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UPCOUNTRY TOWN CENTER 2 OF 2

Upcountry Town Center

Pukalani, Maui, Hawai'i

Revised Final Environmental Impact Statement

VOLUME II. APPENDICES

Accepting Authority:

State of Hawaii Land Use Commission

October 2003

MAUI LAND & PINEAPPLE COMPANY, INC.

Upcountry Town Center

Pukalani, Island of Maui, Hawai'i
TMK 2-3-07:08

Revised Final Environmental Impact Statement

Applicant:

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This environmental document and all ancillary materials were prepared under the direction of the undersigned pursuant to Chapter 200 of Title 11, Administrative Rules, Department of Health, "Environmental Impact Statement Rules."

APPENDICES

A. Market Study, Economic Impact Analysis and Public Cost/Benefit Assessment of the Proposed Village Center at Pukalani (Hallstrom Appraisal Group, July 2001) and Addendum to the Market Study (Hallstrom Appraisal Group, October 8, 2003)

B. Traffic Impact Assessment Study: Upcountry Town Center (Parsons, Brinckerhoff, Quade and Douglas, December 2001) and TIAR Update (PBQD, July 2003)

C. Botanical Resources of the Pukalani Triangle Site, Maui (Char & Associates, March 2001)

D. An Archaeological Inventory Survey of the Upcountry Town Center, Makaeha, Ahupua'a, Makawao, Maui (Aki Sinoto and Jeff Pantaleo, September 2001)

E. Cutural Impact Assessment: The Proposed Phased Development of the Pukalani Triangle Makaeha, Ahupua'a, Makawao, Maui (Aki Sinoto, December 2001)

F. A Survey of Avian and Mammalian Species, Pukalani Triangle Site, Upcountry Maui, (Rana Productions, Ltd., June 2001)

G. Upcountry Town Center: Impact on Agriculture (Decision Analysts Hawaii, June 2001)

H. Assessment of Potential Impacts of a 40-acre Development Site on Groundwater Resources, Upcountry East Maui, Makawao-Pukalani Region (Mink & Yuen, July 2003)

Assessment of the Hydrologic Impact of Maui Land & Pineapple Company's Proposed Well at 1800-foot elevation along Piiholo Road in the Makawao Aquifer System (Tom Nance Water Resource Engineering, July 2003)

I. Preliminary Engineering Report for Upcountry Town Center, Pukalani, Maui (R. T. Tanaka Engineering, Inc., June 2001)

J. MLP Upcountry Maui Project Electrical Assessment (Morikawa & Associates, LLC, July 2001)

K. Meeting Notes from Community/Organization/Individual Meetings

L. Limited Phase II Surface Investigation & Draft Risk Evaluation, Worker Inhalation - Former Corn Mill Camp, Pukalani, Maui, Hawaii (Clayton Group Services June 2001)

M. Corn Mill Camp Warehouse Buildings - Structural Engineering Review (Walter Vorfeld & Associates, December 2002)

N. History and Architectural Analysis of Corn Mill Camp, Makawao, Maui, Hawaii (Niess & Duensing, January 2003)

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O. Archaeological Reconnaissance & Cultural Impact Assessment, Piiholo Well Site (Jeffrey Panteleo, July 2003)

P. Supplemental Phase II Subsurface Investigation Former corn Mill Camp, Pukalani, Maui, Hawaii (Clayton Group Services, December 7, 2001)

Q. Land Use Commission EIS Acceptance Hearing, October 23, 2003 Transcript

Appendix A (Addendum addition to the Revised Final EIS)

Market Study, Economic Impact Analysis and Public Cost/Benefit Analysis of the Proposed Upcountry Town Center Pukalani, Maui

THE HALLSTROM GROUP INC.

REAL ESTATE
CONSULTANTS
& APPRAISERS

Market Study, Economic Impact Analysis and Public Cost/Benefit Assessment of the Proposed

UPCOUNTRY TOWN CENTER

to be located at

Pukalani, Maui, Hawaii

Prepared for

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MARKET STUDY

Introduction

The first step of our assignment was to complete a defined-scope market study of the proposed Upcountry Town Center, a mixed-use, master planned development to be located on approximately 41 acres on the southeasterly edge of Pukalani town, at the junction of Makawao Road, Haleakala Highway and the Pukalani Bypass Highway, approximately 10 miles upslope from the Kahului Airport.

The project, intended to help meet the demand for modern, urban uses in the expanding Upcountry community, will contain 186,900 square feet of finished commercial floor space, 3.25 acres of cottage industry sites, and up to eight acres of multi-family housing units. The improvements will be integrated into a self-contained project having favorable exposure and access characteristics, an internal roadway system, and public park and open spaces.

Our market study was a three-step process:

1. To determine if there is sufficient exiting unmet and forecast future demand to support further development of commercial, cottage industrial and senior housing uses in the study region;

2. To identify in-place and proposed supply available to meet the quantified needs; and,

3. To assess the appropriateness of the subject site for the various uses and estimate absorption levels for the project.

Each of the primary "saleable" uses (commercial, industrial and senior housing) was analyzed according to a standardized format, presented as follows:

1. **Demand**

   A. Regional Macro Demand Levels
   B. Current Market Indicators

2. **Supply**

   A. Availability of Existing Supply
   B. Proposed Additional Supply

3. **Correlation of Demand/Supply Indicators**

4. **Analysis of Subject Appropriateness/ Competitiveness**

The results of our market research and assessment are summarized in the subsequent sections, with emphasis placed on tabular data and concise supporting narrative. The narrative opens with a brief description of the study area and subject property, followed by separate analyses for each of the three saleable primary use types in the development.

Study Area - The Upcountry Region

The focus of our study is the "Upcountry" area of Maui, a vast region on the lower northwesterly slopes of Haleakala, overlooking the central valley of the island, containing the communities of Pukalani, Makawao, Kula, Haliimaile, and Olinda. The first two villages, comprising the majority of population and urban/suburban land uses in the area, are located approximately four miles apart, between the 1000 and 1800 foot elevation levels. The others are smaller outlying communities, stretching from the 700 foot to 3500 foot elevations, based mainly on rural housing and agricultural uses with limited supporting commercial types.

The area is generally defined by Haliimaile Road (downslope), the lower boundary of the Haleakala National Park (upslope), the easterly edge of Makawao Town, and the westerly extent of the Kula community. Primary access is provided by Haleakala Highway, a three-laned, modern high-speed thoroughfare, which extends from the Hana Highway up-mountain through the heart of the region. The roadway has been significantly upgraded, and a bypass constructed around Pukalani, during the past decade. Several secondary roads also lead down from Upcountry, most notably Baldwin Avenue in Makawao. While access into/out of the area has been improved, traffic congestion remains a community concern.

A full-range of public utility systems service Upcountry, including electricity, water, telephone and cable television. Sanitary sewers are limited to the more urbanized neighborhoods. Emergency services are available in Pukalani and Makawao, and there are numerous public and private school facilities in the area. Water supply is an on-going issue due to limited source development relative to population growth, and recent drought conditions.

Historically, the region has been agriculturally-oriented, with ranching, sugar and pineapple being the primary activities. Over the past three decades, the region (specifically Kula) has also become known for its floral and other diversified crops. Yet, because of its favorable climate, superior views, limited housing opportunities on the island and relative proximity to Central Maui, there has been significant urbanization pressure during the past 20 years.

According to the year 2000 United States Census, the study area had approximately 14,602 persons, up 20.4 percent from 1990 and nearly double the total of 1980. As shown by the summary of demographic indicators on Table 1, the region is trending towards typical suburban status, with lowering household sizes (in persons), increasing income levels, and an escalating average age. Additionally, an estimated 1.65 million tourists pass-through/visit the area each year.

While the character of the region remains founded on agricultural uses and a rural environment which area residents desire to retain, there are increasing demands for urban uses being created by an expanding population and economic base, particularly in Pukalani and Makawao. As the number of residents increases, so will the demand for neighborhood-serving development offering a greater ease of access to local consumers along with proximate job and business opportunities.

The Subject Property

The Upcountry Town Center will be located on an approximately 41 acre triangular site formed by the confluence of the Makawao Road (to makai), Haleakala Highway (westerly) and the Pukalani Bypass Highway (easterly). The site has some 2,500 feet of street frontage on the Bypass Highway, 1,800 feet of frontage on Haleakala Highway, and 1,600 feet along Makawao Avenue.

The property runs in elevation from 1610 feet (makai) to 1725 feet (mauka) above sea level, and has varying terrain, with a relatively level

TABLE 1

SUMMARY OF DEMOGRAPHIC INDICATORS FOR PRIMARY STUDY AREA (1)

Analysis of the Proposed Upcountry Center at Pukalani
Pukalani, Maui, Hawaii

	2000	1990	1980
Resident Population	14,602	12,125	7,591
Compounded Annual Growth Rate During Period	1.88%	4.79%	
Households	4,844	3,810	2,304
Compounded Annual Growth Rate During Period	2.43%	5.16%	
Average Household Size	3.01	3.18	3.29
Compounded Annual Growth Rate During Period	-0.55%	-0.34%	
Median Household Income	$63,500	$43,432	$31,388
Compounded Annual Growth Rate During Period	3.87%	3.30%	
Median Household Consumption Expenditures	$41,300	$27,206	$15,553
Compounded Annual Growth Rate During Period	5.00%	5.75%	
Percent Households in Owner/Occupied Units	61.58%	64.68%	63.89%
Compounded Annual Growth Rate During Period	-0.49%	0.12%	
Median Resident Age	35.90	33.48	30.92
Compounded Annual Growth Rate During Period	0.70%	0.80%	
Percent of Residents Over 62	10.92%	9.19%	7.68%
Compounded Annual Growth Rate During Period	1.74%	1.81%	
Resident Household Racial Composition			
White	37%	38%	32%
Black	1%	1%	1%
Asian	24%	42%	41%
Hawaiian	7%	14%	17%
Other Pacific Islander	1%	1%	1%
Other/Not Reported/Two or More Races (2)	30%	4%	8%
Total	100%	100%	100%
Available Motor Vehicles Per Household	2.13	1.95	1.84
Compounded Annual Growth Rate During Period	0.69%	0.58%	
Estimated Annual Tourist Visiting/Through Area	1,650,000	1,550,000	1,050,000
Compounded Annual Growth Rate During Period	0.63%	3.97%	

(1) Includes Pukalani, Makawao & Haliimaile "Census Designated Places".
(2) "Two or More Races" category new in 2000 census.

