Approach delay (s)/LOS	50.1	/	D	34	/	C	20	/	B	22.5	/	C
Intersection delay (s)/ LOS	25.4				/				C			

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: TOT AM 2019
Comment: 2019 TOTAL W/PROJ AM

Site Information

Jurisdiction/Date: 8/16/2009
EB/WB Street: KUIHELANI
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other   Analysis period: .25 h   Signal type: Actuated-Field   % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)	10	10	10	725	10	10	10	855	630	10	410	10
RTOR volume (veh/h)			0			5			150			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	0	0	0	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT   T: TH   R: RT   P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR							
WB		LTR						
NB	R	R	L	TR				
SB			L	TR				
Green (s)	7	31	6	27				
Yellow + All red (s)	5	5	4	5				

Cycle (s): 90   Lost time per cycle (s): 5   Critical v/c Ratio: .355

Intersection Performance

	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Lane group configuration		LTR		L	LT	R	L	T	R	L	T	R
No. of lanes		1		1	1	1	1	2	1	1	2	1
Flow rate (veh/h)		33		394	405	5	11	929	522	11	446	5
Capacity (veh/h)		139		610	612	545	118	1064	1319	118	1064	475
Adjusted saturation flow (veh/h)		1785		1770	1776	1583	1770	3547	1583	1770	3547	1583
v/c ratio		.235		.646	.662	.01	.092	.873	.395	.092	.419	.011
g/C ratio		.078		.344	.344	.344	.067	.3	.833	.067	.3	.3
Average back of queue (veh)		.8		9.2	9.6	.1	.3	14.2	3.8	.3	5	.1
Uniform delay (s)		39		24.9	25	19.4	39.4	29.9	1.9	39.4	25.2	22.1
Incremental delay (s)		0		2.4	2.7	0	0	8.2	.1	0	.1	0
Initial queue delay (s)		0		0	0	0	0	0	0	0	0	0
Delay (s)		39		27.3	27.7	19.4	39.4	38.1	2	39.4	25.3	22.1
LOS		D		C	C	B	D	D	A	D	C	C
Approach delay (s)/LOS	39	/	D	27.5	/	C	25.2	/	C	25.6	/	C
Intersection delay (s)/ LOS		26.1					/			C		

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: EX PM 2009
Comment: 2009 EXISTING PM

Site Information

Jurisdiction/Date: 5/30/2009
EB/WB Street: KUIHELANI
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other   Analysis period: .25 h   Signal type: Actuated-Field   % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)	5	5	5	485	5	5	5	645	635	20	305	5
RTOR volume (veh/h)			5			10			150			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	0	0	0	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT   T: TH   R: RT   P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR							
WB		LTR						
NB		R	L	TR				
SB			L	TR				
Green (s)	5	32	5	46				
Yellow + All red (s)	5	5	4	5				

Cycle (s): 107   Lost time per cycle (s): 15   Critical v/c Ratio: .408

Intersection Performance

	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Lane group configuration		LTR		L	LT	R	L	T	R	L	T	R
No. of lanes		1		1	1	1	1	2	1	1	2	1
Flow rate (veh/h)		11		264	269	-5	5	701	527	22	332	0
Capacity (veh/h)		87		529	531	474	83	1525	1154	83	1525	681
Adjusted saturation flow (veh/h)		1854		1770	1776	1583	1770	3547	1583	1770	3547	1583
v/c ratio		.125		.498	.507	-.011	.066	.46	.457	.263	.217	0
g/C ratio		.047		.299	.299	.299	.047	.43	.729	.047	.43	.43
Average back of queue (veh)		.3		7	7.1	-.1	.2	8.3	7.1	.7	3.4	0
Uniform delay (s)		48.9		30.9	31	26.2	48.8	21.7	5.9	49.2	19.2	17.4
Incremental delay (s)		0		.7	.8	0	0	.2	.2	0	0	0
Initial queue delay (s)		0		0	0	0	0	0	0	0	0	0
Delay (s)		48.9		31.6	31.8	26.2	48.8	21.9	6.1	49.2	19.2	17.4
LOS		D		C	C	C	D	C	A	D	B	B
Approach delay (s)/LOS	48.9	/	D	31.7	/	C	15.2	/	B	21	/	C
Intersection delay (s)/ LOS		20.5					/			C		

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	5/30/2009
Agency or Company	M&E PAC	EB/WB Street	KUIHELANI
Analysis Period/Year	AMB PM 2019	NB/SB Street	HONOAPIILA
Comment	2019 AMBIENT PM		

Intersection Data

Area type Other Analysis period .25 h Signal type Actuated-Field % Back of queue 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)	10	10	10	565	10	5	10	790	780	10	360	10
RTOR volume (veh/h)			0			10			260			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	0	0	0	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR							
WB		LTR						
NB		R	L	TR				
SB			L	TR				
Green (s)	5	32	5	46				
Yellow + All red (s)	5	5	4	5				

Cycle (s) 107 Lost time per cycle (s) 15 Critical v/c Ratio .436

Intersection Performance

	EB	WB			NB			SB		
Lane group configuration	LTR	L	LT	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	1	2	1	1	2	1
Flow rate (veh/h)	22	307	318	-5	11	859	565	11	391	5
Capacity (veh/h)	87	529	531	474	83	1525	1154	83	1525	681
Adjusted saturation flow (veh/h)	1854	1770	1777	1583	1770	3547	1583	1770	3547	1583
v/c ratio	.251	.58	.598	-.011	.131	.563	.49	.131	.257	.008
g/C ratio	.047	.299	.299	.299	.047	.43	.729	.047	.43	.43
Average back of queue (veh)	.7	8.4	8.8	-.1	.3	10.9	7.9	.3	4.1	.1
Uniform delay (s)	49.2	31.8	32	26.2	48.9	22.9	6.1	48.9	19.5	17.4
Incremental delay (s)	0	1.6	1.9	0	0	.5	.3	0	0	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	49.2	33.4	33.9	26.2	48.9	23.4	6.4	48.9	19.5	17.4
LOS	D	C	C	C	D	C	A	D	B	B
Approach delay (s)/LOS	49.2 / D	33.7 / C			16.9 / B			20.3 / C		
Intersection delay (s)/ LOS	22 / C									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	8/16/2009
Agency or Company	M&E PAC	EB/WB Street	KUIHELANI
Analysis Period/Year	TOT PM 2019	NB/SB Street	HONOAPIILA
Comment	2019 TOT W/PROJ PM		

Intersection Data

Area type Other Analysis period .25 h Signal type Actuated-Field % Back of queue 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)	10	10	10	765	10	5	10	875	870	10	465	10
RTOR volume (veh/h)			0			0			150			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	0	0	0	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR							
WB		LTR						
NB	R	R	L	TR				
SB			L	TR				
Green (s)	7	38	6	30				
Yellow + All red (s)	5	5	4	5				

Cycle (s) 100 Lost time per cycle (s) 5 Critical v/c Ratio .527

Intersection Performance

	EB	WB			NB			SB		
Lane group configuration	LTR	L	LT	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	1	2	1	1	2	1
Flow rate (veh/h)	33	557	285	5	11	951	783	11	505	11
Capacity (veh/h)	125	672	675	602	106	1064	1346	106	1064	475
Adjusted saturation flow (veh/h)	1785	1770	1777	1583	1770	3547	1583	1770	3547	1583
v/c ratio	.261	.828	.422	.009	.102	.894	.582	.102	.475	.023
g/C ratio	.07	.38	.38	.38	.06	.3	.85	.06	.3	.3
Average back of queue (veh)	.9	16.4	6.3	.1	.3	16.4	7.6	.3	6.5	.2
Uniform delay (s)	44	28.1	22.9	19.3	44.5	33.5	2.2	44.5	28.6	24.7
Incremental delay (s)	0	8.5	.2	0	0	9.9	.6	0	.3	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	44	36.6	23.1	19.3	44.5	43.4	2.8	44.5	28.9	24.7
LOS	D	D	C	B	D	D	A	D	C	C
Approach delay (s)/LOS	44 / D	31.9 / C			25.2 / C			29.1 / C		
Intersection delay (s)/ LOS	27.8 / C									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: EX AM 2009
Comment: 2009 EXISTING AM

Site Information

Jurisdiction/Date: 5/30/2009
EB/WB Street: N. KIHEI R
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other   Analysis period: .25 h   Signal type: Actuated-Field   % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)				340		585		415	110	400	695	
RTOR volume (veh/h)						200			55			0
Peak-hour factor				.92		.92		.92	.92	.92	.92	
Heavy vehicles (%)				2		2		2	2	2	2	
Start-up lost time, l_1 (s)				2		2		2	2	2	2	
Extension of effective green, e (s)				2		2		2	2	2	2	
Arrival type, AT				3		3		3	3	3	3	
Approach pedestrian volume (p/h)					0			0			0	
Approach bicycle volume (bic/h)					0			0			0	
Left/right parking (Y or N)		/		N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB								
WB	LR	R						
NB	R		TR					
SB		LT	T					
Green (s)	26	35	38					
Yellow + All red (s)	5	4	6					

Cycle (s): 114   Lost time per cycle (s): 6   Critical v/c Ratio: .507

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration				L		R		T	R	L	T	
No. of lanes				2		1		2	1	1	2	
Flow rate (veh/h)				370		418		451	60	435	755	
Capacity (veh/h)				784		917		1182	972	543	2396	
Adjusted saturation flow (veh/h)				3437		1583		3547	1583	1770	3547	
v/c ratio				.472		.457		.382	.061	.8	.315	
g/C ratio				.228		.579		.333	.614	.307	.675	
Average back of queue (veh)				5.6		8.2		6.1	.8	14.6	5.6	
Uniform delay (s)				38.1		13.7		29	8.8	36.3	7.6	
Incremental delay (s)				.4		.3		0	0	8.4	0	
Initial queue delay (s)				0		0		0	0	0	0	
Delay (s)				38.5		14		29	8.8	44.7	7.6	
LOS				D		B		C	A	D	A	
Approach delay (s)/LOS		/		25.5	/	C	26.7	/	C	21.2	/	C
Intersection delay (s)/ LOS	23.7					/				C		

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMB AM 2019
Comment: 2019 AMBIENT AM

Site Information

Jurisdiction/Date: 5/30/2009
EB/WB Street: N. KIHEI R
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other   Analysis period: .25 h   Signal type: Actuated-Field   % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)				415		670		495	145	480	850	
RTOR volume (veh/h)						200			75			0
Peak-hour factor				.92		.92		.92	.92	.92	.92	
Heavy vehicles (%)				2		2		2	2	2	2	
Start-up lost time, l_1 (s)				2		2		2	2	2	2	
Extension of effective green, e (s)				2		2		2	2	2	2	
Arrival type, AT				3		3		3	3	3	3	
Approach pedestrian volume (p/h)					0			0			0	
Approach bicycle volume (bic/h)					0			0			0	
Left/right parking (Y or N)		/		N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB								
WB	LR	R						
NB	R		TR					
SB		LT	T					
Green (s)	26	40	39					
Yellow + All red (s)	5	4	6					

Cycle (s): 120   Lost time per cycle (s): 6   Critical v/c Ratio: .608

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration				L		R		T	R	L	T	
No. of lanes				2		1		2	1	1	2	
Flow rate (veh/h)				451		511		538	76	522	924	
Capacity (veh/h)				745		937		1153	937	590	2453	
Adjusted saturation flow (veh/h)				3437		1583		3547	1583	1770	3547	
v/c ratio				.606		.545		.467	.081	.884	.377	
g/C ratio				.217		.592		.325	.592	.333	.692	
Average back of queue (veh)				7.7		11.2		8	1.2	19.7	7.3	
Uniform delay (s)				42.4		14.8		32.2	10.5	37.8	7.7	
Incremental delay (s)				1.4		.7		.2	0	14.9	0	
Initial queue delay (s)				0		0		0	0	0	0	
Delay (s)				43.8		15.5		32.4	10.5	52.7	7.7	
LOS				D		B		C	B	D	A	
Approach delay (s)/LOS		/		28.7	/	C	29.7	/	C	24	/	C
Intersection delay (s)/ LOS	26.6					/				C		

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: TOT AM 2019
Comment: 2019 TOTAL W/PROJ AM

Site Information

Jurisdiction/Date: 8/16/2009
EB/WB Street: N. KIHEI R
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	95	25	45	495	10	670	15	795	235	480	1040	30
RTOR volume (veh/h)			15			200			45			10
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB		LTR	R					
WB	LTR		R	R				
NB	R	R	L		TR			
SB			L	LTR	TR			
Green (s)	27	15	5	40	49			
Yellow + All red (s)	5	5	4	4	6			

Cycle (s): 160 Lost time per cycle (s): 15 Critical v/c Ratio: .689

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		L	LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	1	2	1	1	2	1
Flow rate (veh/h)	103	27		296	253	511	16	864	207	522	1130	22
Capacity (veh/h)	166	173		299	300	752	55	1086	1009	542	2062	920
Adjusted saturation flow (veh/h)	1770	1848		1770	1778	1583	1770	3547	1583	1770	3547	1583
v/c ratio	.622	.157		.991	.843	.679	.295	.796	.205	.963	.548	.024
g/C ratio	.094	.094		.169	.169	.475	.031	.306	.638	.306	.581	.581
Average back of queue (veh)	4.9	1.2		17.1	12.8	19.2	.8	20.8	4.1	28.3	17.4	.4
Uniform delay (s)	69.8	66.7		66.4	64.5	32.6	75.8	50.9	12.1	54.6	20.6	14.2
Incremental delay (s)	7.1	0		49.5	19.2	2.5	0	4.2	0	29.4	.3	0
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0	0
Delay (s)	76.9	66.7		115.9	83.7	35.1	75.8	55.1	12.1	84	20.9	14.2
LOS	E	E		F	F	D	E	E	B	F	C	B
Approach delay (s)/LOS	74.8	/	E	69.2	/	E	47.2	/	D	40.5	/	D
Intersection delay (s)/ LOS		51.2				/				D		

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: TOAM MIT 2019
Comment: 2019 TOTAL AM W/8 PHASE MITIGATION

Site Information

Jurisdiction/Date: 8/16/2009
EB/WB Street: N. KIHEI R
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	95	25	45	495	10	670	15	795	235	480	1040	30
RTOR volume (veh/h)			15			200			45			10
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	4	4	4
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	L		TR					
WB	L	LTR	TR	R	R			
NB	R			L		TR		
SB	R			L	LTR	TR		
Green (s)	13	12	12	6	14	38		
Yellow + All red (s)	1	5	5	4	4	6		

Cycle (s): 120 Lost time per cycle (s): 17 Critical v/c Ratio: .812

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		L	T	R	L	T	R	L	T	R
No. of lanes	1	1		2	1	1	1	2	1	2	2	1
Flow rate (veh/h)	103	60		538	11	511	16	864	207	522	1130	22
Capacity (veh/h)	192	170		745	450	765	88	1123	752	687	1655	990
Adjusted saturation flow (veh/h)	1770	1697		3437	1863	1583	1770	3547	1583	3437	3547	1583
v/c ratio	.539	.352		.723	.024	.668	.184	.769	.275	.759	.683	.022
g/C ratio	.108	.1		.217	.242	.483	.05	.317	.475	.2	.467	.625
Average back of queue (veh)	3.6	2		9.7	.3	14.3	.6	14.7	3.3	9.5	14.6	.1
Uniform delay (s)	50.7	50.4		43.7	34.7	23.6	54.7	37	19	45.3	25.1	8.6
Incremental delay (s)	3	0		3.5	0	2.2	0	3.3	0	4.9	1.2	0
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0	0
Delay (s)	53.7	50.4		47.2	34.7	25.8	54.7	39.3	15.3	50.2	21.6	4.4
LOS	D	D		D	C	C	D	D	B	D	C	A
Approach delay (s)/LOS	52.5	/	D	36.8	/	D	35	/	C	30.3	/	C
Intersection delay (s)/ LOS		34.2				/				C		

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: EX PM 2009
Comment: 2009 EXISTING PM

Site Information

Jurisdiction/Date: 5/30/2009
EB/WB Street: N. KIHEI R
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other   Analysis period: .25 h   Signal type: Actuated-Field   % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)				305		370		875	450	370	710	
RTOR volume (veh/h)						125			150			0
Peak-hour factor				.92		.92		.92	.92	.92	.92	
Heavy vehicles (%)				2		2		2	2	2	2	
Start-up lost time, l_1 (s)				2		2		2	2	2	2	
Extension of effective green, e (s)				2		2		2	2	2	2	
Arrival type, AT				3		3		3	3	3	3	
Approach pedestrian volume (p/h)					0			0			0	
Approach bicycle volume (bic/h)					0			0			0	
Left/right parking (Y or N)		/		N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT   T: TH   R: RT   P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB								
WB	LR	R						
NB	R		TR					
SB		LT	T					
Green (s)	24	33	38					
Yellow + All red (s)	5	4	6					

Cycle (s): 110   Lost time per cycle (s): 12   Critical v/c Ratio: .787

Intersection Performance

	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Lane group configuration				L		R		T	R	L	T	
No. of lanes				2		1		2	1	1	2	
Flow rate (veh/h)				332		266		951	326	402	772	
Capacity (veh/h)				750		892		1225	979	531	2418	
Adjusted saturation flow (veh/h)				3437		1583		3547	1583	1770	3547	
v/c ratio				.442		.298		.776	.333	.758	.319	
g/C ratio				.218		.564		.345	.618	.3	.682	
Average back of queue (veh)				4.9		4.6		15.5	5.2	12.7	5.5	
Uniform delay (s)				37.2		12.6		32.2	10.1	34.9	7.1	
Incremental delay (s)				.2		0		3.2	0	6.2	0	
Initial queue delay (s)				0		0		0	0	0	0	
Delay (s)				37.4		12.6		35.4	10.1	41.1	7.1	
LOS				D		B		D	B	D	A	
Approach delay (s)/LOS		/		26.4	/	C	28.9	/	C	18.8	/	B
Intersection delay (s)/ LOS			24.5			/			C			

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMB PM 2019
Comment: 2019 AMBIENT PM

Site Information

Jurisdiction/Date: 5/30/2009
EB/WB Street: N. KIHEI R
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other   Analysis period: .25 h   Signal type: Actuated-Field   % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)				370		450		1080	550	425	840	
RTOR volume (veh/h)						125			150			0
Peak-hour factor				.92		.92		.92	.92	.92	.92	
Heavy vehicles (%)				2		2		2	2	2	2	
Start-up lost time, l_1 (s)				2		2		2	2	2	2	
Extension of effective green, e (s)				2		2		2	2	2	2	
Arrival type, AT				3		3		3	3	3	3	
Approach pedestrian volume (p/h)					0			0			0	
Approach bicycle volume (bic/h)					0			0			0	
Left/right parking (Y or N)		/		N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT   T: TH   R: RT   P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB								
WB	LR	R						
NB	R		TR					
SB		LT	T					
Green (s)	24	33	41					
Yellow + All red (s)	5	4	6					

Cycle (s): 113   Lost time per cycle (s): 12   Critical v/c Ratio: .97

Intersection Performance

	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Lane group configuration				L		R		T	R	L	T	
No. of lanes				2		1		2	1	1	2	
Flow rate (veh/h)				402		353		1174	435	462	913	
Capacity (veh/h)				730		869		1287	995	517	2448	
Adjusted saturation flow (veh/h)				3437		1583		3547	1583	1770	3547	
v/c ratio				.551		.407		.912	.437	.894	.373	
g/C ratio				.212		.549		.363	.628	.292	.69	
Average back of queue (veh)				6.3		6.9		22.6	7.6	17	6.8	
Uniform delay (s)				39.7		14.8		34.3	10.8	38.3	7.3	
Incremental delay (s)				.9		.1		10	.2	17.8	0	
Initial queue delay (s)				0		0		0	0	0	0	
Delay (s)				40.6		14.9		44.3	11	56.1	7.3	
LOS				D		B		D	B	E	A	
Approach delay (s)/LOS		/		28.6	/	C	35.3	/	D	23.7	/	C
Intersection delay (s)/ LOS			29.7			/			C			

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst WY
Agency or Company M&E PAC
Analysis Period/Year TOT PM 2019
Comment 2019 TOTAL W/PROJ PM

Site Information

Jurisdiction/Date 8/16/2009
EB/WB Street N. KIHEI R
NB/SB Street HONOAPIILA

Intersection Data

Area type Other   Analysis period .25 h   Signal type Actuated-Field   % Back of queue 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)	45	15	20	435	25	450	40	1210	590	425	1095	115
RTOR volume (veh/h)			10			100			150			20
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB		LTR	R					
WB	LTR		R	R				
NB	R	R	L		TR			
SB			L	LTR	TR			
Green (s)	34	7	5	25	45			
Yellow + All red (s)	5	5	4	4	6			

Cycle (s) 140   Lost time per cycle (s) 12   Critical v/c Ratio 1.021

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		L	LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	1	2	1	1	2	1
Flow rate (veh/h)	49	16		260	240	380	43	1315	478	462	1190	103
Capacity (veh/h)	88	92		430	290	769	63	1140	1097	430	1875	837
Adjusted saturation flow (veh/h)	1770	1848		1770	1195	1583	1770	3547	1583	1770	3547	1583
v/c ratio	.553	.176		.605	.827	.495	.688	1.154	.436	1.075	.635	.123
g/C ratio	.05	.05		.243	.243	.486	.036	.321	.693	.243	.529	.529
Average back of queue (veh)	2.1	.7		9.8	10.5	10.8	2	42.1	8.9	25.9	18.7	2.1
Uniform delay (s)	65	63.7		47	50.2	24.4	66.7	47.5	9.5	53	23.4	16.6
Incremental delay (s)	7.3	0		2.4	17.6	.5	27	79.5	.2	64.9	.7	0
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0	0
Delay (s)	72.3	63.7		49.4	67.8	24.9	93.7	127	9.7	117.9	24.1	16.6
LOS	E	E		D	E	C	F	F	A	F	C	B
Approach delay (s)/LOS	70.1	/	E	43.8	/	D	95.7	/	F	48.4	/	D
Intersection delay (s)/ LOS	66.9					/				E		

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst WY
Agency or Company M&E PAC
Analysis Period/Year TOPM MIT 2019
Comment 2019 TOTAL PM W/8 PHASE MITIGATION

Site Information

Jurisdiction/Date 8/16/2009
EB/WB Street N. KIHEI R
NB/SB Street HONOAPIILA

Intersection Data

Area type Other   Analysis period .25 h   Signal type Actuated-Field   % Back of queue 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)	45	15	20	435	25	450	40	1210	590	425	1095	115
RTOR volume (veh/h)			10			100			150			20
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	4	4	4
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	L		TR					
WB	L	LTR	TR	R				
NB	R			L		TR		
SB	R			L	LTR	TR		
Green (s)	6	10	10	7	7	39.5		
Yellow + All red (s)	1	4	5	3	3	4.5		

Cycle (s) 100   Lost time per cycle (s) 11.5   Critical v/c Ratio .992

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		L	T	R	L	T	R	L	T	R
No. of lanes	1	1		2	1	1	1	2	1	2	2	1
Flow rate (veh/h)	49	27		473	27	380	43	1315	478	462	1190	103
Capacity (veh/h)	106	175		584	447	570	124	1401	792	584	1756	950
Adjusted saturation flow (veh/h)	1770	1751		3437	1863	1583	1770	3547	1583	3437	3547	1583
v/c ratio	.461	.155		.809	.061	.667	.351	.939	.604	.791	.678	.109
g/C ratio	.06	.1		.17	.24	.36	.07	.395	.5	.17	.495	.6
Average back of queue (veh)	1.5	.7		7.8	.6	9.9	1.2	22.9	8.4	7.4	12.1	.7
Uniform delay (s)	45.4	41.1		39.9	29.3	27	44.3	29.1	17.9	39.8	19.2	8.6
Incremental delay (s)	2.3	0		8.4	0	3	0	12.3	1.3	7.3	1.1	0
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0	0
Delay (s)	47.7	41.1		48.3	29.3	30	44.3	38.5	15	47.1	16	4.9
LOS	D	D		D	C	C	D	D	B	D	B	A
Approach delay (s)/LOS	45.4	/	D	39.8	/	D	32.5	/	C	23.5	/	C
Intersection delay (s)/ LOS	30.7					/				C		

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: EX AM 2009
Comment: 2009 EXISTING AM

Site Information

Jurisdiction/Date: 5/30/2009
EB/WB Street: KAPOLI ST
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)				70		25		460	30	50	870	
RTOR volume (veh/h)						0			0			0
Peak-hour factor				.92		.92		.92	.92	.92	.92	
Heavy vehicles (%)				2		2		2	2	2	2	
Start-up lost time, l_1 (s)				2		2		2	2	2	2	
Extension of effective green, e (s)				2		2		2	2	2	2	
Arrival type, AT				3		3		3	3	3	3	
Approach pedestrian volume (p/h)					50			50			50	
Approach bicycle volume (bic/h)					0			0			0	
Left/right parking (Y or N)		/		N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB								
WB	LR	R						
NB			T					
SB		LT	LT					
Green (s)	15	15	58					
Yellow + All red (s)	5	5	7					

Cycle (s) 105 | Lost time per cycle (s) 5 | Critical v/c Ratio .582

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration				L		R		T	R	L	T	
No. of lanes				1		1		2	1	1	1	
Flow rate (veh/h)				76		27		500	33	54	946	
Capacity (veh/h)				253		469		1959		727	1373	
Adjusted saturation flow (veh/h)				1770		1406		3547	1571	1770	1848	
v/c ratio				.301		.058		.255		.075	.689	
g/C ratio				.143		.333		.552		.762	.743	
Average back of queue (veh)				2.1		.6		4.3		.4	16.5	
Uniform delay (s)				40.3		23.8		12.2		3.4	7.1	
Incremental delay (s)				0		0		0		0	1.5	
Initial queue delay (s)				0		0		0		0	0	
Delay (s)				40.3		23.8		12.2		3.4	8.6	
LOS				D		C		B		A	A	
Approach delay (s)/LOS		/		36	/	D	12.2	/	B	8.3	/	A
Intersection delay (s)/ LOS			11.3			/			B			

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMB AM 2019
Comment: 2019 AMBIENT AM

Site Information

Jurisdiction/Date: 5/30/2009
EB/WB Street: KAPOLI ST
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)				105		30		505	35	70	970	
RTOR volume (veh/h)						0			0			0
Peak-hour factor				.92		.92		.92	.92	.92	.92	
Heavy vehicles (%)				2		2		2	2	2	2	
Start-up lost time, l_1 (s)				2		2		2	2	2	2	
Extension of effective green, e (s)				2		2		2	2	2	2	
Arrival type, AT				3		3		3	3	3	3	
Approach pedestrian volume (p/h)					50			50			50	
Approach bicycle volume (bic/h)					0			0			0	
Left/right parking (Y or N)		/		N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB								
WB	LR	R						
NB			T					
SB		LT	LT					
Green (s)	15	15	68					
Yellow + All red (s)	5	5	7					

Cycle (s) 115 | Lost time per cycle (s) 5 | Critical v/c Ratio .664

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration				L		R		T	R	L	T	
No. of lanes				1		1		2	1	1	1	
Flow rate (veh/h)				114		33		549	38	76	1054	
Capacity (veh/h)				231		423		2097		709	1414	
Adjusted saturation flow (veh/h)				1770		1390		3547	1571	1770	1848	
v/c ratio				.494		.077		.262		.107	.745	
g/C ratio				.13		.304		.591		.783	.765	
Average back of queue (veh)				3.7		.8		4.8		.6	21.1	
Uniform delay (s)				46.5		28.5		11.4		3.2	7.4	
Incremental delay (s)				1.6		0		0		0	2.2	
Initial queue delay (s)				0		0		0		0	0	
Delay (s)				48.1		28.5		11.4		3.2	9.6	
LOS				D		C		B		A	A	
Approach delay (s)/LOS		/		43.7	/	D	11.4	/	B	9.2	/	A
Intersection delay (s)/ LOS			12.6			/			B			

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: TOT AM 2019
Comment: 2019 TOTAL W/PROJ PM

Site Information

Jurisdiction/Date: 8/16/2009
EB/WB Street: KAPOLI ST
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	105	5	35	105	1	30	10	560	35	70	1090	30
RTOR volume (veh/h)			10			5			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR							
WB	LTR							
NB		L	T		R			
SB		L	T					
Green (s)	30	15	93					
Yellow + All red (s)	5	5	7					

Cycle (s): 155 Lost time per cycle (s): 12 Critical v/c Ratio: .826

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		L	TR		L	T	R	L	T	R
No. of lanes	1	1		1	1		1	2	1	1	1	1
Flow rate (veh/h)	114	33		114	28		11	609	38	76	1185	33
Capacity (veh/h)	266	313		265	306		171	2128		171	1118	
Adjusted saturation flow (veh/h)	1376	1617		1371	1582		1770	3547	1571	1770	1863	1571
v/c ratio	.428	.104		.43	.092		.063	.286		.444	1.06	
g/C ratio	.194	.194		.194	.194		.097	.6		.097	.6	
Average back of queue (veh)	4.6	1.2		4.6	1		.4	7.1		3.4	68.2	
Uniform delay (s)	55	51.4		55	51.3		63.6	15		66.1	31	
Incremental delay (s)	.5	0		.6	0		0	0		1.1	44.4	
Initial queue delay (s)	0	0		0	0		0	0		0	0	
Delay (s)	55.5	51.4		55.6	51.3		63.6	15		67.2	75.4	
LOS	E	D		E	D		E	B		E	E	
Approach delay (s)/LOS	54.6	/	D	54.7	/	D	15.8	/	B	74.9	/	E
Intersection delay (s)/ LOS			54.9				/			D		

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: TOAM MIT 2019
Comment: 2019 TOTAL AM W/MITIGATION

Site Information

Jurisdiction/Date: 8/16/2009
EB/WB Street: KAPOLI ST
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	105	5	35	105	1	30	10	560	35	70	1090	30
RTOR volume (veh/h)			10			5			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR							
WB	LTR							
NB		L	TR					
SB		L	TR					
Green (s)	30	13	60					
Yellow + All red (s)	5	5	7					

Cycle (s): 120 Lost time per cycle (s): 12 Critical v/c Ratio: .511

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		L	TR		L	T	R	L	T	R
No. of lanes	1	1		1	1		1	2	1	1	2	1
Flow rate (veh/h)	114	33		114	28		11	609	38	76	1185	33
Capacity (veh/h)	344	404		343	395		192	1773	786	192	1773	786
Adjusted saturation flow (veh/h)	1376	1617		1371	1582		1770	3547	1571	1770	3547	1571
v/c ratio	.332	.081		.333	.071		.057	.343	.048	.397	.668	.042
g/C ratio	.25	.25		.25	.25		.108	.5	.5	.108	.5	.5
Average back of queue (veh)	3.3	.9		3.3	.8		.3	6.8	.7	2.6	17.1	.6
Uniform delay (s)	36.8	34.4		36.8	34.4		48	18.1	15.4	49.8	22.5	15.3
Incremental delay (s)	0	0		0	0		0	0	0	.4	1	0
Initial queue delay (s)	0	0		0	0		0	0	0	0	0	0
Delay (s)	36.8	34.4		36.8	34.4		48	18.1	15.4	50.2	23.5	15.3
LOS	D	C		D	C		D	B	B	D	C	B
Approach delay (s)/LOS	36.3	/	D	36.3	/	D	18.4	/	B	24.9	/	C
Intersection delay (s)/ LOS			24.5				/			C		

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: TOAM LT 2019
Comment: 2019 TOTAL AM W/MAALAEA LEFT TURNS

Site Information

Jurisdiction/Date: 8/16/2009
EB/WB Street: KAPOLI ST
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other; Analysis period: .25 h; Signal type: Actuated-Field; % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)	105	5	35	105	1	30	10	560	35	225	1090	30
RTOR volume (veh/h)			10			5			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR							
WB	LTR							
NB		L		TR				
SB		L	LTR	TR				
Green (s)	22	8	16	52				
Yellow + All red (s)	5	5	5	7				

Cycle (s): 120; Lost time per cycle (s): 10; Critical v/c Ratio: .462

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		L	TR		L	T	R	L	T	R
No. of lanes	1	1		1	1		1	2	1	1	2	1
Flow rate (veh/h)	114	33		114	28		11	609	38	245	1185	33
Capacity (veh/h)	252	296		251	290		118	1537	681	428	2158	956
Adjusted saturation flow (veh/h)	1376	1617		1371	1582		1770	3547	1571	1770	3547	1571
v/c ratio	.452	.11		.454	.097		.092	.396	.056	.572	.549	.034
g/C ratio	.183	.183		.183	.183		.067	.433	.433	.242	.608	.608
Average back of queue (veh)	3.7	1		3.7	.8		.4	7.8	.8	7.8	13.3	.5
Uniform delay (s)	43.6	40.8		43.7	40.7		52.6	23.3	19.7	40	13.8	9.4
Incremental delay (s)	.9	0		.9	0		0	0	0	1.8	.3	0
Initial queue delay (s)	0	0		0	0		0	0	0	0	0	0
Delay (s)	44.5	40.8		44.6	40.7		52.6	23.3	19.7	41.8	14.1	9.4
LOS	D	D		D	D		D	C	B	D	B	A
Approach delay (s)/LOS	43.7	/	D	43.8	/	D	23.5	/	C	18.7	/	B
Intersection delay (s)/ LOS	23					/				C		

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: EX PM 2009
Comment: 2009 EXISTING PM

Site Information

Jurisdiction/Date: 5/30/2009
EB/WB Street: KAPOLI ST
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other; Analysis period: .25 h; Signal type: Actuated-Field; % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)				95		85		1085	50	55	830	
RTOR volume (veh/h)						0			0			0
Peak-hour factor				.92		.92		.92	.92	.92	.92	
Heavy vehicles (%)				2		2		2	2	2	2	
Start-up lost time, l_1 (s)				2		2		2	2	2	2	
Extension of effective green, e (s)				2		2		2	2	2	2	
Arrival type, AT				3		3		3	3	3	3	
Approach pedestrian volume (p/h)					0			0			0	
Approach bicycle volume (bic/h)					0			0			0	
Left/right parking (Y or N)		/		N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB								
WB	LR	R						
NB			T					
SB		LT	LT					
Green (s)	15	15	53					
Yellow + All red (s)	5	5	7					

Cycle (s): 100; Lost time per cycle (s): 5; Critical v/c Ratio: .575

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration				L		R		T	R	L	T	
No. of lanes				1		1		2	1	1	1	
Flow rate (veh/h)				103		92		1179	54	60	902	
Capacity (veh/h)				265		550		1880		424	1349	
Adjusted saturation flow (veh/h)				1770		1571		3547	1571	1770	1848	
v/c ratio				.389		.168		.627		.141	.669	
g/C ratio				.15		.35		.53		.75	.73	
Average back of queue (veh)				2.8		1.9		13.3		.5	14.9	
Uniform delay (s)				38.4		22.4		16.5		6.7	7.1	
Incremental delay (s)				.2		0		.7		0	1.3	
Initial queue delay (s)				0		0		0		0	0	
Delay (s)				38.6		22.4		17.2		6.7	8.4	
LOS				D		C		B		A	A	
Approach delay (s)/LOS		/		31	/	C	17.2	/	B	8.3	/	A
Intersection delay (s)/ LOS	14.8					/				B		

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMB PM 2019
Comment: 2019 AMBIENT PM

Site Information

Jurisdiction/Date: 5/30/2009
EB/WB Street: KAPOLI ST
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other   Analysis period: .25 h   Signal type: Actuated-Field   % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)				145		125		1200	55	95	910	
RTOR volume (veh/h)						0			0			0
Peak-hour factor				.92		.92		.92	.92	.92	.92	
Heavy vehicles (%)				2		2		2	2	2	2	
Start-up lost time, l_1 (s)				2		2		2	2	2	2	
Extension of effective green, e (s)				2		2		2	2	2	2	
Arrival type, AT				3		3		3	3	3	3	
Approach pedestrian volume (p/h)					0			0			0	
Approach bicycle volume (bic/h)					0			0			0	
Left/right parking (Y or N)		/		N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT   T: TH   R: RT   P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB								
WB	LR	R						
NB			T					
SB		LT	LT					
Green (s)	15	15	65					
Yellow + All red (s)	5	5	7					

Cycle (s): 112   Lost time per cycle (s): 5   Critical v/c Ratio: .653

Intersection Performance

	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Lane group configuration				L		R		T	R	L	T	
No. of lanes				1		1		2	1	1	1	
Flow rate (veh/h)				158		136		1304	60	103	989	
Capacity (veh/h)				237		491		2058		389	1403	
Adjusted saturation flow (veh/h)				1770		1571		3547	1571	1770	1848	
v/c ratio				.665		.277		.634		.265	.705	
g/C ratio				.134		.313		.58		.777	.759	
Average back of queue (veh)				5.3		3.4		15.5		1	18.2	
Uniform delay (s)				46.1		29		15.6		8	7	
Incremental delay (s)				6.9		0		.6		0	1.6	
Initial queue delay (s)				0		0		0		0	0	
Delay (s)				53		29		16.2		8	8.6	
LOS				D		C		B		A	A	
Approach delay (s)/LOS		/		41.9	/	D	16.2	/	B	8.5	/	A
Intersection delay (s)/ LOS			15.9				/			B		

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: TOT PM 2019
Comment: 2019 TOTAL W/PROJ PM

Site Information

Jurisdiction/Date: 8/16/2009
EB/WB Street: KAPOLI ST
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other   Analysis period: .25 h   Signal type: Actuated-Field   % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)	50	1	20	145	4	125	35	1300	55	95	965	100
RTOR volume (veh/h)			0			25			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT   T: TH   R: RT   P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR							
WB	LTR							
NB		L	T					
SB		L	T					
Green (s)	27	20	76					
Yellow + All red (s)	5	5	7					

Cycle (s): 140   Lost time per cycle (s): 12   Critical v/c Ratio: .804

Intersection Performance

	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Lane group configuration	L	TR		L	TR		L	T	R	L	T	R
No. of lanes	1	1		1	1		1	2	1	1	1	1
Flow rate (veh/h)	54	23		158	113		38	1413	60	103	1049	109
Capacity (veh/h)	222	306		267	305		253	1925		253	1011	
Adjusted saturation flow (veh/h)	1153	1584		1383	1582		1770	3547	1571	1770	1863	1571
v/c ratio	.244	.075		.591	.371		.15	.734		.408	1.037	
g/C ratio	.193	.193		.193	.193		.143	.543		.143	.543	
Average back of queue (veh)	1.9	.8		6.1	4.1		1.4	24.3		3.9	54.3	
Uniform delay (s)	47.9	46.3		51.5	49.1		52.6	24.3		54.6	32	
Incremental delay (s)	0	0		3.5	.1		0	1.5		.4	38.4	
Initial queue delay (s)	0	0		0	0		0	0		0	0	
Delay (s)	47.9	46.3		55	49.2		52.6	25.8		55	70.4	
LOS	D	D		D	D		D	C		D	E	
Approach delay (s)/LOS	47.4	/	D	52.6	/	D	26.5	/	C	69	/	E
Intersection delay (s)/ LOS		46.5				/				D		

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: TOPM MIT 2019
Comment: 2019 TOTAL PM W/ MITIGATION

Site Information

Jurisdiction/Date: 8/16/2009
EB/WB Street: KAPOLI ST
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)	50	1	20	145	4	125	35	1300	55	95	965	100
RTOR volume (veh/h)			0			25			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR							
WB	LTR							
NB		L	TR					
SB		L	TR					
Green (s)	27	20	66					
Yellow + All red (s)	5	5	7					

Cycle (s): 130 | Lost time per cycle (s): 12 | Critical v/c Ratio: .629

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		L	TR		L	T	R	L	T	R
No. of lanes	1	1		1	1		1	2	1	1	2	1
Flow rate (veh/h)	54	23		158	113		38	1413	60	103	1049	109
Capacity (veh/h)	246	329		287	329		272	1801	798	272	1801	798
Adjusted saturation flow (veh/h)	1185	1584		1383	1582		1770	3547	1571	1770	3547	1571
v/c ratio	.221	.069		.549	.344		.14	.785	.075	.379	.583	.136
g/C ratio	.208	.208		.208	.208		.154	.508	.508	.154	.508	.508
Average back of queue (veh)	1.7	.7		5.6	3.7		1.3	24.7	1.2	3.6	15	2.2
Uniform delay (s)	42.8	41.4		46.1	43.9		47.6	26.2	16.4	49.4	22.4	16.9
Incremental delay (s)	0	0		2.2	0		0	2.4	0	.1	.5	0
Initial queue delay (s)	0	0		0	0		0	0	0	0	0	0
Delay (s)	42.8	41.4		48.3	43.9		47.6	28.6	16.4	49.5	22.9	16.9
LOS	D	D		D	D		D	C	B	D	C	B
Approach delay (s)/LOS	42.4	/	D	46.5	/	D	28.6	/	C	24.5	/	C
Intersection delay (s)/ LOS	28.8			/			C					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: TOPM LT 2019
Comment: 2019 TOTAL PM W/MAALAEA LEFT TURNS

Site Information

Jurisdiction/Date: 8/16/2009
EB/WB Street: KAPOLI ST
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)	50	1	20	145	4	125	35	1300	55	260	965	100
RTOR volume (veh/h)			0			25			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		0			0			0			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR							
WB	LTR							
NB		L		TR				
SB		L	L	TR				
Green (s)	23	7	14	52				
Yellow + All red (s)	5	5	7	7				

Cycle (s): 120 | Lost time per cycle (s): 12 | Critical v/c Ratio: .747

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		L	TR		L	T	R	L	T	R
No. of lanes	1	1		1	1		1	2	1	1	2	1
Flow rate (veh/h)	54	23		158	113		38	1413	60	283	1049	109
Capacity (veh/h)	228	304		265	303		103	1537	681	383	1537	681
Adjusted saturation flow (veh/h)	1191	1584		1383	1582		1770	3547	1571	1770	3547	1571
v/c ratio	.238	.075		.595	.373		.369	.919	.088	.737	.682	.16
g/C ratio	.192	.192		.192	.192		.058	.433	.433	.217	.433	.433
Average back of queue (veh)	1.6	.7		5.3	3.5		1.3	28.4	1.2	10	16.3	2.3
Uniform delay (s)	41.1	39.8		44.2	42.2		54.4	32	20	43.8	27.4	20.7
Incremental delay (s)	0	0		3.6	.1		.2	9.3	0	7.3	1.3	0
Initial queue delay (s)	0	0		0	0		0	0	0	0	0	0
Delay (s)	41.1	39.8		47.8	42.3		54.6	41.3	20	51.1	28.7	20.7
LOS	D	D		D	D		D	D	B	D	C	C
Approach delay (s)/LOS	40.7	/	D	45.5	/	D	40.8	/	D	32.5	/	C
Intersection delay (s)/ LOS	37.6			/			D					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PACIFIC
Analysis Period/Year: AM TOT 2019
Comment: 2019 TOTAL AM WFULL ROADWAY ACCESS

Site Information

Jurisdiction/Date: 8/16/2009
EB/WB Street: FULL ACCES
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other   Analysis period: .25 h   Signal type: Actuated-Field   % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)	310		120				65	815			1260	260
RTOR volume (veh/h)			15						0			40
Peak-hour factor	.92		.92				.92	.92			.92	.92
Heavy vehicles (%)	2		2				2	2			2	2
Start-up lost time, l_1 (s)	2		2				2	2			2	2
Extension of effective green, e (s)	2		2				2	2			2	2
Arrival type, AT	3		3				3	3			3	3
Approach pedestrian volume (p/h)		0						0			0	
Approach bicycle volume (bic/h)		0						0			0	
Left/right parking (Y or N)	N	/	N		/		N	/	N	N	/	N