Source: US Census Bureau, State of Hawaii DBEDT, and The Hallstrom Group, Inc.

"lower bowl" along the westerly Makawao Road frontage, sloping sharply upward in the middle of the site, and a more gentle slope in the mauka portions. Portions of the site have good to excellent views towards the central valley and to the upper slopes of Haleakala, but the terrain, nearby development and trees limit much of the potential panoramas.

The holding has the most superior road frontage characteristics of any Upcountry site, with extensive exposure and excellent access on the three main roadways in the region. The large majority of traffic from Central Maui to Upcountry passes by the holding, it is within five miles of almost all of the potential consumers in the region, and has a favorable intercept location relative to other commercial locations.

From a market perspective, it is the "best" urban potential site in the study area. It is also a key holding within the Upcountry community, being advantageously sited to provide a true "hub" for regional commercial activity. The proposed development plan, summarized below, will exploit these opportunities within a thematic, master-planned, mixed-use project.

SUMMARY OF PROPOSED UPCOUNTRY TOWN CENTER LAND USE

Use	Site Area		Floor Space/Units
Retail/Restaurant	10.18		107,000 Sq. Ft.
Office/Medical	3.00		79,900 Sq. Ft.
Cottage Industrial	3.25		46,761 Sq. Ft.
Senior Housing	6.00 to 8.00		96 to 120 Units (1)
Open Space, Parks, Roads	16.57 to 18.57	(2)	--
	41.00		

(1) The maximum density on the site will be up to 12 units per acre for market multi-family use (96 total units maximum) and 15 units per acre for senior housing (120 units maximum).
(2) Includes Waiulu Farms store and pasture areas.

Complete descriptions of the subject property and proposed Upcountry Town Center development were prepared by others and presented in "Section 3.0 Project Description" of the draft environmental impact statement.

The Upcountry Commercial Sector

Commercial development in the study area has been focused towards the Pukalani and Makawao communities, with a few scattered facilities in the lower Kula area. In Pukalani, the projects are oriented towards neighborhood type uses, and include a standard shopping center (Pukalani Terrace), gas stations, a McDonalds, and other multi-tenant and single tenant buildings. The sector also contains a limited number of medical and service-business offices (typically in second floor or rear of project areas). The buildings are located along Haleakala Highway and Makawao Avenue. Observation indicates they do generally good business, given the number of vehicles in parking lots, well-kept tenant improvements and stability of tenants.

In Makawao, the buildings are typically restored older or historic-looking newer structures, most having one to three tenants, with just a few complexes having numerous businesses. Commercial uses are located along Makawao and Baldwin Avenues. Many are oriented towards tourists (gift shops and boutiques) or are restaurants meeting resident and visitor needs. The central area of Makawao has limited on- and off-street parking and is often congested during the business day. There is a rural village ambience to the Makawao commercial sector, capturing the flavor of the community, with many "new age" type businesses, including health practitioners, health foods and book stores. The area is developing a favorable reputation as an interesting shopping experience.

Regional commercial development to date is limited in scope and quality relative to the size of the resident population, with many modern conveniences/businesses typically found in a suburban community missing from the area. At present, consumers must travel from 10 to 15 miles to find what are generally considered as "neighborhood" serving businesses, creating additional congestion on Haleakala Highway, loss of free time, and additional driving expenses.

Regional Macro Demand

The long-term demand for commercial uses in the study area (including retail, restaurant, office, medical and service commercial types) was quantified through application of two techniques: *per capita spatial demand* and *trade area analysis*. The former estimates demand based on the level of floor space needed to support the full-range of business activities necessary for a modern suburban community, the latter estimates the need for "neighborhood shopping" centers in a given trade area.

1. Per Capita Spatial Demand (Primary Method)

Each new resident of a community represents an additional consumer whose needs and wants must be accommodated through businesses occupying commercial real estate developments. The mix and amount of retail, restaurant, service, medical, office, and supporting floor space required to meet consumer demand can vary widely from one market location to the next, but there are many aspects which are relatively static among all modern urban economies.

The availability of groceries, health care products, gasoline, and access to financial and medical services are vital to the very existence of a community. Having convenient restaurants (fast food, full dining, and deli), specialty stores (such as gifts, books, or clothing boutiques), service outlets (video rental, copy/postal services, realtors, or dry cleaners), and office and medical space for local businesses and practitioners, contribute to the fundamental quality of life for proximate residents.

These businesses are considered as the primary *neighborhood-type* retail/service uses.

Secondary retail uses which are often attracted to neighborhood-scale developments include garden/floral businesses, auto parts, hardware, franchise boutique, household appliance, and health food stores. Among the service providers in this subsequent group would be insurance and travel agents, opticians, video arcades, salons and repair shops.

Together these primary and secondary neighborhood businesses comprise an estimated 55 to 70 percent of the total retail/service floor space demand created by the consumers in a community according to studies completed by the Urban Land Institute, CB Realty and others, whose studies are on file.[3]

The remainder of demand within a given "trade area" is focused towards regional malls (10-plus percent of total floor space), power center/warehouse stores (up to 20 percent of the total), freestanding

(3) Among the materials consulted as a statistical base for our demand analysis included: ***Shopping Center Development Handbook***, Urban Land Institute; ***National Market Overview & Forecast***, CB Commercial National; numerous articles from ***The Appraisal Journal***; and published studies prepared by nationwide consulting firms.

specialty product outlets (up to 10 percent), and non-medical service providers (less than 10 percent).

In order to estimate the local demand created by subject area residents, we have surveyed other comparable or insightful communities. The most appropriate indicators for commercial development in the islands can be derived from the spatial levels achieved on Oahu (the state's most modern economic region) and in various neighbor island locales.

As shown on Table 2, there is presently an average of 20.40 square feet of retail/service space on Oahu per full-time resident, excluding hotels. This per capita ratio has grown steadily over the past two decades at a compounded rate of 1.64 percent per year.

Despite this level of floor space expansion, the island remains somewhat underserviced relative to mainland communities of similar size (500,000 to 1,000,000 residents). Comparable metropolitan areas surveyed had retail/service ratios ranging from 16.5 square feet per resident in Quad Cities, Iowa, to 32.5 square feet per resident in Arlington/Fort Worth, Texas. The cited "rule of thumb" in various Appraisal Institute materials is 25 to 28 square feet per resident in major metropolitan areas.

The low vacancy rate for Oahu retail space, currently at less than five percent, and never more than seven percent over the past two decades, is a further indicator that the islandwide market is not mathematically oversupplied.

Among selected neighbor island communities, the amount of finished floor space per resident ranges from 22.66 square feet on Kauai (a stable market) to above 30 square feet per person in Kona, Lahaina and Kihei. A summary of these locales is shown on Table 3. A portion of these higher levels is due to tourism demand.

Our analysis of the subject region indicates the per square foot per capita allowance in Upcountry should be at the lower end of the range (circa 22 feet per resident), with neighborhood-type uses accounting for 57 to 69 percent of total commercial space demand.

Application of these demand levels for neighborhood retail/service floor space to the primary study area (Upcountry) using the per capita method is displayed on Table 4. Three scenarios are tested

TABLE 2

SUMMARY OF RETAIL, SHOPPING CENTER AND SERVICE SPACE ON OAHU 1977 TO 2000
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

Year	Gross Leaseable Floor Space in Sq. Ft. Retail, Restaurant and Center (1)	Service (2)	Total	Resident Population of Island	Ratio of Gross Retail/Service Space Per Person (Sq. Ft.)
1977	7,422,000	2,911,000	10,333,000	737,000	14.02
1978	7,492,000	2,944,000	10,436,000	742,600	14.05
1979	7,806,000	3,002,000	10,808,000	756,000	14.30
1980	7,953,000	3,021,000	10,974,000	764,600	14.35
1981	8,537,000	3,052,000	11,589,000	767,573	15.10
1982	---	---	---	776,075	---
1983	---	---	---	789,097	---
1984	---	---	---	797,791	---
1985	9,014,000	3,242,000	12,256,000	804,294	15.24
1986	9,180,000	3,308,000	12,488,000	810,444	15.41
1987	9,280,000	3,384,000	12,664,000	818,447	15.47
1988	9,460,000	3,488,000	12,948,000	824,072	15.71
1989	9,612,000	3,621,000	13,233,000	831,337	15.92
1990	9,850,500	3,720,000	13,570,500	838,107	16.19
1991	10,000,000	3,800,000	13,800,000	846,568	16.30
1992	10,206,000	3,830,000	14,036,000	858,543	16.35
1993	11,636,000	3,950,000	15,586,000	864,366	18.03
1994	11,975,000	4,080,000	16,055,000	871,362	18.43
1995	12,198,600	4,120,000	16,318,600	873,027	18.69
1996	12,267,600	4,167,500	16,435,100	873,131	18.82
1997	12,470,000	4,200,000	16,670,000	874,449	19.06
1998	12,769,000	4,243,000	17,012,000	872,478	19.50
1999	13,140,000	4,295,000	17,435,000	874,321	19.94
2000	13,500,000	4,375,000	17,875,000	876,156	20.40
Compounded Annual Growth Rate for 1977 through 2000			2.41%	0.75%	1.64%
Average Annual Addition for 1977 through 2000			327,913	6,050	0.28

Note: Complete data not available for all study years.
(1) Includes all significant neighborhood, strip, specialty, community, regional and super-regional malls and centers. Excludes hotels.
(2) Includes all significant business and health services. Excludes hotels.

Source: DBEDT, CB Commercial, Hawaii Real Estate, and The Hallstrom Group, Inc.

TABLE 3

ESTIMATED RETAIL, RESTAURANT AND SERVICE CENTER SPACE IN SELECTED NEIGHBOR ISLAND LOCATIONS
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii
As of Year-End 2000

Region	Big Island		Maui		Kauai
	Kona	Hilo	Lahaina	Kihei	
Estimated Resident Population	53,164	47,351	17,400	23,800	57,300
Gross Leaseable Sq. Ft. of Commercial Space (1)	1,678,000	984,800	592,500	749,300	1,298,300
Sq. Ft. Per Capita Ratio	31.56	20.80	34.05	31.48	22.66
Market Status	Moderately Oversupplied	Stable	Stable (Lge. Tourism)	Mildly Oversupplied	Stable

(1) Excludes hotel commercial and central business district office space.

Source: Hawaii Business and The Hallstrom Group, Inc.

TABLE 4

QUANTIFICATION OF REGIONAL RESIDENT RETAIL AND SERVICE FLOOR SPACE DEMAND IN THE PRIMARY STUDY AREA 2001 TO 2020

Market Study of the Proposed Upcountry Town Center

Pukalani, Maui, Hawaii

Scenario One: Conservative Population Growth & Capture Rate

Year	Annual Population Growth Rate	Forecast Population	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate	=	Net Regional Demand in Square Feet
2001		14,875		22.00		327,250		57%		186,533
2005	1.50%	15,788		22.66		357,756		58%		207,499
2010	1.25%	16,799		23.34		392,085		59%		231,330
2015	1.00%	17,656		24.04		424,450		60%		254,670
2020	0.75%	18,328		24.76		453,823		61%		276,832

Scenario Two: Moderate Population Growth & Capture Rate

Year	Annual Population Growth Rate	Forecast Population	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate	=	Net Regional Demand in Square Feet
2001		14,875		22.00		327,250		57%		186,533
2005	1.90%	16,038		22.99		368,714		59%		217,541
2010	1.70%	17,425		24.02		418,628		61%		255,363
2015	1.50%	18,772		25.11		471,283		63%		296,909
2020	1.30%	20,001		26.24		524,734		65%		341,077

Scenario Three: Optimistic Population Growth & Capture Rate

Year	Annual Population Growth Rate	Forecast Population	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate	=	Net Regional Demand in Square Feet
2001		14,875		22.00		327,250		57%		186,533
2005	2.25%	16,260		23.32		379,183		60%		227,510
2010	2.10%	18,041		24.72		445,959		63%		280,954
2015	1.95%	19,870		26.20		520,641		66%		343,623
2020	1.80%	21,724		27.77		603,373		69%		416,327

urce: The Hallstrom Group, Inc.

(conservative, moderate and optimistic) utilizing various population, demand and capture rates.

The indicators are correlated on Table 5. According to our analysis, the present demand for neighborhood/subregional commercial floor space in the study area is about 251,533 square feet; a figure which will increase to 362,426 to 527,047 square feet by 2020 as the regional population and economy expands.

Given that existing commercial floor space in Upcountry supply is some 211,588 square feet (analyzed subsequently), the current shortfall of space is nearly 40,000 square feet. And, there will be a need for an additional 260,600 square feet of competitive space, the mid-point estimate for the three scenarios, over the next two decades.

Our analysis includes a modest allowance for tourist-oriented demand, most of which is presently oriented towards Makawao town, but which would be further exploited by development capturing tourists passing through on the way to Haleakala National Park.

2. Trade Area Analysis (Secondary Method)

Studies indicate a neighborhood shopping center, defined as a retail/service project having from 50,000 to 150,000 square feet, should be developed to service a given "trade area" containing 5,000 to 40,000 consumers "within a five to ten minute drive," according to "Shopping Center Development," published by the Urban Land Institute. Others, such as the Principal Financial Group, contend 8,000 to 15,000 potential customers within an eight minute drive are sufficient to support a typical neighborhood center.

Such a center generally has a grocery store anchor tenant of 35,000 to 60,000 square feet and a total floor space of 1.75 to 3.5 times this amount.

Aggressive grocery stores on the mainland seek high traffic, presently unserviced locations with 5,000 to 8,000 residents within ten minutes driving time, or conservatively are willing to compete in a market situation where there is a minimum of 8,000 to 15,000 consumers per competitor.

Secondary factors in analyzing a trade area include intercept and/or barrier considerations. Is there a store along the arterial which is

TABLE 5

ESTIMATED TOTAL RETAIL AND SERVICE SPACE DEMAND FOR THE PRIMARY STUDY AREA 2001 TO 2020

Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

Scenario One: Conservative

	Gross Leasable Square Feet		
Year	Primary Resident Demand	Supplemental Tourist Demand	Total Demand
2001	186,533	65,000	251,533
2005	207,499	68,900	276,399
2010	231,330	74,068	305,398
2015	254,670	79,623	334,293
2020	276,832	85,594	362,426

Scenario Two: Moderate

	Gross Leasable Square Feet		
Year	Primary Resident Demand	Supplemental Tourist Demand	Total Demand
2001	186,533	65,000	251,533
2005	217,541	70,200	287,741
2010	255,363	77,220	332,583
2015	296,909	84,942	381,851
2020	341,077	93,436	434,514

Scenario Three: Optimistic

	Gross Leasable Square Feet		
Year	Primary Resident Demand	Supplemental Tourist Demand	Total Demand
2001	186,533	65,000	251,533
2005	227,510	72,800	300,310
2010	280,954	83,720	364,674
2015	343,623	96,278	439,901
2020	416,327	110,720	527,047

Total Existing Potential Regional Demand			251,533
Estimated Existing Retail and Service Space (Sq. Ft.):			211,588
Current Undersupply or (Oversupply)			39,945
Periodic Additions Required (Sq. Ft.):			
Latent/Existing Demand	39,945	39,945	39,945
2001 to 2005	24,866	36,209	48,777
2006 to 2010	28,999	44,842	64,364
2011 to 2015	28,895	49,268	75,227
2016 to 2020	28,134	52,663	87,146
Cumulative Additional Space Required	150,838	222,926	315,459
Increase as a Percent of Existing Floor Space	59.97%	88.63%	125.41%
Estimated Mid-Point Additional Space Required (1):			260,586

(1) Includes existing latent demand in total.

Source: The Hallstrom Group, Inc.

located significantly closer to the population base (intercept)? Or, is there some form of physical or psychological impediment between the consumer and retailer (barrier)?

There are an estimated 14,875 consumers in the Upcountry "trade area," with another 5,000-plus residents projected by 2020. The region is bounded by physical barriers, specifically vast undeveloped agricultural, ranching and conservation lands; and there are no direct intercept opportunities between the Hana Highway/Haleakala Highway junction and the heart of the study region.

When considered as a whole, the Upcountry area is an unusually well-defined and relatively independent trade area, which lends itself to this type of analysis.

As shown on Table 6, the specific subject market sector could currently support 167,344 square feet of competitive-quality neighborhood commercial floor space based on this method. This total will grow to upwards of 225,011 square feet by 2020.

Given there is only a single competitive neighborhood shopping complex in the study area (Pukalani Terrace), having 71,000 square feet, there is reasonable existing support for a second center, with the latent need of more than 95,000 square feet increasing to 150,000 square feet by 2020.

These totals do not account for service, office and medical uses typically located outside of, but proximate to neighborhood shopping centers.

Current Market Indicators

The market for commercial floor space in the study area is exceptionally strong at present. During the course of our investigation, which included three surveys of commercial development in Pukalani/Makawao from May to July, the amount of available floor space was negligible.

At Pukalani Terrace Shopping Center, there was a single vacant bay (circa 1,200 square feet) in May, but the space was quickly renovated and leased by late June. Approximately 1,500 square feet on the ground floor of the 7 Alewa Place building, previously occupied by the Grateful Bread Company, is now vacant, but has yet to be offered for lease. The space is at the rear of the building and has poor access, exposure and parking characteristics.