Signal Phasing Plan

L: LT   T: TH   R: RT   P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB			LR					
WB								
NB	LT	T						
SB		TR						
Green (s)	6	51	27					
Yellow + All red (s)	5	6	5					

Cycle (s) 100   Lost time per cycle (s) 6   Critical v/c Ratio .656

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L		R				L	T			T	R
No. of lanes	1		1				1	2			2	1
Flow rate (veh/h)	337		114				71	886			1370	239
Capacity (veh/h)	478		424				106	2190			1809	801
Adjusted saturation flow (veh/h)	1770		1571				1770	3533			3547	1571
v/c ratio	.705		.269				.665	.404			.757	.298
g/C ratio	.27		.27				.06	.62			.51	.51
Average back of queue (veh)	9.5		2.7				2.3	7.1			18	4.1
Uniform delay (s)	32.9		28.7				46	9.6			19.6	14.2
Incremental delay (s)	4.7		0				14.7	0			1.9	0
Initial queue delay (s)	0		0				0	0			0	0
Delay (s)	37.6		28.7				60.7	9.6			21.5	14.2
LOS	D		C				E	A			C	B
Approach delay (s)/LOS	35.4	/	D		/		13.4	/	B	20.4	/	C
Intersection delay (s)/ LOS		20.4				/				C		

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PACIFIC
Analysis Period/Year: PM TOT 2019
Comment: 2019 TOTAL PM WFULL ROADWAY ACCESS

Site Information

Jurisdiction/Date: 8/16/2009
EB/WB Street: FULL ACCES
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other   Analysis period: .25 h   Signal type: Actuated-Field   % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)	165		70				110	1675			1295	225
RTOR volume (veh/h)			15						0			35
Peak-hour factor	.92		.92				.92	.92			.92	.92
Heavy vehicles (%)	2		2				2	2			2	2
Start-up lost time, l_1 (s)	2		2				2	2			2	2
Extension of effective green, e (s)	2		2				2	2			2	2
Arrival type, AT	3		3				3	3			3	3
Approach pedestrian volume (p/h)		0						0			0	
Approach bicycle volume (bic/h)		0						0			0	
Left/right parking (Y or N)	N	/	N		/		N	/	N	N	/	N

Signal Phasing Plan

L: LT   T: TH   R: RT   P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB			LR					
WB								
NB	LT	T						
SB		TR						
Green (s)	13	53	18					
Yellow + All red (s)	5	6	5					

Cycle (s) 100   Lost time per cycle (s) 5   Critical v/c Ratio .649

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L		R				L	T			T	R
No. of lanes	1		1				1	2			2	1
Flow rate (veh/h)	179		60				120	1821			1408	207
Capacity (veh/h)	319		283				230	2508			1880	833
Adjusted saturation flow (veh/h)	1770		1571				1770	3533			3547	1571
v/c ratio	.563		.211				.52	.726			.749	.248
g/C ratio	.18		.18				.13	.71			.53	.53
Average back of queue (veh)	5		1.5				3.4	18.1			18	3.3
Uniform delay (s)	37.4		34.9				40.6	8.7			18.3	12.7
Incremental delay (s)	2.3		0				2.1	1.1			1.7	0
Initial queue delay (s)	0		0				0	0			0	0
Delay (s)	39.7		34.9				42.7	9.8			20	12.7
LOS	D		C				D	A			B	B
Approach delay (s)/LOS	38.5	/	D		/		11.8	/	B	19.1	/	B
Intersection delay (s)/ LOS		16.6				/				B		

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PACIFIC
Analysis Period/Year: TOT AM 2019
Comment: 2019 TOTAL AM W/ SIGNAL

Site Information

Jurisdiction/Date: 8/16/2009
EB/WB Street: MAALAEA RD
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)			95			120	175	760		165	1230	
RTOR volume (veh/h)						20			0			0
Peak-hour factor			.92			.92	.92	.92		.92	.92	
Heavy vehicles (%)			2			2	2	2		2	2	
Start-up lost time, l_1 (s)			2			2	2	2		2	2	
Extension of effective green, e (s)			2			2	2	2		2	2	
Arrival type, AT			3			3	3	3		3	3	
Approach pedestrian volume (p/h)					50			50			50	
Approach bicycle volume (bic/h)					0			0			0	
Left/right parking (Y or N)		/		N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB								
WB	R							
NB		T						
SB	LT	T						
Green (s)	20	89						
Yellow + All red (s)	5	6						

Cycle (s) 120 Lost time per cycle (s) ____ Critical v/c Ratio ____

Intersection Performance

	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Lane group configuration						R		T		L	T	
No. of lanes						1		2		1	2	
Flow rate (veh/h)						109		826		179	1337	
Capacity (veh/h)						238		2620		295	3356	
Adjusted saturation flow (veh/h)						1430		3533		1770	3533	
v/c ratio						.456		.315		.608	.398	
g/C ratio						.167		.742		.167	.95	
Average back of queue (veh)						3.6		5.3		6.1	2.6	
Uniform delay (s)						45.1		5.2		46.4	.2	
Incremental delay (s)						1		0		3.6	0	
Initial queue delay (s)						0		0		0	0	
Delay (s)						46.1		5.2		50	.2	
LOS						D		A		D	A	
Approach delay (s)/LOS		/		46.1	/	D	5.2	/	A	6.1	/	A
Intersection delay (s)/ LOS		7.6				/				A		

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PACIFIC
Analysis Period/Year: TOT PM 2019
Comment: 2019 TOTAL PM W/ SIGNAL

Site Information

Jurisdiction/Date: 8/16/2009
EB/WB Street: MAALAEA RD
NB/SB Street: HONOAPIILA

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT
Volume (veh/h)			95			215	175	1490		165	1150	
RTOR volume (veh/h)						35			0			0
Peak-hour factor			.92			.92	.92	.92		.92	.92	
Heavy vehicles (%)			2			2	2	2		2	2	
Start-up lost time, l_1 (s)			2			2	2	2		2	2	
Extension of effective green, e (s)			2			2	2	2		2	2	
Arrival type, AT			3			3	3	3		3	3	
Approach pedestrian volume (p/h)					50			50			50	
Approach bicycle volume (bic/h)					0			0			0	
Left/right parking (Y or N)		/		N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB								
WB	R							
NB		T						
SB	LT	T						
Green (s)	19	70						
Yellow + All red (s)	5	6						

Cycle (s) 100 Lost time per cycle (s) 11 Critical v/c Ratio .667

Intersection Performance

	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Lane group configuration						R		T		L	T	
No. of lanes						1		2		1	2	
Flow rate (veh/h)						196		1620		179	1250	
Capacity (veh/h)						275		2473		336	3321	
Adjusted saturation flow (veh/h)						1447		3533		1770	3533	
v/c ratio						.712		.655		.533	.376	
g/C ratio						.19		.7		.19	.94	
Average back of queue (veh)						5.9		14.7		4.9	2.3	
Uniform delay (s)						37.9		8.3		36.5	.3	
Incremental delay (s)						8.4		.6		1.7	0	
Initial queue delay (s)						0		0		0	0	
Delay (s)						46.3		8.9		38.2	.3	
LOS						D		A		D	A	
Approach delay (s)/LOS		/		46.3	/	D	8.9	/	A	5	/	A
Intersection delay (s)/ LOS		9.5				/				A		

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Appendix C

Unsignalized Intersection Level of Service (LOS) Calculations

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: EX AM 2009
Comment: 2009 EXISTING AM

Site Information

Jurisdiction/Date: 5/30/2009
Major Street: HONOAPIILANI HWY
Minor Street: MAALAEA RD

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	T			T			R					
Lane 2	T			L								
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		545		120	955				70			
PHF		.9		.9	.9				.9			
Proportion of heavy vehicles, HV		3		3	3				3			
Flow rate		606		133	1061				78			
Flare storage (# of vehs)									0			
Median storage (# of vehs)												

Signal upstream of Movement 2 ________ ft Movement 5 ________ ft
Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	R	78	690	.113	<1	10.9	B	10.9
	2								B
	3								
EB	1								
	2								
	3								
		1							
		4	133	962	.139	<1	9.3	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMB AM 2019
Comment: 2019 AMBIENT AM

Site Information

Jurisdiction/Date: 5/30/2009
Major Street: HONOAPIILANI HWY
Minor Street: MAALAEA RD

Input Data

Lane Configuration	NB			SB			WB			EB		
Lane 1 (curb)	T			T			R					
Lane 2	T			L								
Lane 3												
	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		600		150	1080				120			
PHF		.9		.9	.9				.9			
Proportion of heavy vehicles, HV		3		3	3				3			
Flow rate		667		167	1200				133			
Flare storage (# of vehs)									0			
Median storage (# of vehs)												

Signal upstream of Movement 2 ________ ft Movement 5 ________ ft
Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	R	133	659	.202	1	11.8	B	11.8
	2								B
	3								
EB	1								
	2								
	3								
		1							
		4	167	912	.183	1	9.8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: TOT AM 2019
Comment: 2019 TOTAL W/PROJ AM

Site Information

Jurisdiction/Date: 8/16/2009
Major Street: HONOAPIILANI HWY
Minor Street: MAALAEA RD

Input Data

Lane Configuration	NB	SB	WB	EB
Lane 1 (curb)	T	T	R	
Lane 2	T	T		
Lane 3		L		

	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		760		155	1230				120			
PHF		.9		.9	.9				.9			
Proportion of heavy vehicles, HV		3		3	3				3			
Flow rate		844		172	1367				133			
Flare storage (# of vehs)									0			
Median storage (# of vehs)												

Signal upstream of Movement 2 ______ ft Movement 5 ______ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	R	133	577	.23	1	13.1	B	13.1
	2								B
	3								
EB	1								
	2								
	3								
		①							
		④	172	781	.22	1	10.9	B	

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1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: EX PM 2009
Comment: 2009 EXISTING PM

Site Information

Jurisdiction/Date: 5/30/2009
Major Street: HONOAPIILANI HWY
Minor Street: MAALAEA RD

Input Data

Lane Configuration	NB	SB	WB	EB
Lane 1 (curb)	T	T	R	
Lane 2	T	L		
Lane 3				

	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		1180		115	865				155			
PHF		.9		.9	.9				.9			
Proportion of heavy vehicles, HV		3		3	3				3			
Flow rate		1311		128	961				172			
Flare storage (# of vehs)									0			
Median storage (# of vehs)												

Signal upstream of Movement 2 ______ ft Movement 5 ______ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	R	172	406	.424	2	20.2	C	20.2
	2								C
	3								
EB	1								
	2								
	3								
		①							
		④	128	518	.247	1	14.2	B	

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1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMB PM 2019
Comment: 2019 AMBIENT PM

Site Information

Jurisdiction/Date: 5/30/2009
Major Street: HONOAPIILANI HWY
Minor Street: MAALAEA RD

Input Data

Lane Configuration	NB	SB	WB	EB
Lane 1 (curb)	T	T	R	
Lane 2	T	L		
Lane 3				

Movement	NB 1 (LT)	NB 2 (TH)	NB 3 (RT)	SB 4 (LT)	SB 5 (TH)	SB 6 (RT)	WB 7 (LT)	WB 8 (TH)	WB 9 (RT)	EB 10 (LT)	EB 11 (TH)	EB 12 (RT)
Volume (veh/h)		1340		165	995				210			
PHF		.9		.9	.9				.9			
Proportion of heavy vehicles, HV		3		3	3				3			
Flow rate		1489		183	1106				233			
Flare storage (# of vehs)									0			
Median storage (# of vehs)												

Signal upstream of Movement 2 ______ ft Movement 5 ______ ft
Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	R	233	355	.657	4	32.6	D	32.6 D
WB	2								
WB	3								
EB	1								
EB	2								
EB	3								
		①							
		④	183	442	.414	2	18.8	C	

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: TOT PM 2019
Comment: 2019 TOTAL W/PROJ PM

Site Information

Jurisdiction/Date: 8/16/2009
Major Street: HONOAPIILANI HWY
Minor Street: MAALAEA RD

Input Data

Lane Configuration	NB	SB	WB	EB
Lane 1 (curb)	T	T	R	
Lane 2	T	T		
Lane 3		L		

Movement	NB 1 (LT)	NB 2 (TH)	NB 3 (RT)	SB 4 (LT)	SB 5 (TH)	SB 6 (RT)	WB 7 (LT)	WB 8 (TH)	WB 9 (RT)	EB 10 (LT)	EB 11 (TH)	EB 12 (RT)
Volume (veh/h)		1490		165	1150				215			
PHF		.9		.9	.9				.9			
Proportion of heavy vehicles, HV		3		3	3				3			
Flow rate		1656		183	1278				239			
Flare storage (# of vehs)									0			
Median storage (# of vehs)												

Signal upstream of Movement 2 ______ ft Movement 5 ______ ft
Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	R	239	312	.765	6	45.9	E	45.9 E
WB	2								
WB	3								
EB	1								
EB	2								
EB	3								
		①							
		④	183	381	.481	3	22.9	C	

1 of 1

APPENDIX K.

Preliminary Engineering Report

PRELIMINARY ENGINEERING REPORT

FOR

OHANA KAI VILLAGE SUBDIVISION

Maalaea, Maui, Hawaii

T.M.K.: (2) 3-6-001: 018

Prepared for:

MVI, LLC
P.O. Box 97
Kihei, Maui, Hawaii 96753

STACY A. OTOMO
LICENSED PROFESSIONAL ENGINEER
No. 5115-C
HAWAII, U.S.A.

Stacy A. Otomo

Prepared by:

OTOMO ENGINEERING, INC.

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

September 2009

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PRELIMINARY ENGINEERING REPORT
FOR
OHANA KAI VILLAGE SUBDIVISION
T.M.K.: (2) 3-6-001: 018

1.0 INTRODUCTION

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

The subject property is identified as T.M.K.: (2) 3-6-00: 018, which contains a total of approximately 260 acres. It is bordered by unused agricultural lands to the north, Honoapiilani Highway to the east, and State conservation land to the south and west.

The proposed project consists of developing approximately 1,100 single family residences, with lot sizes ranging in size from 5,000 square feet to 10,600 square feet. The project will also consist of a commercial area and a park/school site. Proposed improvements include roadways, underground water, sewer, drainage, electrical, and telephone systems, landscaping and greenways for walking and other recreational uses. The project will require the construction of an onsite wastewater treatment plant and offsite potable water source and storage facilities.

2.0 EXISTING INFRASTRUCTURE

2.1 ROADWAYS

Honoapiilani Highway is the major arterial highway which links Wailuku and West Maui. It is a two-way roadway with varying widths of two and four lanes. In the vicinity of the project site, Honoapiilani Highway is a three-lane highway with two lanes in the northbound direction and one in the southbound direction.

Maalaea Road is a two-way, two-lane roadway, which loops onto Honoapiilani Highway along its makai side. It provides access to the apartments and residential areas along the Maalaea coastline and Maalea Harbor. At its north terminus with Honoapiilani Highway, only right turn movements are allowed northbound onto Honoapiilani Highway. At its south terminus, only right turn in and right turn out movements are allowed to and from the northbound lane on Honoapiilani Highway.

Kapoli Street runs perpendicular to the project site on the makai side of the highway and connects Honoapiilani Highway and Maalaea Road. It is a two-

way, four-lane roadway. Honoapiilani Highway is signalized at its intersection with Kapoli Street. Kapoli Street is stop-controlled at its intersection with Maalaea Road.

2.2 DRAINAGE

The existing ground slopes in an northwest to southeast direction from elevation 210 feet above mean sea level at the north western corner of the property to elevation 40 feet at Honoapiilani Highway (southeastern boundary), with an average slope of approximately 5.5%. The project site is currently vacant and previously used for cultivating sugar by the Wailuku Agribusiness Company and more recently used by small independent farms along the northern portion of the project site.

According to the "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii (August, 1972)," prepared by the United States Department of Agriculture Soil Conservation Service, the soils within the project site are classified as Ewa Silty Clay (EsB), Ewa Cobbly Silty Clay (Etb), Pulehu Cobbly Clay Loam (PtB), and Stony Alluvial Land (rSM). Ewa Silty Clay, 3 to 7 percent slopes, is described as having very slow runoff with no more than slight erosion hazard. Ewa Cobbly Silty Clay and Pulehu Cobbly Clay Loam is characterized as having moderate permeability and slow runoff with a slight erosion hazard. Stony Alluvial Land is high in permeability and consists of stones, boulders, and soil deposited by streams along the bottom of gulches and on alluvial fans.

According to Panel Number 150003 0235B of the Flood Insurance Rate Map, June 1, 1981, prepared by the United States Federal Emergency Management Agency, a majority of the parcel is situated in Flood Zone C. Flood Zone C represents areas of minimal flooding. Two small portions of the parcel within the existing drainageway are designated in Flood Zone B. Flood Zone B represents areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one foot; or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood.

There are no drainage improvements within the project site, however there are several unnamed drainageways that traverse the site in the west to east direction which direct both onsite and offsite surface runoff towards Honoapiilani Highway.

It is estimated that the present onsite runoff for a 100-year, 24-hour storm from the entire project site is approximately 790 cfs and approximately 138 acre-ft. of runoff volume. As previously mentioned, onsite and offsite runoff sheet flows in a west to east direction across the project site. When the runoff reaches the

Honoapiilani Highway along the makai or eastern boundary it enters the State Department of Transportation drainage system. The DOT drainage system consists of grated inlet catch basins and inlet headwall structures which intercept surface runoff along the highway shoulder and conveys it under the highway via six larger concrete box culverts and several smaller drainage culverts. From the makai side of the highway, runoff continues downstream through various drainage systems and ultimately discharges into Maalaea Harbor.

2.3 SEWER

There are no existing sewer systems on the subject property. The existing Maalaea community on the makai side of the highway such as the Maalaea Triangle Subdivision and the condominiums on Hauoli Street are serviced by independent private wastewater treatment facilities.

2.4 WATER

The project site is not currently serviced by any source of domestic water. There is irrigation water for the parcel which was previously used for the agricultural activities on the property.

There are three existing wells on the adjacent parcel (TMK: (2) 3-6-004: 003) to serve as the source of domestic water for the project site. The wells are identified as Pohakea #1, 2, & 3 (State ID No. 4930-01, -02, & -03). There are currently no storage tanks at the well site to service the project site.

The previously mentioned Maalaea Triangle Subdivision and adjacent condominiums on the makai side of Honoapiilani Highway are serviced by the County water system. There is a 300,000 gal. storage tank at approximately elevation 220' located to the south of the project side on the adjacent State owned lands that services this area. The existing County facilities are not sufficient to service the proposed project.

2.5 ELECTRIC, TELEPHONE AND CABLE TV

There are overhead electrical and telephone lines along the east (makai) side of Honoapiilani Highway. Underground electrical and telephone service have been installed as part of the Maalaea Triangle Subdivision on that side of Honoapiilani Highway.

3.0 ANTICIPATED INFRASTRUCTURE IMPROVEMENTS

3.1 ROADWAYS

Access to the subdivision will be by three locations along Honoapiilani Highway. One will be at the existing signalized intersection with N. Kihei Road. The second will be at the existing signalized intersection with Kapoli Street. The third will be a newly signalized intersection approximately halfway or 3,000 feet between the two other intersections. Traffic impacts on Honoapiilani Highway along the project frontage have been analyzed and mitigation measures have been proposed which include but is not limited to additional laneage and revised striping at the one new and two existing intersections (See Traffic Impact Analysis Report for Ohana Kai Village)

The interior subdivision streets will have right-of-way widths between 80 ft. to 48 ft. depending on the classification and proposed use, and will be improved to County standards. The cul-de-sacs will have an edge of pavement radius of 40 feet and a right-of-way radius of 50 feet. The larger traffic lanes and cul-de-sac pavement radius are to accommodate the larger fire trucks in the Central Maui district. Appropriate striping and signage will be installed in accordance with the Department of Public Works standards.

3.2 DRAINAGE

It is estimated that the post development runoff from the project site for a 100-year 24-hour design storm will be 1,228 cfs and approximately 166 acre-feet of runoff volume, creating an increase of 438 cfs and 28 acre-feet of runoff volume.

Runoff from the project site will be collected by curb-inlet catch basins and conveyed to the onsite retention basins at the lower portion of the parcel adjacent to Honoapiilani Highway. Overflow from the retention basins will be directed towards the existing drainage culverts along the highway to continue downstream along the existing drainage patten at no greater than pre-development rates. The retention basins will be sized to accommodate at least the increase in surface runoff volume due to the proposed development.

Immediately mauka of the project site is State owned conservation land. If possible and can be achieved, MVI, LLC would like to utilize a strip along the western boundary within the State land as a greenway, fire buffer and offsite retention area. If allowed, retention basins will be constructed near the existing drainageways to help reduce the offsite runoff from entering the project site. The proposed improvements may also include a low berm along the property boundary as an additional measure to retain offsite runoff and direct overflow towards the existing drainageways prior to entering the project site. Three of the existing drainageways traversing the project site will remain in its existing condition except at road crossing where appropriate sized drainage culverts will be installed to allow runoff to continue downstream. When the drainageways reach the proposed buffer strip at the makai side of the project adjacent to the highway, the runoff will continue to flow into the State drainage system along the highway as it is presently occurring.

The proposed drainage system will be designed in accordance with Chapter 4, "Rules for the Design of Storm Drainage Facilities in the County of Maui."

3.3 SEWER

The proposed project consisting of 1,100 single family homes, 7.0 acres of commercial property and 16.0 acres of school and park area will generate an average of approximately 471,000 gallons per day of wastewater (See Preliminary Engineering Report for Ohana Kai Village Subdivision Wastewater Treatment Facility, Engineering Dynamics Corp.). The onsite sewerage collection system will consist of gravity sewer lines which will collect and convey the sewerage to the proposed wastewater treatment plant to be constructed at the southern end of the project site. The treatment facility will utilize the activated sludge process with secondary and tertiary treatment to produce R-1 and R-2 effluent. The treated water will be pumped back across the project site and used for irrigation purposes where allowed such as the retention basins, existing drainageways, and park areas.

3.4 WATER

The proposed plan is to construct a private water system, in accordance with the State of Hawaii, Department of Health standards, to provide the necessary domestic and fire flow demands for the project. The water system will consist of three existing wells on the adjacent property at approximately elevation 350' which will be the source of water for the system. Two 750,00 gallon water tanks will be constructed to provide the necessary storage for the proposed subdivision. Approximately 2,600 feet of 12" waterline will be installed from the proposed storage tanks to the project site where the proposed distribution system will service each lot and include the installation of fire hydrants at appropriately spaced intervals.

In accordance with the Department of Water Supply's Domestic Consumption Guidelines for developments, the average daily demand for the proposed project is approximately 729,200 gallons per day (See Appendix B). Fire flow demand for the commercial portion of the development is 2,000 gallons per minute for a 2 hour duration. There are no existing fire hydrants within or along the project perimeter which can provide fire protection for the project, therefore all fire protection requirements will be met by the private water system within the subdivision.

3.5 ELECTRIC, TELEPHONE AND CABLE TV

The proposed electrical, telephone and cable TV distribution systems for the subject project will be installed underground from the existing facilities along Honoapiilani Highway or the adjacent developments on the makai side of the highway.

APPENDIX A
HYDROLOGIC CALCULATIONS

Hydrograph Plot

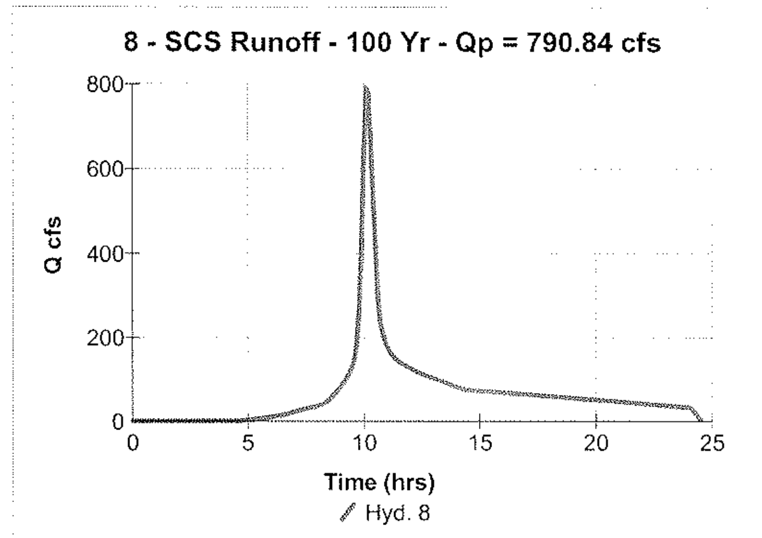
English

Hyd. No. 8

PRE

Hydrograph type	= SCS Runoff	Peak discharge	= 790.84 cfs
Storm frequency	= 100 yrs	Time interval	= 6 min
Drainage area	= 260.00 ac	Curve number	= 71
Basin Slope	= 6.5 %	Hydraulic length	= 1700 ft
Tc method	= LAG	Time of conc. (Tc)	= 24.7 min
Total precip.	= 10.00 in	Distribution	= Type I
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 5,998,820 cuft



Hydrograph Plot

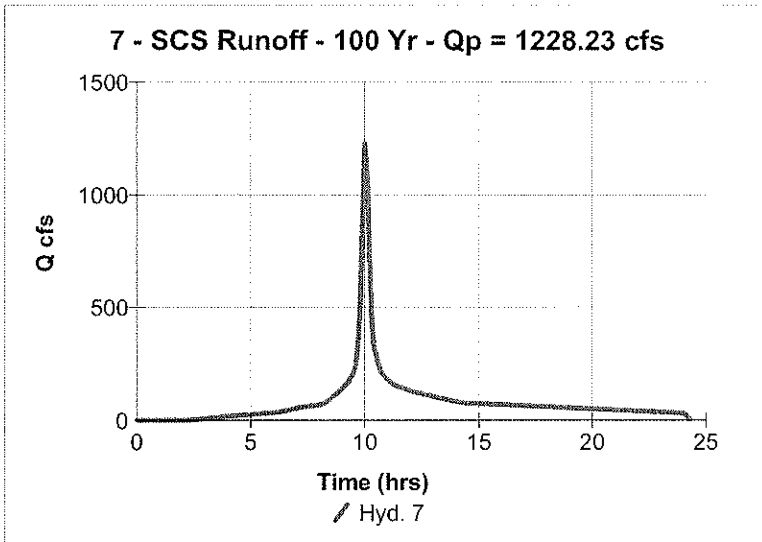
English

Hyd. No. 7

POST

Hydrograph type	= SCS Runoff	Peak discharge	= 1228.23 cfs
Storm frequency	= 100 yrs	Time interval	= 6 min
Drainage area	= 260.00 ac	Curve number	= 85
Basin Slope	= 6.5 %	Hydraulic length	= 1700 ft
Tc method	= LAG	Time of conc. (Tc)	= 16.1 min
Total precip.	= 10.00 in	Distribution	= Type I
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 7,215,863 cuft



Hydrologic Calculations

Purpose: Determine the storage volume required to mitigate the increase in runoff due to the proposed improvements for a 100-year, 24-hour storm. See attached hydrograph calculations.

Runoff created by pre-development conditions = 790 cfs
Runoff Volume created by pre-development conditions = 138 acre-feet

Runoff created by post-developed conditions = 1,228 cfs
Runoff Volume created by post-development conditions = 166 acre-feet

The required storage volume for the project is 28 acre-feet

Approximately 36.0 acre-feet of storage is provided by the onsite retention basins, which is greater than the increase in runoff volume generated by the development of the project and is required by the County drainage standards.

APPENDIX B
WATER DEMAND CALCULATIONS

WATER DEMAND CALCULATIONS

Project Data:
- 1,100 Single Family Residential Units (196.8 acres)
- 16.0 acres Public/Quasi-Public (School & Park)
- 7.0 acres Commercial

Per 2002 Water System Standards:

Consumption Guidelines:
- Single Family Residential = 600 gallons/unit or 3000 gallons/acre
- School & Park = 1,700 gallons/acre
- Commercial = 6,000 gallons/acre

Average Daily Demand (ADD) =

Single Family Residential	= 600 x 1,100 units = 660,000 gallons
	or
	= 3,000 x 196.8 acres = 590,000 gallons
School & Park	=1,700 x 16.0 acres = 27,200 gallons
Commercial	= 6,000 x 7.0 acres = 42,000 gallons

Total Average Daily Demand	= 729,200 gpd
Max. Daily Demand (1.5 x ADD)	= 1.5 x 729,200 = 1,093,800 gpd
Max. Fire Flow	= 1,000 gpm (Residential) 2,000 gpm (Schools & Commercial)

EXHIBITS

1 Location Map

2 Vicinity Map

3 Soil Survey Map

4 Flood Insurance Rate Map

5 Conceptual Site Plan

6 Conceptual Grading Plan

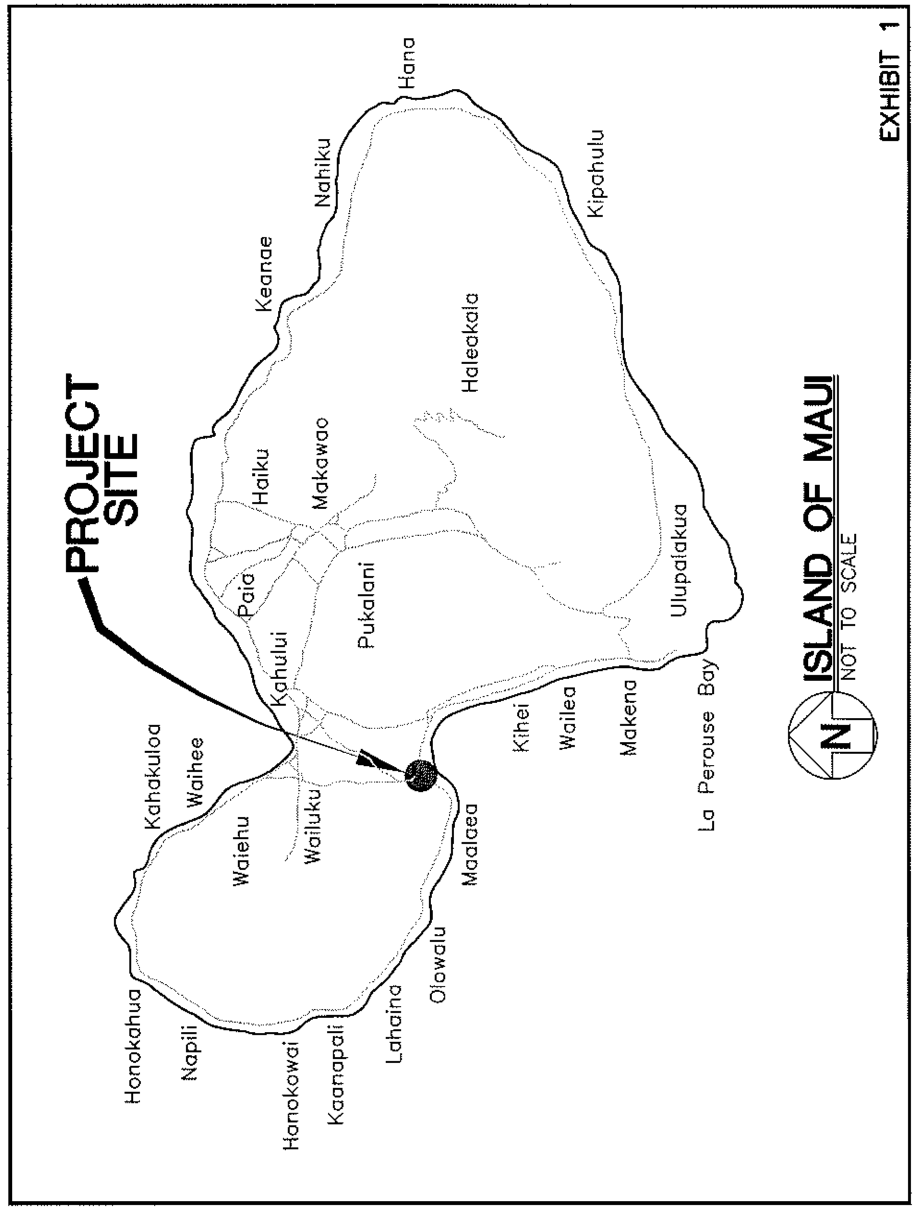
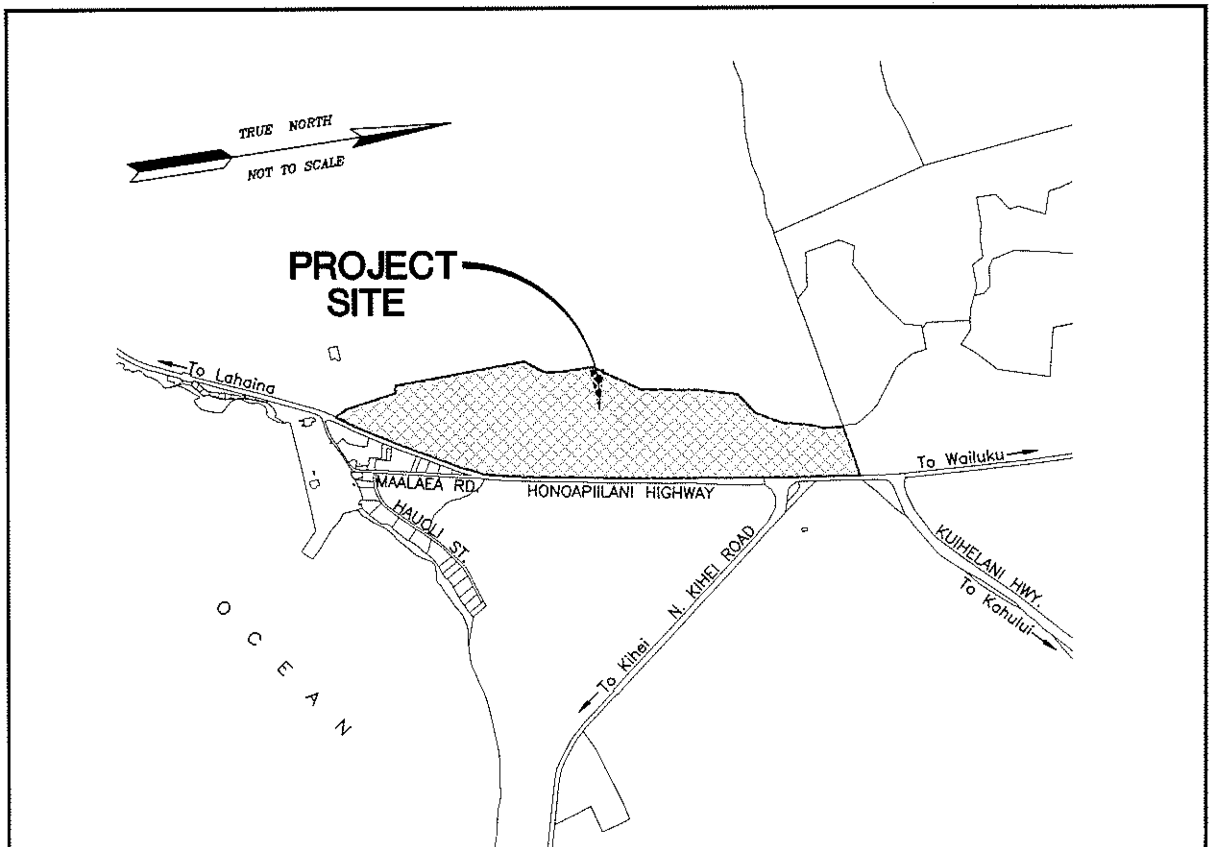
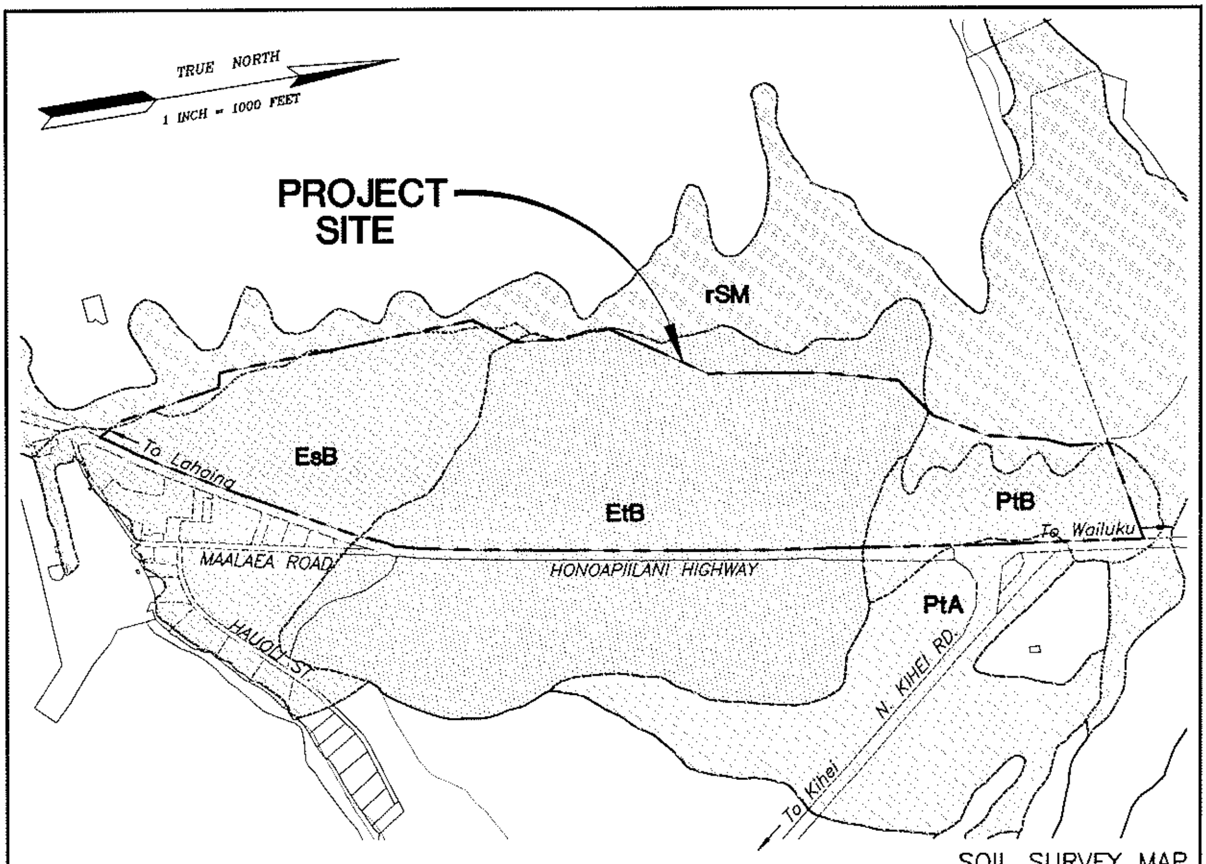


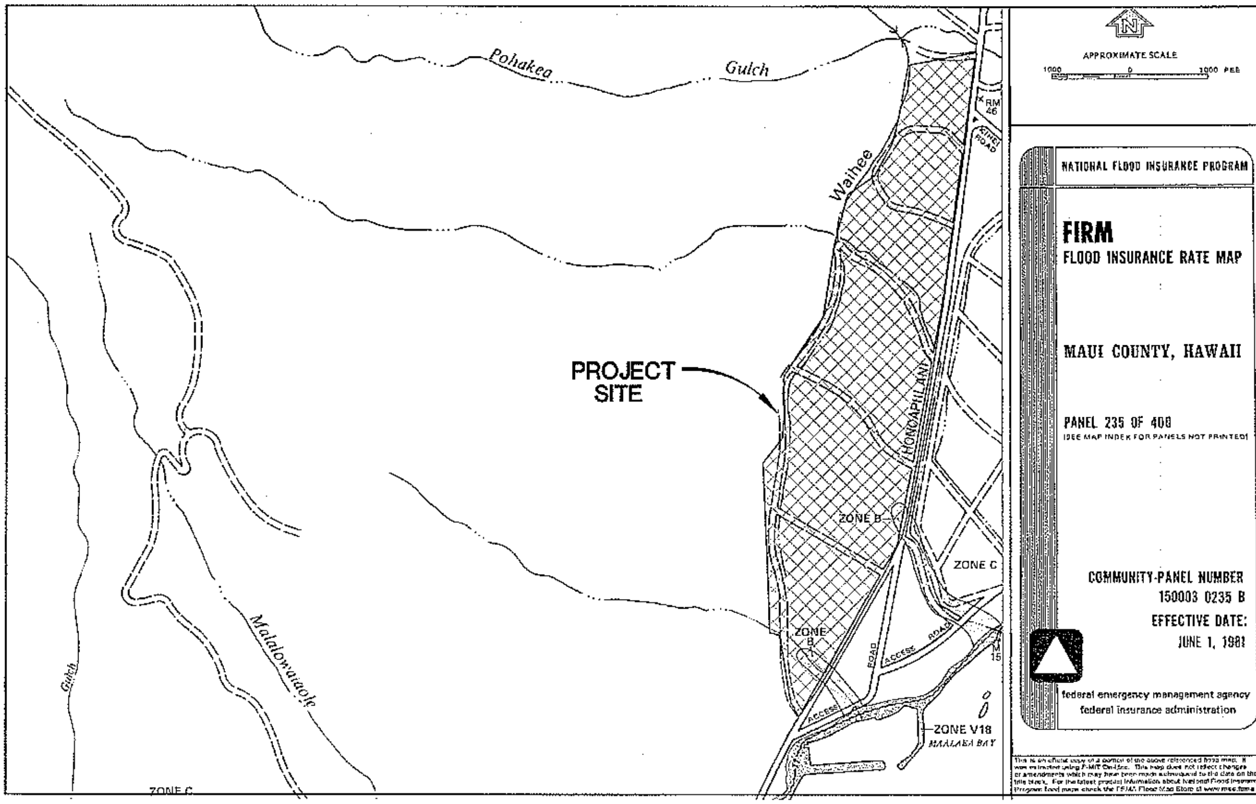
EXHIBIT 1

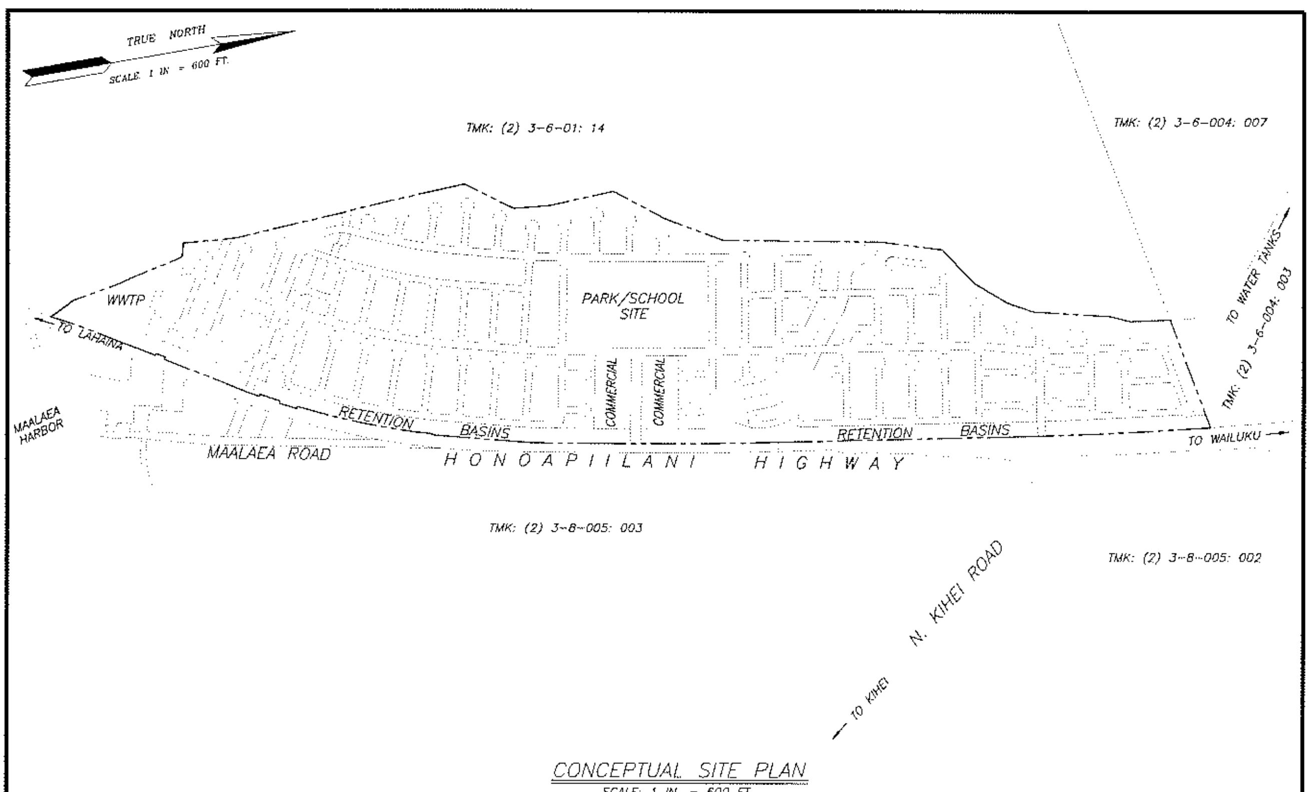


VICINITY MAP
EXHIBIT 2



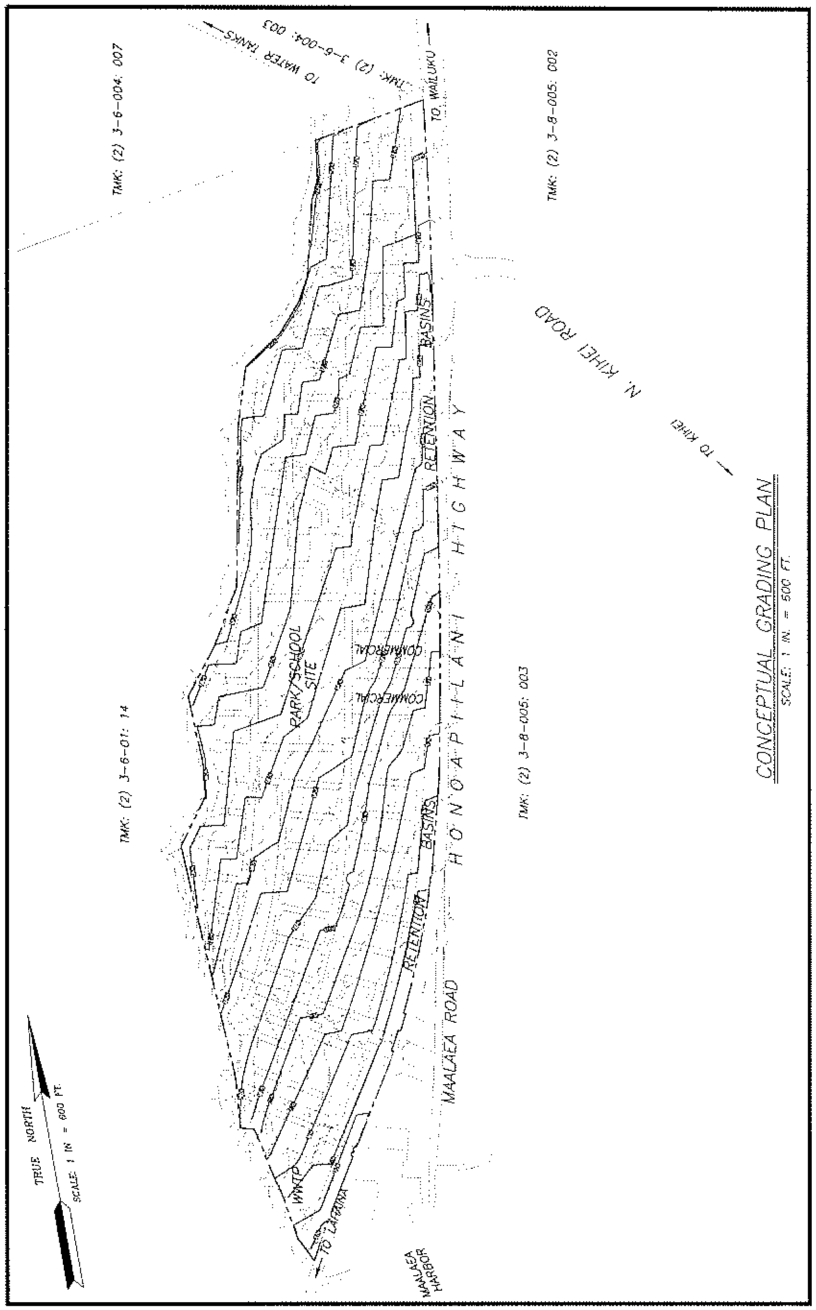
SOIL SURVEY MAP
EXHIBIT 3





CONCEPTUAL SITE PLAN

SCALE: 1 IN. = 600 FT.