TABLE 6

ESTIMATE OF "NEIGHBORHOOD" RETAIL/SERVICE DEMAND IN STUDY AREA BASED ON TRADE AREA ANALYSIS

From 2001 to 2020

Market Study of the Proposed Upcountry Town Center

Pukalani, Maui, Hawaii

MID-POINT ANALYSIS

	2001	2005	2010	2015	2020
Consumer Population (1)	14,875	16,038	17,425	18,772	20,001
Number of Consumers Required to Support Anchor Grocery Store	10,000	10,000	10,000	10,000	10,000
Total Number of Anchor Grocery Stores Region Can Support	1.49	1.60	1.74	1.88	2.00
Average Anchor Grocery Store (in Sq. Ft.)	45,000	45,000	45,000	45,000	45,000
Total Grocery Store Floor Space Demand (Sq. Ft.)	66,938	72,171	78,413	84,474	90,005
Multiplier for Associated/ Other Space in Center	2.50	2.50	2.50	2.50	2.50
TOTAL REGIONAL DEMAND FOR NEIGHBORHOOD RETAIL SPACE IN STUDY AREA (In Sq. Ft.)	167,344	180,428	196,031	211,185	225,011

(1) Potential customers are those in the Pukalani, Makawao and Lower Kula areas.

Source: The Hallstrom Group, Inc.

There are no other spaces listed for lease in Pukalani town.

A similar condition exists in Makawao, where there are no apparent vacant spaces in the town's commercial district, no "for lease" signs, and discussion with brokers indicated there are no choice spaces presently or likely to become available. The market was referred to as "hot", "very tight" and "in need of new inventory".

Overall, we estimate the current vacancy rate in the study region is less than one percent.

Correlation of Demand Indicators

Every methodology from basic observation to application of numerical demand formulae demonstrate that the demand for commercial space in the study area is meaningful and increasing. Virtually all of the available space is occupied, competitive space is quickly absorbed when made available, and mid to long-term analysis points to increasing spatial needs.

At present, the regional market is undersupplied by some 40,000 square feet and at least one neighborhood shopping facility. Future demand will equate to another 220,000-plus square feet of space over the next two decades. The total regional sector will have to double in size by 2020 in order to meet the daily requirements of the local population and tourists visiting the area.

Existing Supply

There are some 115,715 square feet of commercial floor space in Pukalani according to the Hawaii TMK Information Service, as summarized on Table 7, with most being constructed between the late 1970s and late 1980s. Our inspections indicated that with the exception of one bay in 7 Alewa Place, all of the space is occupied at the present time.

Many of the buildings are single tenant and were specially built for their use. The condition of the buildings ranges from fair to good. The overall floor area ratio (FAR) in the community of finished floor space to underlying site area is .2562, which is in line with prevailing design trends.

The exposure and traffic flow characteristics of the properties, within the context of the regional community, has been hindered by the completion of the Bypass Highway, which results in potential Makawao, Kula and tourist patrons missing the commercial corridor of

TABLE 7

SUMMARY OF MAJOR EXISTING COMMERCIAL DEVELOPMENT IN PUKALANI (1)
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

Project Name	Tax Map Key	Location	Size In Square Feet Site	Size In Square Feet Improvements		Year Built	Current Vacancy Rate	Condition	Comments
Pukalani Terrace	2-3-10-52 & 64	Pukalani Street	245,286	70,907		1978	0%	Good	Largest, most modern center in area, but has poor frontage/access, hurt by By-Pass. Market anchor, food & service tenants.
Pukalani Town Square	2-3-44-34 & 35	Makawao Ave.	48,395	14,942		1960-1983	0%	Average	Food & services in single story wing at front of project, two-story office/medical wing at rear. Poor exposure & parking.
#7 Aewa Place	2-3-44-58	Haleakala Highway	20,778	5,940		1987	25%	Average	Two story wood walk-up. Retail/food on ground, service/office above. Vacant space at rear was bread co., only space in town.
McDonalds	2-3-10-50	Haleakala Highway	20,033	2,944		1986	0%	Good	Only free-standing fast food in area, does strong business despite By-Pass effect.
Minit Stop	2-3-10-72	Haleakala Highway	12,799	2,703	(2)	1986	0%	Good	Gas station & mini-mart.
Chevron	2-3-44-45	Haleakala/Makawao	13,058	1,489	(2)	1966	0%	Avg./Fair	Gas station.
Pukalani Superette	2-3-44-1	Makawao Ave.	20,971	6,516		1956	0%	Avg./Fair	Popular local market, good frontage/access but limited parking, near busy corner.
Pukalani Shell & Carwash	2-3-44-3	Haleakala Highway	16,530	1,028	(2)	1973	0%	Avg./Good	Gas station.
First Hawaiian Bank	2-3-44-50	Makawao Ave.	19,558	1,784		1977	0%	Good	Suburban bank branch.
CRTL Partners Bldg.	2-3-24-28	Haleakala Highway	19,768	2,844		1983	0%	Good	Dentist/Medical offices.
3390 Haleakala Highway	2-3-24-18	Haleakala Highway	14,551	4,618		1994	0%	Good	Services and medical.
Totals			451,728	115,715			1%		

(1) Survey excludes buildings built before 1945, non-conforming projects, improvements less than 1,000 square feet or assessed at less than $50,000.
(2) Excludes canopy covering gas pumps. Enclosed floor space only.

Source: Hawaii Information Service, State of Hawaii Realty Directory, and The Hallstrom Group, Inc.

Pukalani. The frontage and access traits of the major center (Pukalani Terrace) are also poor due to elevational and site constraints.

In Makawao, there is approximately 95,873 square feet of finished commercial floor space, much in older buildings built before 1970 (and as far back as 1920). The age of the improvements, while adding to the quaint ambience of the village commercial district, limits their desirability to modern general and franchise businesses, a factor compounded by the lack of off-street parking and poor traffic flow. Our inspections indicated that all of the space is occupied at the present time.

A summary of the identified improved commercial properties in Makawao is shown on Table 8. The FAR for these developments is .2653; however, much of the undeveloped site space is located in rear yards and not available for parking and traffic flow as in a modern complex.

Proposed Supply

The only major commercial project currently proposed in the study area is the first phase of Kulamalu, a several hundred acre holding one mile upslope from the subject which has been proposed for a variety of uses over the past decade. The infrastructure for 20 lots in the area nearest Kula Highway is presently being emplaced and final subdivision should be completed by year end.

The fee simple lots will range in size from .566 to 2.589 acres and be zoned for "Country Town" business. Asking prices range from $6.04 to $23.00 per square foot, and some three lots have been reserved to date. At one time a neighborhood shopping center was proposed for the property; however, the developer has no plans at the present to construct finished buildings, according to the brokerage handling sales, and the lot sizes now being offered are insufficient in size to support competitive center development.

With the exception of the Highway-fronting lots and those immediately fronting the primary access roadway, which have some retail potentials, the commercial outlook for the lots are limited, as evidenced by the "slow" sales reported by the brokerage. Further, the zoning is somewhat restrictive and does not allow for many of the quasi-light industrial uses for which the site would be appropriate, and the subdivision is outside the regional traffic flow of most residents and tourists.

TABLE 8

SUMMARY OF MAJOR EXISTING COMMERCIAL DEVELOPMENT IN MAKAWAO (1)

Market Study of the Proposed Upcountry Town Center

Pukalani, Maui, Hawaii

Address	Tax Map Key	Size in Square Feet Site	Improvements		Year Built	Current Observed Vacancy Rate (2)
1035 Makawao Ave.	2-4-24-1	27,768	6,537		1925	0%
1039 Makawao Ave.	2-4-24-2	33,555	15,040		1990	0%
1100 Makawao Ave.	2-4-7-120	20,873	840	(3)	1964	0%
1127 Makawao Ave.	2-4-31-4	6,890	1,953		1993	0%
1135 Makawao Ave.	2-4-31-5	7,166	3,580		1987	0%
1143 Makawao Ave.	2-4-31-6	7,028	960		1983	0%
1150 Makawao Ave.	2-4-7-51	5,040	1,144		1945	0%
1156 Makawao Ave.	2-4-7-93	6,054	2,932		1935	0%
1160 Makawao Ave.	2-4-7-64	5,947	723		1951	0%
1168 Makawao Ave.	2-4-7-55	5,898	3,600		1941	0%
1169 Makawao Ave.	2-4-31-98	5,547	2,790		1986	0%
1170 Makawao Ave.	2-4-7-6	15,158	2,160		1962	0%
1188 Makawao Ave.	2-4-7-69	21,553	4,630		1929	0%
1155 Baldwin Ave.	2-4-31-64	27,981	14,822		1927/1991	0%
3682 Baldwin Ave.	2-4-31-8	5,640	3,298		1930	0%
3674 Baldwin Ave.	2-4-31-9	12,236	6,506		1930	0%
3660 Baldwin Ave.	2-4-31-11	7,358	3,090		1982	0%
3654 Baldwin Ave.	2-4-31-12	6,000	1,748		1940	0%
3661 Baldwin Ave.	2-4-37-2	57,063	7,545		1920-1946	0%
3617 Baldwin Ave.	2-4-37-4	10,275	3,589		1920/1927	0%
3677 Baldwin Ave.	2-4-37-1	66,302	8,386		1924/1933	0%
Totals		361,332	95,873			0%

(1) Survey excludes warehouses/storage buildings, and non-conforming projects.

(2) Three inspections were made of the Makawao commercial core for this study. There were no apparent vacant bays or buildings, nor are there space available/realty signs visible on any project.

(3) Excludes canopy covering gas pumps. Enclosed floor space only.

Source: Hawaii Information Service, State of Hawaii Realty Directory, and The Hallstrom Group, Inc.

A major shopping center (the "Barto" project) was proposed for the interior of Makawao, near Baldwin Avenue, in the mid-1990s. The 100,000 square foot complex was intended to meet the perceived need for modern neighborhood shopping in the underserviced community. However, the site had poor access and parking potentials and there was meaningful community concerns over increased traffic and the need for open space in the area. The project was never built.

A summary of these proposed developments is shown on Table 9. There are no other readily developable, competitive sites of sufficient size to support the scope of development needed to service the study region.

Correlation of Demand/Supply Indicators

The available inventory of commercial floor space in the study area is effectively *fully occupied*, and analysis indicates there is an existing unmet demand for nearly 40,000 square feet. Over the next two decades, population and economic growth will create a further need for an additional 220,000 square feet of development. Total construction of some 260,000 square feet (mid-point estimate) will be needed to fully service the Upcountry sector.

Statistical techniques indicate the community could support another neighborhood shopping center at present.

The available supply of 211,588 square feet is inadequate both in scope and characteristics to meet the existing and forecast demand. The only significant additions proposed are within a subdivision that is somewhat outlying and limited in lot size and exposure.

We conclude there is sufficient demand to support the subject development over the near to mid-term.

Analysis of Subject Appropriateness/ Competitiveness

The subject property has an excellent location, superior frontage and access characteristics, is at the hub of regional traffic flow, and in an established commercial neighborhood. The project will provide sufficient parking, ease of egress and a modern complex which will attract a variety of businesses and services which are currently lacking or under-represented in the region. By all indicators it is the "best" site for commercial development in the Upcountry area from a market perspective.

The shopping center will have an FAR of .2413, a density below market averages, which will allow for more parking and easier

TABLE 9

SUMMARY OF PROPOSED MAJOR COMMERCIAL DEVELOPMENT IN PUKALANI & MAKAWAO
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

Project	Location	Comments
Kula Malu	Makai side of Kula Highway, one mile south of subject.	Project has undergone many revisions & is now being subdivided into 20 fee simple lots ranging in size from .5 to more than 2.5 acres. Zoning is for "Country Town Business". Three lots reserved to date, infrastructure completion by year-end 2001. Most lots have no Highway frontage/exposure. Site is outside area traffic flow. Lot purchasers will build commercial/business improvements. Less than 1/3 of sites will have competitive location (on highway or entrance road), others have limited potentials
Barto Project	Interior at Makawao and Baldwin Avenues.	Up to 100,000 square foot project proposed in mid-1990s to provide space for area resident consumers. Site has poor access/parking and traffic in area is congested. Development never built.

Source: Prudential/Iwada Realty, and The Hallstrom Group, Inc.

vehicular movement, a major consideration among patrons and businesses. This also allows for more landscaped space in the facility and better angles of visibility.

The commercial areas will have favorable exposure from all three major fronting roadways, and create a "themed" center having a uniform look as opposed to the uncoordinated, non-homogenous development that has occurred in Pukalani to date.

Interior access roadways will limit off-site traffic congestion, allowing patrons to move through the project and onto the fronting streets with minimized disruption to existing traffic flow (as opposed to having individual driveways for each business as it typical of the area).

The anchor stores, which are the major draws of a center, are sufficiently separated (by some 400 feet) to spread vehicular and pedestrian traffic throughout the complex. The free-standing office/medical buildings will be accessed by separate roadways and have individual parking areas, spreading out on-site traffic.

The appropriateness and competitiveness of the subject master plan is confirmed by the application of the *residual* and *market capture* techniques which demonstrate the subject commercial components will be fully absorbed during the projection period.

Table 10 displays the residual method, a conservative application which assumes that all other proposed properties will receive their full share before any "left over" demand flows to the subject. As can be seen, the subject will achieve full market acceptance during the projection period even with the development of the commercial lots at Kulamalu and an allowance for 1,000 square feet of other freestanding space constructed yearly beginning in 2006.

In interpreting the data it must be remembered that commercial space is typically developed and absorbed prior to full market need, the integral indicator being whether the market is demonstrating consistent unmet need for additional floor space over time. The full capacity of the subject center may not be reached for more than a decade, but there is sufficient near-term demand to support its development and absorption with a five to twelve year period. As can be seen, there are no years in the projection period in which the absorption of competitive supply would outpace regional demand

TABLE 10

QUANTIFICATION OF POTENTIAL SUBJECT RETAIL/SERVICE DEMAND USING THE RESIDUAL METHOD

Market Study of the Proposed Upcountry Town Center

Pukalani, Maui, Hawaii

ALL ABSORPTION FORECASTS IN THOUSANDS IN SQUARE FEET, PROBABLE PROJECTS ONLY

Project	In Square Feet (000s) Competitive Floor Space	Absorption 2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Totals
Kula Malu	54			6	6	6	6	6	6	6	6	6										54
Market Share %				100%	100%	100%	86%	86%	86%	86%	86%	86%										
Other Long-Term Projects	15						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
Market Share %					0%	0%	14%	14%	14%	14%	14%	14%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Projected Absorption		0	0	6	6	6	7	7	7	7	7	7	1	1	1	1	1	1	1	1	1	69
Periodic Regional Demand		51	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	260
Periodic Undersupply or (Excess)		51	11	5	5	5	4	4	4	4	4	4	10	10	10	10	10	10	10	10	10	191
Cumulative Undersupply or (Excess)		51	62	67	72	77	81	85	89	93	97	101	111	121	131	141	151	161	171	181	191	
Residual Potential Subject Demand																						
at 100% Residual Capture Rate		51	11	5	5	5	4	4	4	4	4	4	10	10	10	10	10	10	10	10	10	191
at 95% Residual Capture Rate		48	10	5	5	5	4	4	4	4	4	4	10	10	10	10	10	10	10	10	10	181
at 90% Residual Capture Rate		46	10	5	5	5	4	4	4	4	4	4	9	9	9	9	9	9	9	9	9	172
at 80% Residual Capture Rate		41	9	4	4	4	3	3	3	3	3	3	8	8	8	8	8	8	8	8	8	153

Source: The Hallstrom Group, Inc.

TABLE 11

PROJECTED SUBJECT DEMAND USING MARKET CAPTURE RATE ANALYSIS OF THE TOTAL REGIONAL RETAIL/SERVICE SECTOR
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

1. Conservative Scenario

Year	Annual Regional Demand (in Square Feet)	Subject Capture Rate	Total Subject Demand (in Square Feet)
2001	50,100	75%	37,575
2002	11,032	80%	8,826
2003	11,032	85%	9,377
2004	11,032	85%	9,377
2005	11,032	85%	9,377
2006	11,032	85%	9,377
2007	11,032	85%	9,377
2008	11,032	85%	9,377
2009	11,032	85%	9,377
2010	11,032	85%	9,377
2011	11,032	85%	9,377
2012	11,032	85%	9,377
2013	11,032	85%	9,377
2014	11,032	85%	9,377
2015	11,032	85%	9,377
2016	11,032	85%	9,377
2017	11,032	80%	8,826
Totals (16.9 Years)	**226,612**	**82%**	**186,507**

2. Optimistic Scenario

Year	Annual Regional Demand (in Square Feet)	Subject Capture Rate	Total Subject Demand (in Square Feet)
2002	50,100	85%	42,585
2003	11,032	90%	9,929
2004	11,032	95%	10,480
2005	11,032	95%	10,480
2006	11,032	95%	10,480
2007	11,032	95%	10,480
2008	11,032	95%	10,480
2009	11,032	95%	10,480
2010	11,032	95%	10,480
2011	11,032	95%	10,480
2012	11,032	95%	10,480
2013	11,032	95%	10,480
2014	11,032	95%	10,480
2015	11,032	95%	10,480
2016	11,032	75%	8,274
Totals (14.8 Years)	**204,548**	**91%**	**186,553**

Source: The Hallstrom Group, Inc.

Table 11 shows the application of the market capture rate method. The technique demonstrates there is support for the subject development during the projection period. Again, commercial uses (and particularly anchor-type tenants) must be built in anticipation of demand. Under this approach, the subject property would reach full capacity during the projection period, with sufficient demand to support absorption in less than ten years.

Based on our analysis of market factors, we conclude the commercial component of the subject would be fully absorbed within eight years of initial groundbreaking, with the retail center and "Maui Fresh" facilities requiring circa three years and the office/medical buildings up to another five years.

The Upcountry Industrial Sector

Industrial development in the study region is highly limited. There are no industrial parks, dedicated subdivisions, or modern multi-tenant projects to support uses in the community. For the most part, existing industrial improvements are incorporated into agricultural uses or are non-conforming.

There are a few scattered quasi-industrial businesses, including auto repair and some minor warehousing, located on commercial lands along Makawao Avenue. But overall, we estimate the total square footage of these uses (almost all within older, uncompetitive structures) at only about 3,000 square feet.

As a result, regional businesses needing industrial lands (for storage, preparation, manufacturing, base yards or other uses) must either locate in the central valley, find non-conforming sites, use space at their residence or find other less-desirable sites. This serves to limit the evidently strong entrepreneurship among Upcountry residents, removes employment and capital from the community, creates further traffic congestion on the downslope arterials, and increases driving times for many workers in the area who must commute to their place of business before returning to Upcountry job sites.

Regional Macro Demand

As with commercial uses, the demand for industrial development in the study region was quantified based on per capita spatial demand trends seen elsewhere in the state. Demand for industrial development is a direct function of consumer demand for a finished product or service;

as population levels increase the need for additional supporting uses is proportionately created.

Beyond this, however, a modern suburban community needs industrial space in order to provide a full-spectrum lifestyle in reasonable proximity to consumers and business owners. Industrial development provides support for many local businesses, particularly warehousing for retail and restaurant operations who seek to minimize spatial needs through "as needed" deliveries of goods. It provides floor space for craftspersons, specialized repair trades, atypical retailing, and needed lesser quality office/administration space.