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

B. Erosion and Sediment Control Guide for Hawaii, prepared by U.S. Department of Agriculture, Soil Conservation Service, March, 1981.

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

D. Flood Insurance Rate Maps of the County of Maui, June 1981.

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

F. Water System Standards, Department of Water Supply, County of Maui, 2002.

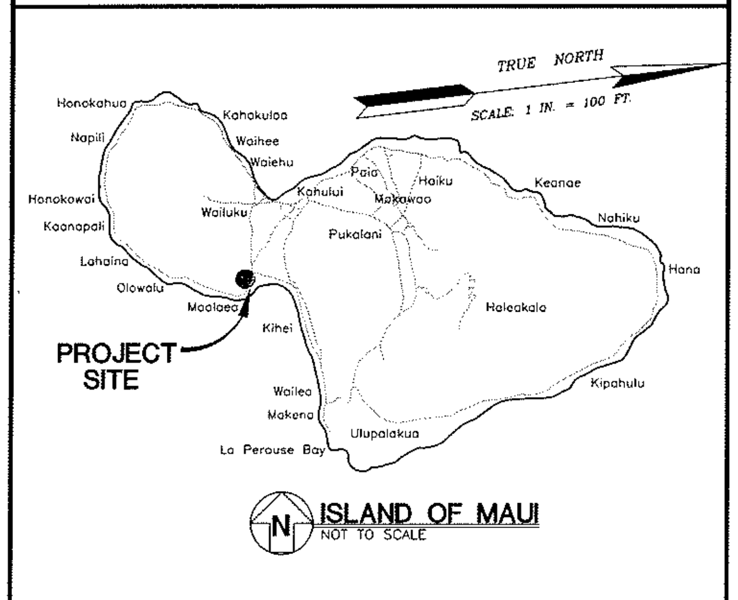
G. Preliminary Engineering Report fo Ohana Kai Village Subdivision Water Treatment Facility, prepared by Engineering Dynamics Corp., 2009.

H. Traffic Impact Analysis Report for Ohana Kai Village, prepared by AECOM Pacific, Inc. 2009.

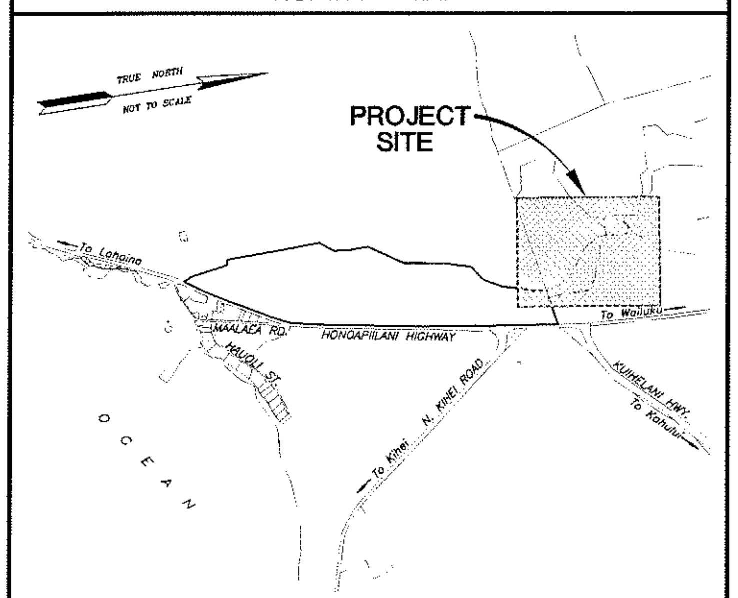
Appendix K-1.

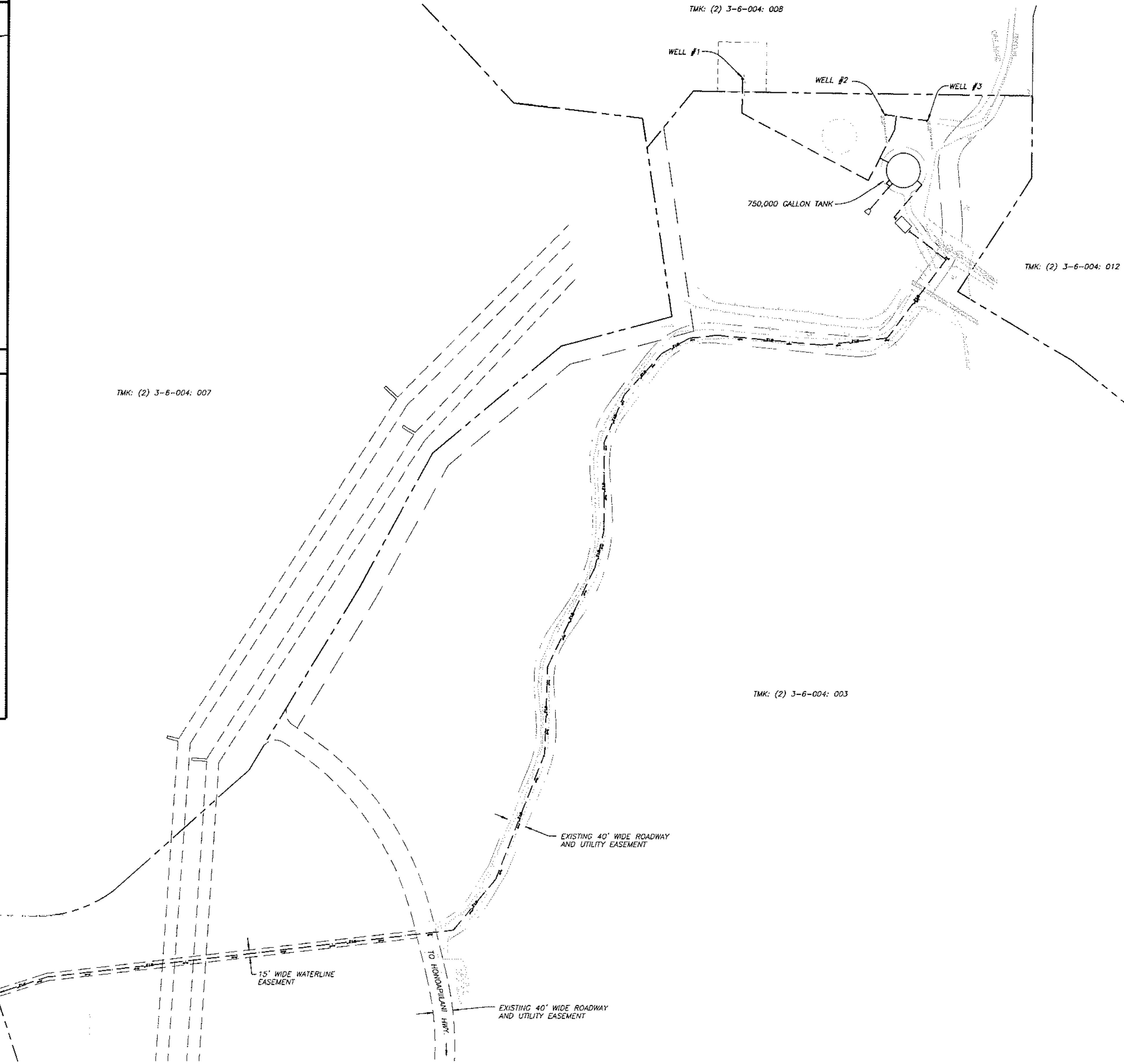
Preliminary Site Plans for Offsite Water System

LOCATION MAP



VICINITY MAP





OFFSITE WATERLINE SITE PLAN

SCALE: 1 IN. = 100 FT.

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

OHANA KAI VILLAGE SUBDIVISION

T.M.K.: (2) 3-6-01: 18

MAALAEA, MAUI, HAWAII

OFFSITE WATERLINE SITE PLAN

REVISION	DATE	NOTE
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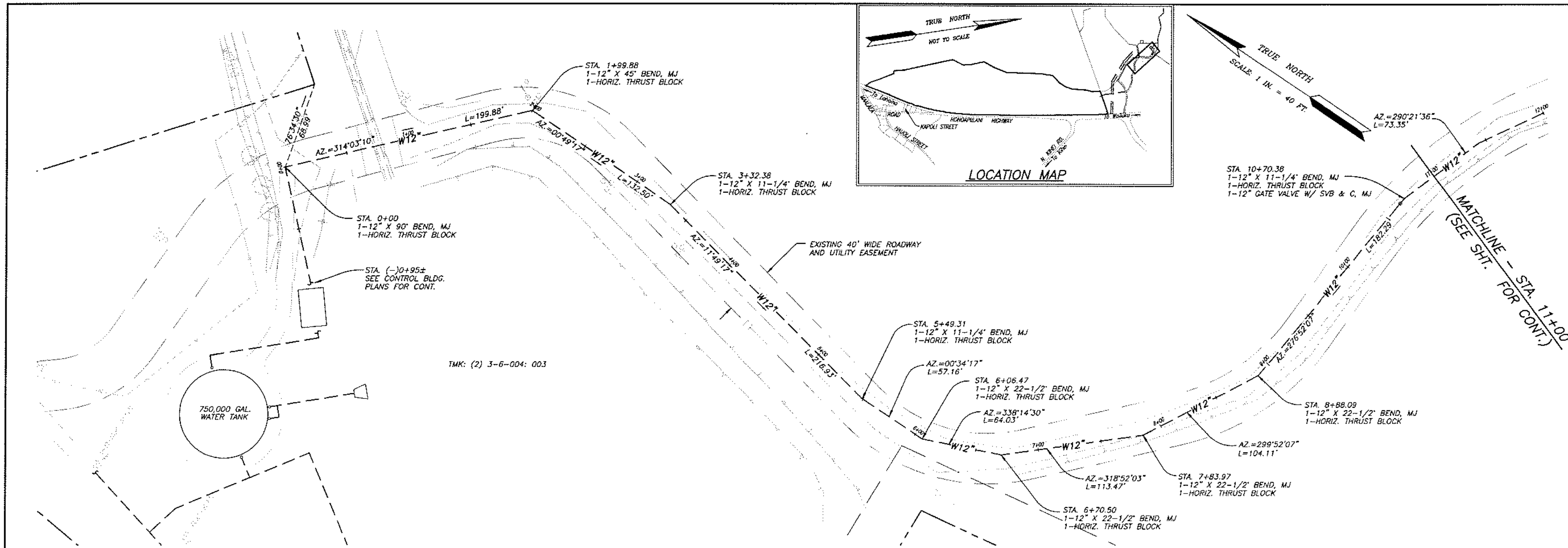
DESIGNED BY: M.M.M.
DRAWN BY: L.C.O.
PROJECT NO.: 2008-72
DRAWING NAME: WS/SITE-OSWL
DATE: 8-6-09

SHEET NO

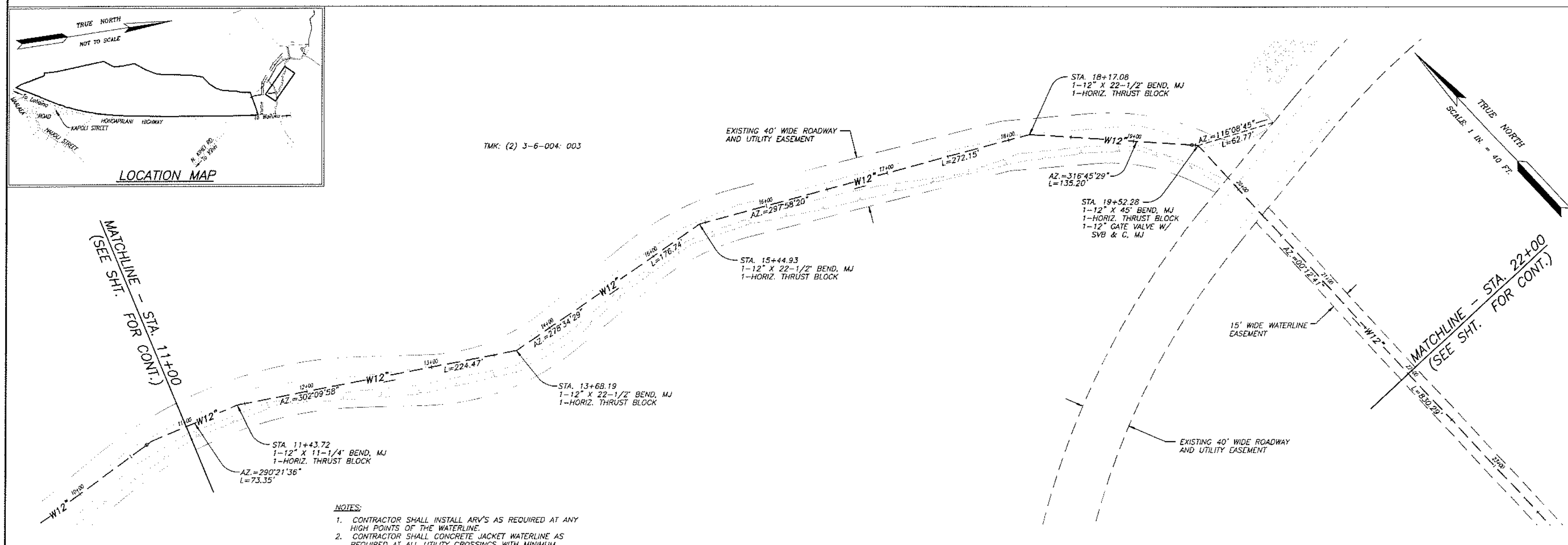
W-1

OF SHEETS



PLAN - OFFSITE WATERLINE

SCALE: 1 IN. = 40 FT.



PLAN - OFFSITE WATERLINE

SCALE: 1 IN. = 40 FT.

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

OHANA KAI VILLAGE SUBDIVISION

T.M.K.: (2) 3-6-01: 18

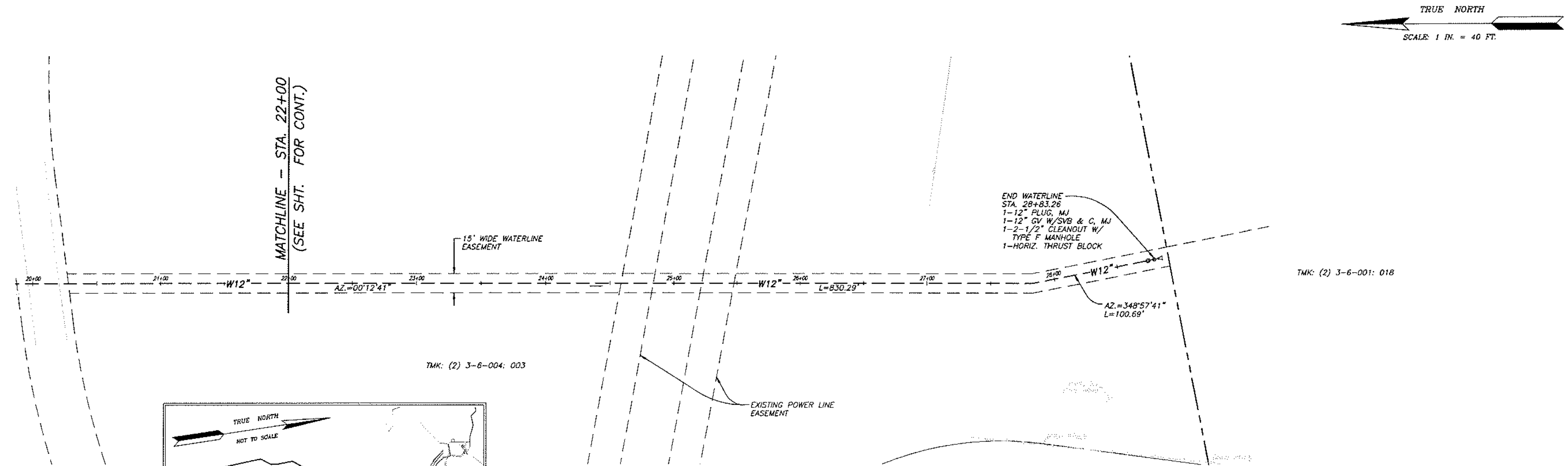
MAALAEA, MAUI, HAWAII

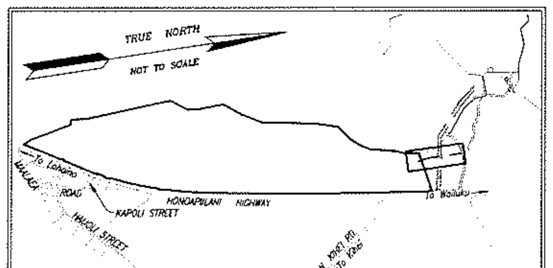
PLAN - OFFSITE WATERLINE

REVISION	DATE	NOTE

DESIGNED BY: M.M.M.
DRAWN BY: L.C.O.
PROJECT NO.: 2008-72
DRAWING NAME: PL-TANK-WL
DATE: 8-6-09

SHEET NO.
W-2
OF SHEETS





LOCATION MAP

PLAN – OFFSITE WATERLINE
SCALE: 1 IN. = 40 FT.

NOTES:
1. CONTRACTOR SHALL INSTALL ARV'S AS REQUIRED AT ANY HIGH POINTS OF THE WATERLINE.
2. CONTRACTOR SHALL CONCRETE JACKET WATERLINE AS REQUIRED AT ALL UTILITY CROSSINGS WITH MINIMUM CLEARANCE OR COVER.

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

OHANA KAI VILLAGE SUBDIVISION
T.M.K.: (2) 3-6-01: 18
MAALAEA, MAUI, HAWAII
PLAN – OFFSITE WATERLINE

REVISION	DATE	NOTE
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△		

DESIGNED BY: M.M.M.
DRAWN BY: L.C.O.
PROJECT NO.: 2008-72
DRAWING NAME: PL-TANK-WL
DATE: 8-6-09

SHEET NO.
W-3
OF SHEETS

WATER SYSTEM (PRIVATE)

1. The Contractor shall notify the Owner, in writing, one (1) week prior to commencement of work.
2. All materials used and methods of construction of water system facilities shall be in accordance with the latest revisions of DWS Standards unless otherwise noted. Contractor shall obtain the latest revisions of the DWS Standard Details before commencing construction.
3. The exact depth and location of existing waterlines, service laterals and other utilities are not known. It shall be the Contractor's responsibility to locate same prior to trenching for the new waterline. The cost of lowering, relocating or adjusting existing waterlines, service laterals and other utilities shall be considered incidental to the cost of the new waterline, unless noted otherwise, and will not be paid for separately.
4. Concrete for reaction blocks and anchor blocks shall be DWS Class 2500.
5. The maximum distance between valve nut and top of manhole cover shall be three (3) feet.
6. For 316 stainless steel bolting, heavy duty stainless steel nuts shall be furnished with TRIPAC 2000 BLUE COATING SYSTEM. Anti-seize shall not be used.
7. Minimum cover over water main, 6" diameter or larger, shall be 3'-0". Minimum cover for 4" diameter shall be 2'-6". Minimum cover for diameters less than 4" shall be 1'-6".
8. All buried metals shall be wrapped with Poly-Wrap. For all buried installations of Ductile Iron pipe and fittings, Poly-Wrap is required except within concrete jackets.
9. Lubricate hydrant nozzle threads with non-toxic grease.
10. Water mains and appurtenances shall be subject to hydrostatic testing in accordance with the latest revision of AWWA C600, under the "Hydrostatic Testing" section, to a pressure of at least 1.5 times the working pressure. Unless otherwise stated in the construction documents or limited by the pressure rating of equipment, the pressure test and leakage test shall be performed at 225 pounds per square inch pressure.
11. All waterline piping and storage tank materials shall be American National Standards Institute (ANSI/National Sanitation Foundation (NSF) Standard 61 certified for contact with drinking water.
12. The Contractor shall be responsible for obtaining a NPDES permit from the Department of Health, Clean Water Branch prior to the start of construction, for the disposal of water for hydrostatic testing and chlorination.
13. The Contractor shall submit two sets of Record Drawings via a consultant to the owner prior to acceptance of the water system.
14. The Contractor shall notify the Professional Engineer monitoring construction of any modifications that arise during construction.

CHLORINATION OF WATER SYSTEM (PRIVATE)

1. Water mains shall be disinfected in accordance with AWWA Standard for disinfecting water mains, ANSI/AWWA C651-99, Section 4.4.3, Continuous-Feed Method.
2. The storage tank shall be disinfected in accordance with AWWA Standard for disinfecting water-storage facilities, ANSI/AWWA C652-92, Section 4.1, Chlorination Method 1.
3. Liquid chlorine or calcium hypochlorite, that has been tested and certified as meeting the specifications of ANSI/NSF Standard 60, drinking water treatment chemicals – health effects, shall be used for the chlorination of the water mains and storage tank.
4. Prior to chlorination, the water mains and storage tank shall be thoroughly flushed.
5. The interior surfaces of the water mains and storage tank shall be exposed to the chlorinating solution, by completely filling the main to removed all air pockets, for a minimum of 24 hours and the free chlorine residual shall not be less than 10 PPM after such time.
6. Should calcium hypochlorite be used, no solid and/or undissolved portion of the compound shall be introduced into any section of the water mains and storage tank to be chlorinated.
7. At the end of the 24-hour disinfection period, representative samples shall be taken and analyzed to assure a free chlorine residual of at least 10 PPM.
8. Should the free chlorine residual results indicate adequate chlorination, the water mains and storage tank shall be thoroughly flushed and filled with water from the existing system and again tested for free chlorine residual. The flushing shall be considered adequate if the free chlorine residual test results indicate that the water in the water mains and storage tank has returned to normal operating levels (typically 0.5 PPM or less).
9. The Contractor shall be responsible for the proper disposal of chlorinated water to safeguard public health and environment in accordance with applicable State Department of Health requirements. A neutralizing chemical shall be applied to the water to be wasted to thoroughly neutralize the chlorine residual remaining in the water in accordance with AWWA C651-99, Section 4.5.2, and Appendix C.
10. The Contractor shall be responsible for obtaining a national pollutant discharge elimination system (NPDES) permit from the Department of Health, Clean Water Branch prior to the start of construction for the disposal of water used for hydrotesting and chlorination.
11. Following the acceptable flushing of the water mains and storage tank, two consecutive sets of acceptable samples, taken at least 24 hours apart, from representative points shall be taken and subjected to microbiological tests (total and fecal coliform). For waterlines, at least one set of samples shall be collected from every 1,200 feet of the new water main, plus one from the end of the line and at least one set from each branch. For the storage tank, the sample shall be collected from the tank's effluent line sample tap. Positive or invalid test results will not be acceptable and the process will be repeated.
12. All measurements for chlorine residual shall be analyzed using E.P.A. approved methods for drinking water.
13. All microbiological tests shall be performed by a laboratory approved by the Department of Health, State of Hawaii, using E.P.A. approved methods for drinking water.
14. The Contractor shall be responsible for all costs associated with all of the foregoing.
15. See ANSI/AWWA C651-99, Sec. 4.3.6 for swabbing chlorination procedures.

EXISTING GRADES

1. Existing grades shall be verified by the contractor before proceeding with grading work. Should any discrepancies be discovered in the existing grades or dimensions given on the plans, the Contractor shall immediately notify the Engineer before proceeding further with any work, otherwise he will be held responsible for any cost involved in correction of construction placed due to such discrepancies.

EXISTING UTILITIES

1. The location, depth and type of the various existing utility lines shown on the construction plans were determined on the basis of the best information possible. The Contractor shall verify exact location, depth, and type prior to commencement of work.
2. Contractor shall notify the Engineer of any discrepancies between the existing utilities as shown on the construction plans and that located in ground, and not proceed with any further work until written notification is received from the Engineer. Any work done without written notification from the Engineer shall be the sole responsibility of the Contractor.
3. All existing utilities whether or not shown on the plans, if damaged during construction by the Contractor, shall be repaired solely at his expense.

EROSION CONTROL

The following measures shall be taken to control erosion during the site development period:
1. Minimize the time of construction.
2. Retain existing ground cover until latest date to complete construction.
3. Early construction of drainage control features.
4. Use temporary area sprinklers in non-active construction areas when ground cover is removed.
5. Station water truck on site during construction period to provide for immediate sprinkling, as needed in active construction zones (weekends and holidays included).
6. Use temporary berms and cut-off ditches, where needed, for control of erosion.
7. Graded areas shall be thoroughly watered after construction activity has ceased for the day and on weekends.
8. All cut and fill slopes shall be sodded immediately after grading work has been completed.

COMPACTION REQUIREMENTS

1. Testing of materials shall be conducted by an approved independent testing agency in accordance with ASTM standard methods or as specified by the Department of Public Works, Engineering Division, as follows:
   a. Embankment/Select Borrow and Subgrade Materials: One (1) compaction test per 600 square yards per lift of material.
   b. Aggregate Subbase Course: One (1) compaction test per 400 square yards per lift of material; and one (1) gradation and sand equivalent test per project.
   c. Aggregate Base Course: One (1) compaction test per 300 square yards per lift of materail; and one (1) gradation and sand equivalent test per project.
   d. Asphalt Concrete Pavement or Asphalt Treated Base Course: Three (3) A.C. cores minimum for thickness and density tests.
   e. Trench Backfill Material: One (1) test for each 300 lineal feet of trench per lift of material.
2. Contractor shall submit all testing reports including results to the County's inspection agency for review and approval prior to County's acceptance of the work.
3. The contractor shall be required to notify the County of any testing failures and correct each failure prior to proceeding to the next phase of construction. Noncompliance will require removal of all subsequent work to correct the area of failure. All costs of testing, removal, and reconstruction shall be borne by the contractor.

ENVIRONMENTAL PROTECTION

1. The contractor shall remove all silt and debris resulting from his work and deposited in drainage facilities, roadways and other areas. The costs incurred for any necessary remedial action by the Chief Environmentalist shall be borne by the Contractor.
2. The Contractor shall keep the project area and surrounding areas free from dust nuissance, all in accordance with Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control. All costs shall be borne by the Contractor.
3. All grading operations shall be performed in conformance with the applicable provisions of Hawaii Administrative Rules, Title 11, Chapter 54, Water Quality Standards, and Chapter 55, Water Pollution Control, and if applicable, the NPDES permit for the project.
4. All cut and fill slopes shall be sodded or planted immediately after grading work has been completed.
5. Construction debris and wastes shall be deposited at appropriate sites. The Contractor shall inform the Engineer of the location of the disposal sites. The disposal sites shall also fulfill the requirements of the Grading Ordinance.
6. The Contractor shall not demolish or clear any structure, site, or vacant lot without first ascertaining the presence or absence of rodents which may endanger the public health by dispersal from such premises. Should such inspection reveal the presence of such rodents, the Contractor shall eradicate such rodents before demolishing or clearing said structure, site or vacant lot.

STATE HISTORIC PRESERVATION DIVISION REQUIREMENTS

Should historic sites such as walls, platforms, pavements and mounds, or remains such as artifacts, burials, concentration of charcoal or shells be encountered during construction activities, work shall cease in the immediate vicinity of the find and the find shall be protected from further damage. The contractor and/or landowner shall immediately contact the State Historic Preservation Division (692-8015 or 243-5169), which will assess the significance of the find and recommend an appropriate mitigation measure, if necessary.

SECTION 3.44.015(C)–MAUI COUNTY CODE

NOTE: Pursuant to Maui County Code Section 3.44.015(C), the County of Maui is not responsible for any park, roadway, easement (including but not limited to drainage, sewer, access, reclaimed water, or avigation easement), or any other interest in real property shown on this map or shown these plans, unless the Maui County Council has accepted its dedication by a resolution approved by a majority of Council's members at a regular or special meeting of the Maui County Council.

THE FOLLOWING DETAILS AS SHOWN IN THE WATER SYSTEM STANDARS, 2002 SHALL BE CONSIDERED PART OF THE CONSTRUCTION DRAWINGS. THE WORK CONTEMPLATED MAY REQUIRE REFERENCE TO STANDARD DETAILS NOT LISTED. THE CONTRACTOR SHALL REFER TO THE WATER SYSTEM STANDARDS, 2002 AND COMPLY WITH ALL APPLICABLE STANDARD DETAILS.

DETAIL NO.	CONTENTS
B1	REINFORCED CONCRETE JACKET – TYPICAL DETAIL
B2	HORIZONTAL THRUST BLOCK FOR WATER MAINS
B3–B6	HORIZONTAL THRUST BLOCK – MINIMUM BEARING AREAS
B7	TYPICAL THRUST BLOCK AT VERTICAL BENDS
MH8–MH9	TYPE "A" MANHOLE
MH17	MANHOLE FRAME AND COVER (CAST IRON, 24" SIZE)
P10	TRENCH BACKFILL
V3	MANHOLE FRAME AND COVER (CAST IRON, 6" SIZE)
V4	AIR VALVE CONNECTION IN MANHOLE
V12	SLIDING VALVE BOX ASSEMBLY
V18	VALVE MARKER DETAIL
V21	CLEANOUT
V23	ARV INSTALLATION TYPE "F" MANHOLE

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

OHANA KAI VILLAGE SUBDIVISION
T.M.K.: (2) 3-6-01: 18
MAALAEA, MAUI, HAWAII
CONSTRUCTION NOTES

REVISION	DATE	NOTE
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△		
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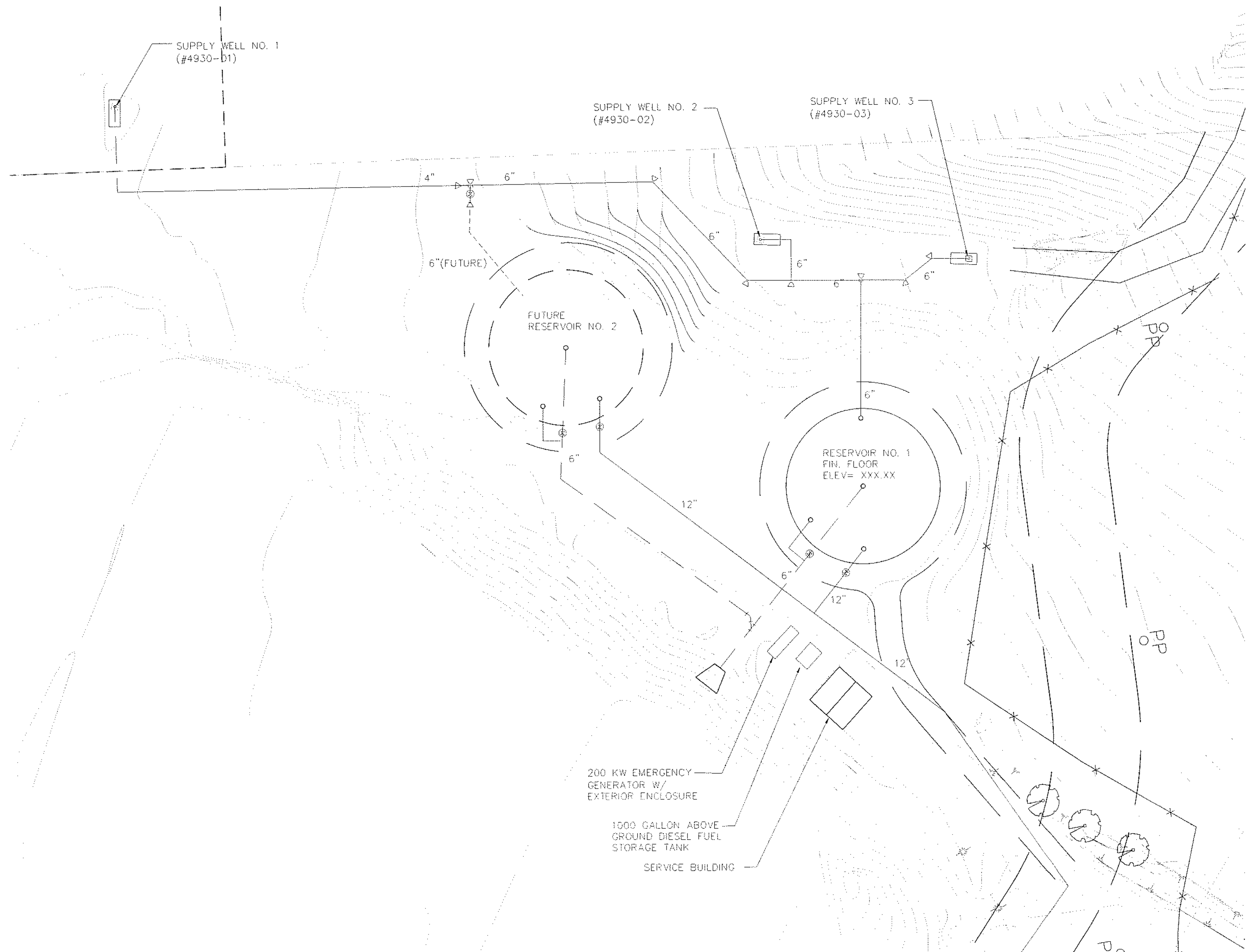
DESIGNED BY: M.M.M.
DRAWN BY: L.C.O.
PROJECT NO.: 2008-72
DRAWING NAME: WS/NOTES-1
DATE: 4-8-09

SHEET NO.
W-4
OF SHEETS



SHEET NO.
M-1
___OF___ SHEETS

REVISIONS

TANK AND WELL SITE PLAN

OHANA KAI VILLAGE @ MAALAEA

HONOAPIILANI HIGHWAY

MAALAEA, MAUI, HAWAII

TMK: (2) 3-4-43: 42

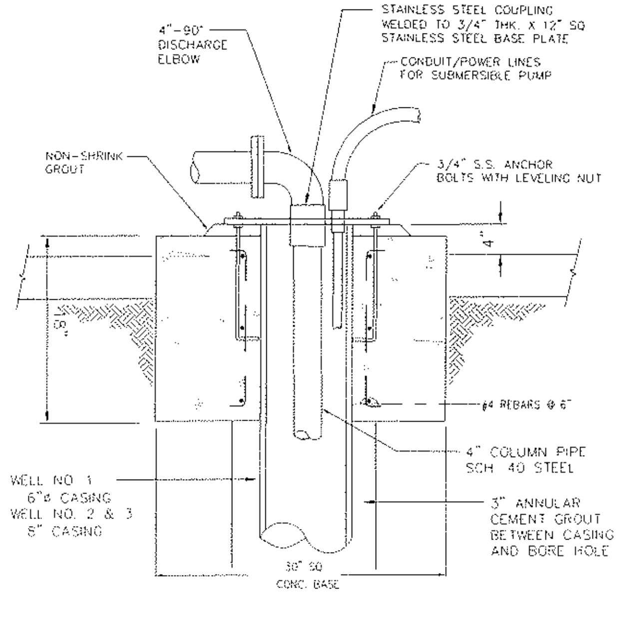
RAD
KS
DLG
APRIL 16, 2004
04552

Note: Contractor shall check and verify all dimensions of job before proceeding with work.