As shown on Table 12, industrial space development on Oahu now averages about 39.67 square feet per person, escalating at a compounded annual rate of 1.08 percent per person over the past 24 years. On the neighbor islands, the range is from 13.21 square feet per person in the strongly undersupplied Lahaina market to 41.83 square feet per person in the oversupplied Hilo market. Table 13 provides a summary of floor space ratios in selected communities statewide.

Materials from the Urban Land Institute indicate a range from 25 to 35 square feet of industrial space per resident is appropriate for a modern economy. This overall national range represents the lower end of the spectrum for Hawaii. In the islands, unlike the mainland, many quasi-industrial and commercial-oriented users locate in industrial projects (instead of retail facilities) pushing the effective per capita "industrial" figure higher. Also, given the isolated nature of the state, a full-spectrum of industrial use-types is required on each island, whereas on the mainland, neighboring communities often share uses.

We have concluded the appropriate level of demand for a suburban neighbor island region would be in range of 30 to 35 square feet of finished industrial development per person.

The majority of this space would not be located in the study area, which is somewhat outlying, but would be sited within centralized parks in Wailuku/Kahului that serve a broader cross-section of the island. Analysis indicates a suburban town typically contains about 25 to 40 percent of the industrial space created by local needs, the remainder being in "heavy" industrial parks (15-plus percent), port facilities (10 percent) and urban (or general) light industrial development serving the larger community (35-plus percent).

TABLE 12

SUMMARY OF INDUSTRIAL SPACE DEVELOPMENT
ON OAHU 1977 TO 2000
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

Year	Industrial Floor Space Area (Leaseable Sq. Ft.)	Resident Population of Island	Ratio of Industrial Space Per Person (Sq. Ft.)
1977	22,819,000	737,000	30.96
1978	23,412,000	742,600	31.53
1979	23,976,000	756,000	31.71
1980	24,780,000	764,600	32.41
1981	25,645,000	767,573	33.41
1982	---	776,075	---
1983	---	789,097	---
1984	---	797,791	---
1985	28,929,999	804,294	35.97
1986	28,159,000	810,444	34.75
1987	28,644,000	818,447	35.00
1988	29,714,000	824,072	36.06
1989	30,582,000	831,337	36.79
1990	31,261,000	838,107	37.30
1991	32,444,000	846,568	38.32
1992	33,280,000	858,543	38.76
1993	33,600,000	864,366	38.87
1994	33,820,000	871,362	38.81
1995	33,960,000	873,027	38.90
1996	34,120,000	873,131	39.08
1997	34,270,000	874,449	39.19
1998	34,400,000	872,478	39.43
1999	34,580,000	874,321	39.55
2000	34,760,000	876,156	39.67
Compounded Annual Growth Rate for 1977 through 2000	1.85%	0.75%	1.08%
Average Annual Addition for 1977 through 2000	519,174	6,050	0.38

Note: Complete data not available for all study years.

Source: DBEDT, CB Commercial, Hawaii Real Estate, and The Hallstrom Group, Inc.

TABLE 13

ESTIMATED FINISHED INDUSTRIAL FLOOR SPACE
IN SELECTED NEIGHBOR ISLAND LOCATIONS
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii
As of Year-End 2000

	Big Island		Maui		
Region	**Kona**	**Hilo**	**Lahaina**	**Kihei**	**Kauai**
Estimated Resident Population	53,164	47,351	17,400	23,800	57,300
Gross Leaseable Sq. Ft. of Industrial Space (1)	2,034,540	1,980,690	229,844	534,600	1,380,420
Sq. Ft. Per Capita Ratio	38.27	41.83	13.21	22.46	24.09
Market Status	Stable	Oversupplied	Strongly Undersupplied	Stable to Undersupplied	Stable to Undersupplied

Source: Hawaii Business and The Hallstrom Group, Inc.

TABLE 14

QUANTIFICATION OF INDUSTRIAL FLOOR SPACE DEMAND IN THE PRIMARY STUDY AREA FROM 2001 TO 2020

Market Study of the Proposed Upcountry Town Center

Pukalani, Maui, Hawaii

Scenario One: Conservative Population Estimates and Growth Rate (1)

Year	De Facto Population: Annual Growth Rate	De Facto Population: Forecast Total	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate (4)	=	Net Regional Demand in Square Feet
2001		14,875		33.00		490,875		25.0%		122,719
2005	1.50%	15,788		33.67		531,528		26.0%		138,197
2010	1.25%	16,799		34.52		579,874		27.0%		156,566
2015	1.00%	17,656		35.39		624,875		28.0%		174,965
2020	0.75%	18,328		36.29		665,070		29.0%		192,870

Scenario Two: Moderate Population Estimates & Growth Rate (2)

Year	De Facto Population: Annual Growth Rate	De Facto Population: Forecast Total	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate (4)	=	Net Regional Demand in Square Feet
2001		14,875		33.00		490,875		25.0%		122,719
2005	1.90%	16,038		34.34		550,742		27.0%		148,700
2010	1.70%	17,425		36.09		628,888		29.0%		182,378
2015	1.50%	18,772		37.93		712,055		31.0%		220,737
2020	1.30%	20,001		39.87		797,366		33.0%		263,131

Scenario Three: Optimistic Population Growth & Growth Rate (3)

Year	Annual Population Growth Rate	Forecast Population	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate (4)	=	Net Regional Demand in Square Feet
2001		14,875		33.00		490,875		25.0%		122,719
2005	2.25%	16,260		35.03		569,526		29.0%		165,163
2010	2.10%	18,041		37.73		680,754		31.0%		211,034
2015	1.95%	19,870		40.65		807,726		34.0%		274,627
2020	1.80%	21,724		43.79		951,355		37.0%		352,002

Source: The Hallstrom Group, Inc.

We have utilized a current level of overall demand for light industrial development of 33 square feet per person for the study area population and a regional capture rate of 25 percent. Based on this application, the current demand for industrial space in the Upcountry region would equate to approximately 122,719 square feet total.

Over time, as the population and area economy grows, and sufficient land is made available, the per capita demand and regional capture rate will increase. We have tested three scenarios (conservative, moderate and optimistic) for the study area stretching to 2020, as shown on Table 14. The indicated overall demand by the end of the two decade projection period, existing and from future growth, would range from 193,000 to 352,000 square feet.

Table 15 correlates the findings of the three scenarios and converts them to demand for underlying gross site acreage based on an FAR of .28 and a "net to gross" development efficiency for the raw sites of 75 percent. The indicated mid-point demand for finished space is about 296,000 square feet by the year 2020, and the mid-point demand for raw land is some 23 acres.

Current Market Indicators

As there are no major industrial developments in the Upcountry area, there are no current market data available to demonstrate latent demand levels.

We have conducted interviews with brokers handling commercial real estate in Upcountry and Central Maui, and the consensus was there would be meaningful demand for industrial lands in the study area were they made available. Among the uses for which they saw potentials included, contractor storage area, service business base yards, floral and vegetable processing, craft/artesian workshops, auto repair and servicing, self storage facilities, specialized manufacturing/assembly, agricultural and ranching products, limited warehousing, and various quasi-retail applications.

The industrial market is currently strong throughout the island, particularly in underserviced locales, as evidenced by the on-going rapid absorption of the Lahaina Business Park (23 of 25 Phase I lots sold to date) and in two new light industrial subdivisions in Kihei (fully absorbed over the past two years). Prices have firmed up since the mid-1990s softness and now range from $12 to $26 per square foot. There is every reason to expect that a subject project would also achieve such prices and absorption velocities.

TABLE 15

ESTIMATED TOTAL INDUSTRIAL FLOOR SPACE AND ACREAGE DEMAND FOR THE PRIMARY STUDY AREA 2001 TO 2020

Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

Scenario One: Conservative

Year	Forecast Floor Space Demand (In Sq. Ft.)	Divided by FAR Allowance (1)	Resulting Land Area Demand (In Acres)
2001	122,719	0.21	13
2005	138,197	0.21	15
2010	156,566	0.21	17
2015	174,965	0.21	19
2020	192,870	0.21	21

Scenario Two: Moderate

Year	Forecast Floor Space Demand (In Sq. Ft.)	Divided by FAR Allowance (1)	Resulting Land Area Demand (In Acres)
2001	122,719	0.21	13
2005	148,700	0.21	16
2010	182,378	0.21	20
2015	220,737	0.21	24
2020	263,131	0.21	29

Scenario Three: Optimistic

Year	Forecast Floor Space Demand (In Sq. Ft.)	Divided by FAR Allowance (1)	Resulting Land Area Demand (In Acres)
2001	122,719	0.21	13
2005	165,163	0.21	18
2010	211,034	0.21	23
2015	274,627	0.21	30
2020	352,002	0.21	38

FINISHED FLOOR SPACE ANALYSIS (In Square Feet)

Total Existing Demand			122,719
Estimated Existing Industrial Space (Sq. Ft.):			3,000
Current Undersupply or (Oversupply):			119,719
Periodic Additions Required (Sq. Ft.):			
Latent/Existing Demand	119,719	119,719	119,719
2001 to 2005	15,479	25,982	42,444
2006 to 2010	18,369	33,677	45,871
2011 to 2015	18,399	38,360	63,593
2016 to 2020	17,905	42,394	77,375
Cumulative Additional Space Required:	189,870	260,131	349,002
Increase as a Percent of Existing Floor Space	154.72%	211.97%	284.39%
Estimated Mid-Point Additional Space Required (2):			295,958

DEVELOPABLE LAND AREA ANALYSIS (In Acres)

Total Existing Demand			13
Estimated Existing Industrial Development Sites (In Acres.):			10
Current Undersupply or (Oversupply):			3
Periodic Additions Required (Sq. Ft.):			
Latent/Existing Demand	3	3	3
2001 to 2005	2	3	5
2006 to 2010	2	4	5
2011 to 2015	2	4	7
2016 to 2020	2	5	8
Cumulative Additional Acreage Required	11	19	28
Increase as a Percent of Existing Acreage:	82.62%	139.88%	212.29%
Estimated Mid-Point Additional Space Required (2):			23

(1) Assuming average finished "Floor Area Ratio" of .28 for industrial development sites, with a net to gross efficiency on bulk sites of 75%.
(2) Includes existing latent demand in totals.

Source: The Hallstrom Group, Inc.

Correlation of Demand Indicators

Application of numerical demand formulae demonstrate that the demand for light industrial land and finished space in the study area is meaningful. This is supported by the absorption levels being achieved in other suburban Maui communities.

At present, the regional market is undersupplied by at least 120,000 square feet or upwards of 13 acres. Future demand will equate to another 175,000-plus square feet of space and 20 more acres of development over the next two decades. The total regional sector will have to grow from virtually nothing to the size of a second tier suburban market by 2020 in order to meet the regional business requirements of the local population and tourists visiting the area.

TABLE 16

SUMMARY OF MAJOR EXISTING INDUSTRIAL DEVELOPMENT IN PUKALANI & MAKAWAO

Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

Project Name	Tax Map Key	Location	Size In Square Feet		Year Built	Current Vacancy Rate	Condition	Comments
			Site	Improvements				

ACCORDING TO THE HAWAII INFORMATION SERVICE TMK DATABASE THERE ARE NO CONFORMING INDUSTRIAL PROPERTIES IN THE STUDY AREA (HAVING A PITT CODE OF 400 - INDUSTRIAL)

While there are some minor industrial uses in the region, many are agricultural-related, located on properties zoned for other (typically commercial) properties, or located in sub-standard, older warehouse type improvements.

Source: Hawaii Information Service, State of Hawaii Realty Directory, and The Hallstrom Group, Inc.

TABLE 17

SUMMARY OF PROPOSED MAJOR INDUSTRIAL DEVELOPMENT IN PUKALANI & MAKAWAO

Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

Project	Location	Comments
Kula Malu	Makai side of Kula Highway, one mile south of subject.	At present, this under-construction development (previously described) is zoned for Country Town Business, which would not allow for many/most typical light industrial uses. However, only about one-third of the lots will have a siting desirable for most commercial (retail/service/office) uses, with the majority being interior lots best suited for industrial-type development. Given the rate of reservations to date, and the limitation of the project, we believe that upwards of two-thirds of the property will eventually be utilized for industrial-oriented development. This alternative would encompass about 10 net acres of lots.

Source: Prudential/Iwada Realty, and The Hallstrom Group, Inc.

Existing Supply

Table 16 summarizes the existing, conforming industrial lands and developments in Upcountry (or lack thereof). According to the Hawaii TMK Information Service database, there are no conforming industrial properties in the study region (having a Pitt Code of 400 - Industrial).

Proposed Supply

The only announced potential for industrial land supply is within the Kulamalu development discussed in the commercial sector section, as shown on Table 17. While the project, currently in the subdivision process, is zoned for "Country Town" business, we consider it unlikely all of the lots will be absorbed in a timely manner under such constraints. The interior lots are better suited for business park/cottage/light industrial uses.

We consider it highly likely that up to ten net acres of the non-highway, non-access roadway frontage lots will be placed into industrial-type uses over time; and we have accordingly reflected this potential inventory in our analysis, although this assumption may result in an overstatement of potential/competitive supply.

Correlation of Demand/Supply Indicators

Our analysis indicates there is an existing unmet demand for nearly 120,000 square feet and 13 acres of cottage/light industrial development in the study area. Over the next two decades, population and economic growth will create a further need for an additional 175,000 square feet and 20 acres. Total construction of some 296,000 square feet and 33 acres (mid-point estimate) will be needed to fully service the Upcountry sector.

There is virtually no available conforming, competitive supply of industrial space or land in Pukalani/Makawao. This is obviously is inadequate to meet the existing and future demands of the community. The only significant potential supply would be from the less desirable interior lots of a subdivision that is currently not zoned for industrial-type uses, and even were these lots available for industrial-oriented uses, they would have no exposure and are relatively outlying from the primary traffic/business flow.

We conclude there is sufficient demand to support the subject development over the near to mid-term.

TABLE 18

QUANTIFICATION OF POTENTIAL SUBJECT INDUSTRIAL DEMAND USING THE RESIDUAL METHOD

Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii
ALL ABSORPTION FORECASTS IN ACRES, PROBABLE PROJECTS ONLY

Project	In Acres Competitive Lot Area	Absorption 2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Totals
Kula Malu	10				3	3	3	1														10
Market Share %					100%	100%	100%	100%														
Other Long-Term Inventory	13								1	1	1	1	1	1	1	1	1	1	1	1	1	13
Market Share %									100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Projected Absorption		0.0	0.0	0.0	3.0	3.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	23.0
Periodic Regional Demand		14.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	33.0
Periodic Undersupply or (Excess)		14.0	1.0	1.0	(2.0)	(2.0)	(2.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
Cumulative Undersupply or (Excess)		14.0	15.0	16.0	14.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Residual Potential Subject Demand																						
at 100% Residual Capture Rate		14	1	1	(2)	(2)	(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
at 95% Residual Capture Rate		13	1	1	(2)	(2)	(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
at 90% Residual Capture Rate		13	1	1	(2)	(2)	(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
at 80% Residual Capture Rate		11	1	1	(2)	(2)	(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8

Source: The Hallstrom Group, Inc.

Analysis of Subject Appropriateness/ Competitiveness

Competitive industrial-oriented properties require a location near major thoroughfares, proximate to the community they support, and accessible to patrons, shippers and suppliers. Street frontage/exposure, while desirable for some users, is not as essential as for commercial development.

The subject property has a favorable location for light or cottage industrial uses. It is at the hub of the regional traffic pattern, with strong access characteristics, and will be centrally sited to service the Pukalani, Makawao and Kula communities, in addition to the on-site demand created by other businesses in the Upcountry Town Center project.

The subdivided lots will have direct access to/from all three of the major arterials defining the subject property, and will be an independent component along a road set apart from the other use-types. Several of the lots will have exposure along the Bypass Highway, but for the most part will be buffered from the right-of-way by up to 400 feet of open space/pasture.

The subject property is a superior location for the proposed use, and is among the better potential sites for cottage industrial development in the region from a market perspective. Absent any existing or zoned competition it should be successfully absorbed in a reasonable period by a sector as yet untapped.

It is anticipated the FAR of the improvements will range from .25 to .35 depending upon user requirements. For the purposes of this study, an overall FAR of .33 was used as a maximum figure. This density is commensurate with levels seen in similar projects statewide and reflects appropriate open space, parking and traffic flow needs.

The appropriateness and competitiveness of the subject master plan is demonstrated by the application of the *residual* and *market capture* techniques which indicate the subject cottage industrial components will be fully absorbed during the projection period.

Table 18 displays the residual method, a conservative application which assumes that all other proposed properties will receive their full share before any "left over" demand flows to the subject. In light of the lack of existing and proposed competition, it could be asserted the "residual" demand available to the subject is 100 percent of the

TABLE 19

PROJECTED SUBJECT DEMAND USING MARKET CAPTURE RATE ANALYSIS OF THE TOTAL REGIONAL INDUSTRIAL SECTOR
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

1. Conservative Scenario

Year	Annual Regional Demand (1) (in Acres)	Subject Capture Rate	Total Subject Demand (in Acres)
2001	1.7	50%	0.8
2002	1.7	55%	0.9
2003	1.7	60%	1.0
2004	1.7	33%	0.5
Totals (3.5 Years)	6.6	50%	3.3

2. Optimistic Scenario

Year	Annual Regional Demand (1) (in Acres)	Subject Capture Rate -	Total Subject Demand (in Acres)
2001	1.7	75%	1.2
2002	1.7	85%	1.4
2003	1.7	40%	0.7
Totals (2.4 Years)	5.0	67%	3.3

(1) The regional latent demand of 13 acres is spread over the projection period in this application Otherwise the subject would shoe as being fully absorbed in the first year in both scenarios.

Source: The Hallstrom Group, Inc.

regional requirement. However, for analytical purposes we have shown the absorption of 10 interior acres at Kulamalu (assuming their eventual highest and best use is business/light industrial), and an allowance for one acre of other (as yet unknown) industrial lands yearly beginning in 2008.

The analysis indicates the 3.25 acres of the subject inventory, comprised of nine finished lots, should be readily absorbed by the market within a two to three year period.

Table 19 shows the application of the market capture rate method. The technique also demonstrates there is strong support for the subject development during the projection period. Under this approach, the subject lots would be fully absorbed in a 2.4 to 3.5 year period.

We believe these methods may understate the actual absorption speed. As this will be the first project in the area of its kind, there will be meaningful long pent-up demand that should emerge and hasten sell-out. Based on our analysis of market factors, we conclude the cottage industrial component of the subject would be fully absorbed within three years of initial groundbreaking, with the build-out and absorption of the finished buildings requiring up to another five years.