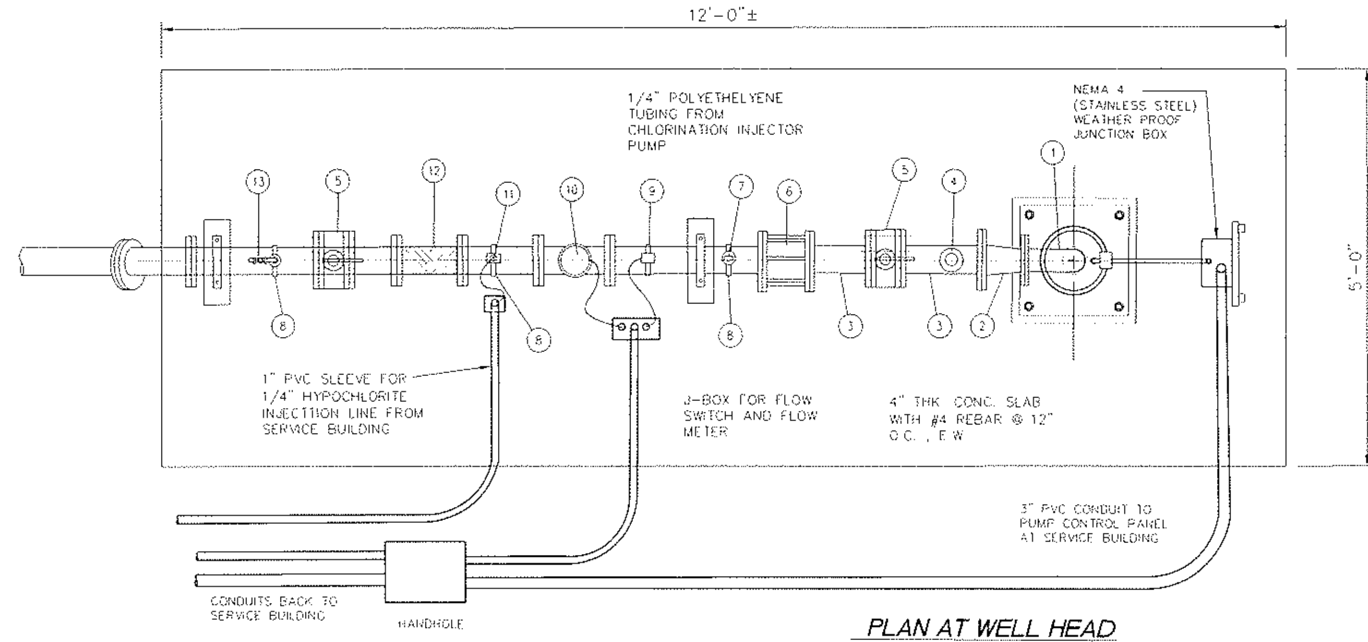
DOUGLAS L. GOMES
LICENSED PROFESSIONAL ENGINEER
No. 3646-M
HAWAII, U.S.A.
APRIL 30, 2010

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION WILL BE UNDER MY OBSERVATION (OBSERVATION OF CONSTRUCTION AS DEFINED IN SECTION 12 (N) OF THE RULES AND REGULATIONS OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS & SURVEYORS OF THE STATE OF HAWAII)

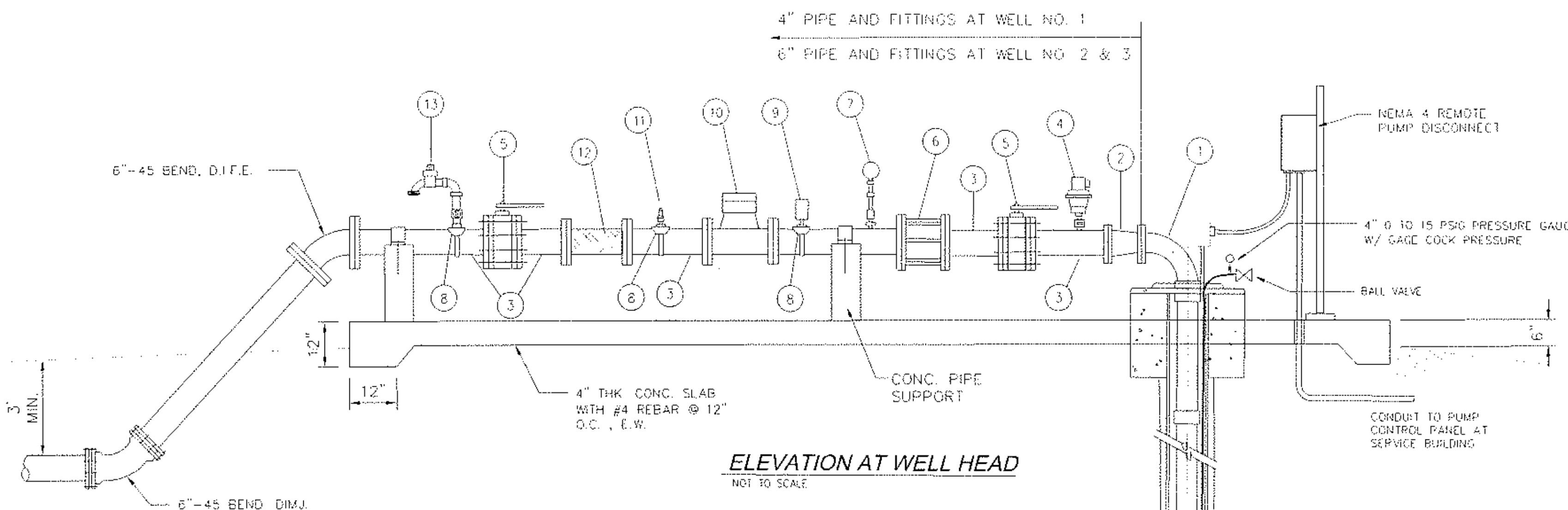
ENGINEERING DYNAMICS CORP. Civil & Mechanical Engineering Services Maui Office: 66 Wailani Street, Wailuku, Hawaii 96793 Phone: (808) 242-1644 Fax: (808) 242-0838



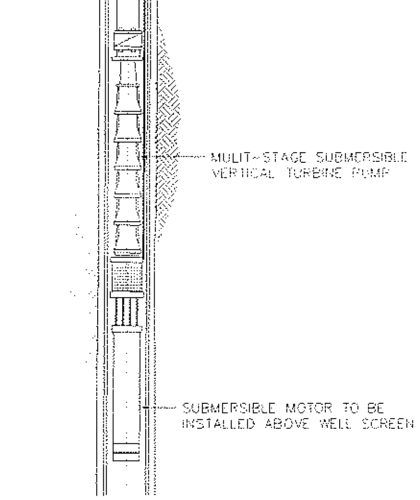
DETAIL (A)
NOT TO SCALE



PLAN AT WELL HEAD
NOT TO SCALE



ELEVATION AT WELL HEAD
NOT TO SCALE



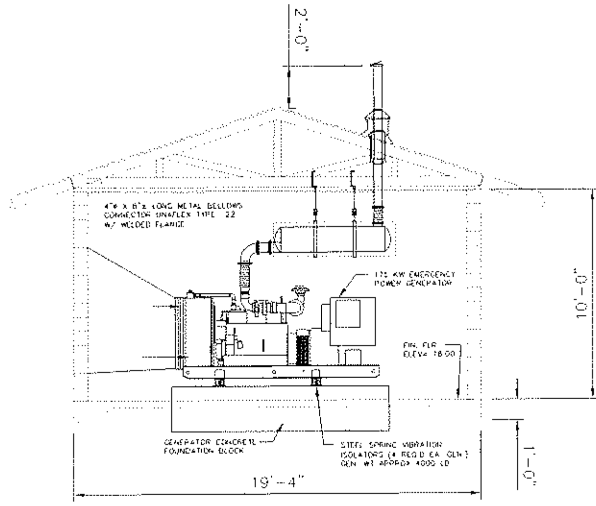
	WATER WELL NO. 1		WATER WELL NO. 2 & 3
	ITEM DESCRIPTION		ITEM DESCRIPTION
1	4" DISCHARGE HEAD, F.E.	1	4" DISCHARGE HEAD, F.E.
2	NOT REQUIRED	2	4" X 6" RDUCER, F.E.
3	4" PIPE PIPE NIPPLE, F.E. (LENGTH TO SUITE)	3	6" PIPE PIPE NIPPLE, F.E. (LENGTH TO SUITE)
4	1/2" AIR AND VACUUM RELIEF VALVE W/ CORP STOP	4	1/2" AIR AND VACUUM RELIEF VALVE W/ CORP STOP
5	4" BUTTER FLY VALVE	5	6" BUTTER FLY VALVE
6	4" IN-LINE SPRING CHECK VALVE	6	6" IN-LINE SPRING CHECK VALVE
7	4" DIAM. 0 TO 120 PSIG PRESSURE GAUGE W/ SNUBBER AND GAGE COCK	7	4" DIAM. 0 TO 120 PSIG PRESSURE GAUGE W/ SNUBBER AND GAGE COCK
8	4" SERVICE SADDLE	8	6" SERVICE SADDLE
9	FLOW SWITCH	9	FLOW SWITCH
10	4" FLOW METER/ TRANSMITER WITH INDICTOR AND TOTALIZER	10	6" FLOW METER/ TRANSMITER WITH INDICTOR AND TOTALIZER
11	HYPO-CHLORITE SOLUTION INJECTOR	11	HYPO-CHLORITE SOLUTION INJECTOR
12	SATIC IN-LINE MIXER	12	SATIC IN-LINE MIXER
13	1/2" LOOSE KEY HOSE BIBB W/ STOP COCK	13	1/2" LOOSE KEY HOSE BIBB W/ STOP COCK

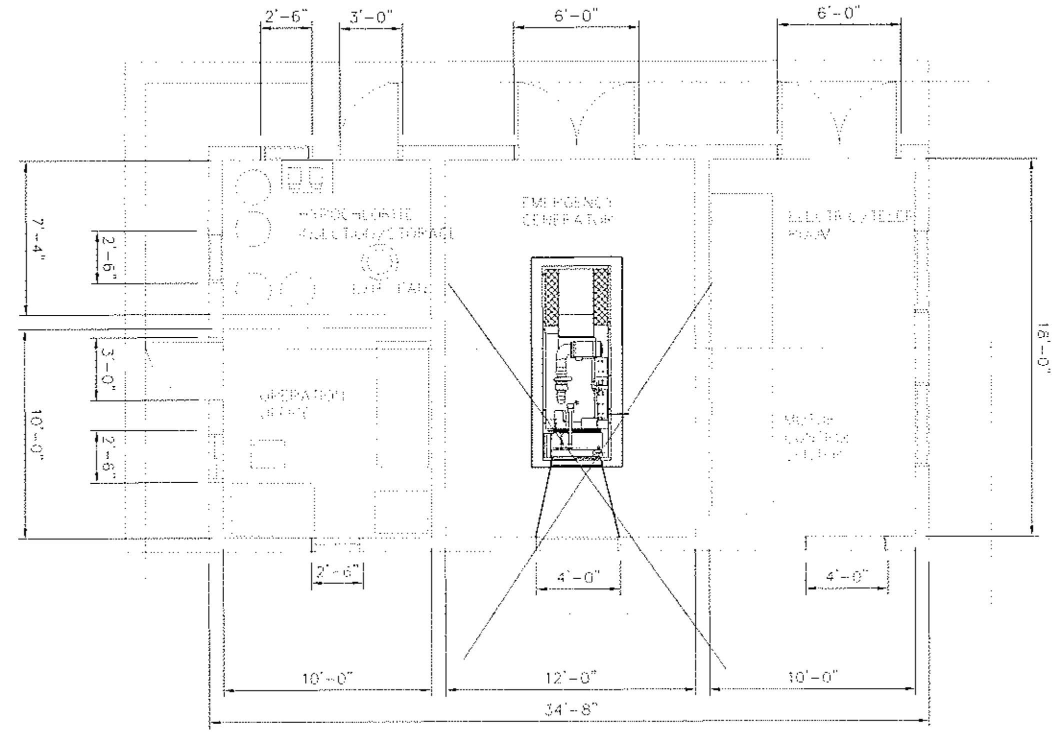
PIPING AT WELL HEAD
OHANA KAI VILLAGE @ MAALAEA
HONOAPIILANI HIGHWAY
MAALAEA, MAUI, HAWAII
TMK: (2) 3-4-43: 42

REVISIONS

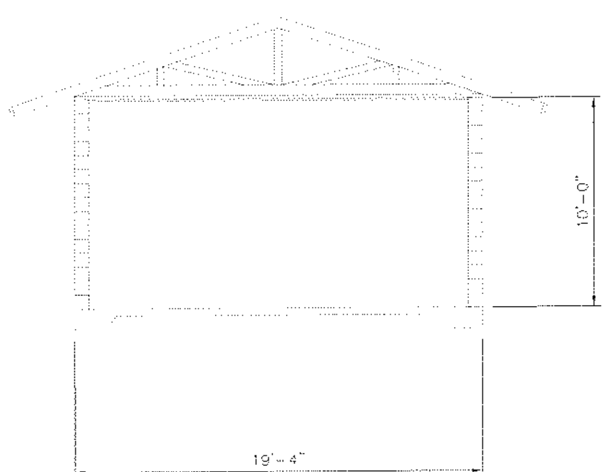
SHEET NO.
M-2
__ OF __ SHEETS

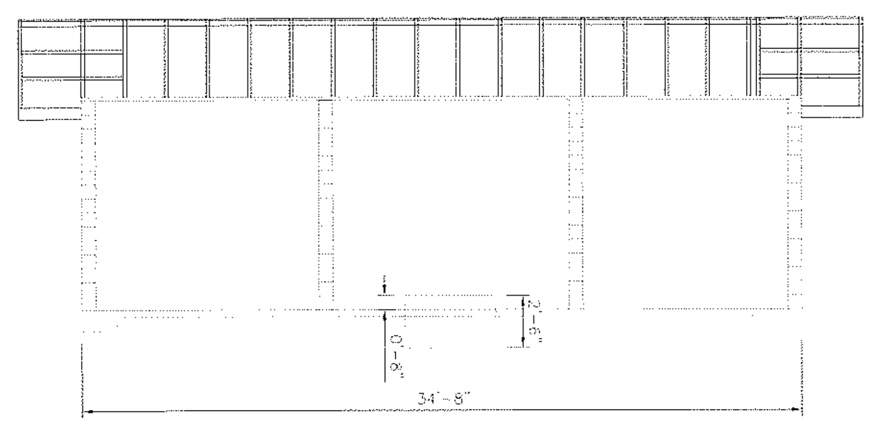
ENGINEERING DYNAMICS CORP. Civil & Mechanical Engineering Services Maui Office: 66 Wailani Street, Wailuku, Hawaii 96793 Phone (808) 242-1644 Fax (808) 242-0838





SERVICE BUILDING FLOOR PLAN





SERVICE BUILDING LONGITUDINAL SECTION

WATER SYSTEM SERVCIE BUILDING
OHANA KAI VILLAGE @ MAALAEA
HONOAPIILANI HIGHWAY
MAALAEA, MAUI, HAWAII

ENGINEERING DYNAMICS CORP. Civil & Mechanical Engineering Services

SHEET NO M-3

APPENDIX K-2.

Easement Documents for Waterline and Well Purposes

LAND COURT | REGULAR SYSTEM

Return By Mail ☐ Pick-Up ☐ To:

CARLSMITH BALL LLP
One Main Plaza, Suite 400
2200 Main Street
Wailuku, Maui, Hawaii 96793

Attention: Blaine J. Kobayashi
Telephone: (808) 242-4535

TITLE OF DOCUMENT:

ACCESS AND UTILITY EASEMENT

PARTIES TO DOCUMENT:

GRANTOR: WAIKAPU PROPERTIES, LLC
1132 Norman Drive
Manteca, California 95336

GRANTEE: MVI, LLC
P. O. Box 97
Kihei, Maui, Hawaii 96753

Easements W-1, A and A-1

TAX MAP KEY(S): (2) 3-6-004:003 and
(2) 3-6-001:018

(This document consists of 23 pages.)

ACCESS AND UTILITY EASEMENT

THIS INDENTURE made this ______ day of __________________, 20____, by and between WAIKAPU PROPERTIES, LLC, a Hawaii limited liability company, whose address is 1132 Norman Drive, Manteca, California 95336, hereinafter called "GRANTOR", and MVI, LLC, a Hawaii limited liability company, whose address is P. O. Box 97, Kihei, Maui, Hawaii 96753, hereinafter called "GRANTEE",

W I T N E S S E T H:

WHEREAS, the GRANTOR is the owner of Lot 6 of the Waikapu Hema Large Lot Subdivision, situate, lying and being at Waikapu, District of Wailuku, Island and County of Maui, State of Hawaii, area 657.19 acres, more or less, and bearing Tax Key designation (2) 3-6-004:003, hereinafter called "GRANTOR'S PARCEL;" and

WHEREAS, the GRANTEE is the owner of that certain parcel of land (being all of the land(s) described in and covered by Land Patent Grant S-13975 to Wailuku Sugar Company; Land Patent Grant 11067 to Wailuku Sugar Company; Land Patent Grant 10962 to Wailuku Sugar Company; Land Patent Grant 10745 to Wailuku Sugar Company; Land Patent Grant 10497 to Wailuku Sugar Company; Land Patent Grant 10294 to Wailuku Sugar Company and Grant 9794 to Wailuku Sugar Company; and portion(s) of the land(s) described in and covered by Land Patent Grant Number 3152 to H. Cornwell), situate, lying and being at Ukumehame, Waikapu, District of Wailuku, Island and County of Maui, State of Hawaii, area 256.903 acres, more or less, and bearing Tax Key designation (2) 3-6-001:018, hereinafter called "GRANTEE'S PARCEL;" and

WHEREAS, the GRANTEE requires an easement over, under, across and through portions of the GRANTOR'S PARCEL for access and utility purposes; and

WHEREAS, the GRANTOR has agreed to grant same to the GRANTEE, subject to and in accordance with the terms, covenants, conditions, and provisions hereinafter set forth; NOW, THEREFORE,

F U R T H E R   W I T N E S S E T H   T H A T:

The parties hereto, for and in consideration of the premises, and the mutual promises, covenants, and agreements hereinafter set forth, do hereby agree as follows:

1. Grant of Non-Exclusive Perpetual Easements: The GRANTOR, as the owner of the GRANTOR'S PARCEL, in consideration of the sum of TEN AND NO/100 DOLLARS ($10.00) and other good and valuable consideration paid to the GRANTOR by the GRANTEE, the receipt whereof is hereby acknowledged, does hereby grant and convey unto the GRANTEE, its successors and assigns, as the owner of the GRANTEE'S PARCEL, non-exclusive perpetual easements for access and utility purposes, over, under, across and through portions of the GRANTOR'S PARCEL, designated as Easement "W-1", Easement "A" and Easement "A-1", hereinafter called "Easement Areas", which Easement Areas are more particularly described in Exhibits "A" - "C", respectively, attached hereto and by reference made a part hereof.

2. Use of Easement Areas: The GRANTEE shall use the Easement Areas for access (i.e. ingress and egress) and for utility service purposes, including but not limited to the installation, construction, reinstallation, reconstruction, operation, replacement, removal, maintenance and repair of a roadway (hereinafter called "Roadway") and waterlines, sewerlines,

drainage lines, electrical and telephone lines, cable television lines, or any other utility service lines, including meters, valves, pullboxes, conduits, switches, guy lines, and other appurtenant appliances, equipment, and facilities (hereinafter collectively referred to as "Utility Lines"), within the Easement Areas.

If any permits, approvals, consents, or authorizations to construct or install the Roadway or Utility Lines are required, the parties shall cooperate and sign any and all such permits, approvals, consents, or authorizations.

3. <u>Maintenance and Repair</u>: The GRANTEE shall be responsible for the costs and expenses for cleaning, maintaining, and repairing the Easement Areas and all improvements placed thereon, including the Roadway and Utility Lines, and to keep the same in a clean, safe, and orderly appearance and condition at all times.

The GRANTEE shall use due care and diligence to construct, re-construct, install, re-install, maintain, operate, repair, replace and/or remove the Roadway and/or Utility Lines within the Easement Areas, and to keep the same in a proper and safe condition and manner at all times. Upon completion of any work therein, the Easement Areas shall be restored to the same to the condition it was in prior to such work to the extent that such restoration is reasonably possible.

4. <u>Waste and Unlawful, Improper or Offensive Use of the Easement Areas</u>: The GRANTEE shall not commit or cause to be committed any waste in or upon the Easement Areas or maintain any public or private nuisance or any other action which may interfere with or disturb the quiet enjoyment of the Easement Areas or any surrounding property, including the GRANTOR'S PARCEL, nor shall the GRANTEE permit the Easement Areas to be used for any improper, offensive or unlawful purpose.

5. Minimal Interference: The GRANTEE shall use the Easement Areas solely for the purposes provided herein, and will exercise GRANTEE'S rights hereunder in such manner as to occasion as little interference as reasonably necessary with the use and enjoyment of the rest of the GRANTOR'S PARCEL.

6. Reserved Use by GRANTOR: The GRANTOR excepts and reserves the right to use the Easement Areas for access and utility purposes, including the right to construct, install, erect, allow, or permit any improvements thereon, including the Roadway and Utility Lines, and including the right to grant easements over the Easement Areas or any portion or portions thereof, to others; provided, however, that such use by the GRANTOR or others shall not unreasonably interfere with the GRANTEE'S easement rights herein.

7. Compliance With Laws: The GRANTEE shall, at all times observe, perform, and comply with the requirements of all laws, statutes, ordinances, rules and regulations applicable to the Easement Areas and any improvements therein, now or hereafter enacted by any governmental authority with applicable jurisdiction.

8. Acceptance: The GRANTEE accepts the Easement Areas in "AS IS, WHERE IS" condition, and understands and agrees that the GRANTOR has made no representation or warranty with respect to the condition of the Easement Areas or the suitability or fitness of the Easement Areas for any particular use or purpose.

9. Liens: The GRANTEE shall not commit or permit any act or neglect whereby the GRANTOR'S PARCEL, or any portion thereof, shall become subject to any attachment, judgment, lien, charge or encumbrance whatsoever resulting from the acts or omission of GRANTEE, and shall indemnify and hold GRANTOR harmless against all loss, cost, and expenses, including reasonable attorneys' fees and costs, whether or not suit is filed,

with respect thereto. GRANTEE shall promptly discharge or cause to be discharged or dismissed, every such attachment, judgment, lien, charge, encumbrance, or any notice or application thereof, which may be filed against the GRANTOR'S PARCEL or any portion thereof.

10. Dedication to County of Maui or State of Hawaii: In the event the Easement Areas, or any portion or portions thereof, is dedicated to the County of Maui, the State of Hawaii, or any other governmental agency for public roadway purposes, then all easement rights in such dedicated Easement Areas, or any portion or portions thereof so dedicated, shall automatically terminate. If such rights are not automatically terminated for any reason, GRANTEE shall execute and record any documentation to effectively cancel such easement rights. The GRANTOR and the GRANTEE agree to cooperate in the dedication process, including the signing of any deed, joinder, authorizations, consents, approvals, or permits.

11. Easements To County or Utility Companies: In the event easements are requested and/or required by the County of Maui, State of Hawaii, a public utility company such as Maui Electric Company, Ltd. or Hawaiian Telcom, Inc., or other similar governmental agency or utility company, the parties hereto shall fully cooperate to grant and convey such easements, provided, however, that such easements and/or the use thereof shall not obstruct or interfere with the GRANTEE'S plans and use of the Easement Areas for access and utility purposes to service the GRANTEE'S PARCEL.

12. Condemnation: If the Easement Areas, or any portion thereof, shall be condemned or taken by any governmental authority or public service company for use by the general public, the GRANTEE shall surrender the Easement Areas or the portion so condemned, and this easement shall terminate as to the Easement Areas or the portion so condemned. Any

compensation and/or damages payable by reason of such condemnation shall be payable to the GRANTOR, except that the GRANTEE shall have the right to claim and recover from the condemning authority, but not from the GRANTOR, any such compensation which is payable for the GRANTEE'S Utility Lines and Roadway.

13. Indemnity: The GRANTEE shall defend, indemnify and hold the GRANTOR harmless from and against any and all claims and demands for any and all losses or damages, including property damage, personal injury, and wrongful death, fines, penalties, injuries, causes of actions, suits, and expenses, of whatsoever kind and nature, in contract or in tort, arising out of or in connection with the GRANTEE'S use of the Easement Areas, and proximately caused by the GRANTEE.

14. Insurance: The GRANTEE shall secure, pay for, and maintain at all times, at GRANTEE'S sole cost and expense, a policy of general liability insurance, or the equivalent thereof, with a responsible insurance company authorized to do business in the State of Hawaii, naming the GRANTOR as additional insured with respect to the Easement Areas and any improvements thereon, and including a provision requiring thirty days' prior written notice to GRANTOR of pending cancellation or change in the terms, in such liability limits as prudent insurance practices in the County of Maui may require for like or similar properties. Upon request of the GRANTOR, the GRANTEE shall promptly provide the GRANTOR a current Certificate of Insurance or other evidence of such insurance coverage.

15. Dispute Resolution:

a. Negotiation: The parties agree that it is in their best interests to resolve and settle any claims, disputes, or disagreements in a cooperative and expeditious manner. Accordingly, the parties agree to negotiate in good faith toward the resolution of any claim, dispute, disagreement, or other matter in question arising out of this Easement or the breach thereof.

b. Mediation: If the parties cannot resolve any claim, dispute, disagreement, or other issues, such dispute shall be referred to Mediation Services of Maui, Inc., or other similar organization, or any individual or organization selected by the parties hereto, for non-binding mediation. Either party may refer the dispute to mediation. The parties shall meet with the mediator as soon as reasonably possible, and no formal discovery shall occur in connection with the mediation. The parties may offer such evidence as they desire, or as may be requested by the mediator. All oral and written communications to and from the mediator and the parties with respect to the mediation shall be confidential and inadmissible for any purpose in any subsequent arbitration or litigation. The parties agree to execute a confidentiality agreement prior to commencing the mediation.

c. Arbitration: If the dispute is not resolved by mediation, it may be decided by binding arbitration. Otherwise, the parties maintain their rights, claims and actions under applicable law. Should the parties agree to binding arbitration, the parties may agree upon an impartial and disinterested arbitrator.

In the event the parties are unable to agree upon a single, impartial and disinterested arbitrator, then the dispute shall be determined by three arbitrators. Each party shall appoint one arbitrator, and shall give the other written notice of such appointment. If either party fails to so appoint an arbitrator within ten (10) days after written receipt of notice from the other party, the party making the appointment may apply to any Judge of the Second Circuit Court for appointment of a second arbitrator. The two arbitrators shall select a third arbitrator. If they fail to do so within ten (10) days after appointment of the second arbitrator, either party may apply to any Judge of the Second Circuit Court for appointment of a third arbitrator. A decision of the majority of the arbitrators shall be final, conclusive, and binding upon the parties, unless the same shall be vacated, modified, or corrected, as provided in Section 658, Hawaii Revised Statutes, as the same may be amended from time to time.

16. Default:

The parties hereto shall not willfully commit any breach or default of this Easement, or the spirit or intent hereof, and shall abide and comply with the terms hereof in good faith.

In the event of a breach or default, the matter shall be resolved and/or decided upon as hereinabove set forth; provided, however, that the non-defaulting party shall be entitled to an award of all costs and expenses incurred from the defaulting party, including reasonable attorney's fees and costs.

17. Non-Waiver: No failure by either party to insist on the strict performance of any term hereof or to exercise any right or remedy consequent upon an event of failure shall constitute a waiver of any such breach of any of such term. Efforts to mitigate the damages caused by default or breach of the terms and covenants of this Easement shall not be construed to be a waiver of any right to recover damages or claims.

18. Runs With The Land: This Easement shall be recorded in the Bureau of Conveyances of the State of Hawaii. Upon such recording, the easement rights granted herein and the covenants and agreements of the parties hereto shall constitute obligations which shall run with the GRANTEE'S PARCEL and the GRANTOR'S PARCEL, and be the responsibility of all future owners of the GRANTEE'S PARCEL and the GRANTOR'S PARCEL.

19. Hawaii Law: This Easement is made under, and shall be governed by the laws of the State of Hawaii.

20. Successors: The rights and obligations hereunder shall inure to the benefit of and be binding on the parties hereto, and their respective heirs, personal representatives, successors and assigns. The use of any gender shall include all genders, and the use of any numbers shall be construed as the singular or the plural, as the case may require. All terms, covenants, and conditions to be observed and performed by either party shall be joint and several if entered into by more than one.

21. Invalid Provisions: If any provision of this Easement is adjudged or otherwise determined to be unenforceable or invalid, all other terms, conditions and covenants contained herein shall nevertheless remain in full force and effect.

22. Entire Agreement: This Easement constitutes the entire agreement between the parties with respect to their rights, duties, and obligations hereunder, and all matters related thereto, and supersedes all prior negotiations, representations, correspondence, understandings and agreements between the parties. The parties reserve the right to discuss any other items as they may arise from time to time, but any amendment to this Easement shall be ineffective unless in writing and signed by the parties hereto.

23. Counterparts: The parties hereto agree that this instrument may be executed in counterparts, each of which shall be deemed an original, and said counterparts shall together constitute one and the same agreement, binding all of the parties hereto, notwithstanding all of the parties are not signatory to the original or the same counterparts. For all purposes, including, without limitation, recordation, filing and delivery of this instrument, duplicate

unexecuted and unacknowledged pages of the counterparts may be discarded and the remaining pages assembled as one document.

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

Approved as to Form
CARLSMITH BALL LLP

By____________________

GRANTOR:

WAIKAPU PROPERTIES, LLC

By____________________
WILLIAM S. FILIOS
Its Manager

By____________________
LARRY W. ANDERSON
Its Manager

GRANTEE:

MVI, LLC

By____________________
JESSE SPENCER
Its Member

STATE OF CALIFORNIA)
) ss.
COUNTY OF ____________________)

On this ______ day of ____________________, 20____, before me personally appeared WILLIAM S. FILIOS, Manager of WAIKAPU PROPERTIES, LLC, a Hawaii limited liability company, proved to me, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable in the capacity shown, having been duly authorized to execute such instrument in such capacity.

____
Name:

Notary Public, State of California

My commission expires: ____________________

STATE OF CALIFORNIA)
) ss.
COUNTY OF ____________________)

On this ______ day of ____________________, 20____, before me personally appeared LARRY W. ANDERSON, Manager of WAIKAPU PROPERTIES, LLC, a Hawaii limited liability company, proved to me, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable in the capacity shown, having been duly authorized to execute such instrument in such capacity.

____
Name:

Notary Public, State of California

My commission expires: ____________________

STATE OF HAWAII)
) ss.
COUNTY OF MAUI)

On this ______ day of __________________, 20____, before me personally appeared JESSE SPENCER, to me personally known/proved to me on the basis of satisfactory evidence, who, being by me duly sworn or affirmed, did say that he is the Member of MVI, LLC, a Hawaii limited liability company, and that such person executed the foregoing instrument as the free act and deed of such person, and if applicable in the capacity shown, having been duly authorized to execute such instrument in such capacity.

____
Name:

Notary Public, State of Hawaii

(Notary Stamp or Seal)

My commission expires: ______________________

NOTARY CERTIFICATION STATEMENT

Document Identification or Description: ACCESS AND UTILITY EASEMENT

Document Date: ______________________

No. of Pages: ______________________

Jurisdiction (in which notarial act is performed): Second Circuit

(Notary Stamp or Seal)

____
Printed Name of Notary

____
Signature of Notary Certification Date

<u>LAND DESCRIPTION</u>
Easement W-1
(40 Feet Wide)

An easement for waterline purposes in favor of MVI, LLC, affecting Lot 6 of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421) DWS SD No. 88-87, being a portion of Land Patent Grant 3152 to H. Cornwell.

Situate at
Waikapu, Wailuku, Maui, Hawaii
Tax Map Key: (2) 3-6-04: Portion of 03

Beginning at the southwest corner of this easement, being a point on the southerly property boundary line of Lot 6 of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421), and on the northerly property boundary line of Land Patent Grant 9744 to Wailuku Sugar Company [TMK: (2) 3-6-01: 18] a direct tie from the southwesterly corner along the southerly property boundary line of Lot 6 of the Waikapu Hema Large Lot Subdivision being 258° 57' 41" for 158.86 feet, the coordinates of said point of beginning are based on record information and referred to Government Survey Triangulation Station "LUKE" being 23,843.80 feet south and 4,452.55 feet west and running by azimuths measured clockwise from true south; thence,

1.	168° 57' 41"	138.24	feet over, across, and through Lot 6 of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421) to a point; thence,
2.	191° 10' 00"	216.52	feet along the same, to a point; thence,
3.	174° 19' 00"	235.60	feet along the same, to a point; thence,
4.	182° 10' 00"	282.34	feet along the same to a point on the southerly right-of-way line of Easement "A" of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421); thence,
5.	262° 47'00"	40.54	feet along the southerly right-of-way line of Easement "A" of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421) to a point; thence,
6.	2° 10' 00"	286.21	feet over, across, and through Lot 6 of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421) to a point; thence,
7.	354° 19' 00"	238.78	feet along the same, to a point; thence,
8.	11° 10' 00"	214.59	feet along the same, to a point; thence,

<u>EXHIBIT "A"</u>

Continued…
Land Description
Easement W-1
TMK: (2) 3-6-04: Portion of 03

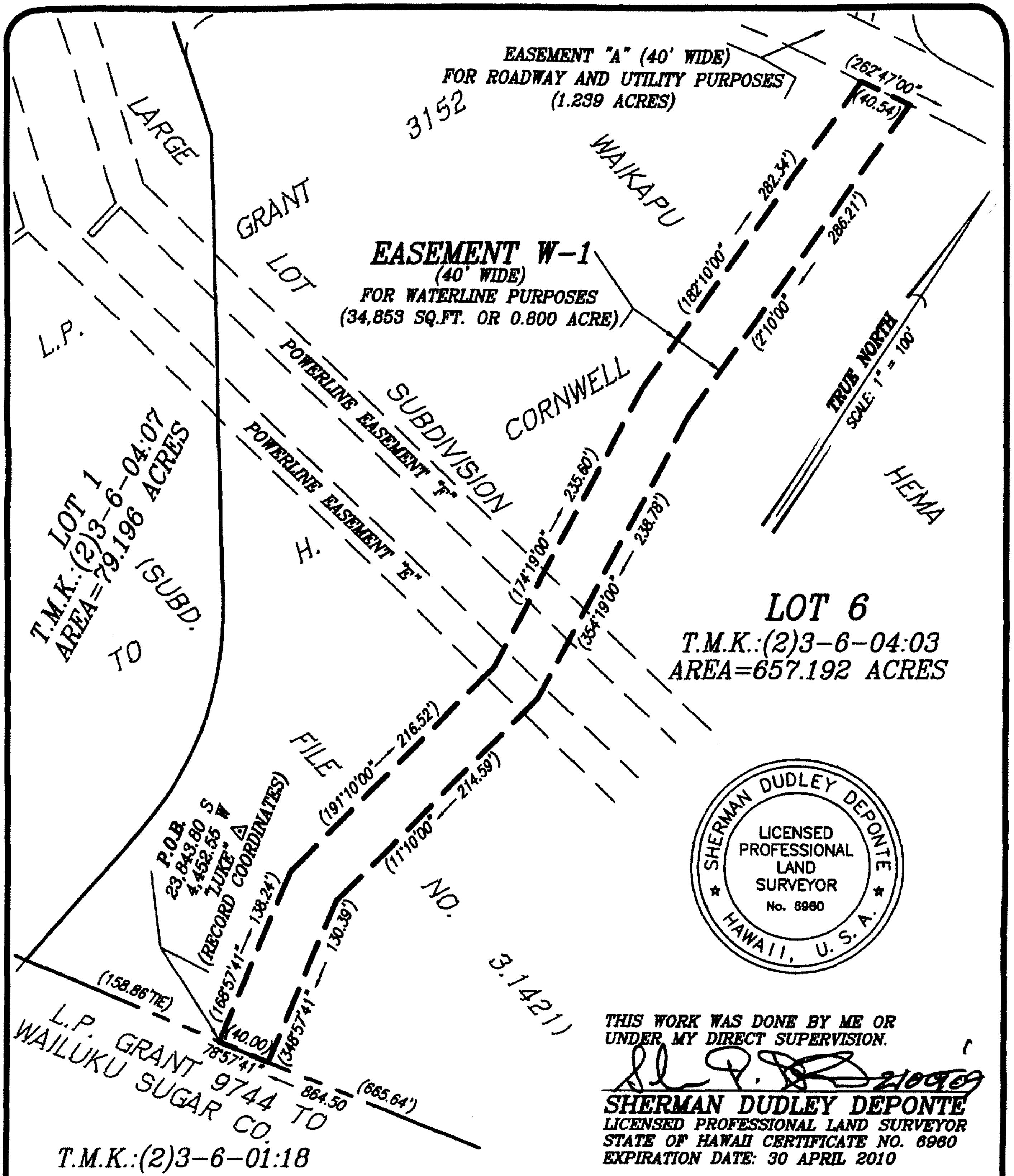
9.	348° 57' 41"	130.39	feet along the same, to a point on the southerly property boundary line of Lot 6 of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421); thence,
10.	78° 57' 41"	40.00	feet along the southerly property boundary line of Lot 6 of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421) to the point of beginning and containing an area of 34,853 square feet or 0.800 acre.

This work was done by me or
under my direct supervision.

AKAMAI LAND SURVEYING, INC.

Sherman Dudley DePonte
Licensed Professional Land Surveyor
State of Hawaii Certificate No. 6960
Expires: April 30, 2010
209221 – JM (10/21/09)

SHERMAN DUDLEY DEPONTE
LICENSED PROFESSIONAL LAND SURVEYOR
No. 6960
HAWAII, U.S.A.



THIS WORK WAS DONE BY ME OR UNDER MY DIRECT SUPERVISION.

2/10/09

SHERMAN DUDLEY DEPONTE
LICENSED PROFESSIONAL LAND SURVEYOR
STATE OF HAWAII CERTIFICATE NO. 6960
EXPIRATION DATE: 30 APRIL 2010

	JOB NO.:209221-W1ESMT
	SCALE: 1" = 100'
AKAMAI LAND SURVEYING, INC. P.O. BOX 1748 MAKAWAO, MAUI, HAWAII 96768	T.M.K.:(2)3-6-04: POR. OF 03
	DATE:10/21/09 | SHEET 1 OF 1

END OF EXHIBIT "A"

EXHIBIT "B"

A Roadway and Utility Easement "A" over and across a portion of Lot 6 of Waikapu Hema Large Lot Subdivision, subject to vehicular access restrictions from Honoapiilani Highway (Federal Aid Project Number 13-G) and being more particularly described as follows:

Beginning at a point at the southeasterly corner of this easement, the azimuth and distance from the southeasterly corner of Lot 6 of Waikapu Hema Large Lot Subdivision being 185° 25' 18.33" 536.67 feet, the coordinates of said point of beginning referred to Government Survey Triangulation Station "LUKE", being 23,174.43 feet South and 3,709.27 feet West and running by azimuths measured clockwise from True South:

1. Thence over and across a portion of Grant 3152 to H. Cornwell, being also over and across a portion of Lot 6 of Waikapu Hema Large Lot Subdivision on a curve to the left having a radius of 30.00 feet, the chord azimuth and distance being: 139° 55' 56.37" 42.46 feet;

2. Thence over and across same on a curve to the right having a radius of 529.72 feet, the chord azimuth and distance being: 107° 34' 13.04" 232.55 feet;

3. 120° 15' 49.06 feet over and across same;

4. Thence over and across same on a curve to the left having a radius of 600.00 feet the chord azimuth and distance being: 101° 31' 385.40 feet;

5. 82° 47' 116.06 feet over and across same;

6. Thence over and across same on a curve to the left having a radius of 585.00 feet, the chord azimuth and distance being: 60° 22' 35" 445.98 feet;

7. Thence over and across same on a curve to the left having a radius of 30.00 feet, the chord azimuth and distance being: 352° 58' 10" 42.43 feet;

8. 127° 58' 10" 100.00 feet over and across a portion of Grant 3152 to H. Cornwell, being also along Lot 1 of Waikapu Hema Large Lot Subdivision;

9. Thence over and across a portion of Grant 3152 to H. Cornwell, being also over and across a portion of Lot 6 of Waikapu Hema Large Lot Subdivision on a curve to the left having a radius of 30.00 feet, the chord azimuth and distance being: 262° 58' 10" 42.43 feet,

10. Thence over and across same on a curve to the right having a radius of 625.00 feet, the chord azimuth and distance being: 240° 22' 35" 476.48 feet;

11. 262° 47' 116.06 feet over and across same;

12. Thence over and across same on a curve to the right having a radius of 640.00 feet, the chord azimuth and distance being: 281° 31' 411.09 feet;

13. 300° 15' 49.06 feet over and across same;

14. Thence over and across same on a curve to the left having a radius of 489.72 feet, the chord azimuth and distance being: 387° 34' 13.04" 214.99 feet;

15. Thence over and across same on a curve to the left having a radius of 30.00 feet, the chord azimuth and distance being: 229° 50' 55.80" 42.46 feet;

16. Thence along the westerly side of Honoapiilani Highway (Federal Aid Project Number 13-G) on a curve to the right having a radius of 34,342.50 feet, the chord azimuth and distance being: 4° 53' 26.09" 100.09 feet to the point of beginning and containing an Area of 1.239 acre, more or less.

<u>END OF EXHIBIT "B"</u>

EXHIBIT "C"

ALL OF THAT CERTAIN 40 feet wide Easement "A-l", for roadway and utility purposes, affecting Lot 6 of the Waikapu Hema Large Lot Subdivision, a portion of Grant 2152 to H. Cornwell, situate at Waikapu, Wailuku, Island and County of Maui, State of Hawaii and more particularly described as follows:

BEGINNING at a point at the southeast corner of this easement and along the north side of an existing 40 feet wide Easement A for roadway and utility purposes affecting Lot 6 of Waikapu Hema Large Lot Subdivision, the coordinates of said point of beginning being

South 22,933.22 feet
West 4,405.73 feet

referred to Government Survey Triangulation Station "LUKE" and running by azimuths measured clockwise from true South (meridian of said "LUKE"); thence,

1.	82°	47'	72.18	feet along the remainder of Lot 6 of Waikapu Hema Large Lot Subdivision, being also the north side of existing Easement A to a point; thence,
2.	158°	00'	20.26	feet along the remainder of Lot 6 of Waikapu Hema Large Lot Subdivision to a point; thence,

3. Along the same on a curve to the left with a radius of 157.96 feet and a central angle of 29° 48', the chord azimuth and distance being

	143°	06'	81.23	feet to a point; thence,
4.	128°	12'	66.19	feet along the same to a point; thence,
5.	118°	58'	213.74	feet along the same to a point; thence,

6. Along the same on a curve to the left with a radius of 200.00 feet and a central angle of 25° 20', the chord azimuth and distance being

	106°	18'	87.71	feet to a point; thence,
7.	93°	38'	79.38	feet along the same to a point; thence,

8. Along the same on a curve to the right with a radius of 190.00 feet and a central angle of 37° 58', the chord azimuth and distance being

	112°	37'	123.61	feet to a point; thence,
9.	131°	36'	53.64	feet along the same to a point; thence,

10. Along the same on a curve to the left with a radius of 300.00 feet and a central angle of 38° 28', the chord azimuth and distance being

112°	22'	197.65	feet to a point; thence,

11. 93° 08' 87.37 feet along the same to a point; thence,

12. Along the same on a curve to the right with a radius of 200.00 feet and a central angle of 40° 52', the chord azimuth and distance being

113°	34'	139.65	feet to a point; thence,

13. 134° 00' 123.08 feet along the same to a point; thence,

14. Along the same on a curve to the right with a radius of 160.00 feet and a central angle of 58° 14', the chord azimuth and distance being

163°	07'	155.71	feet to a point; thence,

15. 192° 14' 283.29 feet along the same to a point; thence,

16. Along the same on a curve to the left with a radius of 80.00 feet and a central angle of 59° 54', the chord azimuth and distance being

162°	17'	79.88	feet to a point; thence,

17. 132° 20' 148.31 feet along the same to a point; thence,

18. Along the same on a curve to the left with a radius of 120.00 feet and a central angle of 40° 20', the chord azimuth and distance being

112°	10'	82.74	feet to a point; thence,

19. 92° 00' 103.86 feet along the same to a point; thence,

20. Along the same on a curve to the right with a radius of 100.00 feet and a central angle of 49° 30', the chord azimuth and distance being

116°	45'	83.73	feet to a point; thence,

21. 141° 30' 73.10 feet along the same to a point; thence,

22. 123° 30' 22.89 feet along the same to a point; thence,

23. 187° 30' 44.50 feet along Lot 2 of Waikapu Hema Large Lot Subdivision to a point;

24.	303°	30'	48.74	feet along the remainder of Lot 6 of Waikapu Hema Large Lot Subdivision to a point; thence,
25.	321°	30'	79.43	feet along the same to a point; thence,

26. Along the same on a curve to the left with a radius of 60.00 feet and a central angle of 49° 30', the chord azimuth and distance being

	296°	45'	50.24	feet to a point; thence,
27.	272°	00'	103.86	feet along the same to a point; thence,

28. Along the same on a curve to the right with a radius of 160.00 feet and a central angle of 40° 20', the chord azimuth and distance being

	292°	10'	110.32	feet to a point; thence,
29.	312°	20'	148.31	feet along the same to a point; thence,

30. Along the same on a curve to the right with a radius of 120.00 feet and a central angle of 59° 54', the chord azimuth and distance being

	342°	17'	119.82	feet to a point; thence,
31.	12°	14'	283.29	feet along the same to a point; thence,

32. Along the same on a curve to the left with a radius of 120.00 feet and a central angle of 58° 14', the chord azimuth and distance being

	343°	07'	116.78	feet to a point; thence,
33.	314°	00'	123.08	feet along the same to a point; thence,

34. Along the same on a curve to the left with a radius of 160.00 feet and a central angle of 40° 52', the chord azimuth and distance being

	293°	34'	111.72	feet to a point; thence,
35.	273°	08'	87.37	feet along the same to a point; thence,

36. Along the same on a curve to the right with a radius of 340.00 feet and a central angle of 38° 28', the chord azimuth and distance being

	292°	22'	224.00	feet to a point; thence,
37.	311°	36'	53.64	feet along the same to a point; thence,

38. Along the same on a curve to the left with a radius of 150.00 feet and a central angle of 37° 58', the chord azimuth and distance being

	292°	37'	97.59	feet to a point; thence,
39.	273°	38'	79.38	feet along the same to a point; thence,

40. Along the same on a curve to the right with a radius of 240.00 feet and a central angle of 25° 20', the chord azimuth and distance being

	286°	18'	105.25	feet to a point; thence,
41.	298°	58'	216.97	feet along the same to a point; thence,
42.	308°	12'	69.42	feet along the same to a point; thence,

43. Along the same on a curve to the right with a radius of 197.96 feet and a central angle of 29° 48', the chord azimuth and distance being

323°	06'	101.80	feet to a point; thence,

44. Along the same on a curve to the left with a radius of 40.00 feet and a central angle of 75° 13', the chord azimuth and distance being

300°	23'	30"	48.82	feet to a point of beginning and containing an area of 2.171 acres, more or less.

END OF EXHIBIT "C"

LAND COURT	REGULAR SYSTEM

Return By Mail ☐ Pick-Up ☐ To:

CARLSMITH BALL LLP
One Main Plaza, Suite 400
2200 Main Street
Wailuku, Maui, Hawaii 96793

Attention: Blaine J. Kobayashi
Telephone: (808) 242-4535

TITLE OF DOCUMENT:

EXCLUSIVE ACCESS AND UTILITY EASEMENT

PARTIES TO DOCUMENT:

GRANTOR: WAIKAPU PROPERTIES, LLC
1132 Norman Drive
Manteca, California 95336

GRANTEE: MVI, LLC
P. O. Box 97
Kihei, Maui, Hawaii 96753

Easement T-1

TAX MAP KEY(S): (2) 3-6-004:003 and
(2) 3-6-001:018

(This document consists of 16 pages.)

EXCLUSIVE ACCESS AND UTILITY EASEMENT

THIS INDENTURE made this ______ day of __________________, 20____, by and between WAIKAPU PROPERTIES, LLC, a Hawaii limited liability company, whose address is 1132 Norman Drive, Manteca, California 95336, hereinafter called "GRANTOR", and MVI, LLC, a Hawaii limited liability company, whose address is P. O. Box 97, Kihei, Maui, Hawaii 96753, hereinafter called "GRANTEE",

W I T N E S S E T H:

WHEREAS, the GRANTOR is the owner of Lot 6 of the Waikapu Hema Large Lot Subdivision, situate, lying and being at Waikapu, District of Wailuku, Island and County of Maui, State of Hawaii, area 657.19 acres, more or less, and bearing Tax Key designation (2) 3-6-004:003, hereinafter called "GRANTOR'S PARCEL;" and

WHEREAS, the GRANTEE is the owner of that certain parcel of land (being all of the land(s) described in and covered by Land Patent Grant S-13975 to Wailuku Sugar Company; Land Patent Grant 11067 to Wailuku Sugar Company; Land Patent Grant 10962 to Wailuku Sugar Company; Land Patent Grant 10745 to Wailuku Sugar Company; Land Patent Grant 10497 to Wailuku Sugar Company; Land Patent Grant 10294 to Wailuku Sugar Company and Grant 9794 to Wailuku Sugar Company; and portion(s) of the land(s) described in and covered by Land Patent Grant Number 3152 to H. Cornwell), situate, lying and being at Ukumehame, Waikapu, District of Wailuku, Island and County of Maui, State of Hawaii, area 256.903 acres, more or less, and bearing Tax Key designation (2) 3-6-001:018, hereinafter called "GRANTEE'S PARCEL;" and

WHEREAS, the GRANTEE requires an exclusive easement over, under, across and through a portion of the GRANTOR'S PARCEL for access and utility purposes; and

WHEREAS, the GRANTOR has agreed to grant said exclusive easement to the GRANTEE, subject to and in accordance with the terms, covenants, conditions, and provisions hereinafter set forth; NOW, THEREFORE,

F U R T H E R   W I T N E S S E T H   T H A T:

The parties hereto, for and in consideration of the premises, and the mutual promises, covenants, and agreements hereinafter set forth, do hereby agree as follows:

1. Grant of Exclusive Perpetual Easement: The GRANTOR, as the owner of the GRANTOR'S PARCEL, in consideration of the sum of TEN AND NO/100 DOLLARS ($10.00) and other good and valuable consideration paid to the GRANTOR by the GRANTEE, the receipt whereof is hereby acknowledged, does hereby grant and convey unto the GRANTEE, its successors and assigns, as the owner of the GRANTEE'S PARCEL, an exclusive perpetual easement for access and utility purposes, over, under, across and through a portion of the GRANTOR'S PARCEL, designated as Easement "T-1", hereinafter called "Easement Area", which Easement Area is more particularly described in Exhibit "A" and as shown on the map designated as Exhibit "B", both attached hereto and by reference made a part hereof.

2. Use of Easement Area: The GRANTEE shall use the Easement Area for access (i.e. ingress and egress) and for utility service purposes, including but not limited to the installation, construction, reinstallation, reconstruction, operation, replacement, removal, maintenance and repair of a roadway (hereinafter called "Roadway") and waterlines, sewerlines, drainage lines, electrical and telephone lines, cable television lines, or any other utility service

lines, including meters, valves, pullboxes, conduits, switches, guy lines, and other appurtenant appliances, equipment, and facilities (hereinafter collectively referred to as "Utility Lines"), to service GRANTEE'S PARCEL. Unless otherwise agreed in writing by the parties, use of the Easement Area hereunder shall be limited to and for the benefit of GRANTEE'S PARCEL, and no other parcels of real property.

If any permits, approvals, consents, or authorizations to construct or install the Roadway or Utility Lines are required, the parties shall cooperate and sign any and all such permits, approvals, consents, or authorizations.

3. Maintenance and Repair: The GRANTEE shall be responsible for the costs and expenses for cleaning, maintaining, and repairing the Easement Area and all improvements placed thereon by GRANTEE, including the Roadway and Utility Lines, and any landscaping, and to keep the same in a clean, safe, and orderly appearance and condition at all times.

The GRANTEE shall use due care and diligence to construct, re-construct, install, re-install, maintain, operate, repair, replace and/or remove the Roadway and/or Utility Lines within the Easement Area, and to keep the same in a proper and safe condition and manner at all times. Upon completion of any work therein, the Easement Area shall be restored to the same to the condition it was in prior to such work to the extent that such restoration is reasonably possible.

4. Waste and Unlawful, Improper or Offensive Use of the Easement Area: The GRANTEE shall not commit or cause to be committed any waste in or upon the Easement Area or maintain any public or private nuisance or any other action which may interfere with or disturb the quiet enjoyment of the Easement Area or any surrounding property, including the

GRANTOR'S PARCEL, nor shall the GRANTEE permit the Easement Area to be used for any improper, offensive or unlawful purpose.

5. Compliance With Laws: The GRANTEE shall, at all times observe, perform, and comply with the requirements of all laws, statutes, ordinances, rules and regulations applicable to the Easement Area and any improvements therein, now or hereafter enacted by any governmental authority with applicable jurisdiction.

6. Acceptance: The GRANTEE accepts the Easement Area in "AS IS, WHERE IS" condition, and understands and agrees that the GRANTOR has made no representation or warranty with respect to the condition of the Easement Area or the suitability or fitness of the Easement Area for any particular use or purpose.

7. Liens: The GRANTEE shall not commit or permit any act or neglect whereby the GRANTOR'S PARCEL, or any portion thereof, shall become subject to any attachment, judgment, lien, charge or encumbrance whatsoever resulting from the acts or omission of GRANTEE, and shall indemnify and hold GRANTOR harmless against all loss, cost, and expenses, including reasonable attorneys' fees and costs, whether or not suit is filed, with respect thereto. GRANTEE shall promptly discharge or cause to be discharged or dismissed, every such attachment, judgment, lien, charge, encumbrance, or any notice or application thereof, which may be filed against the GRANTOR'S PARCEL or any portion thereof.

8. Condemnation: If the Easement Area, or any portion thereof, shall be condemned or taken by any governmental authority or public service company for use by the general public, the GRANTEE shall surrender the Easement Area or the portion so condemned, and this easement shall terminate as to the Easement Area or the portion so condemned. Any

compensation and/or damages payable by reason of such condemnation shall be payable to the GRANTOR, except that the GRANTEE shall have the right to claim and recover from the condemning authority, but not from the GRANTOR, any such compensation which is payable for the GRANTEE'S Utility Lines and Roadway.

9. Indemnity: The GRANTEE shall defend, indemnify and hold the GRANTOR harmless from and against any and all claims and demands for any and all losses or damages, including property damage, personal injury, and wrongful death, fines, penalties, injuries, causes of actions, suits, and expenses, of whatsoever kind and nature, in contract or in tort, arising out of or in connection with the GRANTEE'S use of the Easement Area, and proximately caused by the GRANTEE.

10. Insurance: The GRANTEE shall secure, pay for, and maintain at all times, at GRANTEE'S sole cost and expense, a policy of general liability insurance, or the equivalent thereof, with a responsible insurance company authorized to do business in the State of Hawaii, naming the GRANTOR as additional insured with respect to the Easement Area and any improvements thereon, and including a provision requiring thirty days' prior written notice to GRANTOR of pending cancellation or change in the terms, in such liability limits as prudent insurance practices in the County of Maui may require for like or similar properties. Upon request of the GRANTOR, the GRANTEE shall promptly provide the GRANTOR a current Certificate of Insurance or other evidence of such insurance coverage.

11. Dispute Resolution:

a. Negotiation: The parties agree that it is in their best interests to resolve and settle any claims, disputes, or disagreements in a cooperative and expeditious manner. Accordingly, the parties agree to negotiate in good faith toward the resolution of any claim, dispute, disagreement, or other matter in question arising out of this Easement or the breach thereof.

b. Mediation: If the parties cannot resolve any claim, dispute, disagreement, or other issues, such dispute shall be referred to Mediation Services of Maui, Inc., or other similar organization, or any individual or organization selected by the parties hereto, for non-binding mediation. Either party may refer the dispute to mediation. The parties shall meet with the mediator as soon as reasonably possible, and no formal discovery shall occur in connection with the mediation. The parties may offer such evidence as they desire, or as may be requested by the mediator. All oral and written communications to and from the mediator and the parties with respect to the mediation shall be confidential and inadmissible for any purpose in any subsequent arbitration or litigation. The parties agree to execute a confidentiality agreement prior to commencing the mediation.

c. Arbitration: If the dispute is not resolved by mediation, it may be decided by binding arbitration. Otherwise, the parties maintain their rights, claims and actions under applicable law. Should the parties agree to binding arbitration, the parties may agree upon an impartial and disinterested arbitrator.

In the event the parties are unable to agree upon a single, impartial and disinterested arbitrator, then the dispute shall be determined by three arbitrators. Each party shall appoint one arbitrator, and shall give the other written notice of such appointment. If either party fails to so appoint an arbitrator within ten (10) days after written receipt of notice from the other party, the party making the appointment may apply to any Judge of the Second Circuit Court for appointment of a second arbitrator. The two arbitrators shall select a third arbitrator. If they fail to do so within ten (10) days after appointment of the second arbitrator, either party may apply to any Judge of the Second Circuit Court for appointment of a third arbitrator. A decision of the majority of the arbitrators shall be final, conclusive, and binding upon the parties, unless the same shall be vacated, modified, or corrected, as provided in Section 658, Hawaii Revised Statutes, as the same may be amended from time to time.

12. Default:

The parties hereto shall not willfully commit any breach or default of this Easement, or the spirit or intent hereof, and shall abide and comply with the terms hereof in good faith.

In the event of a breach or default, the matter shall be resolved and/or decided upon as hereinabove set forth; provided, however, that the non-defaulting party shall be entitled to an award of all costs and expenses incurred from the defaulting party, including reasonable attorney's fees and costs.

13. Non-Waiver: No failure by either party to insist on the strict performance of any term hereof or to exercise any right or remedy consequent upon an event of failure shall constitute a waiver of any such breach of any of such term. Efforts to mitigate the damages caused by default or breach of the terms and covenants of this Easement shall not be construed to be a waiver of any right to recover damages or claims.

14. Runs With The Land: This Easement shall be recorded in the Bureau of Conveyances of the State of Hawaii. Upon such recording, the easement rights granted herein and the covenants and agreements of the parties hereto shall constitute obligations which shall run with the GRANTEE'S PARCEL and the GRANTOR'S PARCEL, and be the responsibility of all future owners of the GRANTEE'S PARCEL and the GRANTOR'S PARCEL.

15. Hawaii Law: This Easement is made under, and shall be governed by the laws of the State of Hawaii.

16. Successors: The rights and obligations hereunder shall inure to the benefit of and be binding on the parties hereto, and their respective heirs, personal representatives, successors and assigns. The use of any gender shall include all genders, and the use of any numbers shall be construed as the singular or the plural, as the case may require. All terms, covenants, and conditions to be observed and performed by either party shall be joint and several if entered into by more than one.

17. Invalid Provisions: If any provision of this Easement is adjudged or otherwise determined to be unenforceable or invalid, all other terms, conditions and covenants contained herein shall nevertheless remain in full force and effect.

18. Entire Agreement: This Easement constitutes the entire agreement between the parties with respect to their rights, duties, and obligations hereunder, and all matters related thereto, and supersedes all prior negotiations, representations, correspondence, understandings and agreements between the parties. The parties reserve the right to discuss any other items as they may arise from time to time, but any amendment to this Easement shall be ineffective unless in writing and signed by the parties hereto.

19. Counterparts: The parties hereto agree that this instrument may be executed in counterparts, each of which shall be deemed an original, and said counterparts shall together constitute one and the same agreement, binding all of the parties hereto, notwithstanding all of the parties are not signatory to the original or the same counterparts. For all purposes, including, without limitation, recordation, filing and delivery of this instrument, duplicate

unexecuted and unacknowledged pages of the counterparts may be discarded and the remaining pages assembled as one document.

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

GRANTOR:

WAIKAPU PROPERTIES, LLC

By________________________________
WILLIAM S. FILIOS
Its Manager

By________________________________
LARRY W. ANDERSON
Its Manager

GRANTEE:

MVI, LLC

By________________________________
JESSE SPENCER
Its Member

STATE OF CALIFORNIA)
) ss.
COUNTY OF ____________________)

On this ______ day of ____________________, 20____, before me personally appeared WILLIAM S. FILIOS, Manager of WAIKAPU PROPERTIES, LLC, a Hawaii limited liability company, proved to me, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable in the capacity shown, having been duly authorized to execute such instrument in such capacity.

____
Name:

Notary Public, State of California

My commission expires: ____________________

STATE OF CALIFORNIA)
) ss.
COUNTY OF ____________________)

On this ______ day of ____________________, 20____, before me personally appeared LARRY W. ANDERSON, Manager of WAIKAPU PROPERTIES, LLC, a Hawaii limited liability company, proved to me, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable in the capacity shown, having been duly authorized to execute such instrument in such capacity.

____
Name:

Notary Public, State of California

My commission expires: ____________________

STATE OF HAWAII)
) ss.
COUNTY OF MAUI)

On this ______ day of ________________, 20____, before me personally appeared JESSE SPENCER, to me personally known/proved to me on the basis of satisfactory evidence, who, being by me duly sworn or affirmed, did say that he is the Member of MVI, LLC, a Hawaii limited liability company, and that such person executed the foregoing instrument as the free act and deed of such person, and if applicable in the capacity shown, having been duly authorized to execute such instrument in such capacity.

____
Name:

Notary Public, State of Hawaii

(Notary Stamp or Seal)

My commission expires: ____________________

NOTARY CERTIFICATION STATEMENT	
Document Identification or Description: ACCESS AND UTILITY EASEMENT	
Document Date: ______________ No. of Pages: ______________ Jurisdiction (in which notarial act is performed): Second Circuit	(Notary Stamp or Seal)
______________________________ Printed Name of Notary	
______________________________ Signature of Notary Certification Date	

LAND DESCRIPTION

Easement T-1

For Access and Utility Purposes

An easement for access and utility purposes in favor of MVI, LLC, affecting Lot 6 of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421) D.W.S. SD No. 88-87, being a portion of Land Patent Grant 3152 to H. Cornwell.

Situate at

Waikapu, Wailuku, Maui, Hawaii

Tax Map Key: (2) 3-5-02: Portion of 03

Beginning at the southwesterly corner of this easement, being the southeasterly corner of Easement W-1 and a point on the common property boundary line of Lot 6 and of 2 of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421) [Tax Map Key: (2) 3-6-04: 03 and 08] the coordinates of said point of beginning are based on record information and refer to Government Survey Triangulation Station "LUKE" being 22,174.52 feet south and 6,086.75 feet west, running by azimuths measured clockwise from true south; thence,

1.	187° 30' 00"	543.39	feet along the easterly property boundary line of Lot 2 of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421) [Tax Map Key: (2) 3-6-04: 03] to a southwesterly corner of Easement A-1 (Roadway and Utility Easement);
2.	303° 30' 00"	22.90	feet along the southerly and southwesterly right-of-way line of Easement A-1 affecting Lot 6 of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421) for access and utility purposes to a point; thence,
3.	321° 30' 00"	73.10	feet along the same, to a point; thence,

4. Following along the same, along the arc of a curve concave to the left, having a radius of 100.00 feet, the chord azimuth and distance being 296° 45' 00" 83.73 feet to a point; thence,

5.	272° 00' 00"	103.86	feet along the southerly and southwesterly right-of-way of Easement A-1, affecting Lot 6 of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421) for access and utility purposes to a point; thence,

6. Following along the same, along the arc of a curve concave to the right, having a radius of 120.00 feet, the chord azimuth and distance being 292° 10' 00" 82.74 feet to a point; thence,

7.	312° 20' 00"	6.81	feet along the southerly and southwesterly right-of-way line of Easement A-1, affecting Lot 6 of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421) for access and utility purposes to a point; thence,

Continued...
Land Description
Easement T-1
Tax Map Key: (2) 3-5-02: Portion of 03

8.	48° 00' 00"	157.16	feet over, across, and through Lot 6 of the Waikapu Hema Large Lot Subdivision (Subdivision File No. 3.1421) to a point; thence,
9.	138° 00' 00"	40.00	feet over, across, and through the same, to a point; thence,
10.	48° 00' 00"	15.00	feet over, across, and through the same, to a point; thence,
11.	138° 00' 00"	40.00	feet over, across, and through the same, to a point; thence,
12.	48° 00' 00"	129.13	feet over, across, and through the same, to a point; thence,
13.	138° 00' 00"	48.00	feet over, across, and through the same, to a point; thence,
14.	48° 00' 00"	15.00	feet over, across, and through the same, to a point; thence,
15.	138° 00' 00"	48.00	feet over, across, and through the same, to a point; thence,
16.	48° 00' 00"	31.76	feet over, across, and through the same, to a point; thence,
17.	34° 24' 00"	175.47	feet over, across, and through the same, to a point; thence,
18.	69° 37' 00"	40.50	feet over, across, and through the same, to a point of beginning and containing an area of 1.948 acres.

This work was done by me or
under my direct supervision.

AKAMAI LAND SURVEYING, INC.

Sherman Dudley DePonte
Licensed Professional Land Surveyor
State of Hawaii Certificate No. 6960
Expires: April 30, 2010
209221 (11/4/09 – JM)

SHERMAN DUDLEY DEPONTE
LICENSED PROFESSIONAL LAND SURVEYOR
No. 6960
HAWAII, U.S.A.

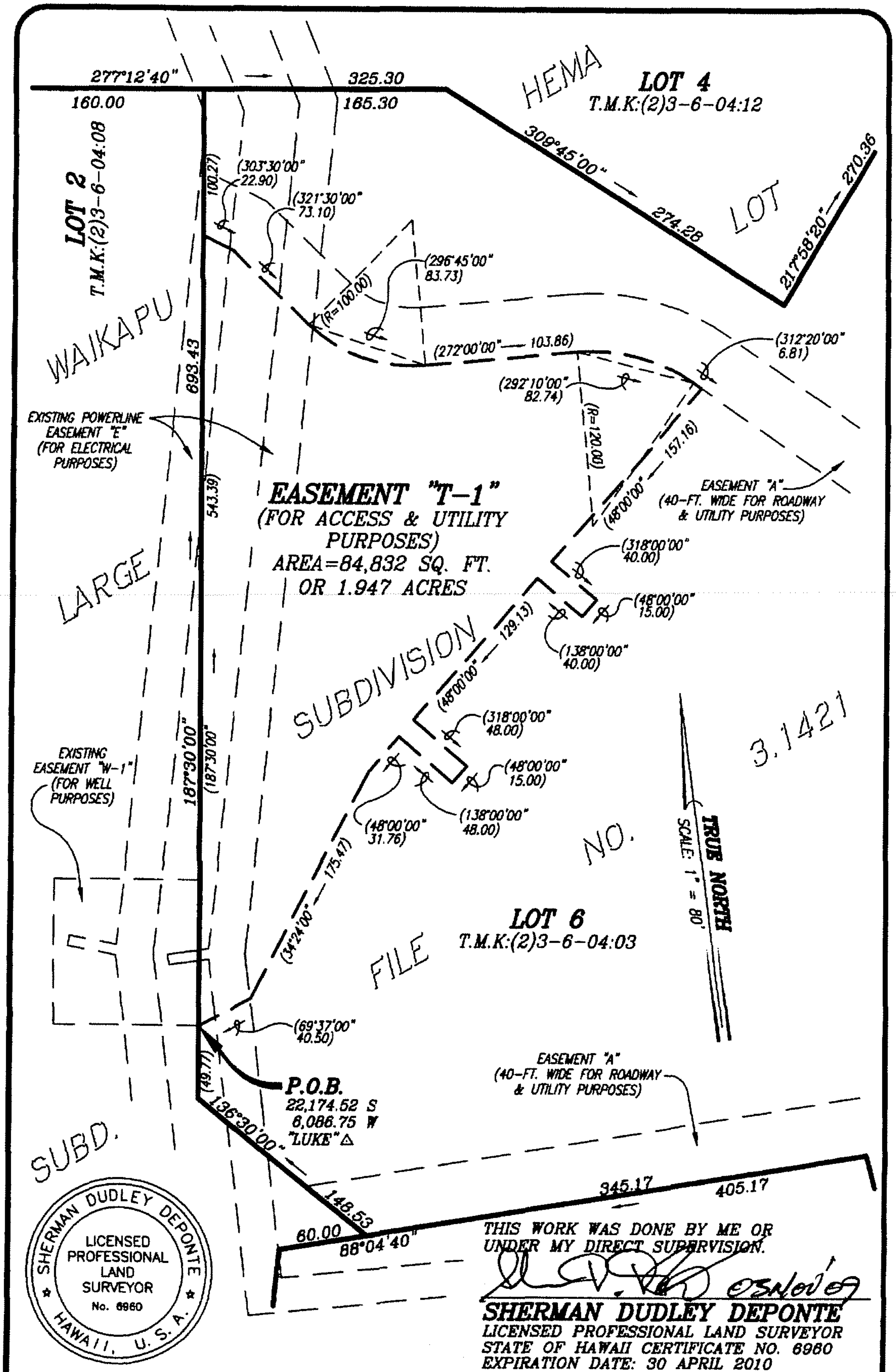


EXHIBIT "B"	JOB NO.: 209221TANK-ESMT
	SCALE: 1" = 80'
AKAMAI LAND SURVEYING, INC. P.O. BOX 1748 MAKAWAO, MAUI, HAWAII 96768	T.M.K.:(2)3-6-04:POR.03
	DATE:03NOV'09 SHEET 1 OF 1

|N

R-660 STATE OF HAWAII
BUREAU OF CONVEYANCES
RECORDED
OCT 23, 2008 11:00 AM
Doc No(s) 2008-163636

/s/ NICKI ANN THOMPSON
ACTING REGISTRAR

20 3/3 Z9

LAND COURT SYSTEM	REGULAR SYSTEM
Return by Mail (✓) Pickup ( ) To:	
MVI, LLC P.O. Box 97 Kihei HI 96753	TG: 200802916 - 2 TGE: A8760090 Doris A. Kekaha

25
3

Tax Key: (2) 3-6-04:08
(2) 3-6-01:18

Total No. of Pages: 12

ASSIGNMENT OF GRANT OF EASEMENT
FOR WATERLINE AND WELL PURPOSES

THIS ASSIGNMENT is made and entered into this 21st day of Oct, 2008, by and between MAALAEA PROPERTIES, LLC, a Hawaii limited liability company, whose address is P. O. Box 1870, Manteca, California 95336 (the "Assignor"), and MVI, LLC, a Hawaii limited liability company, whose address is P. O. Box 97, Kihei, Hawaii 96753 (the "Assignee"),

RECITALS: Assignee is purchasing from Assignor that land situate at Ukumehame, District of Lahaina, Island and County of Maui, State of Hawaii, identified as Tax Map Key No. (2) 3-6-001-018, being more particularly described on Exhibits "A" and "B" attached hereto and made a part hereof (the "Property"). Assignor holds an easement for waterline and well purposes as set forth in that certain Grant of Easement for Waterline and Well Purposes dated Oct 21, 2008, recorded in the Bureau of Conveyances of the State of Hawaii as Document No. ___ (the "Easement"), granted by Allen Ting, III

Doc 2008-163634
OCT 23, 2008 11:00 AM

and Donna P. Ting, husband and wife (the "Tings"). The purpose of this Assignment is to transfer the Easement by Assignor to Assignee as part of, and to become effective upon, Assignor's transfer of legal title to the Property to Assignee.

ASSIGNMENT: For valuable consideration receipt of which is hereby acknowledged, Assignor hereby assigns and transfers to Assignee all of Assignor's right, title and interest in and to the Easement, upon the following terms and conditions:

1. Assignee hereby accepts this assignment and hereby assumes and agrees to perform all of Assignor's liabilities and obligations under the Easement which shall accrue and become due and payable (or performable) from and after the effective date of this assignment. Assignee agrees to indemnify, defend and hold harmless the Assignor from and against all claims, losses, liabilities and expenses, including attorney's fees, which Assignor may suffer or incur or which may be asserted against Assignor as a result of Assignee's failure to perform its obligations under the preceding sentence.

2. Assignor hereby warrants to Assignee that the Easement is in full force and effect and that Assignor is not in breach or default of any of its obligations to the Tings under the Easement. Assignor agrees to indemnify, defend and hold harmless the Assignee from and against all claims, losses, liabilities and expenses, including attorney's fees, which Assignee may suffer or incur or which may be asserted against Assignee as a result of Assignor's failure to perform its obligations under the preceding sentence.

3. This assignment shall become effective upon Assignor's transfer to Assignee of legal title to the Property.

The parties hereto agree that this instrument may be executed in counterparts, each of which shall be deemed an original, and said counterparts shall together constitute one and the same agreement, binding all of the parties hereto, notwithstanding all of the parties are not signatory to the original or the same counterparts. For all purposes, including, without limitation, recordation, filing and delivery of this instrument, duplicate unexecuted and unacknowledged pages of the counterparts may be discarded and the remaining pages assembled as one document.

The parties have executed this Assignment on the day and year first above written.

APPROVED AS TO FORM:
MANCINI, WELCH & GEIGER LLP

By Paul R. Mancini

MAALAEA PROPERTIES, LLC

By ______________________
LARRY W. ANDERSON
Its Manager

Assignor

MVI, LLC

By ______________________
Jesse Spencer
Its Member

By ______________________
____
Its ______________________

Assignee

STATE OF HAWAII)
) SS.
COUNTY OF MAUI)

On this 21st day of October, 20 08, before me personally appeared LARRY W. ANDERSON, to me personally known, who, being by me duly sworn or affirmed, did say that such person(s) executed the foregoing instrument as the free act and deed of such person(s), and if applicable, in the capacities shown, having been duly authorized to execute such instrument in such capacities.

Joyce M. Takitani
Name: Joyce M. Takitani
Notary Public, State of Hawaii.
My commission expires: 8/16/11

JOYCE M. TAKITANI NOTARY PUBLIC No. 79-562 STATE OF HAWAII

NOTARY PUBLIC CERTIFICATION
Joyce M. Takitani Second Circuit
Doc. Description: Assignment of Grant of Easement for Waterline and Well Purposes
No. of Pages: 13 Date of Doc. undated
Joyce M. Takitani 10/21/08
Notary Signature Date

JOYCE M. TAKITANI NOTARY PUBLIC No. 79-562 STATE OF HAWAII

STATE OF ______________)
) SS.
COUNTY OF ______________)

On this _____ day of ______________, 20___, before me personally appeared ________________________, to me personally known, who, being by me duly sworn or affirmed, did say that such person(s) executed the foregoing instrument as the free act and deed of such person(s), and if applicable, in the capacities shown, having been duly authorized to execute such instrument in such capacities.

____
Print Name: ______________________
Notary Public, in and for said State and County.

My commission expires: __________

STATE OF Hawaii)
) SS.
COUNTY OF Maui)

On this 22nd day of Oct, 2008, before me personally appeared Jessi Spencer, to me personally known, who, being by me duly sworn or affirmed, did say that such person(s) executed the foregoing instrument as the free act and deed of such person(s), and if applicable, in the capacities shown, having been duly authorized to execute such instrument in such capacities.

DORIE A. KEKAHA ★ NOTARY 03-565 PUBLIC ★ STATE OF HAWAII

[signature]
Print Name: ______________________
Notary Public, in and for said State and County. Dorie A. Kekaha
Expiration Date: September 28, 2011

My commission expires: __________

NOTARY CERTIFICATE, STATE OF HAWAII
Doc. Descript./Id: Assignment of Grant of Easement for pole line & Wall Purposes
Doc. Date: undated # of Pgs: 12 2nd Circuit
Dorie A. Kekaha
Printed Name of Notary
[signature] 10/22/08
Signature of Notary Cert. Date

DORIE A. KEKAHA ★ NOTARY 03-565 PUBLIC ★ STATE OF HAWAII

EXHIBIT "A"

All of that certain parcel of land (being all of the land(s) described in and covered by Land Patent Grant S-13975 to Wailuku Sugar Company; Land Patent Grant 11067 to Wailuku Sugar Company; Land Patent Grant 10962 to Wailuku Sugar Company; Land Patent Grant 10745 to Wailuku Sugar Company; Land Patent Grant 10497 to Wailuku Sugar Company; Land Patent Grant 10294 to Wailuku Sugar Company; and Land Patent Grant 9794 to Wailuku Sugar Company; and portion(s) of the land (s) described in and covered by Land Patent Grant Number 3152 to H. Cornwell) situate, lying and being at Ukumehame, District of Lahaina, Island and County of Maui, State of Hawaii, containing an area of 256.903 acres, more or less, and being more particularly described in Exhibit "B" attached hereto and made a part hereof.

SUBJECT, HOWEVER, to the following:

1. Roadway, as shown on Land Patent Grant No. 9794.

2. Notice of Imposition of Conditions By the Land Use Commission dated December 9, 1992, recorded as Document No. 92-200449.

3. The terms and provisions contained in the Declaration dated January 25, 1993, recorded in the said Bureau of Conveyances as Document No. 93-014788.

4. Grant to Maui Electric Company, Limited, a Hawaii corporation, dated November 1, 1995, recorded in the said Bureau of Conveyances as Document No. 95-161279, granting a perpetual right and easement for utility purposes as shown on the map attached thereto.

Said Grant was amended by instrument dated July 1, 1998, recorded as Document No. 98-101152 and more particularly described as follows:

EASEMENT B

For Overhead Electrical Transmission Purposes
In Favor of Maui Electric Company
Affecting Portions of Grant 3152 to Henry Cornwell and Grant 9794 to Wailuku Sugar Co.
Situated at Waikapu, Ukumehame, Wailuku, Maui, Hawaii

Beginning at the Northeast corner of this easement, on the West side of Honoapiilani Highway (F.A.P. No. 13-G), being also the southeast corner of Lot 2 of "Waikapu Hema Large Lot Subdivision", the coordinates of said point of beginning referred to Government Survey Triangulation Station "LAINA" being 29,405.90 feet South and 54,921.88 feet East, and thence running by azimuths measured clockwise from True South:

1. Along the West side of Honoapiilani Highway (F.A.P. No. 13-G), on a curve to the right, with a radius of 34,342.50 feet, the chord azimuth and distance being:

	5°	56'	34.98"	126.15	feet;
2.	157°	51'		71.11	feet;
3.	98°	26'	30"	149.08	feet;
4.	258°	36'	53"	191.10	feet along Lot 2 of the "Waikapu Hema Large Lot Subdivision" to the point of beginning and containing an area of 6949 square feet.

5. The terms and provisions contained in Agreement for Allocation of Future Subdivision Potential dated January 3, 2002, recorded in the said Bureau of Conveyances as Document No. 2003-059347, by and between Wailuku Agribusiness Company, Inc. ("Subdivider") and County of Maui, through its Department of Public Works and Waste Management, a political subdivision of the State of Hawaii ("County").

6. The terms and provisions contained in Limited Warranty Deed dated August 10, 2004, recorded in the said Bureau of Conveyances as Document No. 2004-165726.

7. The terms and provisions contained in the Declaration of Covenants, Conditions, Easements, Reservations and Restrictions dated effective as of August 10, 2004, recorded in the said Bureau of Conveyances as Document No. 2004-165727.

The foregoing includes, but is not limited to, matters relating to water reservation, farming reservation; easements.

Assignment of In Gross Reservations effective October 1, 2005, recorded as Document No. 2005-229077, by and between Wailuku Agribusiness Co., Inc., a Hawaii corporation, "Assignor", and Wailuku Water Company, LLC, a Hawaii limited liability company, doing business as Wailuku Water Company, "Assignee".

8. Claims arising out of customary and traditional rights and practices, including without limitation those exercised for subsistence, cultural, religious, access or gathering purposes, as provided for in the Hawaii Constitution or the Hawaii Revised Statutes.

9. Any unrecorded leases and matters arising from or affecting the same.

10. Discrepancies, conflicts in boundary lines, shortage in area, encroachments or any other matters which a correct survey or archaeological study would disclose.

END OF EXHIBIT "A"

Tax Key: (2) 3-6-001-018

EXHIBIT "B"

Land situated on the westerly side of Honoapiilani Highway (N.R.H. 13-C and F.A.P. 13-G) at Ukumehame, Waikapu, Wailuku, Maui, Hawaii.

Being all of Grant S-13975 to Wailuku Sugar Company, Grant 11067 to Wailuku Sugar Company, Grant 10962 to Wailuku Sugar Company, Grant 10745 to Wailuku Sugar Company, Grant 10497 to Wailuku Sugar Company, Grant 10294 to Wailuku Sugar Company and Grant 9794 to Wailuku Sugar Company, and a portion of Grant 3152 to Henry Cornwell.

Beginning at a point at the northeasterly corner of this parcel of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "LUKE" being 23,709.07 feet South and 3,760.16 feet West and running by azimuths measured clockwise from true South:

1. Thence along the westerly side of Honoapiilani Highway (F.A.P. 13-G) on a curve to the right, with the point of curvature azimuth from the radial point being: 275° 52' 12.4" and the point of tangency azimuth from the radial point being: 278° 14' 56", having a radius of 34,342.50 feet, the chord azimuth and distance being: 7° 03' 34.2" 1,425.71 feet to a point;

2. 8° 14' 56" 1,823.79 feet along same to a point;

3. Thence along same on a curve to the right, having a radius of 34,342.50 feet, the chord azimuth and distance being: 9° 22' 41" 1,353.53 feet to a point;

4. 10° 30' 26" 504.25 feet along same to a point;

5. 14° 07' 22" 743.00 feet along the westerly side of Honoapiilani Highway (F.A.P.

13-G and N.R.H. 13-C) to a point;

6. 105° 46' 29" 10.00 feet along the westerly side of Honoapiilani Highway (N.R.H. 13-C) to a point;

7. Thence along same on a curve to the right, with the point of curvature azimuth from the radial point being: 285° 46' 29" and the point of tangency azimuth from the radial point: 296° 19' 59", having a radius of 5,647.97 feet, the chord azimuth and distance being: 21° 03' 14" 1,039.32 feet to a point;

8. 296° 16' 56" 18.00 feet along same to a point;

9. Thence along same on a curve to the right, with the point of curvature azimuth from the radial point being: 296° 19' 59" and the point of tangency azimuth from the radial point being: 297° 44' 17", the chord azimuth and distance being: 27° 02' 08" 138.94 feet to a point;

10. 117° 47' 19" 18.00 feet along same to a point;

11. Thence along same on a curve to the right, with the point of curvature azimuth from the radial point being: 297° 44' 17" and the point of tangency azimuth from the radial point being: 299° 21' 03", having a radius of 5,647.97, the chord azimuth and distance being: 28° 32' 40" 158.98 feet to a point;

12. 299° 18' 18.00 feet along same to a point;

13. Thence along same on a curve to the right, with the point of curvature azimuth from the radial point being: 299° 21' 02" and the point of tangency azimuth from the radial point being: 301° 05' 41", having a radius of 5,665.97 feet, the chord azimuth and distance being: 30° 13' 21.5" 172.47 feet to a point;

14. 31° 05' 41" 603.65 feet along same to a point;

15. 121° 05' 41" 15.00 feet along same to a point;

16. 31° 05' 41" 75.00 feet along same to a point;

17. 301° 05' 41" 15.00 feet along same to a point;

18. 31° 05' 41" 286.00 feet along same to a point;

19. Thence along same on a curve to the left, with the point of curvature azimuth from the radial point being: 121° 05' 41" and the point of tangency azimuth from the radial point being: 118° 20' 52.6", having a radius of 11,539.55 feet, the chord azimuth and distance being: 29° 43' 16.8" 553.16 feet to a point;

20. 153° 40' 17" 209.46 feet along portion of Government Land of Ukumehame to a point;

21. 169° 48' 47" 376.44 feet along same to a point;

22. 165° 07' 47" 112.44 feet along same to a point;

23. 167° 31' 47" 394.87 feet along same to a point;

24. 105° 51' 47" 103.85 feet along same to a point;

25.	184°	08'	47"	400.00 feet along same to a point;
26.	176°	24'	47"	1,520.00 feet along same to a point;
27.	177°	16'	47"	246.00 feet along same to a point;
28.	216°	09'	47"	413.00 feet along same to a point;
29.	185°	14'	47"	254.00 feet along same to a point;
30.	177°	22'	47"	506.00 feet along same to a point;
31.	217°	16'	47"	437.00 feet along same to a point;
32.	210°	02'	47"	470.00 feet along same to a point;
33.	190°	15'	17"	1,179.70 feet along same to a point;
34.	197°	01'	47"	467.15 feet along same to a point;
35.	235°	55'	47"	349.70 feet along same to a point;
36.	220°	15'	47"	280.20 feet along same to a point;
37.	208°	33'	47"	216.10 feet along same to a point;
38.	193°	09'	47"	570.10 feet along same to a point;
39.	203°	49'	47"	164.90 feet along same to a point;
40.	187°	16'	47"	301.10 feet along same to a point;
41.	258°	57'	41"	864.14 feet along Grant 3152 to Henry Cornwell and along the remainder of Grant 3152 to Henry Cornwell, being also along Lot 6 of Waikapu Hema Large Lot Subdivision to the point of beginning and containing an area of 256.903 acres.

END OF EXHIBIT "B"

R-658 STATE OF HAWAII
BUREAU OF CONVEYANCES
RECORDED
OCT 23, 2008 11:00 AM
Doc No(s) 2008-163634

/s/ NICKI ANN THOMPSON
ACTING REGISTRAR

20 1/3 Z9

W

LAND COURT SYSTEM | REGULAR SYSTEM

Return by Mail (X) Pickup ( ) To:
Mancini Welch & Geiger LLP
33 Lono Ave, Ste 470
Kahului HI 96732

TG:A 2008329116 - S
TG: A82040640
Doric A Kekaha

RS
1

Tax Map Key No. (2) 3 - 6 - 04 : 08 Total No. of Pages: 10

GRANT OF EASEMENT FOR WATERLINE AND WELL PURPOSES

THIS GRANT OF EASEMENT FOR WATERLINE AND WELL PURPOSES ("Grant of Easement"), is made as of Oct 21, 2008, by and between ALLEN TING, III and DONNA P. TING, husband and wife (collectively "Grantor"), whose address is 1962 Wells Street, Wailuku, Hawaii 96793, and MAALAEA PROPERTIES, LLC, a Hawaii limited liability company ("Grantee"), whose address is 1670 Honoapiilani Highway, Wailuku, Hawaii 96793.

A. GRANT:

The Grantor, for one dollar ($1.00) and other valuable consideration paid by the Grantee to the Grantor, the receipt of which is hereby acknowledged, and subject to the terms, conditions and covenants contained herein on the part of the Grantee to be observed and performed, hereby grants to the Grantee the right, in the nature of a perpetual, non-exclusive easement over, under, through and across those certain easement areas described as Easement "W-1" in Exhibit "A" and shown on the sketch attached as Exhibit "B", attached hereto and made a part hereof (collectively the "Easement Area"), for waterline and well purposes, including, without limitation, the right to construct, install, maintain, operate, repair, replace and remove fences, water transmission and overflow lines and water well(s), together with pumps, meters, valves, lines, control facilities, electrical service, communications, and other appurtenances as shall be necessary for the operation of the well(s) and water transmission facilities, together with the right of ingress to and egress from the Easement Area for all purposes in connection with the rights hereby granted.

TO HAVE AND TO HOLD THE SAME unto the Grantee for the uses and purposes and upon and subject to the terms and conditions herein set forth, and subject to recorded rights and interests, if any, of others in the servient estate existing as of the date of this Grant of Easement.

B. COVENANTS AND AGREEMENTS OF THE GRANTOR AND THE GRANTEE:

THE GRANTOR AND THE GRANTEE, in consideration of this Grant of Easement, covenant and agree as follows:

1. The Grantee shall observe and perform all laws, ordinances, rules and regulations now or hereafter made by any governmental authority applicable to the exercise of the Grantee's rights hereunder. The Grantee shall at all times in its entry upon and use of the Easement Area exercise due care for public and private safety.

2. The Grantee shall not commit or suffer or permit to be committed or suffered any waste, nuisance, strip or unlawful or improper use of the Easement Area, or any part thereof.

3. The Grantee shall have the right, at the Grantee's sole cost, to construct, reconstruct, install, maintain, operate, repair and replace facilities for the foregoing purposes within the Easement Area.

4. The Grantee shall maintain any and all facilities constructed by the Grantee within the Easement Area in good and safe condition and repair, and after the completion of any construction, reconstruction, installation, maintenance or repair, shall restore the surface of the ground and surrounding area to the condition thereof prior to such work.

5. The Grantee shall not commit or suffer any act or neglect whereby the Easement Area, or any portion thereof, shall at any time become subject to any attachment, judgment, lien, charge or encumbrance whatsoever, and will indemnify and hold the Grantor harmless against all loss, costs and expenses, including attorneys' fees, with respect thereto.

6. All of the covenants, conditions and restrictions set forth herein to be performed or observed by the Grantee shall run with the Easement Area and shall be binding upon and inure to the benefit of every person or entity who acquires any right or interest in the Easement Area without the execution, delivery or recordation of any further deed, instrument, document, agreement, declaration, covenant, or the like, and

the acquisition of any such right or interest shall be deemed to constitute the acceptance of all of such covenants, conditions and restrictions by such person or entity, and upon the transfer of any such right or interest in such property, the same shall be subject to and the transferee shall assume and be bound and obligated to observe or perform all of such covenants, conditions and restrictions.

7. If at any time any portion of the Easement Area shall be taken or condemned by any authority having the power of eminent domain, then and in every such case all compensation and damages payable for or on account of such premises and any adjoining property of the Grantor, including any part of said easement so taken or condemned, shall be paid to and be the property of the Grantor without any apportionment thereof to the Grantee, provided that the Grantee shall be entitled to recover only from the condemning authority full compensation for any improvements constructed by the Grantee in the condemned portion of the Easement Area and any severance damages to its rights hereunder, including the cost of obtaining and relocating to a substitute easement.

8. In the event of any default in respect of any of the covenants, conditions or restrictions to be observed or performed by the Grantee hereunder, and if such default shall continue for 30 days after written notice thereof is given by the Grantor to the Grantee at the last address of the Grantee known to the Grantor, then the Grantor shall have the right to terminate all easement rights granted to the Grantee under this indenture. The Grantee shall pay to the Grantor on demand all costs and expenses, including reasonable attorneys' fees, incurred by the Grantor in enforcing any of the covenants herein contained, in remedying any breach by the Grantee of any covenants, or in connection with any litigation (other than condemnation proceedings) commenced by or against the Grantee in which the Grantee is found to be at fault and to which the Grantor, without fault on its part, shall be made a party.

9. The Grantee assumes all risk of bodily injury or death or damage or loss to property arising out of or in connection with entry upon or use of the Easement Area by the Grantee, its agents, contractors, employees, licensees, successors and assigns. The Grantor shall incur no liability or obligation of any nature to the Grantee as a result of or relating to entry upon and/or use of Easement Area or the Grantee's activities thereupon or relating thereto. The Grantee agrees to and shall indemnify, defend and hold harmless the Grantor from and against any and all loss, liability, cost, claim, expenses (including without limitation attorneys' fees and litigation costs), demand, damage, action, causes of action, suit, administrative proceedings and/or penalties resulting from or otherwise directly or indirectly relating to this Grant of Easement, the exercise of the Grantee's rights under this Grant of Easement, or the Grantee's use or occupancy of, or any other act or neglect by Grantee with respect to the Easement Area. Such indemnity shall include and cover, without limitation, claims relating to the presence or existence of hazardous or nuisance conditions on, under or affecting the Easement Area and shall survive termination of this Grant of Easement.

10. If the Grantee shall at any time in the future abandon or remove its improvements, equipment and appurtenances from the Easement Area and shall, for a period of two years, fail to use or reinstall the same through, under or across the Easement Area, then and in either of such events, the rights granted and the obligations imposed hereunder shall thereupon terminate without any action on the part of the Grantor and the Grantee shall on request by the Grantor be required to remove therefrom, upon such abandonment, any structure or equipment constructed or placed within the Easement Area, and the Grantee shall, on request by the Grantor, execute a written instrument evidencing such termination.

11. The right and easement granted herein are nonexclusive, and the Grantor shall have the right to make one or more irrevocable, non-exclusive grants or assignments of all or portions of the Easement Area from time to time to governmental authorities, public or private utilities, corporations or other parties, and the Grantee hereby consents thereto; provided, however, that any such grant or assignment shall not unreasonably interfere with the Grantee's use and enjoyment of the Easement Area for the purposes stated herein.

12. The Grantee, for itself, any person or entity claiming by or through it and their respective successors and assigns, acknowledges that the Easement Area is located near or adjacent to properties (the "Adjacent Properties") which are or may be used for various agricultural and related or ancillary purposes. As such, it is expected that the Easement Area will periodically be affected by noise, dust, smoke, soot, ash, odor or other adverse conditions of any kind created by or resulting from such agricultural activities. The Grantee, for itself, any person or entity claiming by or through it and their respective successors and assigns, further acknowledges and agrees that neither the Grantor, the owners of the Adjacent Properties, nor any of their respective successors in title or assigns, shall be held liable for any nuisance, personal injury, illness or other loss, damage or claim which is caused by or related to the presence, operation and/or use of the Adjacent Properties adjacent to or near the Easement Area.

13. Unless otherwise expressly consented to in writing, the Grantee's interest hereunder, the fee title to the Easement Area and the easements created hereunder shall not merge, but shall always remain separate and distinct, notwithstanding the union of such estates either in the Grantee or in a third party by purchase or otherwise.

14. This Grant of Easement shall be binding on and inure to the benefit of the parties and their respective successors and assigns.

15. If any governmental approvals shall be required under applicable law to render this Grant of Easement valid (including subdivision approval by the County of Maui if this Grant of Easement shall be deemed an easement for access), then this Grant of Easement shall be deemed to be an irrevocable license and the Grantee shall

have the responsibility at the Grantee's expense (with the Grantor's reasonable cooperation) to obtain said approvals.

16. It is expressly understood by and between the Grantee and the Grantor that the Grantor makes absolutely no representations or warranties, express or implied, with respect to the withdrawal, transmission and use of water from or through the Easement Area, including the availability, amount or quality thereof. The Grantee shall be responsible for obtaining, at its cost and expense, all necessary or desirable registrations, filings, permits or approvals from applicable governmental authorities relating to water rights and usage for and with respect to the exercise of the Grantee's rights hereunder.

17. The Grantee shall not cause or permit any hazardous material (as that term is defined below) to be used, transported or disposed of on or in the Easement Area or the Grantor's lands adjacent to the Easement Area by the Grantee or persons claiming by, through or under the Grantee, except in strict accordance with all applicable laws. If any portion of the Roadway Area or the Grantors' adjacent land shall become contaminated in any manner for which the Grantee, the Grantee's agents, employees, contractors or invitees are responsible or liable, the Grantee, at the Grantee's sole expense, promptly shall take any and all necessary actions to clean up and remediate the Easement Area and the Grantors' adjacent land, provided that the Grantee shall first obtain the Grantors' written approval for any such remedial action. If the Grantee breaches the obligations stated in this Section 17 or if contamination of the Easement Area or the Grantors' adjacent land by any hazardous material occurs as a result of, or is attributable to the use of, or operations on the Easement Area or the Grantor's adjacent lands by the Grantee or the Grantee's agents, employees, contractors or invitees, the Grantee shall hold harmless the Grantor from all claims, damages, judgments, penalties, fines, costs, liabilities, losses and damages, including foreseeable and unforeseeable consequential damages, diminution in value of the Easement Area or the Grantors' adjacent land, losses and damages for the loss or restrictions on use of, all or any portion of the Easement Area or the Grantors' adjacent land, sums paid in settlement of claims and reasonable expenses, including attorney's fees, consultant fees and expert fees that arise as a result of the Grantor's investigation and defense of environmental damage claims (whether or not formal administrative or legal action is filed) or any investigation of site conditions or any clean-up, remedial, removal or restoration work required by any governmental agency because of hazardous material present in the soil or ground water on or under the Easement Area or the Grantors' adjacent land. The term "hazardous material" as used in this Grant of Easement means any substance: (i) the presence of which requires investigation or remediation under any law applicable to the Easement Area or the Grantors' adjacent land; or (ii) which is or becomes defined as a "hazardous substance," pollutant or contaminant under any environmental law; or (iii) which contains gasoline, diesel fuel or other petroleum hydrocarbons, polychlorinated bipheynols (PCBs), asbestos or urea formaldehyde foam insulation; or (iv) the presence of which on the Easement Area or

the Grantors' adjacent land causes or threatens to cause a nuisance upon the Easement Area or the Grantors' adjacent land or poses or threatens to pose a hazard to the health or safety of persons on or about the Easement Area or the Grantors' adjacent land.

The Grantor and the Grantee have signed this Grant of Easement as of the date first referenced above.

GRANTOR

ALLEN TING III

DONNA P. TING

GRANTEE

MAALAEA PROPERTIES, LLC.,
a Hawaii limited liability company,

By ______________________
Its Managing Member Larry W. Anderson

STATE OF HAWAII)
) SS.
COUNTY OF MAUI)

On this 14th day of June, 2007, before me personally appeared ALLEN TING III, to me known, who being by me duly sworn, did say that he signed the foregoing instrument in the capacity stated and as his free act and deed.

ELLEN P. K. K. HOOPAI NOTARY PUBLIC STATE OF HAWAII

Ellen P K K Hoopai
Notary Public, in and for
said County and State
Print Name: Ellen PKK Hoopai
My Commission expires: 01-02-09

STATE OF HAWAII)
) SS.
COUNTY OF MAUI)

On this 14th day of June, 2007, before me personally appeared DONNA P. TING, to me known, who being by me duly sworn, did say that she signed the foregoing instrument in the capacity stated and as her free act and deed.

ELLEN P. K. K. HOOPAI NOTARY PUBLIC STATE OF HAWAII

Ellen P K K Hoopai
Notary Public, in and for
said County and State
Print Name: Ellen PKK Hoopai
My Commission expires: 01-02-09

STATE OF HAWAII)
) SS.
COUNTY OF MAUI)

On this 21st day of October, 20 08, before me personally appeared LARRY W. ANDERSON, to me personally known, who, being by me duly sworn or affirmed, did say that such person(s) executed the foregoing instrument as the free act and deed of such person(s), and if applicable, in the capacities shown, having been duly authorized to execute such instrument in such capacities.

JOYCE M. TAKITANI NOTARY PUBLIC No. 79-582 STATE OF HAWAII

Joyce M. Takitani
Print Name: Joyce M. Takitani
Notary Public, State of Hawaii.
My commission expires: 8/16/11

Date of Doc: undated # Pages: 10
Name: Joyce M. Takitani Second Circuit
Doc. Description: Grant of Easement for Waterline and Well Purposes

Joyce M. Takitani
Notary Signature
NOTARY CERTIFICATION

JOYCE M. TAKITANI NOTARY PUBLIC (Seal) No. 79-582 STATE OF HAWAII

EXHIBIT "A"

DESCRIPTION OF EASEMENT W-1

For Well Purposes

Being a portion of Lot 2
of the Waikapu Hema Large Lot Subdivision,
(L.U.C.A. File No. 3.1421)
also being a portion of Grant 3152 to H. Cornwell

Land situated at Waikapu, Wailuku, Maui, Hawaii
Tax Map Key: (2) 3-6-04:08

Beginning at the Southeasterly corner of this easement, being on the East side of Lot 2 as shown on L.U.C.A. File No. 3.1421, the coordinates of said point of beginning referred to Government Survey Triangulation Station "LUKE", being 22,174.52 feet South and 6,086.76 feet West, thence running by azimuths measured clockwise from true South:

1.	97°	30'	100.00 feet along the remainder of Lot 2 of L.U.C.A. File No. 3.1421;
2.	187°	30'	100.00 feet along the same;
3.	277°	30'	100.00 feet along the same;
4.	7°	30'	100.00 feet along Lot 6 of L.U.C.A. File No. 3.1421 to the point of beginning and containing an area of 10,000 sq. ft.

END OF EXHIBIT "A"

EXHIBIT "B"

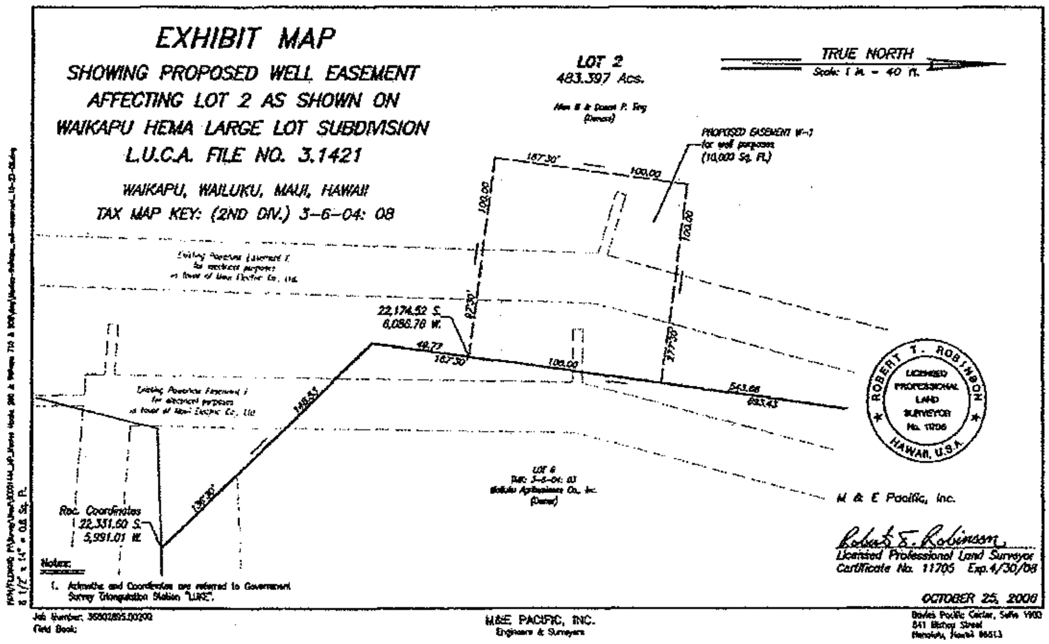


EXHIBIT MAP
SHOWING PROPOSED WELL EASEMENT
AFFECTING LOT 2 AS SHOWN ON
WAIKAPU HEMA LARGE LOT SUBDIVISION
L.U.C.A. FILE NO. 3.1421
WAIKAPU, WAILUKU, MAUI, HAWAII
TAX MAP KEY: (2ND DIV.) 3-6-04: 08
LOT 2
483.397 Acs.
TRUE NORTH
Scale: 1 in. = 40 ft.
PROPOSED EASEMENT W-1
for well purposes
(10,000 Sq. Ft.)
167.30
100.00
22,174.52 S.
6,086.70 W.
49.27
543.66
693.43
Rec. Coordinates
22,331.60 S.
5,991.01 W.
Notes:
1. Azimuths and Coordinates are referred to Government Survey Triangulation Station "LUKE".
ROBERT T. ROBINSON
LICENSED PROFESSIONAL LAND SURVEYOR
No. 11705
HAWAII, U.S.A.
M & E Pacific, Inc.
Robert T. Robinson
Licensed Professional Land Surveyor
Certificate No. 11705 Exp.4/30/08
OCTOBER 25, 2006
M&E PACIFIC, INC.
Engineers & Surveyors
Davies Pacific Center, Suite 1900
841 Bishop Street
Honolulu, Hawaii 96813

APPENDIX K-3.

Water Quality Testing Results for Groundwater Wells

April 29, 2008

To: Martin Nakasone, M&E Pacific

From: Glenn Bauer, Mink & Yuen, Inc.

Subject: Preliminary Discussion of Water Quality Results for MW 1 -3

The Maalaea Wells (MW) were drilled within the Waikapu Aquifer System. The Water Resources Protection Plan of the Commission on Water Resource Management (CWRM) puts the sustainable yield of this aquifer system at 2 million gallons per day (mgd). Sustainable yield is a global number, which assumes that the amount of water extracted can be done perpetually without harm to the aquifer.

The first, 4930-01 (MW 1), was completed in 2004. The measured water static water level at the time of completion was 7.43 feet above mean sea level (ft., msl). The well's depth reported in the CWRM well database is 350 ft. or -29 ft., msl. When originally pump tested at 316 gallons per minute (gpm) the drawdown was 4 ft. and the chloride ion concentration was 140 mg/L. Chloride is a measure of salinity in Hawaii,. Since 2004 two additional wells have been drilled. In the CWRM database they are numbered 4930-02,03 (MW 2 and 3). These wells are located north of the original well, so that the well spacing is about 200 ft. between them.

Though the well completion reports have not been filed with CWRM yet, it is assumed that the static water level encountered in MW 2 and 3 would be similar as the measured water level in MW 1. Under Ghyben-Herzberg conditions, the less dense freshwater core of the lens floats on denser saltwater at depth. Separating the freshwater from the saltwater is a zone of mixture referred to as the transition zone. The theoretical balance point within the zone of mixture where the water is half fresh, half salt is 40 times the static water level. In the case of MW 1 that balance point elevation would be about -297 ft., msl. The thickness of the transition zone and theoretical mid-point is susceptible to the amount of groundwater that naturally flows from the recharge zone to the discharge zone at the coast. The transition zone can be thickened if the specific discharge of groundwater through the aquifer is low or if sediments forming a caprock impede the flow of groundwater. Groundwater pumpage from existing wells can also cause higher salinity in wells. At the present time, pumpage in the Waikapu Aquifer System is very low.

Water quality testing by AECOS Laboratory was done for each well. MW 2 and 3 were tested on January 23, 2008. MW1 was tested on August 23, 2007. The test results can be separated into Microbiological and Chemical.

1. Microbiological
   MW 1 - 3 showed the presence of total coliform, which are naturally occurring in the environment. Since the State Department of Health (DOH) requires a reading of zero, the sources should be resampled and tested, preferably after wells have been chlorinated and flushed. This should be discussed with DOH before taking action. In addition it is imperative that the sampling point be sterilized using an alcohol lamp prior to taking the sample.

2. Chemical
   MW 1 - 3 show that organic contaminants were not detected. Conspicuous inorganic constituents detected were nitrate (as nitrogen), barium, chromium, calcium, and fluoride. All were within acceptable limits. Barium, chromium, calcium, and fluoride occur naturally in basalt. Alkalinity is also within acceptable limits. The chloride concentration

ranging between 180 and 220 mg/L are below the secondary EPA standard set at 250 mg/L. Honolulu Board of Water Supply and other county water supplies have a limit of 150 mg/L. The chloride values seen in MW 1 - 3 are not a health risk, but may pose problems for people on a low sodium diet. The calcium concentrations are within acceptable limits.

AECOS, Inc.

45-939 Kamehameha Hwy., Room 104 • Kaneohe, HI 96744
Telephone: (808) 234-7770 • Fax: (808) 234-7775

CLIENT: M&E Pacific
1001 Bishop Street, Pauahi Tower, Suite 500
Honolulu HI 96813
ATTENTION: Martin Nakasone

FILE No.: 457
REPORT DATE: 10/02/07
PAGE: 1 of 3

AECOS REPORT OF MICROBIOLOGICAL RESULTS

SAMPLE TYPE: Potable water — *AECOS* LOG No.: 23197

DATE SAMPLED: 08/23/07 — METHOD SM 9221B,E
DATE/TIME RECEIVED: 08/23/07 @1600 — SAMPLER: C. Linebaugh
TEMPERATURE CONTROL: 16.0 °C — MATRIX: Potable water
CHLORINE RESIDUAL: ---

Analysis Date 08/23/07 @1630 — Analyst: C. Linebaugh

ANALYTE (UNITS)		Total Coliforms (Present/Absent) SM9221B	E. coli (Present / Absent) SM9221E	
SAMPLE ID ⇩	TIME SAMPLED ⇩			
Maalaea	1052	Absent	Absent	

J. Mello, Laboratory Director

CLIENT: M&E Pacific
1001 Bishop Street, Pauahi Tower, Suite 500
Honolulu HI 96813
ATTENTION: Martin Nakasone

FILE No.: 457
REPORT DATE: 10/02/07
PAGE: 2 of 3

AECOS REPORT OF ANALYTICAL RESULTS

SAMPLE TYPE: Potable well water
DATE SAMPLED: 08/23/07

AECOS LOG No.: 23197
DATE RECEIVED: 08/23/07
Sampled by: C. Linebaugh

SAMPLE ID ⇨ / ANALYTE ⇩	Maalaea		EPA Method Number	Reporting Limit	Analysis Date Analyst ID
Temperature (°C)	24.5		170.1	0.1	08/23/07 field
pH	7.07		150.2	---	08/23/07 field
Turbidity (NTU)	0.42		180.1	0.01	08/24/07 ml
Nitrate (mg/L)	2.23*		353.2	0.100	09/21/07 TAH*
Nitrite (mg/L)	<0.0500		353.2	0.0500	08/24/07 TAH
Chloride (mg/L)	180		EPA 300.0	5.0	09/20/07 MWH
Alkalinity (mg CaCO3/L)	103		SM2320B / EPA 310.1	2.0	08/28/07 MWH
Conductivity (μmho/cm)	865		SM2510B	2.0	08/28/07 MWH
Calcium (mg/L)	36		200.7	1.0	08/29/07 MWH
Fluoride (mg/L)	0.15		SM4500 F-C	0.050	08/30/07 MWH
Cyanide (mg/L)	<0.025		SM4500 CN-F	0.025	09/05/07 MWH
Antimony (μg/L)	<1.0		200.8	1.0	09/05/07 MWH
Arsenic (μg/L)	<1.0		200.8	1.0	09/05/07 MWH
Barium (μg/L)	15		200.8	2.0	09/05/07 MWH
Beryllium (μg/L)	<1.0		200.8	1.0	09/05/07 MWH
Cadmium (μg/L)	<0.50		200.8	0.50	09/05/07 MWH
Chromium (μg/L)	4.0		200.8	1.0	09/05/07 MWH
Copper (μg/L)	<2.0		200.8	2.0	09/05/07 MWH
Lead (μg/L)	<0.50		200.8	0.50	09/05/07 MWH
Mercury (μg/L)	<0.20		245.1	0.20	08/31/07 MWH
Nickel (μg/L)	<5.0		200.8	5.0	09/05/07 MWH
Selenium (μg/L)	<5.0		200.8	5.0	09/05/07 MWH
Thallium (μg/L)	<1.0		200.8	1.0	09/05/07 MWH

For additional information please see the attached complete reports from MWH Laboratories – Report # 214377 and TAH - TestAmerica-Honolulu, HI – Work Order No.: HQH0130

*The sample for nitrate was re-analyzed from a non-preserved bottle, past the EPA recommended hold time. Refer to the TestAmerica report for details.

CLIENT: M&E Pacific
1001 Bishop Street, Pauahi Tower, Suite 500
Honolulu HI 96813
ATTENTION: Martin Nakasone

FILE No.: 457
REPORT DATE: 10/02/07
PAGE: 3 of 3

AECOS REPORT OF ANALYTICAL RESULTS

SAMPLE TYPE: Potable well water
DATE SAMPLED: 08/23/07

AECOS LOG No.: 23197
DATE RECEIVED: 08/23/07

SAMPLE ID ⇨ / ANALYTE ⇩	Maalaea		EPA Method Number	Reporting Limit	Analysis Date Analyst ID
Endothall (μg/L)	<20		548.1	20	08/29/07 MWH
Glyphosate (μg/L)	<6.0		547	6.0	08/29/07 MWH
2,3,7,8-TCDD 1613 (Dioxin) pg/L	<5		1613	5	09/04/07 ,MWH/PACE
DBCP (Dibromo-chloropropane) (μg/L)	<0.01		EPA 504.1	0.01	08/28/07 MWH
EDB (Ethylene Dibromide) (μg/L)	<0.01		EPA 504.1	0.01	08/28/07 MWH
Diquat (μg/L)	<0.4		EPA 549.1	0.4	08/30/07 MWH
Pesticides (μg/L)	ND		EPA 505	Varies	08/29/07-MWH
Herbicides (μg/L)	ND		EPA 515.4	Varies	08/30/07 MWH
Volatile Organic Compounds (μg/L)	ND		EPA 524.2	Varies	08/28/07 MWH
Semivolatiles (μg/L)	ND		EPA 525.2	Varies	08/31/07 MWH
Aldicarbs (μg/L)	ND		EPA 531.2	0.5	08/28/07 MWH
Asbestos (MFL)	<0.20		EPA 100.2	0.20	08/27/07 MWH

ND = Not detected.
For additional information please see the attached complete reports from MWH Laboratories – Report # 214377 and TAH - TestAmerica-Honolulu, HI – Work Order No.: HQH0130

AECOS, Inc.
45-939 Kamehameha Hwy., Room 104 • Kaneohe, HI 96744
Telephone: (808) 234-7770 • Fax: (808) 234-7775

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CLIENT: M&E Pacific
841 Bishop Street, Suite 1900
Honolulu HI 96813
ATTENTION: Martin Nakasone

FILE No.: 457
REPORT DATE: 03/17/07
PAGE: 1 of 3

AECOS REPORT OF MICROBIOLOGICAL RESULTS

SAMPLE TYPE: Potable water — *AECOS* LOG No.: 23785,23786

DATE SAMPLED: 01/23/08 — METHOD: SM 9223B
DATE/TIME RECEIVED: 01/23/08 @1700 — SAMPLER: S. Mello
TEMPERATURE CONTROL: --- — MATRIX: Potable water
CHLORINE RESIDUAL: ---

Analysis Date: 01/23/08 — Analyst: S. Mello, C. Linebaugh

ANALYTE (UNITS)		Total Coliforms (Present/Absent)	E. coli (Present / Absent)
		SM9221B	SM9221E
SAMPLE ID ⇩	TIME SAMPLED ⇩		
23785 Maalaea Well 2	1054	Present	Absent
23786 Maalaea Well 3	1131	Present	Absent

J. Mello, Laboratory Director

CLIENT: M&E Pacific
841 Bishop Street, Suite 1900
Honolulu HI 96813
ATTENTION: Martin Nakasone

FILE No.: 457
REPORT DATE: 03/17/08
PAGE: 2 of 3

AECOS REPORT OF ANALYTICAL RESULTS

SAMPLE TYPE: Potable well water — *AECOS* LOG No.: 23785, 23786
DATE SAMPLED: 01/23/08 — DATE RECEIVED: 01/23/08
Sampled by: S. Mello

SAMPLE ID ⇨ / ANALYTE ⇩	Maalaea Well 2	Maalaea Well 3	EPA Method Number	Reporting Limit	Analysis Date Analyst ID
Temperature (°C)	23.2	23.4	170.1	0.1	01/23/08 field
pH	6.94	7.06	150.2	---	01/23/08 field
Turbidity (NTU)	0.54	0.50	180.1	0.01	01/24/08 ml
Nitrate (mg/L)	1.88	1.93	353.2	0.300	01/24/08 TAH
Nitrite (mg/L)	<0.0500	<0.0500	353.2	0.0500	01/24/08 TAH
Chloride (mg/L)	190	220	EPA 300.0	10	02/05/08 MWH
Alkalinity (mg CaCO3/L)	88	100	SM2320B / EPA 310.1	2.0	01/28/08 MWH
Conductivity (µmho/cm)	908	990	SM2510B	2.0	01/28/08 MWH
Calcium (mg/L)	39	42	200.7	1.0	03/02/08 MWH
Fluoride (mg/L)	0.12	0.12	SM4500 F-C	0.050	02/08/08 MWH
Cyanide (mg/L)	<0.025	<0.025	SM4500 CN-F	0.025	01/29/08 MWH
Antimony (µg/L)	<1.0	<1.0	200.8	1.0	02/13/08 MWH
Arsenic (µg/L)	<1.0	<1.0	200.8	1.0	02/13/08 MWH
Barium (µg/L)	17	19	200.8	2.0	02/13/08 MWH
Beryllium (µg/L)	<1.0	<1.0	200.8	1.0	02/13/08 MWH
Cadmium (µg/L)	<0.5	<0.5	200.8	0.5	02/13/08 MWH
Chromium (µg/L)	5	5.4	200.8	1.0	02/13/08 MWH
Copper (µg/L)	<2.0	<2.0	200.8	2.0	02/13/08 MWH
Lead (µg/L)	<0.5	<0.5	200.8	0.50	02/13/08 MWH
Mercury (µg/L)	<0.20	<0.20	245.1	0.20	02/01/08 MWH
Nickel (µg/L)	<5.0	<5.0	200.8	5.0	02/13/08 MWH
Selenium (µg/L)	<5.0	<5.0	200.8	5.0	02/13/08 MWH
Thallium (µg/L)	<1.0	<1.0	200.8	1.0	02/13/08 MWH

For additional information please see the attached complete reports from MWH Laboratories – Report # 23785, # 23786 and TAH - TestAmerica-Honolulu, HI – Work Order No.: HRA0115

CLIENT:	M&E Pacific 841 Bishop Street, Suite 1900 Honolulu HI 96813
ATTENTION:	Martin Nakasone

FILE No.:	457
REPORT DATE:	03/17/08
PAGE:	3 of 3

AECOS REPORT OF ANALYTICAL RESULTS

SAMPLE TYPE: Potable well water
DATE SAMPLED: 01/23/08

AECOS LOG No.: 23785, 23786
DATE RECEIVED: 01/23/08

SAMPLE ID ⇨ ANALYTE ⇩	Maalaea Well 2	Maalaea Well 3	EPA Method Number	Reporting Limit	Analysis Date Analyst ID
Endothall (µg/L)	<20	<20	548.1	20	02/07/08 MWH
Glyphosate (µg/L)	<6.0	<6.0	547	6.0	01/29/08 MWH
2,3,7,8-TCDD 1613 (Dioxin) pg/L	<5	<5	1613	5	02/12/08 PACE/MWH
DBCP (Dibromo-chloropropane) (µg/L)	<0.01	<0.01	EPA 504.1	0.01	02/04/08 MWH
EDB (Etheylene Dibromide) (µg/L)	<0.01	<0.01	EPA 504.1	0.01	02/04/08 MWH
Diquat (µg/L)	<0.4	<0.4	EPA 549.2	0.4	02/04/08 MWH
Pesticides (µg/L)	ND	ND	EPA 505	Varies	01/30/08 MWH
Herbicides (µg/L)	ND	ND	EPA 515.4	Varies	02/09/08 MWH
Volatile Organic Compounds (µg/L)	ND	ND	EPA 524.2	Varies	01/31/08 MWH
Semivolatiles (µg/L)	ND	ND	EPA 525.2	Varies	02/07/08 MWH
Aldicarbs (µg/L)	ND	ND	EPA 531.2	0.5	01/31/08 MWH
Asbestos (MFL)	<0.20	<0.20	EPA 100.2	0.20	01/28/08 MWH

ND = Not detected.
For additional information please see the attached complete reports from MWH Laboratories – Report # 23785, # 23786 and TAH - TestAmerica-Honolulu, HI – Work Order No.: HRA0115

Legend:
ND = No Detection
NT = Not Tested

VOC's = Volatile Organic Carbons

MCL = Maximum Concentration Level

AECOS
Temp (°C) 24.5 Herbicides ND
Alkalinity (mg CaCO3/L) [illegible] Pesticides NT
Conductivity (umho/cm) 665 VOC's ND
Calcium (mg/L) 59 Semi-VOC's ND
Aldicarbs NT

State DOH Standards

Contaminant	MCL (mg/l)	AECOS MCL (mg/l)	
Inorganic Chemicals			
Arsenic	0.01	ND	
Asbestos	7million fibers/L (longer than 10um)	ND	
Barium	2	15	µg/l
Cadmium	0.005	ND	
Chromium	0.1	4	µg/l
Mercury	0.002	ND	
Nitrate (as Nitrogen)	10	2.23	
Nitrite (as Nitrogen)	1	ND	
Total Nitrate & Nitrite (as Nitrogen)	10		
Selenium	0.05	ND	
Antimony	0.006	ND	
Beryllium	0.004	ND	
Cyanide (as free Cyanide)	0.2	ND	
Thallium	0.002	ND	
Fluoride	4	0.15	mg/l
Copper (Action Level)	1.3	ND	
Lead (Action Level)	0.015	ND	
Nickel	N/A	ND	
Organic Chemicals			
Benzene	0.005	ND	
Carbon Tetrachloride	0.005	ND	
o-Dichlorobenzene	0.6	ND	
para-Dichlorobenzene	0.075	ND	
1,2-Dichloroethane	0.005	ND	
1,1-Dichloroethylene	0.007	ND	
cis-1,2-Dichloroethylene	0.07	ND	
trans-1,2-Dichloroethylene	0.1	ND	
DCP (1,2-Dichloropropane)	0.005	ND	
Ethylbenzene	0.7	ND	
Monochlorobenzene	0.1	ND	
Styrene	0.1	ND	
Tetrachloroethylene	0.005	ND	
Toluene	1	ND	
1,1,1-Trichloroethane	0.2	ND	
Trichloroethylene	0.005	ND	
TCP (1,2,3-Trichloropropane)	0.0006	ND	
Vinyl Chloride	0.002	ND	
Xylenes (total)	10	ND	
Dichloromethane	0.005	ND	
1,2,4-Trichlorobenzene	0.07	ND	
1,1,2-Trichloroethane	0.005	ND	

MW 1 - RESULTS

Synthetic Organic Chemicals	MCL	Result
Alachlor	0.002	ND
Atrazine	0.003	ND
Carbofuran	0.04	ND
Chlordane	0.002	ND
DBCP (Dibromochloropropane)	0.00004	ND
2,4-D	0.07	ND
EDB (Ethylene Dibromide)	0.00004	ND
Heptachlor	0.0004	ND
Heptachlor Epoxide	0.0002	ND
Lindane	0.0002	ND
Methoxychlor	0.04	ND
Polychlorinated biphenyls (PCB)	0.0005	ND
Pentachlorophenol	0.001	ND
Toxaphene	0.003	ND
2,4,5-TP (Silvex)	0.05	ND
Benzo(a)pyrene	0.0002	ND
Dalapon	0.2	ND
Di(2-ethylhexyl) adipate	0.4	ND
Di(2-ethylhexyl) phthalate	0.006	ND
Dinoseb	0.007	ND
Diquat	0.02	ND
Endothall	0.1	ND
Endrin	0.002	ND
Glyphosate	0.7	ND
Hexachlorobenzene	0.001	ND
Hexachlorocyclopentadiene	0.05	ND
Oxamyl (Vydate)	0.2	ND
Picloram	0.5	ND
Simazine	0.004	ND
2,3,7,8-TCDD (Dioxin)	3.0E-08	ND
Disinfection Byproducts		
Total trihalomethanes (TTHM)	0.08	NT
Haloacetic acids (five) (HAA5)	0.06	NT
Bromate	0.01	NT
Chlorite	1	NT
Radionuclides		
gross alpha	15 pCi/l	NT
radium 226+228	5 pCi/l	NT
gross beta *	4 mrem/yr	NT
Microbiological		
Total Coliform Bacteria:		
40 or more samples per month	No more than 5.0% of the samples may be total coliform positive	
Less than 40 samples per month	No more than 1 sample/month may be total coliform positive.	ND
Fecal Coliform Bacteria:		
An acute violation occurs when		ND
-A total coliform positive routine is followed by a fecal coliform positive repeat, or		
-A fecal coliform positive routine is followed by a total coliform positive repeat		
Turbidity		
Nephelometric Turbidity units = NTU		
at no time water quality > 5 NTU		0.42
Disinfectant Residual	MRDL (mg/L)	
Chlorine	4	NT
Chloramines	4	NT
Chlorine Dioxide	0.8	NT

MW 1 - RESULTS

EPA Contaminants	MCL	Result
Note: List only contains contaminants not listed by State DOH		
Microorganisms	MCL (mg/L)	
Cryptosporidium	0	NT
Giardia lamblia	0	NT
Heterotrophic Plate count	n/a	NT
Legionella	0	NT
Viruses (enteric)	0	NT
Organic Chemicals		
Note: For Acrylamide & Epichlorohydrin, the combination of dose and monomer level shall not exceed		
Acrylamide	0.05% dosed at 1mg/L	NT
Epichlorohydrin	0.01% dosed at 20 mg/L	NT
Radionuclides		
Uranium	30 µg/L	NT
Secondary Water Regulations: Non-enforceable guidelines		
Aluminum	0.05 - 0.2 mg/L	NT
Chloride	250 mg/L	185
Color	15 (color units)	NT
Copper	1.0 mg/L	NT
Corrosivity	noncorrosive	NT
Fluoride	2.0 mg/L	NT
Foaming Agents	0.5 mg/L	NT
Iron	0.3 mg/L	NT
Manganese	0.05 mg/L	NT
Odor	3 Threshold odor number	NT
pH	6.5 - 8.5	7.07
Silver	0.10 mg/L	NT
Sulfate	250 mg/L	NT
Total Dissolved Solids	500 mg/L	NT
Zinc	5 mg/L	NT

Legend:
ND = No Detection
NT = Not Tested

VOC's = Volatile Organic Carbons

MCL = Maximum Concentration Level

AECOS
Temp (°C)
Alkalinity (mg CaCO3/L)
Conductivity
Hardness
Calcium mg/L

State DOH Standards

Contaminant	MCL (mg/l)	MCL (mg/l)
Inorganic Chemicals		
Arsenic	0.01	ND
Asbestos	7million fibers/L (longer than 10µm)	ND
Barium	2	17 [illegible]
Cadmium	0.005	ND
Chromium	0.1	5 [illegible]
Mercury	0.002	ND
Nitrate (as Nitrogen)	10	1.86
Nitrite (as Nitrogen)	1	ND
Total Nitrate & Nitrite (as Nitrogen)	10	
Selenium	0.05	ND
Antimony	0.006	ND
Beryllium	0.004	ND
Cyanide (as free Cyanide)	0.2	ND
Thallium	0.002	ND
Fluoride	4	0.12 mg/l
Copper (Action Level)	1.3	ND
Lead (Action Level)	0.015	ND
Nickel	N/A	ND
Organic Chemicals		
Benzene	0.005	ND
Carbon Tetrachloride	0.005	ND
o-Dichlorobenzene	0.6	ND
para-Dichlorobenzene	0.075	ND
1,2-Dichloroethane	0.005	ND
1,1-Dichloroethylene	0.007	ND
cis-1,2-Dichloroethylene	0.07	ND
trans-1,2-Dichloroethylene	0.1	ND
DCP (1,2-Dichloropropane)	0.005	ND
Ethylbenzene	0.7	ND
Monochlorobenzene	0.1	ND
Styrene	0.1	ND
Tetrachloroethylene	0.005	ND
Toluene	1	ND
1,1,1-Trichloroethane	0.2	ND
Trichloroethylene	0.005	ND
TCP (1,2,3-Trichloropropane)	0.0006	ND
Vinyl Chloride	0.002	ND
Xylenes (total)	10	ND
Dichloromethane	0.005	ND
1,2,4-Trichlorobenzene	0.07	ND
1,1,2-Trichloroethane	0.005	ND

Synthetic Organic Chemicals		
Alachlor	0.002	ND
Atrazine	0.003	ND
Carbofuran	0.04	ND
Chlordane	0.002	ND
DBCP (Dibromochloropropane)	0.00004	ND
2,4-D	0.07	ND
EDB (Ethylene Dibromide)	0.00004	ND
Heptachlor	0.0004	ND
Heptachlor Epoxide	0.0002	ND
Lindane	0.0002	ND
Methoxychlor	0.04	ND
Polychlorinated biphenyls (PCB)	0.0005	ND
Pentachlorophenol	0.001	ND
Toxaphene	0.003	ND
2,4,5-TP (Silvex)	0.05	ND
Benzo(a)pyrene	0.0002	ND
Dalapon	0.2	ND
Di(2-ethylhexyl) adipate	0.4	ND
Di(2-ethylhexyl) phthalate	0.006	ND
Dinoseb	0.007	ND
Diquat	0.02	ND
Endothall	0.1	ND
Endrin	0.002	ND
Glyphosate	0.7	ND
Hexachlorobenzene	0.001	ND
Hexachlorocyclopentadiene	0.05	ND
Oxamyl (Vydate)	0.2	ND
Picloram	0.5	ND
Simazine	0.004	ND
2,3,7,8-TCDD (Dioxin)	3.0E-06	ND
Disinfection Byproducts		
Total trihalomethanes (TTHM)	0.08	NT
Haloacetic acids (five) (HAA5)	0.06	NT
Bromate	0.01	NT
Chlorite	1	NT
Radionuclides		
gross alpha	15 pCi/l	NT
radium 226+228	5 pCi/l	NT
gross beta *	4 mrem/yr	NT
Microbiological		
Total Coliform Bacteria:		
40 or more samples per month	No more than 5.0% of the samples may be total coliform positive	
Less than 40 samples per month	No more than 1 sample/month may be total coliform positive	ND
Fecal Coliform Bacteria:		
An acute violation occurs when		ND
-A total coliform positive routine is followed by a fecal coliform positive repeat, or		
-A fecal coliform positive routine is followed by a total coliform positive repeat		
Turbidity		
Nephelometric Turbidity units = NTU		
at no time water quality > 5 NTU		[illegible]
Disinfectant Residual	MRDL (mg/L)	
Chlorine	4	NT
Chloramines	4	NT
Chlorine Dioxide	0.8	NT

MW - 2 RESULTS

EPA Contaminants

Note: List only contains contaminants not listed by State DOH

Microorganisms	MCL (mg/L)	
Cryptosporidium	0	NT
Giardia lamblia	0	NT
Heterotrophic Plate count	n/a	NT
Legionella	0	NT
Viruses (enteric)	0	NT

Organic Chemicals

Note: For Acrylamide & Epichlorohydrin, the combination of dose and monomer level shall not exceed

Acrylamide	0.05% dosed at 1mg/L	NT
Epichlorohydrin	0.01% dosed at 20 mg/L	NT

Radionuclides		
Uranium	30 µg/L	NT

Secondary Water Regulations: Non-enforceable guidelines		
Aluminum	0.05 - 0.2 mg/L	NT
Chloride	250 mg/L	190
Color	15 (color units)	NT
Copper	1.0 mg/L	NT
Corrosivity	noncorrosive	NT
Fluoride	2.0 mg/L	NT
Foaming Agents	0.5 mg/L	NT
Iron	0.3 mg/L	NT
Manganese	0.05 mg/L	NT
Odor	3 Threshold odor number	NT
pH	6.5 - 8.5	7.24
Silver	0.10 mg/L	NT
Sulfate	250 mg/L	NT
Total Dissolved Solids	500 mg/L	NT
Zinc	5 mg/L	NT

MW - 3 RESULTS

Legend:
ND = No Detection
NT = Not Tested

VOC's = Volatile Organic Carbons

MCL = Maximum Concentration Level

AECOS

Calcium (mg/l)

State DOH Standards

Contaminant		
Inorganic Chemicals	MCL (mg/l)	MCL (mg/l)
Arsenic	0.01	ND
Asbestos	7million fibers/L (longer than 10µm)	ND
Barium	2	19
Cadmium	0.005	ND
Chromium	0.1	5.4
Mercury	0.002	ND
Nitrate (as Nitrogen)	10	1.85
Nitrite (as Nitrogen)	1	ND
Total Nitrate & Nitrite (as Nitrogen)	10	
Selenium	0.05	ND
Antimony	0.006	ND
Beryllium	0.004	ND
Cyanide (as free Cyanide)	0.2	ND
Thallium	0.002	ND
Fluoride	4	0.12
Copper (Action Level)	1.3	ND
Lead (Action Level)	0.015	ND
Nickel	N/A	ND
Organic Chemicals		
Benzene	0.005	ND
Carbon Tetrachloride	0.005	ND
o-Dichlorobenzene	0.6	ND
para-Dichlorobenzene	0.075	ND
1,2-Dichloroethane	0.005	ND
1,1-Dichloroethylene	0.007	ND
cis-1,2-Dichloroethylene	0.07	ND
trans-1,2-Dichloroethylene	0.1	ND
DCP (1,2-Dichloropropane)	0.005	ND
Ethylbenzene	0.7	ND
Monochlorobenzene	0.1	ND
Styrene	0.1	ND
Tetrachloroethylene	0.005	ND
Toluene	1	ND
1,1,1-Trichloroethane	0.2	ND
Trichloroethylene	0.005	ND
TCP (1,2,3-Trichloropropane)	0.0005	ND
Vinyl Chloride	0.002	ND
Xylenes (total)	10	ND
Dichloromethane	0.005	ND
1,2,4-Trichlorobenzene	0.07	ND
1,1,2-Trichloroethane	0.005	ND

MW - 3 RESULTS

Synthetic Organic Chemicals	MCL	Result
Alachlor	0.002	ND
Atrazine	0.003	ND
Carbofuran	0.04	ND
Chlordane	0.002	ND
DBCP (Dibromochloropropane)	0.00004	ND
2 4-D	0.07	ND
EDB (Ethylene Dibromide)	0.00004	ND
Heptachlor	0.0004	ND
Heptachlor Epoxide	0.0002	ND
Lindane	0.0002	ND
Methoxychlor	0.04	ND
Polychlorinated biphenyls (PCB)	0.0005	ND
Pentachlorophenol	0.001	ND
Toxaphene	0.003	ND
2,4,5-TP (Silvex)	0.05	ND
Benzo(a)pyrene	0.0002	ND
Dalapon	0.2	ND
Di(2-ethylhexyl) adipate	0.4	ND
Di(2-ethylhexyl) phthalate	0.006	ND
Dinoseb	0.007	ND
Diquat	0.02	ND
Endothall	0.1	ND
Endrin	0.002	ND
Glyphosate	0.7	ND
Hexachlorobenzene	0.001	ND
Hexachlorocyclopentadiene	0.05	ND
Oxamyl (Vydale)	0.2	ND
Picloram	0.5	ND
Simazine	0.004	ND
2 3 7,8-TCDD (Dioxin)	3.0E-08	ND
Disinfection Byproducts		
Total trihalomethanes (TTHM)	0.08	NT
Haloacetic acids (five) (HAA5)	0.06	NT
Bromate	0.01	NT
Chlorite	1	NT
Radionuclides		
gross alpha	15 pCi/l	NT
radium 226+228	5 pCi/l	NT
gross beta *	4 mrem/yr	NT
Microbiological		
Total Coliform Bacteria:		
40 or more samples per month	No more than 5.0% of the samples may be total coliform positive	
Less than 40 samples per month	No more than 1 sample/month may be total coliform positive	ND
Fecal Coliform Bacteria:		
An acute violation occurs when:		ND
-A total coliform positive routine is followed by a fecal coliform positive repeat, or		
-A fecal coliform positive routine is followed by a total coliform positive repeat.		
Turbidity		
Nephelometric Turbidity units = NTU		
at no time water quality > 5 NTU		0.5
Disinfectant Residual	MRDL (mg/L)	
Chlorine	4	NT
Chloramines	4	NT
Chlorine Dioxide	0.8	NT

MW - 3 RESULTS

EPA Contaminants

Note: List only contains contaminants not listed by State DOH

Microorganisms	MCL (mg/L)	Result
Cryptosporidium	0	[illegible]
Giardia lambia	0	[illegible]
Heterotrophic Plate count	n/a	[illegible]
Legionella	0	[illegible]
Viruses (enteric)	0	[illegible]

Organic Chemicals

Note: For Acrylamide & Epichlorohydrin, the combination of dose and monomer level shall not exceed

Acrylamide	0.05% dosed at 1mg/L	NT
Epichlorohydrin	0.01% dosed at 20 mg/L	NT
Radionuclides		
Uranium	30 µg/L	[illegible]

Secondary Water Regulations: Non-enforceable guidelines

Aluminum	0.05 - 0.2 mg/L	[illegible]
Chloride	250 mg/L	[illegible]
Color	15 (color units)	[illegible]
Copper	1.0 mg/L	[illegible]
Corrosivity	noncorrosive	[illegible]
Fluoride	2.0 mg/L	[illegible]
Foaming Agents	0.5 mg/L	[illegible]
Iron	0.3 mg/L	[illegible]
Manganese	0.05 mg/L	[illegible]
Odor	3 Threshold odor number	NT
pH	6.5 - 8.5	[illegible]
Silver	0.10 mg/L	NT
Sulfate	250 mg/L	[illegible]
Total Dissolved Solids	500 mg/L	[illegible]
Zinc	5 mg/L	[illegible]

Summary of Detections

MW-1

Detections		
Temp (°C)	24.5	
Alkalinity (mg CaCO3/L)	103	
Conductivity (µmho/cm)	865	
Calcium (mg/L)	36	
Turbidity	0.42	NTU
pH	7.07	
Barium	15	µg/L
Chromium	4	µg/L
Nitrate (as Nitrogen)	2.23	mg/L
Fluoride	0.15	mg/L
Chloride	180	mg/L

no infractions

MW-2

Detections		
Temp (°C)	23.2	
Alkalinity (mg CaCO3/L)	88	
Conductivity (µmho/cm)	908	
Calcium (mg/L)	39	
Turbidity	0.54	NTU
pH	6.94	
Barium	17	µg/L
Chromium	5	µg/L
Nitrate (as Nitrogen)	1.88	mg/L
Fluoride	0.12	mg/L
Chloride	190	mg/L

no infractions

MW-3

Detections		
Temp (°C)	23.4	
Alkalinity (mg CaCO3/L)	100	
Conductivity (µmho/cm)	990	
Calcium (mg/L)	42	
Turbidity	0.5	NTU
pH	7.06	
Barium	19	µg/L
Chromium	5.4	µg/L
Nitrate (as Nitrogen)	1.93	mg/L
Fluoride	0.12	mg/L
Chloride	220	mg/L

no infractions

APPENDIX L.

Wastewater Treatment Plant Preliminary Engineering Report

PRELIMINARY ENGINEERING REPORT

for

OHANA KAI VILLAGE SUBDIVISION

WASTEWATER TREATMENT FACILITY

Ma'alaea, Maui, Hawaii

TMK (2) 03 - 06 - 001: 018

Prepared by:

Engineering Dynamics Corp.
66 Wailani St.
Wailuku, Hawaii 96793

DOUGLAS L. GOMES LICENSED PROFESSIONAL ENGINEER No. 3646-C HAWAII, U.S.A.

This work was prepared by me or under my supervision.

Douglas L. Gomes, P.E.

October 16, 2009

This report is an "instrument of service" and is part of an integrated process of technical design. Use outside this process is inappropriate and transfer of its observations, conclusions, or methodology to any other work may have serious consequences. Definitions used have only the meanings in the context employed.

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LIST OF EXHIBITS

1.01 Purpose

This report was prepared to identify the method, process, and facilities that would be best suited to treat the wastewater from the proposed Ohana Kai Village Subdivision and the dispose method for the effluent resulting from such treatment process.

1.02 Project Description

The Ohana Kai Village Subdivision will be the results of the development of a 257 acres parcel of land located between Ma'alaea and the Waikapu Community. The development will contain approximately 1,100 single family residential units, a 16 acre school and park site, a 7 acre commercial site and significant open space along the existing natural drainage ways and the 120 foot wide highway buffer strip. The commercial site will be used for office/retail, restaurant, and a gas station. Approximately 7 acres will be used for the proposed wastewater treatment facilities. The project will be constructed in phases probably taking several years to complete. See Exhibits 1, 2 and 3 for site location.

1.03 Existing Conditions

The subdivision site borders the North side of the Hono'api'ilani Highway and the West Maui Mountains with a roadway frontage of approximately 8,900 linear feet. The depth of the lot ranges between 800 ft. to 1900 ft. The Means Seal Level (MSL) elevation ranges between 40 ft. at the South end and 210 ft. at the North end of the project site. The site slopes between 5 percent adjacent to the highway and up to 16 percent at the higher elevations.

According to the Soil Conservation Services, Soil Survey of the Island of Kauai, Oahu, Maui, Molokai and Lanai, the soil classifications is Ewa Series (EsB and EtB) and Pulehu Series (Ptb). These are well drained soils on alluvial fans of silty clay loam with cobblestone in the surface layers. Runoff is slow to medium and erosion hazard is slight to moderate.

The wastewater treatment site is located at the Southern end of the project site immediately adjacent to the Hono'api'ilani Highway. The site ranges in elevation between 50 ft. and 80 ft. MSL and has an average slope of 7 percent.

An existing drainage ditch runs along the South East boundary and intercepts all drainage run-off from the adjacent higher elevations from entering the site. A new open drainage retention basin which will be constructed between the existing highway and the treatment facility site to accept some of this run-off.

1.04 Design Standards

This Preliminary Engineering Report will be prepared in accordance with the following standards and references:

1. State of Hawaii, Title 11, Chapter 62 Wastewater Systems.
2. State of Hawaii, Guidelines for the Treatment and Use of Recycled Water.
3. City & County of Honolulu, Design Standard of the Dept. of Wastewater Management, Volume 1, July 1993.
4. Maui County Codes.

1.05 Estimated Wastewater Design Flows

Basis of Design

Type of Use	Contribution per unit	Total No. of Persons*
Single Family Residence (4 persons / residence)	400 gpd/unit	4,400 residence**
Elementary School	15 gal/student/day	700 students
Commercial - Office and Retail	20 gpcd	500 employees & customers
Restaurant	80 gpd/seat	100 seats
Gas Station	5 gpcd	100 employees & customers
Fire Station	100 gpcd	10 employees
Park Restroom	5 gpcd	200 persons
	Total Design Population	**6,010 persons**

* Persons using restroom
**1,100 residential homes x 4 persons/residence = 4,400 persons

Estimated Average Daily Wastewater Flows

Type of Use	Design x Unit Fow	Total Contribution
Single Family Residence	1,100 units x 400 gpd/unit	440,000 gpd
Elementary School	700 students & staff x 15 gpd	10,500 gpd
Commercial-Office & Retail	500 persons x 20 gpcd	10,000 gpd
Restaurants	100 seat x 80 gpd/seat	8,000 gpd
Gas Station	100 person x 5 gpcd	500 gpd
Fire Station	10 persons x 100 gpcd	1,000 gpd
Park Restroom	200 persons x 5 gpcd	1,000 gpd
	Average Daily Flow	**471,000 gpd**

Maximum Wastewater Flow

Qmax:	Total Maximum Wastewater Flow
Average Daily Flow:	471,000 gpd
Maximum Flow Factor MFF (based on Babbitt):	3.54

Qmax = Avg Daily Flow x MFF
Qmax = 471,000 gpd x 3.54
= 1,667,340 gpd

Wet Weather Infiltration

Q wwinfilt:	Total Wet Weather Infiltration
Wet Weather Infiltration (above water table):	1250 gad
Development Area:	257 acres

Q wwinfilt = Acres x gad
Q wwinfilt = 257 acres x 1250 gad
= 321,250 gpd

Peak Design Flow Rate

Q pk: Peak Design Flow Rate

Q pk = Qmax + Qwwinfilt
Q pk = 1,667,340 + 321,250
= 1,988,590 gpd

1.06 Sewage Characteristics

The anticipated sewage characteristics will be similar to most typical residential subdivision and assumed to have the following characteristics

Description	Loading
5-day Biochemical Oxygen Demand (BOD)	0.20 lb/day per capita
Total Suspended Solids (TSS)	0.20 lb/day per capita
Chemical Oxygen Demand (COD)	0.48 lb/day per capita
Total Kjedahl Nitrogen (TKN)	0.03 lb/day per capita
Total Phosphorous (TP)	0.008 lb/day per capita

Design Loading for New Wastewater Treatment Facilities

BOD = 6,010 persons x 0.20 lb/day per capita
= 1,202 lb/day
TSS = 6,010 persons x 0.20 lb/day per capita
= 1,202 lb/day

1.07 Collection System

The proposed sewage collection system within the development will be designed and constructed in accordance with the Design Standards of the Division of Wastewater Management, City and County of Honolulu. Gravity sewer lines will consist of 6-inch, 8-inch, and 10-inch diameter PVC pipe material. Slopes will be set to provide a minimum velocity of 2 feet per second when flowing full and set not to exceed 10 feet per second maximum velocity.

Manholes will be spaced at not greater that 350 feet apart and shall be of pre-cast concrete with an internal liner that will resist corrosion.

1.08 Treatment Facilities

The wastewater treatment facility will utilize the activated sludge process with secondary and tertiary treatment to produce R-1 effluent which will be used for surface irrigation of the subdivision's open spaces including the highway setback, the drainage ways, and the park site.

Conventional Activated Sludge process typically utilizes an aeration tank, secondary settling tank, with a sludge recycle line. The volumetric loading ranges between 20 to 40 lb. BOD/ 1000 cu. ft. and hydraulic detention time between 4 and 8 hours. Depending on the size of the plant, sludge can be treated either by aerobic or anaerobic digestion.

Sequential Batch Reactor (SBR) process is also an activated sludge process where all treatment processes occur in one tank. Fill, reaction (aeration), settling, decanting and idle all occur in the same tank. Aeration times generally ranges between 60 and 90 minutes. The fill and draw principle provides the advantages of elimination of a separate clarifier and sludge return lines, increased settling area, quiescent settling, and the ability to handle high organic and hydraulic loads. SBR produces more sludge because of the short retention time and the effluent is of low quality than the other processes.

Extended Aeration Process utilized the endogenous respiration phase and therefore requires low organic loading and long aeration periods. BOD loading ranges between 10 and 25 lb per 1000 cu. ft. and the hydraulic detention time ranges between 18 to 36 hours. Sludge is usually treated during the aerobic digestion process. This type of system is usually provided by pre-fabricated package plants with average design flow of 1 mgd or less.

1.09 Proposed Wastewater Treatment

The Ohana Kai Village Subdivision WWTF will be designed in accordance with:
State of Hawaii, Title 11, Chapter 62, Wastewater Systems.
State of Hawaii, Dept. of Health, Guidelines for the Treatment and Use of

Recycled Water.
Design Standard of the Division of Wastewater Management for the City and County of Honolulu.

The treatment process will utilize the extended aeration process with tertiary treatment to produce R-1 water which will be used to irrigate the buffer areas, park landscape and drainage areas within the subdivision. Two open storage reservoirs (with impervious liner) will be used to store the treated effluent before usage. Multiple injection wells will also be provided to dispose of the excess effluent during long period of rainfall. This would prevent any effluent run-off from occurring.

The treatment units will consist of multiple (between 4 and 5) pre-fabricated extended aeration package plants each consisting of a flow equalization basin, extended aeration basin, final settling basin, aerobic digestion basin, chlorine contact tank, direct filtration equipment (or possible MBR) and disinfection equipment with use of hypochlorite solution or Ultra-Violet units (UV)

1.10 Design Criteria

Aeration Tank Loading	12.5 lb/ 1000 cu. ft.
	18 hours hydraulic retention
Average Final Settling Flow:	not less than 4 hours of retention time
	not to exceed 300 gpd/ sf surface overflow
Disinfection	Chlorination or UV
Filtration	Multi-media or MBR
Sludge Holding	minimum of 20 days
Effluent	less than 30 mg/L BOD5
	less than 30 mg/L Suspended Solids

1.11 Influent Screening and Flow Equalization

The wastewater entering the facility will first be passed through bar screens to remove all large materials such as rags, plastic and tissue that could plug the downstream processing. The screened material will be washed and collected into a storage bin for periodic removal to the land fill.

Due to the elevation the sewer lines entering the treatment facilities and the elevation of the treatment facility site, a lift station will be provided to transfer the screened sewage to the influent channel of the packaged treatment units. A double retention basin with multiple variable speed sewage submersible pumps will be used to provide flow equalization.

Flow equalization will also be provided at each of the individual pre-fabricated package plants. Flow equalization will minimize the impact of peak flows and wet weather infiltration from flushing out the biological solids and reducing the treatment efficiency.

1.12 Aeration Tank Sizing (volume at full build out)

Total Suspended Solids:	1,202 lb/day
Lb/ 1,000 cu. ft.:	12.5 lb
Volume:	7.48 gal/ cu. ft.

Vat = TSS / lb / 1,000 cu. ft
= 1,202 lb./day / 12.5 lb./ 1000 cu. ft.
= 96,160 cu. ft.
Vat gallons: Vat cu. ft. x Volume
= 96,160 x 7.48
= 719,276 gallons

Air Requirements

lb of Oxygen / lb BOD:	1.8
lb BOD/day:	1,202
Air:	0.075 lb/ cu. ft.
O2:	20% of air
Oxygen Transfer Efficiency:	6% (course bubble)
Minutes / day:	1,440

Vair = lb O2/ lb BOD x lb BOD/day / Air x O2 x O2 transfer eff. x min/day
= 1.8 x 1,020 / 0.075 x 0.20 x 0.06 x 1,440
= 1,669 cfm

Air Required for Tank Mixing:	20 cfm/1000 cu. ft. (spiral roll mixing)
Vat:	96,160 cu. ft.

Vair = Vat / air required for tank mixing
= 96,160 cu. ft. /1000 cu. ft. x 20 cfm/1000 cu. ft.
= 1,923 cfm

1.13 Final Settling (volume at full build out)

Minimum Volume

Average Daily Flow:	471,000 gpd
Daily Time Period:	4 hours / day (24 hours)
Volume:	7.48 gal/ cu. ft.

Vfs = Average Daily Flow / Daily Time Period
= (471,000 gpd / 4/24 hr/day) / Volume
= 78,500 gallons / 7.48
= 10,495 cu. ft.

Minimum Surface Area

Average Daily Flow:	471,000 gpd
Average Final Settling flow:	300 gpd/sq. ft.

Afs = Average Daily Flow / final settling
= 471,000 gpd / 300 gpd/ sq. ft.
= 1,570 sq. ft.

1.14 Aerobic Digestion - Sludge Holding (volume at full build out)

Lbs/ Day:	1,202 lbs/day
% Volatile Solids:	70 %
Sludge Production / lb BOD:	0.65 lbs
% Sludge Concentration:	1.5 %
Water Density:	8.34 lbs/ gal.

Tank Loading Volatile Suspended Solids (less than 100 lb/1000 cu. ft./ day)

Alternate 1
Vad = Lbs/day x Sludge Production/lb BOD / 100 lb/1,000 cu. ft. x 1,000
= 1,202 lb/day x 0. 65/lbs/lb / 100 lb/1000 cf x 1,000
= 7,813 cu. ft.

Alternate 2
Vad = lb/day x % Volatile Solids x Sludge Prod. / lb BOD / % Sludge Concentration / Water Density
= 1,202 lb/day x 0.70 lb/lb x 0.65 lb/lb / 0.015 / 8.34 lb/gal
= 4,371 gpd

Over a 20 Day Retention Period

Vad per Day:	4,371 gpd
Retention Period:	20 days

Vad = Vad / day x Retention Period
= 4,371 gpd x 20days
= 87,438 gallons

Volume over a 20 Day Retention Period

Total Gallons (20 days):	87,438 gallons
Volume gal/ cu. ft.:	7.48 gal/cf

Vad = gpd (20 day period) / gal/ cu. ft.
= 11,689 cu ft.

Provide 11,689 cu. ft for the Aerobic Digestion Tank

It is anticipated that each package treatment units will consist to two-70,000 gpd units for a total of 140,000 gpd. Based on four phase the total capacity will be 560,000 gpd. This arrangement will allow one complete 70,000 gpd unit to be off-line for repairs and maintenance and still have sufficient capacity to threat the full developement design average flow. The volumes of these tanks will be adjusted to meet the above stated design criteria for each component.

1.15 Sludge Handling

Approximately 840 lbs/day (dry weight) of sludge will be generated per day at full development. The aerobically digested sludge will be de-watered on site with the use of multiple screw presses or belt presses. Provisions for adding coagulants or polymer for flocculation of the sludge prior to dewatering will be provided. A separate building will be provided for the de-watering equipment and storage of flocculent chemical supplies. The de-watered sludge will be hauled to the County landfill site where EKO Composting will process the collected into recyclable composting material.

1.16 Air Blowers

Multiple air blowers will be provided to supply air to the flow equalization tanks, aeration tanks, aerobic digestion tanks, as well as air lift pumps with will be used to transfer settled sludge to the aeration tank or to the digestion tanks. The blowers will be located in a blower equipment room in the support building to protected them from exposure to the elements and provide reduced noise levels to adjacent properties. Sufficient blower capacity will be provided to insure that more than adequate amount of supply air would be provided should one air blower be out of operation.

1.17 Tertiary Treatment

Tertiary treatment will be designed to meet applicable required of the Guidelines for the Treatment and Use of Recycled Water.

With the use of high rate sand/media filters, chemical coagulation for flocculation will be provide prior to direct filtration. Multiple filtrations units will be provided to handle peak flow rates with one unit in standby mode and one unit in back flushing mode. Continuous recording of turbidity will be provided before and after filtration.

Disinfection equipment will be provided by use of multiple ultra-violet units. The units will be sized to handle peak flow rates with one unit in standby mode.

A small sodium hypochlorite system utilizing liquid or solid tablets will be provided to control algae growth in the effluent holding ponds and shock treatment of the injection wells.

1.18 Support Facilities

A control building will be provided to accommodate an office for the supervisory and maintenance staff. Laboratory facilities will also be provided along with the necessary equipment to do all required testing to maintain quality control of the treatment process.

The control building will also house the emergency standby generator, motor control center, restroom, locker facilities and storage for maintenance supply and spare parts. The generator will be sized to handle the entire electrical load of the treatment facilities including the effluent irrigation wells.

A Supervisory Control and Data Acquisition (SCADA) system with remote sensors and controls will be located throughout the treatment facility. This will allow the operator to monitor, record and control the operations of the entire facilities. The SCADA system will utilize a desktop computer with multiple monitors and with internet connection to allow remote monitoring of the system.

Provisions will also be made to connect into a SCADA system that will be provided for the community water system.

The control building as well as the sludge dewatering building will be constructed of concrete masonry with wood or metal truss roof. Sound attenuation material will be provided to keep the sound level of all the equipment to a minimum acceptable decibel levels.

A solar hot water storage system will be provided for hot water to the staff showers. Consideration to provide photovoltaic panels will be made to help reduce the electrical demand and consumption needed to run all of the electrical equipment.

1.19 Odor Control

Offensive odors are not expected from the proposed treatment process, however should this become a problem due to system upset, the processing tank can be covered with plastic panel covers that would allow the odors to be contained, collected and neutralized with odor scrubbing equipment.

1.20 Effluent Reuse

The effluent reuse system will be designed and constructed in accordance with the Guidelines for and Treatment and Use of Recycled Water. All proper treatment, materials, signage, testing and monitoring will be provided.

The treatment process will utilize a tertiary process that will produce R-1 quality effluent that would be suitable for landscape irrigation use. There will approximately 45 acres in the roadside buffer, drainage and park areas that can use the R-1 effluent for irrigation. During the build-out of the proposed subdivision, much of this effluent could also be used on established ground cover in all the graded areas and used for dust control in the active construction of lot and roadway grading. At the completion of the full build-out of all the lot sites, it will be necessary to utilize an alternate means of disposal such as injection wells. This will be particularly necessary during the rainy months from December through April when landscape irrigation will be curtailed to prevent run-off of the effluent.

1.21 Injection Wells

The wastewater treatment site is below the State Underground Injection Control Line (UIC Line) therefore the use on injections will be considered as an alternate means of effluent disposal. A minimum of two (possibly three or four) injection wells will be provided to dispose of excess effluent. Both the primary and secondary injection wells systems will be sized to handle the peak flow rate. Monitoring and recording of flow into the injection well will be provided.

1.22 Site Improvements

The wastewater treatment site will be enclosed in a 6 ft. high chainlink fence for security reasons. The site will have asphaltic concrete paved roadways to access all of the treatment units and equipment. The site will be provided with lighting to access all equipment areas at night should it be necessary. The site will be graded to direct all rain-fall away from the treatment units, equipment and structures. Areas around and between the treatment units and between other equipment and structures will be graveled to provide a clean and easily maintained site. Perimeter landscaping and shade trees will be provided at the parking areas as required by local codes.

1.23 Phasing of Subdivision and WWTF Construction

The subdivision will be constructed in several phases with 150 to 200 residential units being constructed per phase. The residential subdivision, including the school and park site and commercial areas will probably take 8 to 10 years to be full developed.

The phased construction of the Wastewater Treatment Facilities must precede the subdivision development to insure that the infrastructure is in place to accept the sewage from the residences when occupancy begins.

1.24 Permits

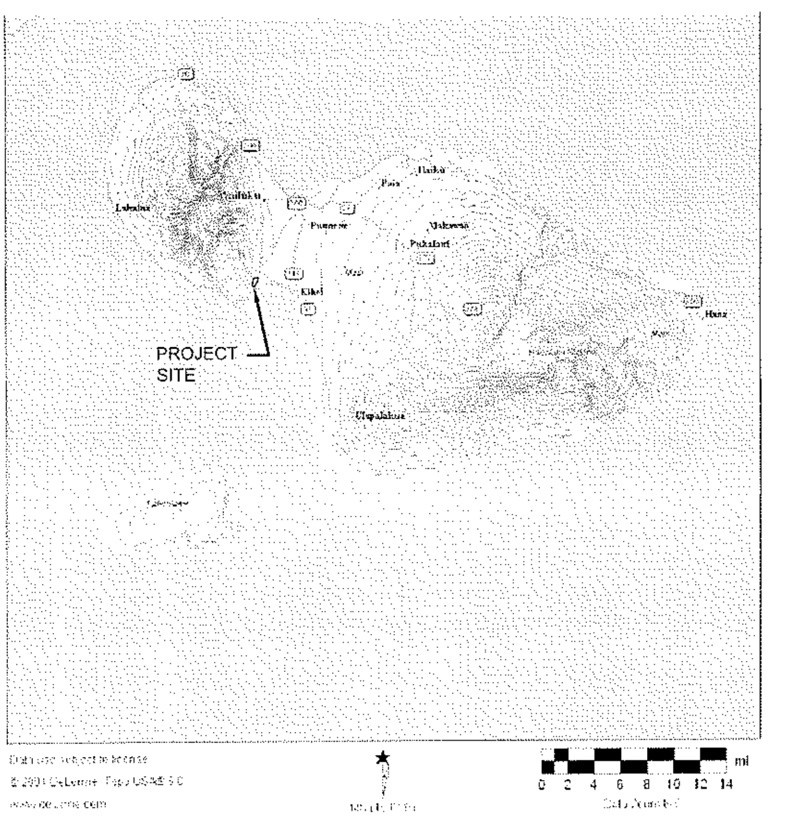
This project development may be subject to the following permit/ approval requirements:

NPDES Storm water, Construction Dewatering and Hydro testing Permits
Underground Injection Control (UIC) permit
Grading Permit
Building Permits
Plumbing and Electrical Permits
Pressure Vessel and Boiler Permit
Aboveground Fuel Storage Permit
Department of Health (DOH) Approval to Construct the Wastewater System
DOH Wastewater Operations Permit
DOH Permit to Operate a Water Reuse Project
Department of Army (DA) Permit
Section 401 Water Quality Certification and Coastal Zone Management Consistency Review Approval
State Land Use Commission (SLUC) Special Use Permit (SUP)
County Conditional Use Permit

Acronym Table

Afs	Area Final Settling
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
cu. ft.	Cubic Feet
DA	Department of Army
BOD 5	5 Day BOD
DOH	Department of Health
gal	Gallons
gal/ cf	Gallons per Cubic Feet
gpcd	Gallons per Capita per Day
gpd	Gallons per Day
lb or lbs	Pounds
lb BOD	Pounds BOD
lb BOD/ day	Pounds Biochemical Oxygen Demand per day
MBR	Membrane Bio Rector
MFF	Maximum Flow Factor
mg/L	Million Gallons per Liter
mgd	Million Gallons per Day
MSL	Mean Sea Level
O2	Oxygen
Q pk	Peak Design Flow Rate
Qmax	Total Maximum Flow Factor
SBR	Sequential Batch Reactor
SCADA	Supervisory Control and Data Acquisition
sf or sq. ft.	Square Feet
SLUC	State Land Use Commission
SUP	Special Use Permit
TKN	Kjedahl Nitrogen
TP	Total Phosphorous
TSS	Total Suspended Solids
UIC	Underground Injection Control
UV	Ultra-Violet
Vad	Volume of Aerobic Digester
Vair	Volume of Air
Vat	Volume of Aerobic Tank
Vfs	Volume of Final Settling
wwinfilt	Wet Weather Infiltration
WWTF	Wastewater Treatment Facility

EXHIBITS



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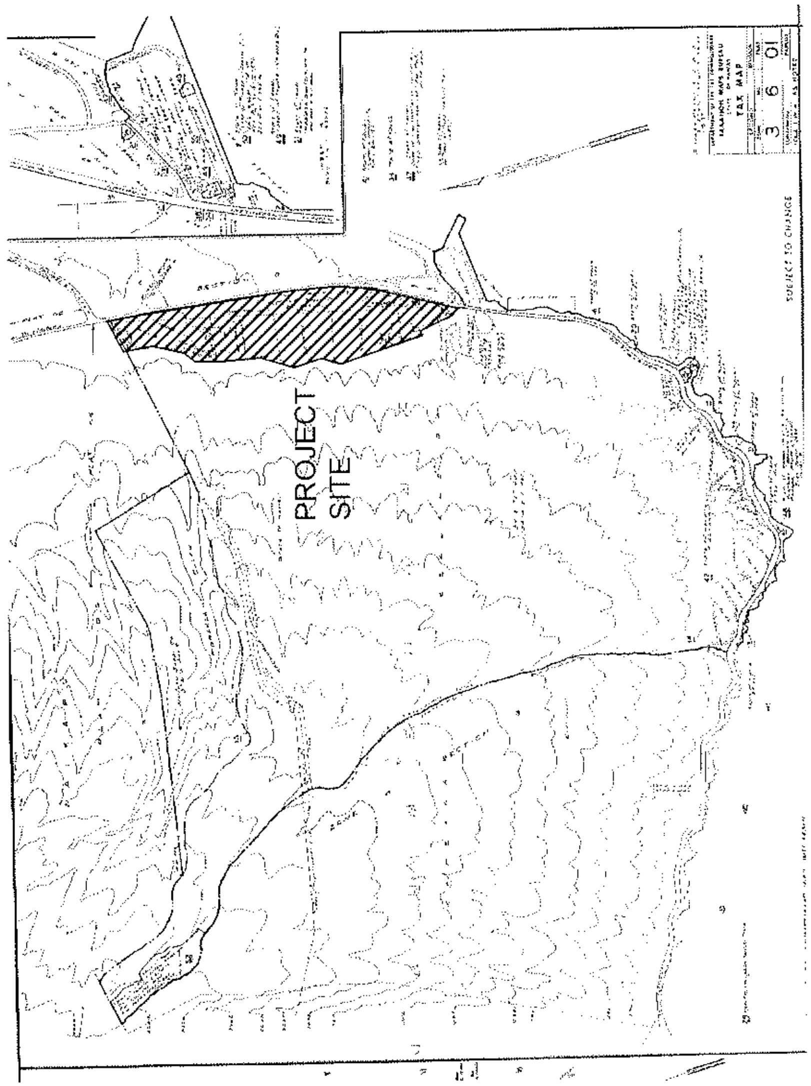

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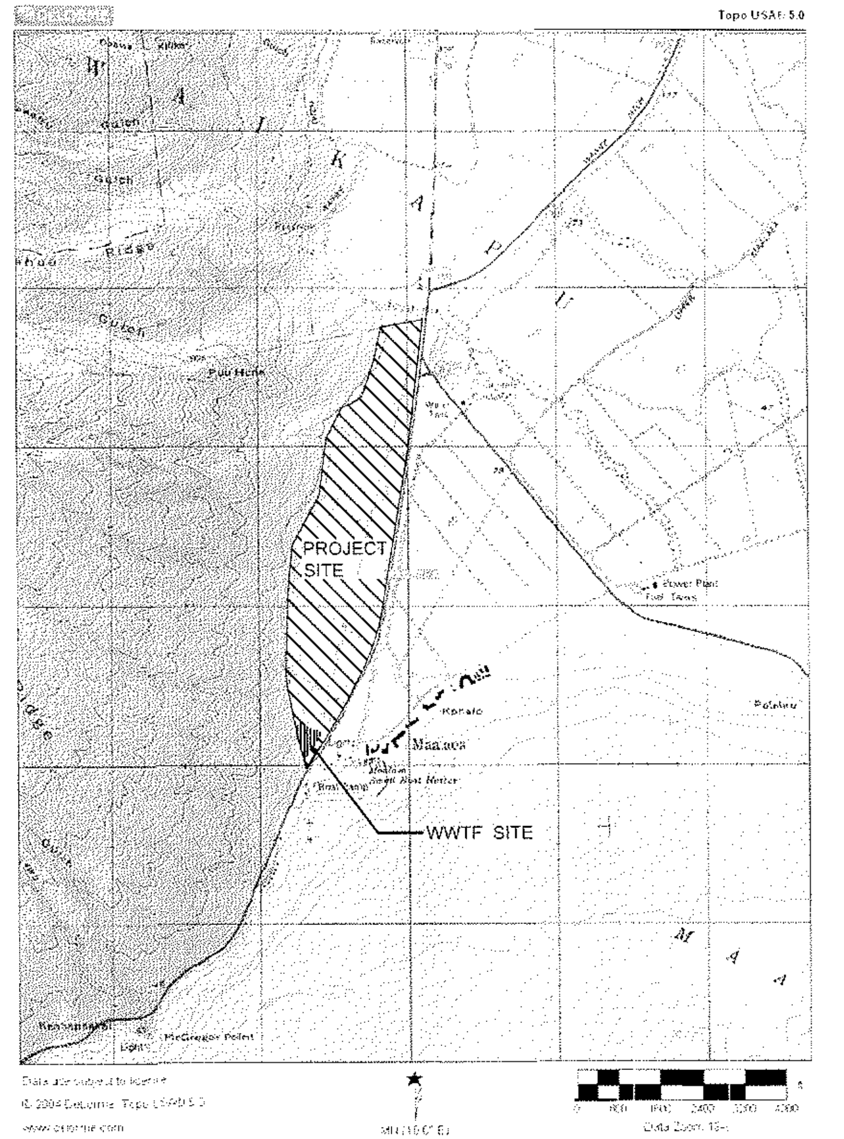

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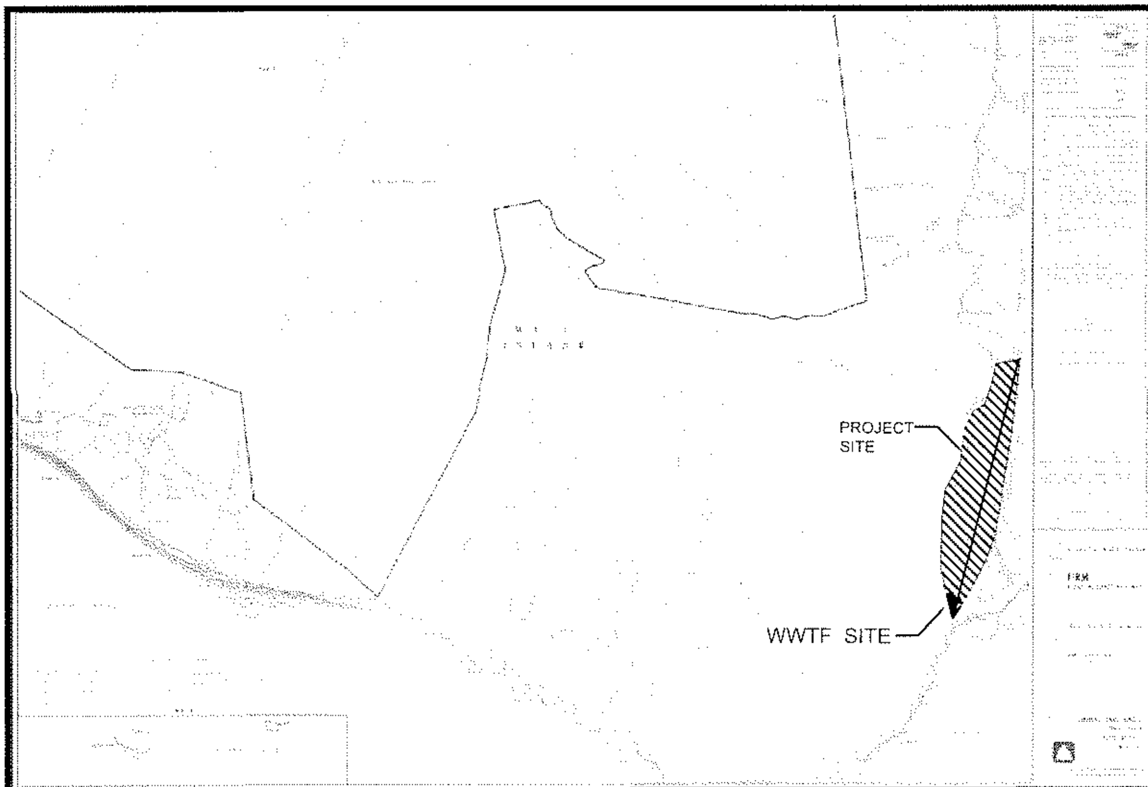

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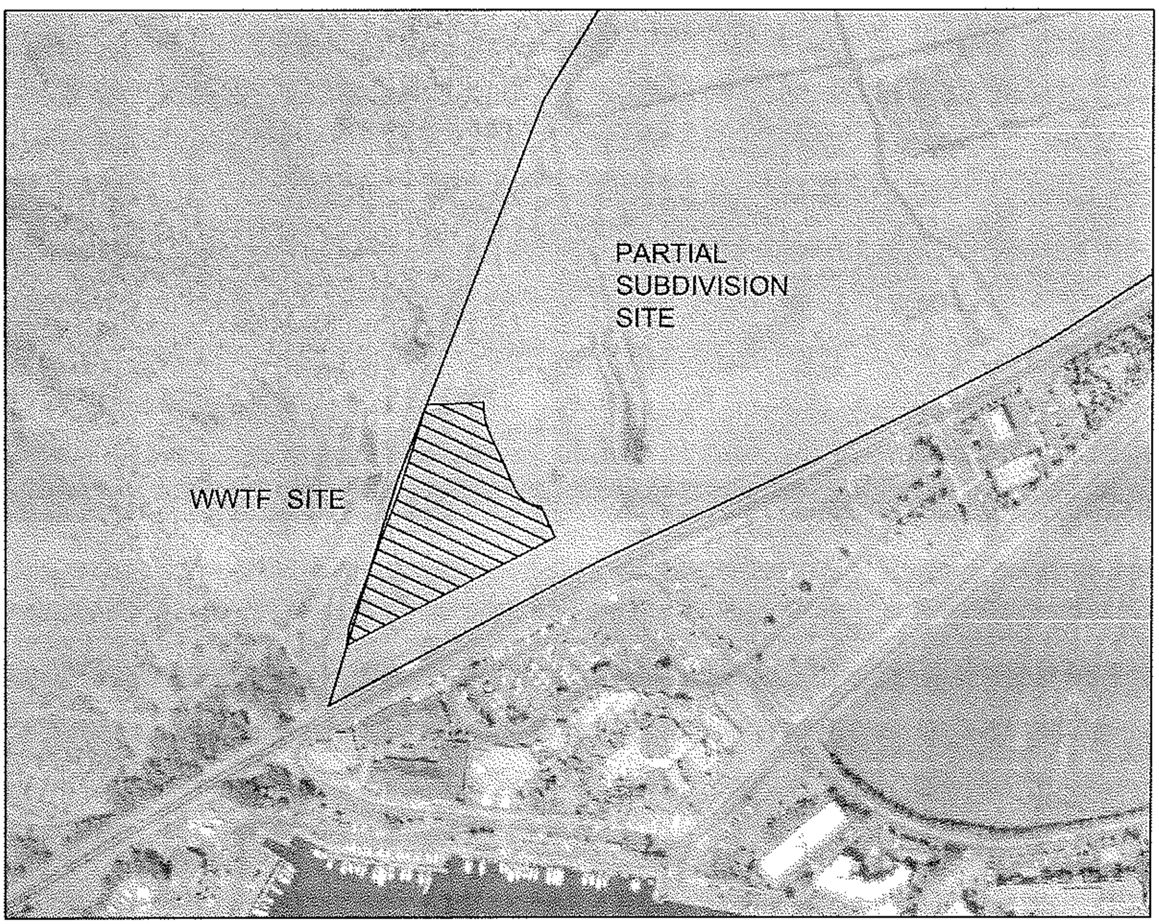

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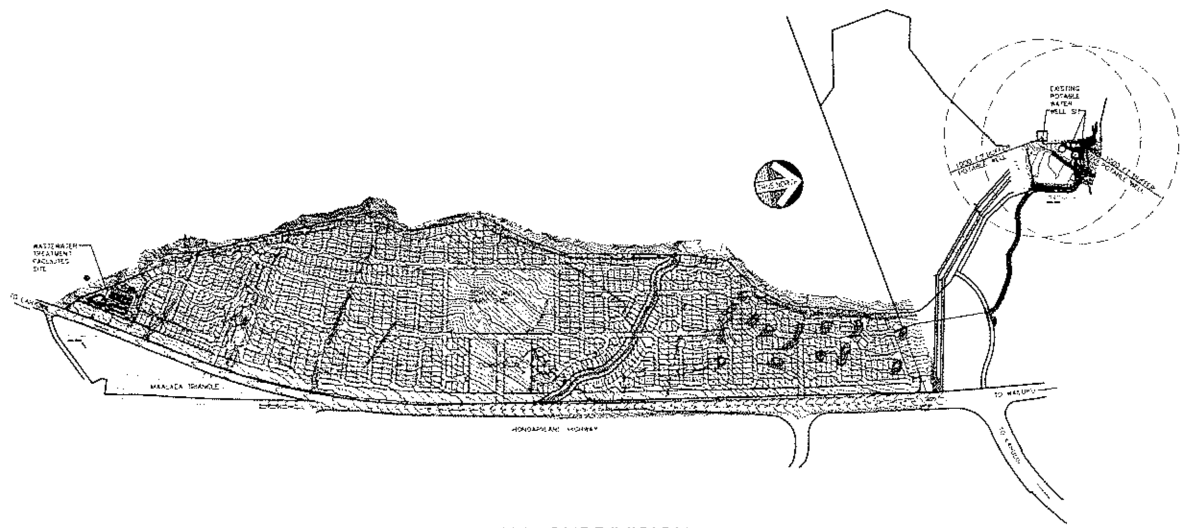
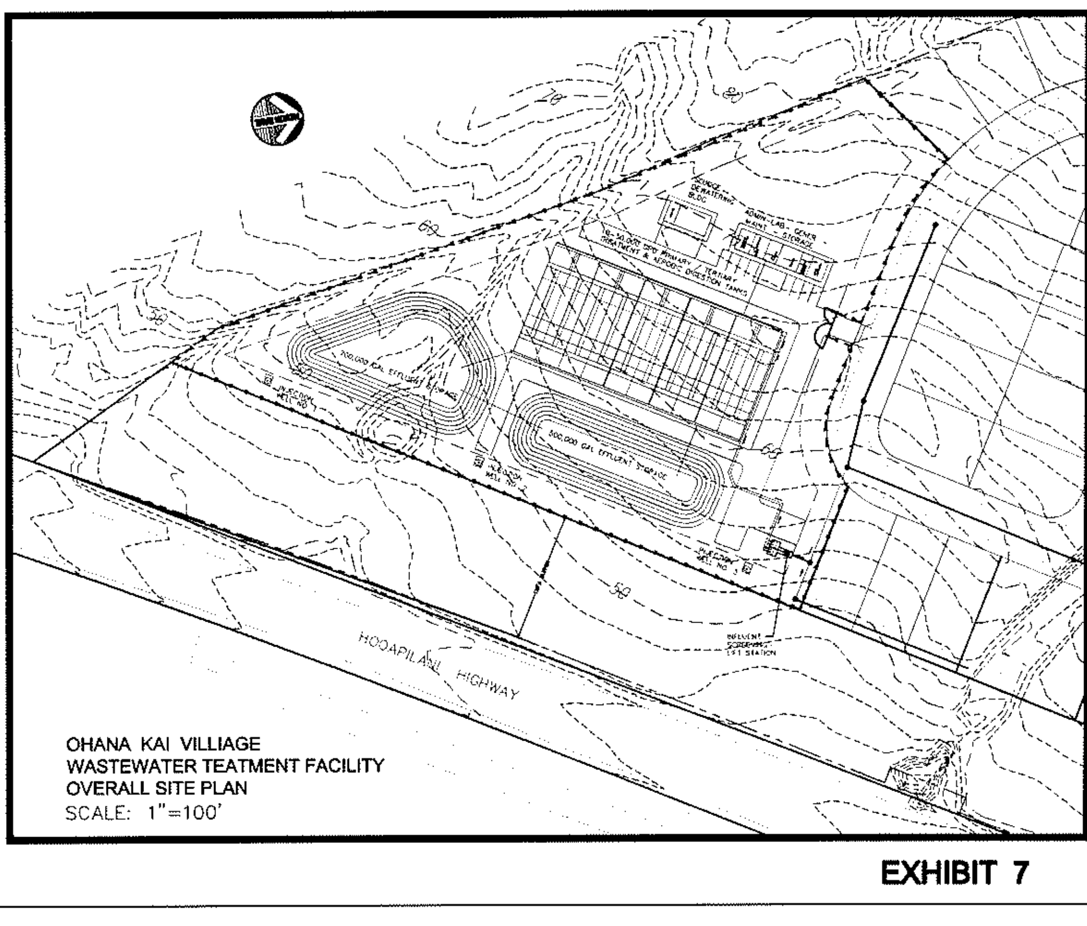


OVERALL SUBDIVISION
DEVELOPMENT PLAN

EXHIBIT 6



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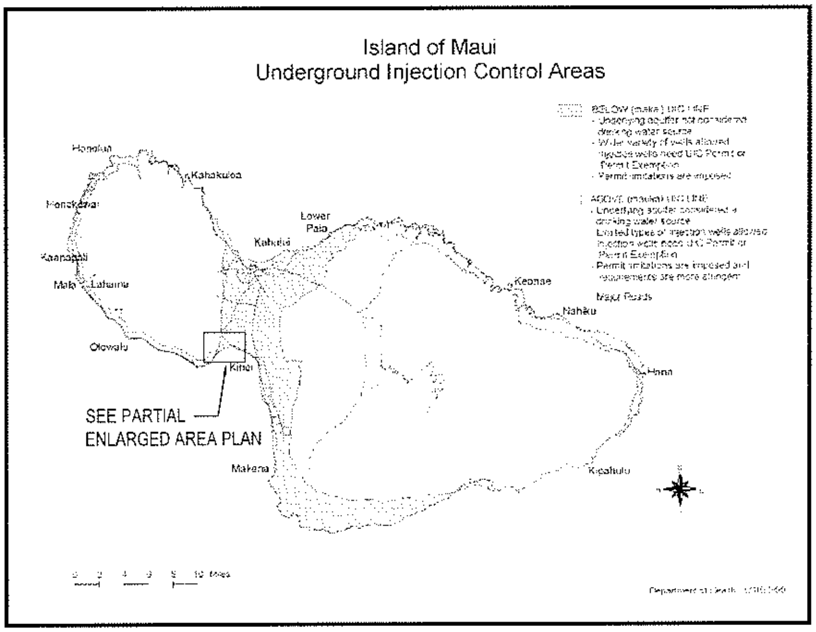
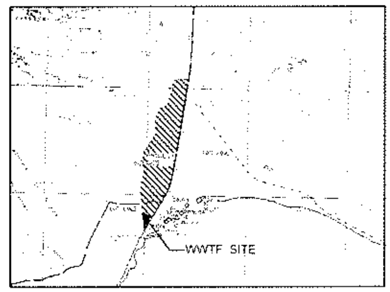
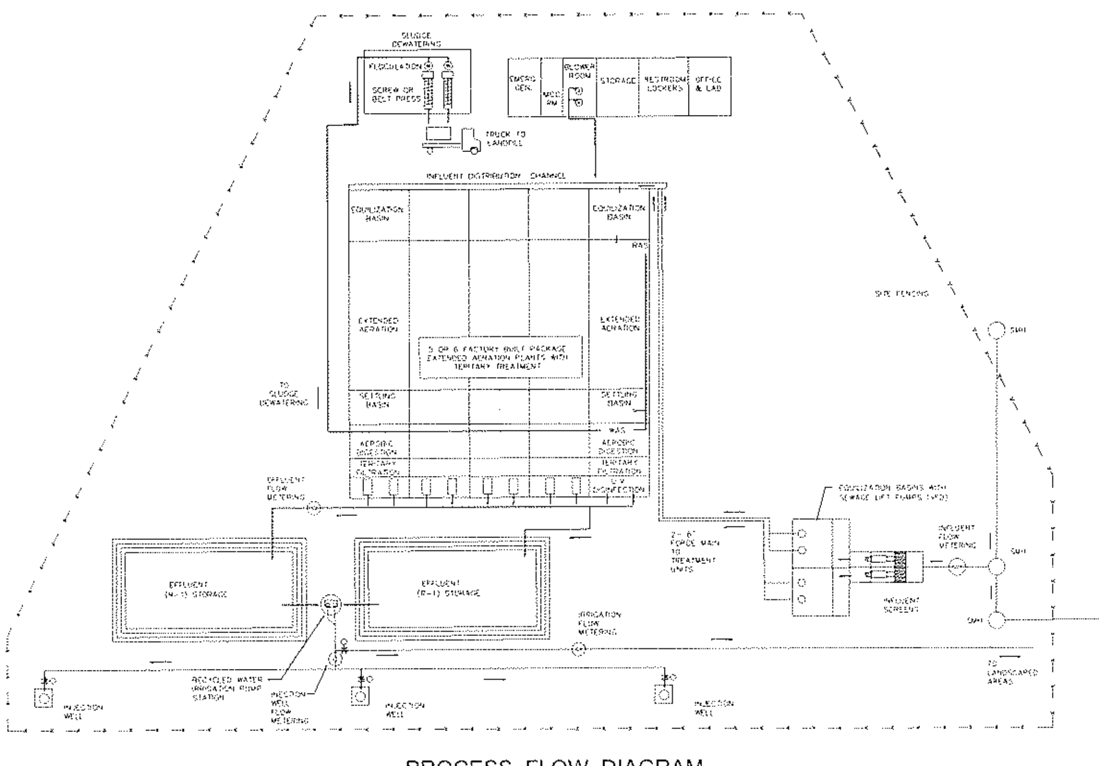




PARTIAL ENLARGED AREA
FROM UIC PLAN

EXHIBIT 8



PROCESS FLOW DIAGRAM

EXHIBIT 9

APPENDIX M.

Preliminary Drainage Report

PRELIMINARY DRAINAGE REPORT

FOR

OHANA KAI VILLAGE SUBDIVISION

Maalaea, Maui, Hawaii

T.M.K.: (2) 3-6-001: 018

Prepared For:

MVI, LLC
P.O. Box 97
Kihei, Maui, Hawaii 96753

STACY A. OTOMO
LICENSED PROFESSIONAL ENGINEER
No. 5115-C
HAWAII, U.S.A.

Stacy A. Otomo

Prepared By:

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

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PRELIMINARY DRAINAGE REPORT
FOR
OHANA KAI VILLAGE SUBDIVISION
Maalaea, Maui, Hawaii

I. INTRODUCTION

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

II. SITE LOCATION AND PROJECT DESCRIPTION

The subject parcel is identified as T.M.K.: (2) 3-6-001: 018 containing approximately 260 acres. It is bordered by unused agricultural lands to the north, Honoapiilani Highway to the east, and State conservation land to the south and west.

The proposed project consists of developing approximately 1,100 single family residences, with lot sizes ranging in size from 5,000 square feet to 10,600 square feet. The project will also consist of a commercial area and a park/school site. Proposed improvements include roadways, underground water, sewer, drainage, electrical, and telephone systems, landscaping and greenways for other recreational uses. The project will require the construction of an onsite wastewater treatment plant and offsite potable water source and storage facilities.

III. EXISTING TOPOGRAPHY AND SOIL CONDITIONS

The existing ground slopes in an northwest to southeast direction from elevation 210 feet above mean sea level at the north western corner of the property to elevation 40 feet at Honoapiilani Highway (southeastern boundary), with an average slope of approximately 5.5%. The project site is currently vacant and previously used for cultivating sugar by the Wailuku Agribusiness Company and more recently used by small independent farms along the northern portion of the project site.

According to the "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii (August, 1972)," prepared by the United States Department of Agriculture Soil Conservation Service, the soils within the project site are classified as Ewa Silty Clay (EsB), Ewa Cobbly Silty Clay (Etb), Pulehu Cobbly Clay Loam (PtB), and Stony Alluvial Land (rSM). Ewa Silty Clay, 3 to 7 percent slopes, is described as having very slow runoff with no more than slight erosion hazard. Ewa Cobbly Silty Clay and Pulehu Cobbly Clay Loam is characterized as having moderate permeability and slow runoff with a slight

erosion hazard. Stony Alluvial Land is high in permeability and consists of stones, boulders, and soil deposited by streams along the bottom of gulches and on alluvial fans.

IV. EXISTING DRAINAGE CONDITIONS

There are no drainage improvements within the project site, however there are several unnamed drainageways that traverse the site in the west to east direction which direct both onsite and offsite surface runoff towards Honoapiilani Highway.

It is estimated that the present onsite runoff for a 100-year, 24-hour storm from the entire project site is approximately 790 cfs and approximately 138 acre-ft. of runoff volume. As previously mentioned, onsite and offsite runoff sheet flows in a west to east direction across the project site. When the runoff reaches the Honoapiilani Highway along the makai or eastern boundary it enters the State Department of Transportation drainage system. The DOT drainage system consists of grated inlet catch basins and inlet headwall structures which intercept surface runoff and conveys it under the highway via six larger concrete box culverts and several smaller drainage culverts. From the makai side of the highway, runoff continues downstream through various drainage systems and ultimately discharges into Maalaea Harbor.

V. FLOOD AND TSUNAMI ZONE

According to Panel Number 150003 0235B of the Flood Insurance Rate Map, June 1, 1981, prepared by the United States Federal Emergency Management Agency, a majority of the parcel is situated in Flood Zone C. Flood Zone C represents areas of minimal flooding. Two small portions of the parcel within the existing drainageway are designated in Flood Zone B. Flood Zone B represents areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one foot; or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood.

VI. PROPOSED DRAINAGE PLAN

It is estimated that the post development runoff from the project site for a 100-year 24-hour design storm will be 1,228 cfs and approximately 166 acre-feet of runoff volume, creating an increase of 435 cfs and 28 acre-feet of runoff volume.

Runoff from the project site will be collected by curb-inlet catch basins and conveyed to the onsite retention basins at the lower portion of the parcel adjacent to Honoapiilani Highway. Overflow from the retention basins will be directed towards the existing drainage culverts along the highway to continue downstream along the existing drainage patten at no greater than pre-development rates. The retention basins will be sized to accommodate at least the increase in surface runoff volume due to the proposed development.

Immediately mauka of the project site is State owned conservation land. If possible and can be achieved, MVI, LLC would like to utilize a strip along the western boundary within the State land as a greenway, fire buffer and offsite retention area. If allowed, retention basins will be constructed near the existing drainageways to help reduce the offsite runoff from entering the project site. The proposed improvements may also include a low berm along the property boundary as an additional measure to retain offsite runoff and direct overflow towards the existing drainageways prior to entering the project site. Three of the existing drainageways traversing the project site will remain in its existing condition except at road crossing where appropriate sized drainage culverts will be installed to allow runoff to continue downstream. When the drainageways reach the proposed buffer strip at the makai side of the project adjacent to the highway, the runoff will continue to flow into the State drainage system along the highway as it is presently occurring.

VII. HYDROLOGIC CALCULATIONS

The hydrologic calculations are based on the "Chapter 4 - Rules for the Design of Storm Drainage Facilities in the County of Maui," and the "Rainfall Frequency Atlas of the Hawaiian Islands," Technical Paper No. 43, U.S. Department of Commerce, Weather Bureau.

For drainage areas under 100 acres the Rational Formula is used based on a 50-year 1-hour storm with sump conditions:

Q = CIA is used for drainage areas under 100 acres

Where Q = rate of flow (cfs)

C = rainfall coefficient

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

A = drainage area (Acres)

For drainage areas over 100 acres the Natural Resources Conservation Service hydrograph method is used based on a 100-year 24-hour storm.

See Appendix A for Hydrologic Calculations

VIII. CONCLUSION

After the completion of the proposed project, it is estimated that the 100-year storm runoff will be 1,228 cfs and generate approximately 166 acre-feet of runoff volume, creating an increase of 438 cfs of runoff and 28 acre-feet of runoff volume. A majority of the onsite runoff will be intercepted by onsite curb-inlet catch basins within the subdivision roadways and conveyed to a series of retention basins along the lower portion of the project site. System will be sized to accommodate the increase in post-development runoff volume of a 100-year 24-hour storm for the project site. Therefore, there will be no increase in runoff sheet flowing from the project site after completion of the development. Overflow from the subdivisions drainage system will be allowed to continue downstream along the existing drainage pattern. This is in accordance with Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui.

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

IX. REFERENCES

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

B. Erosion and Sediment Control Guide for Hawaii, prepared by U.S. Department of Agriculture, Soil Conservation Service, March, 1981.

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

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

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

EXHIBITS

1 **Location Map**

2 **Vicinity Map**

3 **Soil Survey Map**

4 **Flood Insurance Rate Map**

5 **Drainage Area Map**

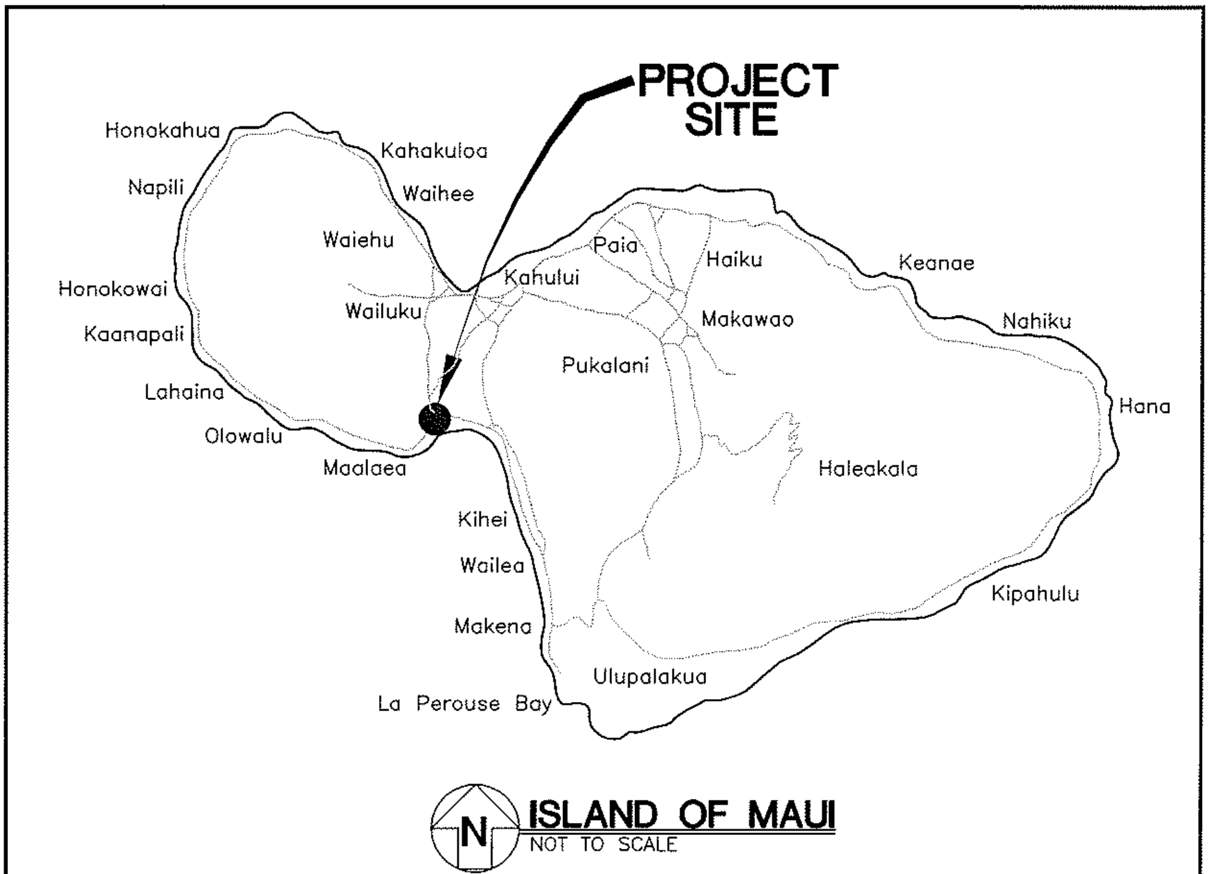
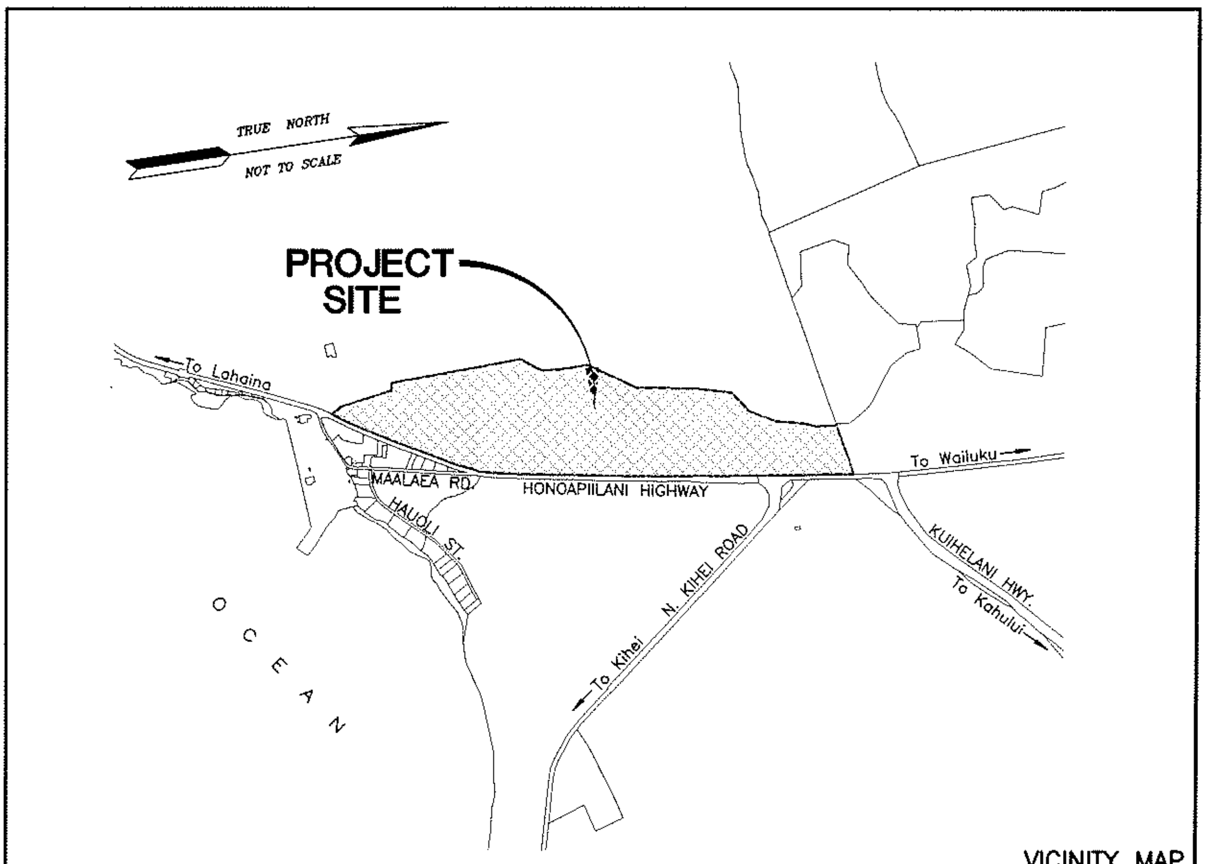
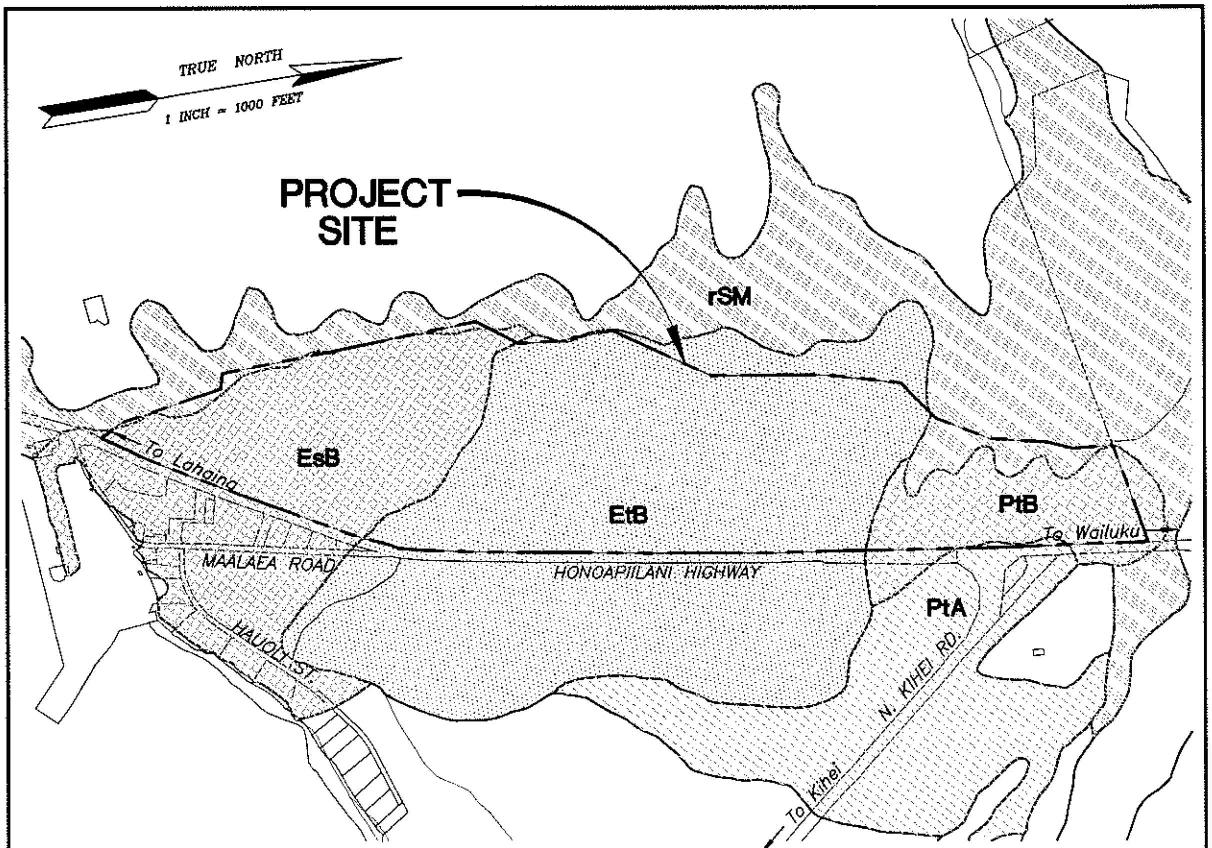


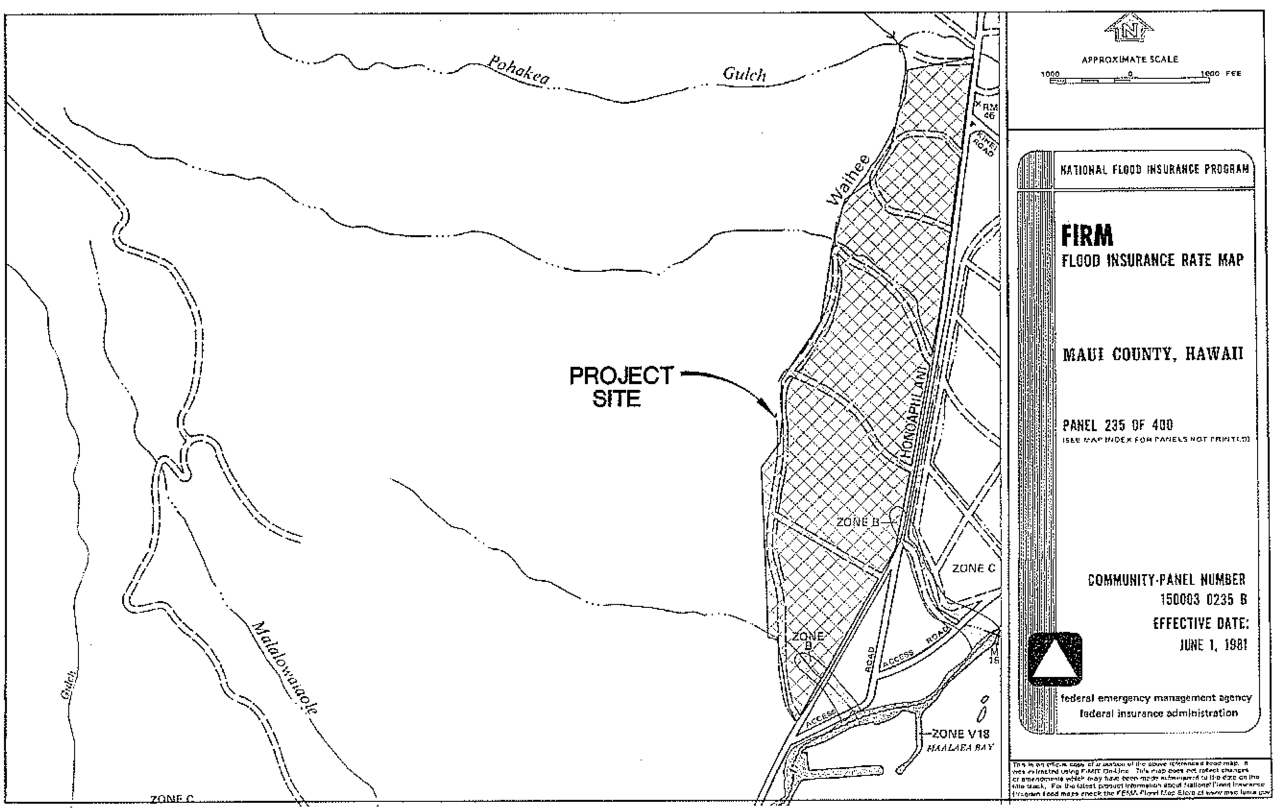
EXHIBIT 1

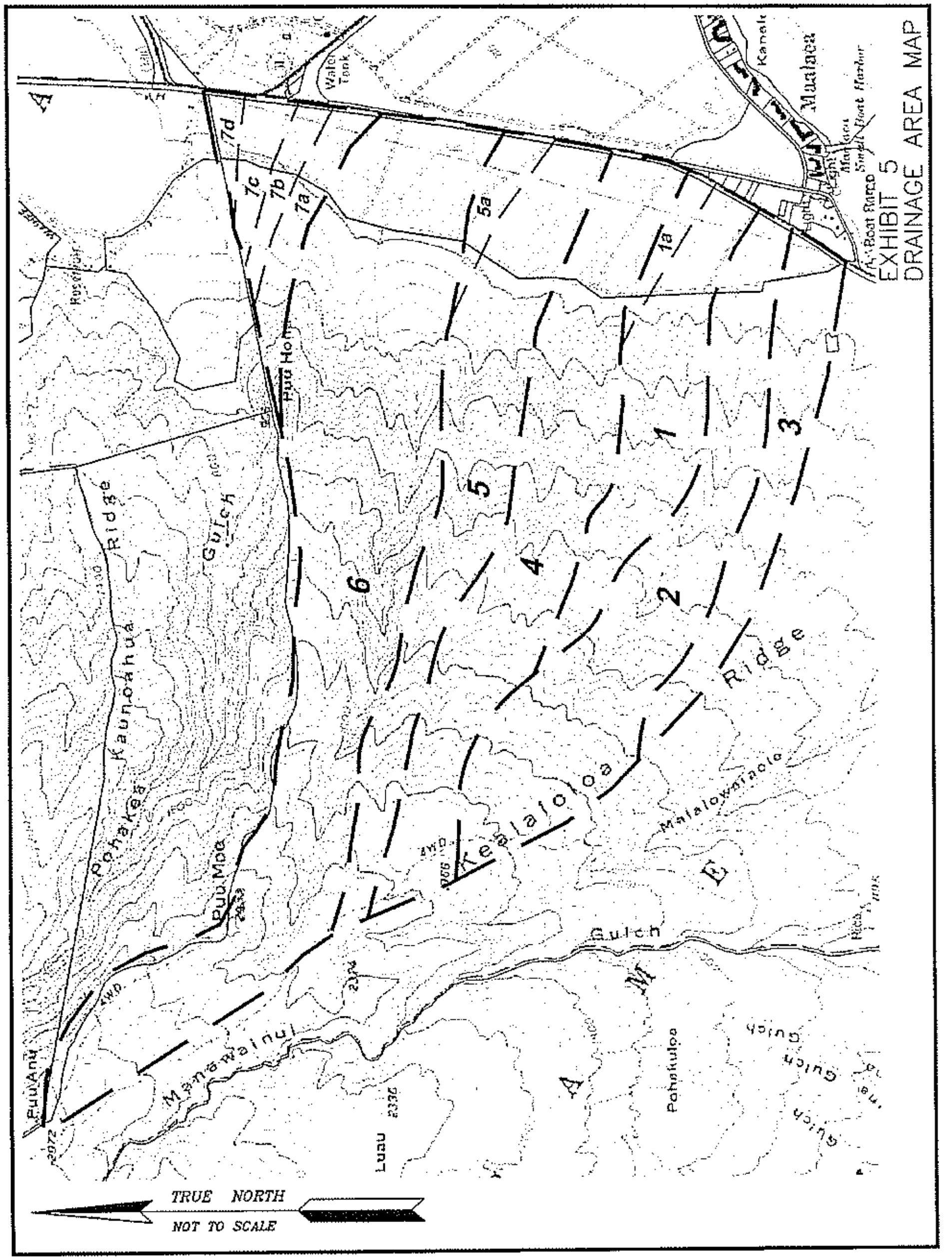


VICINITY MAP
EXHIBIT 2



SOIL SURVEY MAP
EXHIBIT 3





APPENDIX A

HYDROLOGIC CALCULATIONS

Hydrologic Calculations

Purpose: Determine the storage volume required to mitigate the increase in runoff due to the proposed improvements for a 100-year, 24-hour storm. See attached hydrograph calculations.

Runoff Volume created by pre-development conditions = 138 acre-feet

Runoff Volume created from the post development conditions = 166 acre-feet

The required storage volume for the project is 28 acre-feet

Approximately 36.0 acre-feet of storage is provided by the onsite retention basins, which is greater than the volume required.

Hydrograph Plot

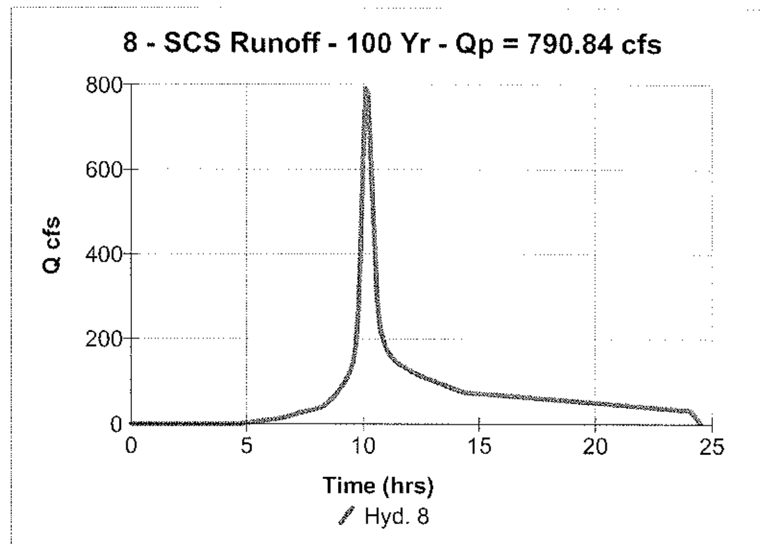
English

Hyd. No. 8

PRE

Hydrograph type	= SCS Runoff	Peak discharge	= 790.84 cfs
Storm frequency	= 100 yrs	Time interval	= 6 min
Drainage area	= 260.00 ac	Curve number	= 71
Basin Slope	= 6.5 %	Hydraulic length	= 1700 ft
Tc method	= LAG	Time of conc. (Tc)	= 24.7 min
Total precip.	= 10.00 in	Distribution	= Type I
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 5,998,820 cuft



Hydrograph Plot

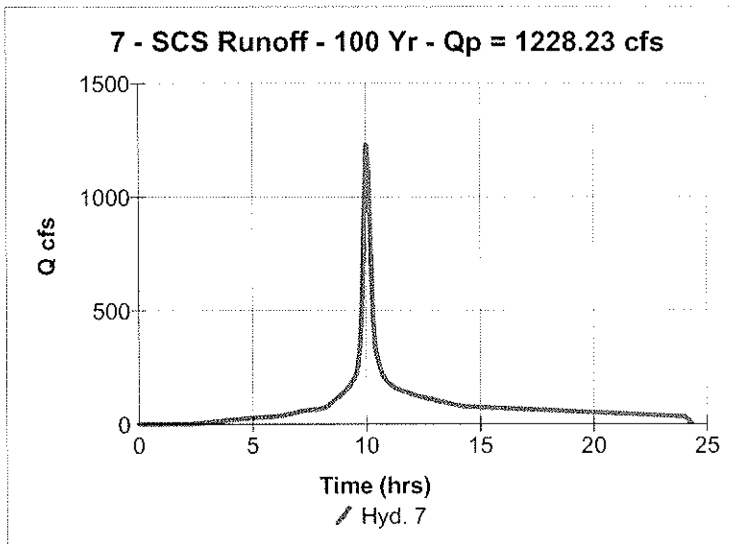
English

Hyd. No. 7

POST

Hydrograph type	= SCS Runoff	Peak discharge	= 1228.23 cfs
Storm frequency	= 100 yrs	Time interval	= 6 min
Drainage area	= 260.00 ac	Curve number	= 85
Basin Slope	= 6.5 %	Hydraulic length	= 1700 ft
Tc method	= LAG	Time of conc. (Tc)	= 16.1 min
Total precip.	= 10.00 in	Distribution	= Type I
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 7,215,863 cuft



MAALAEA MAUKA OFFSITE RUNOFF - PRE DEVELOPMENT

Drainage #	Area (acres)	Cn	t_c (hr.)	Q (cfs)
1	136	78	0.65	350
2	213	79	0.75	533
3	149	79	0.82	354
4	296	83	0.74	861
	190	89		
	106	71		
5	221	82	0.75	633
	137	89		
	84	71		
6	540	83	0.99	1,340
	368	89		
	172	71		

100 year - 24 hour Rainfall = 10 inches

Drainage Areas 1-3 are based on *Drainage and Soil Erosion Control Report for Maalaea Triangle Project*, by Warren S. Unemori Engineering, Inc.

Drainage #	Area (acres)	t_c (min.)	I	Q (cfs)
1b	14.7	30.0	3.50	15
3b				12
5b	22.4	30.0	3.50	24
7a	34.2	30.0	3.50	36
7b	15.2	30.0	3.50	16
7c	19.0	28.0	3.60	21
7d	14.2	23.0	3.90	17

50 year - 1 hour Rainfall = 2.5 inches

MAALAEA MAUKA OFFSITE RUNOFF - POST DEVELOPMENT

Drainage #	Area (acres)	Cn	t_c (hr.)	Q (cfs)
1	136	80	0.64	377
2	213	81	0.73	601
3	149	81	0.79	420
4	296	85	0.74	885
	190	89		
	50	71		
	56	85		
5	221	85	0.72	660
	137	89		
	42	71		
	42	85		
6	540	84	0.96	1,378
	368	89		
	105	71		
	62	85		

100 year - 24 hour Rainfall = 10 inches

Drainage Areas 1-3 are based on *Drainage and Soil Erosion Control Report for Maalaea Triangle Project*, by Warren S. Unemori Engineering, Inc.

Drainage #	Area (acres)	t_c (min.)	I	Q (cfs)
1b	14.7	18.0	4.30	35
3b				12
5b	22.4	21.0	4.05	43
	15.3			
	7.1			
7a	9.0	15.0	4.60	23
7b	8.6	15.0	4.60	22
7c	9.2	13.0	4.80	24
7d	8.1	10.5	5.10	23

50 year - 1 hour Rainfall = 2.5 inches

APPENDIX N.

Section 201H, Hawai`i Revised Statutes Exemption List

PROPOSED 201H-38, HRS EXEMPTIONS FOR OHANA KAI VILLAGE AFFORDABLE HOUSING PROJECT

A. EXEMPTION FROM TITLE 2, MAUI COUNTY CODE (MCC), ADMINISTRATION AND PERSONNEL

1. An exemption from Chapter 2.80B, MCC, General Plan and Community Plans, shall be granted to permit the project without obtaining a community plan amendment for the commercial and public/quasi-public components of the project.

B. EXEMPTION FROM TITLE 12, MCC, STREETS, SIDEWALKS AND PUBLIC PLACES

1. An exemption from Chapter 12.08 MCC, Driveways, shall be granted to exempt the project from payment of driveway permit and inspection fees.

C. EXEMPTION FROM TITLE 14, MCC, PUBLIC SERVICES

1. An exemption from Chapter 14.68, MCC, Impact Fees for Traffic and Roadway Improvements in Kihei and Makena, Maui, Hawaii shall be granted to exempt the project from traffic impact fees. Related to this exemption from Chapter 14.68, an exemption shall be granted to exempt the project from regional roadway improvements (i.e., improvements to roadway systems not abutting the subject property).

D. EXEMPTIONS FROM TITLE 16, MCC, BUILDINGS AND CONSTRUCTION

1. Exemption from MCC Chapters 16.04A, Fire Code, 16.18A, Electrical Code, 16.20A, Plumbing Code, and 16.26, Building Code, shall be granted to exempt the project from fire, electrical, plumbing, and building permit fees, as well as inspection fees.

2. An exemption from Chapter 16.26.107.2, MCC, Permit Fees, shall be granted to exempt the project from building permit fees.

3. An exemption from Section 16.26.3304, MCC, Improvements to Public Streets, shall be granted so that Title 18 exemptions listed herein are not triggered by the proposed action.

E. EXEMPTIONS FROM TITLE 18, MCC, SUBDIVISIONS

1. Exemptions from Section 18.04.030, MCC, Administration, and related land use consistency and conformity requirements of Title 18 (i.e., Section 18.16.020, MCC,

Compliance), shall be granted to exempt the project from obtaining a change in zoning and community plan amendment to enable subdivision approval.

2. An exemption from Section 18.16.320, MCC, Parks and Playgrounds, shall be granted to allow the park facility within the project to satisfy the park dedication and assessment requirements.

3. An exemption from Section 18.20.105 MCC, Traffic calming elements, shall be granted.

4. An exemption from Section 18.24, MCC, Fees, shall be granted to exempt the project from payment of subdivision filing fees.

F. EXEMPTIONS FROM TITLE 19, MCC, ZONING

1. An exemption from Chapter 19, MCC, shall be granted to permit the development and use of the parcel for single-family, public/quasi-public, park, and commercial purposes, including supporting infrastructure requirements. Further, this exemption shall allow the subdivision of the property in substantial compliance with the conceptual site plan shown in Attachment "A", which may be amended by the Director of Public Works. The following zoning standards shall apply to the proposed development:

Single-Family Residential

Permitted Uses:	Use permitted in Chapter 19.08, Residential District
Minimum Lot Size:	5,000 square feet.
Front Yard Setback:	Minimum of 15 feet.
Garage Setback:	Minimum of 20 feet.
One-Story Homes: Side/Rear Yard Setbacks	Minimum of 6 feet.
Two-Story Homes: Side/Rear Yard Setbacks	Minimum of 10 feet.
Maximum Height:	No building shall exceed 2-stories or 30-feet in height from finished grade.

Commercial

Permitted Uses:	Uses permitted in Chapter 19.18, Community Business District.
Lot Size:	Minimum of 6,000 square feet.
Lot Frontage:	Minimum of 60 feet.
Maximum Height:	No more than three (3) stories in height.
Yard Setbacks:	No minimum yard spacing with the exception that where the side or rear of a commercial lot abuts a residential lot, the abutting side or rear yard shall have the same yard spacing as that required by the single-family zoning standards.

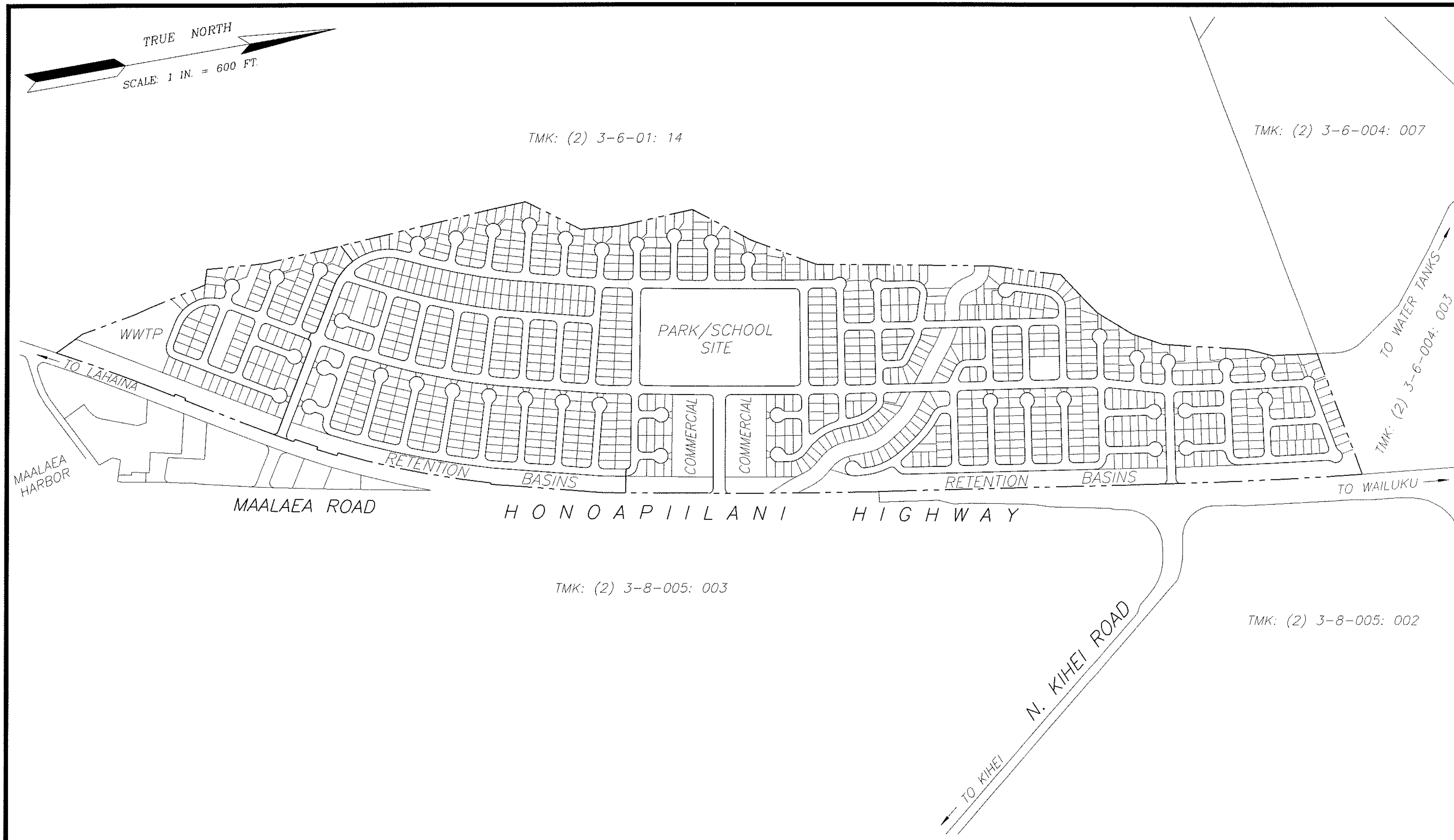
(TO BE CONFIRMED BY MVI, LLC)

Public/Quasi-Public

Permitted Uses:	Uses permitted in Chapter 19.31, Public/Quasi-Public District.
Lot Width:	Minimum of 100 feet.
Front Yard Setback:	Minimum of 15 feet.
Side Yard Setback:	Minimum of 10 feet.
Rear Yard Setback:	Minimum of 15 feet.
Maximum Height:	Two (2) stories not to exceed 45-feet in height from finish grade.

G. EXEMPTIONS FROM TITLE 20, MCC, ENVIRONMENTAL PROTECTION

1. An exemption from Section 20.08.090, MCC, Grubbing and Grading Permit Fees shall be granted to exempt the project from payment of grading, grubbing, and excavation permit fees, as well as inspection fees.



PRELIMINARY SITE PLAN

SCALE: 1 IN. = 600 FT.

ATTACHMENT "A"