The Upcountry Senior Housing Sector

Despite concerted efforts by public agencies and private developers, Hawaii has had more difficulty meeting the housing needs of the elderly than most states. The number of designated senior housing units in the islands relative to the over-62 population is about one-third the nationwide ratio, and the immediate shortfall is estimated at more than 2,500 units.

Demographic projections indicate that up to 12,000 elderly housing units must be added to the statewide inventory over the next 10 to 15 years to effectively meet the needs of the senior group. The exceptional longevity of Hawaii citizens further stresses the available supply.

The Maui situation is comparable to worse than the state as a whole, with the West Maui and Upcountry areas being among the more poorly served on the island. The median age on the island is higher than statewide averages, the housing market is tighter with higher than average prices, and there are generational issues for seniors raised in the agrarian economy of the past who are forced to compete in the modern Maui market.

Regional Demand

Senior housing demand is not as locationally constrained as are "neighborhood" commercial and industrial uses, and is typically forced into whatever product may be available islandwide. However, discussions with elderly-serving agencies indicate seniors have strong regional housing preferences that often go unmet.

Most long-time residents would seek housing in their existing community if available. A majority prefer the cooler and less visitor-oriented windward and Upcountry regions, although there is meaningful demand in West Maui. Affordability is a key issue, as senior incomes lag behind the investor/tourist-fueled local economy, and residential real estate enters another upcycle.

According to the 2000 census, 13.6 percent of Maui residents are over the age of 62. Some 23.5 percent of the households in the county include persons over 65, and 6.3 percent of all "householders" are over this age. This ratio, which extrapolates into two-thirds of Maui seniors living within the homes of younger households (typically multi-generational), is among the highest in the nation, a product of both culture and economics.

The relative lack of available units has forced many Upcountry elderly into Wailuku/Kahului in search of housing, and the surge in population brought about by new development has attracted younger families. The result is that the percentage of elderly in the study region is less than the county-wide average. The population of Makawao is particularly more youth-oriented. Only 10.9 percent Upcountry residents are over the age of 62, and seniors are found in only 19.0 percent of the households and are the householder in 4.2 percent of the homes.

We have quantified the demand for senior housing units in the study area over the next two decades, focusing on the number of units that will be required to adequately service the community. Our calculations are shown on Table 20.

Senior housing units are those having a price (or monthly rental) quantified as being oriented toward low to moderate income households. These are households with incomes ranging up to 140

TABLE 20

QUANTIFICATION OF SENIOR HOUSING DEMAND IN THE UPCOUNTRY REGION 2001 THROUGH 2020
Market Study of the Upcountry Town Center
Pukalani, Maui, Hawaii

	2001	2005	2010	2015	2020
Regional Resident Population (Moderate Growth Estimate)	14,875	16,038	17,425	18,772	20,001
Percent Seniors (Over age 62)	11.0%	11.5%	12.0%	12.5%	13.0%
Total Senior Population	1,636	1,844	2,091	2,347	2,600
Percent of Seniors Living Independently	33%	35%	37%	39%	40%
Total Independent Seniors	540	646	774	915	1,040
Average Senior Household Size	1.60	1.60	1.60	1.60	1.60
Total Housing Unit Demand Created by Independent Living Seniors	864	1,033	1,238	1,464	1,664
Percent of Seniors in Designated Housing Group (1)	85%	86%	87%	88%	89%
Total Senior Housing Units Required	734	888	1,077	1,289	1,481

Total Current Unit Demand	734
Existing Senior Householder Units	518
Current Unmet/Latent Senior Housing Demand	216
Additional Senior Housing Demand 2001 Through 2020	747
Total Regional Senior Housing Demand Through 2020	963

(1) With household incomes of less than 140 percent of median levels, adjusted for household size.

Source: Year 2000 Census, US Department of Housing and Urban Development, and The Hallstrom Group, Inc.

percent of median levels, as adjusted for size. Generally, the criteria defines housing affordability as not to exceed 30 percent of the gross income level, whether as a mortgage payment or rent. Under current standards, the maximum monthly housing costs for a moderate income senior household of two persons would be $1,111.

The demand for senior housing units in Upcountry at present is some 734 total units. Extrapolation of the year 2000 census data indicate there are approximately 518 existing available units to service this demand, resulting in a shortfall of 216 units to fully meet regional market needs. These individuals are currently being housed in multi-generational units or homes which are outside their affordability parameters.

The need for senior housing will increase at residents age and live longer, the regional population grows, and greater numbers seek independent housing. An additional 747 affordable senior units beyond existing demand totals will be needed in the community over the next two decades. The total number of units required to fully service unmet/latent and future demand will be 963 by 2020. **This does not include current residents of other Maui areas, or in-migrating seniors, many of which would find Upcountry a desirable retirement housing location.**

Current Market Indicators

The demand for housing of all types on Maui has been historically strong due to high land costs and visitor industry influence on real estate. While the "tightness" let up somewhat during the economically slow 1990s, the housing market is again moving into an upcycle resulting in another acute shortage of housing opportunities. Double-digit appreciation is expected in the Maui residential sector in 2001, with lower-priced inventory being quickly absorbed in recent months; particularly in desirable and/or low supply areas such as West Maui and Upcountry.

In this regard, the demand for housing in all residential sectors of the study area, including the senior component, are strong. This is supported by the 100 percent occupancy at the senior housing project in Makawao.

Supply

The only major "affordable " housing project in Upcountry is the Hale Mahaolu - Eha Elderly project located at 1057 Makawao Avenue, on the makai side of the road near the fairgrounds. The 40 unit "affordable, unassisted elderly rental" development was constructed on a 1.14 acre site in 1995. The three story, wood frame structure, identified on State Tax Maps as Second Division TMK 2-2-24, Parcel 3, has all one bedroom units.

The other affordable senior housing units (estimated at 470 total) are spread throughout the region, in both multi-tenant and single family housing. However, as homeowners age, it becomes more difficult to maintain a free-standing residence, and many of the seniors currently housed in single family inventory will require relocation to other accommodations. This will create additional demand not reflected in our calculations, as well as likely remove a unit from the available senior housing category.

There are long-term plans to develop more senior housing units in the study region, but even if pursued in a timely manner, they will be insufficient to meet even the unmet/latent demand in the community.

Correlation of Demand/Supply Indicators

The demand for senior housing units in the study area currently exceeds the available supply by some 216 units, and is forecast to reach an additional 747 units by 2020. There are not enough units proposed, announced, or even envisioned at this time to meet the need for 963 total units by the year 2020.

Analysis of Subject Appropriateness/ Competitiveness

Given the acute shortfall of qualified housing units in Upcountry, a condition expected to be exacerbated over time as development pressures and population levels rise, it can be reasonably concluded the 120 proposed subject units(4) will be readily absorbed over a reasonable development period.

The subject location is highly appropriate for this use type. Seniors desire/require housing that is easily accessible; proximate to retail stores, health care providers, emergency services and civic/support agencies; and with nearby open space/parks available for modest activities.

The Upcountry Town Center will provide a more comprehensive lifestyle than available at any other Upcountry site. The largest shopping center in the area, numerous medical practitioners, and other services will be available within walking distance. The commercial and industrial businesses will also provide excellent employment opportunities for the residents.

(4) Maximum unit count based on 8.0 net acre site developed at 15 units per acre.

The master plan also includes trails and safe interior roadways for strolling, and significant amounts of open space. The Pukalani Senior Center is only blocks away, and there is an emergency response station on the property. The modern urban environment and thematic ambience of the project will further contribute to the competitiveness of the subject senior housing component.

The developer anticipates the project will be built in several phases over an up to five year period. Given this modest construction schedule and the state of the market, we conclude the 120 unit (maximum) senior housing project at the Upcountry Town Center will be absorbed within a five year construction and sales period.

THE UPCOUNTRY MULTIFAMILY RESIDENTIAL SECTOR

Although a minor component of the proposed subject, a multifamily project will be a highly appropriate use for an Upcountry Town Center site from a market perspective. A moderate density residential development is in keeping with the overall scale and scope of the master plan, and will provide synergistic lifestyle and operational benefits to residents and Center businesses.

Historically, the Upcountry residential sector has been dominated by single family development, ranging from smaller plantation-style subdivisions (as at Hailiimailii) to bulk acreage ranch and agricultural lots (in Olinda and Kula). Prices cover a similar spectrum, from low-end entry level homes to upscale gentlemen farms. The low density "country" ambience and housing alternatives have been major attractions of the region.

However, as a result of the increasing urbanization of the island, limited housing opportunities in Wailuku/Kahului, and the relative proximity of Upcountry to Maui economic centers, the study region is evolving into a bedroom community offering a variety of unit types typical of suburban development. The movement has gained inertia in recent years as the ease of commute has been enhanced through the expansion of the Haleakala Highway and completion of the Pukalani Bypass. The commercial and public components of the subject master plan are designed to address the emerging retail, service and medical needs associated with this on-going transformation.

Escalating residential densities are a by-product of Upcountry modernization; an effort to provide greater supply within a high demand area having limited infrastructure and zoned land resources. The average size of house lots in the region has decreased meaningfully in recent years, and multifamily units have entered the market. Given the maturation of the community, its desirable lifestyle and proximity attributes, and cost factors, we believe there is strong general support for further multifamily development in the study area.

Projecting the probable demand for market-priced Upcountry Town Center multifamily units is a three-step process:

1. **Quantification of Upcountry Housing Unit Demand** -- Estimating the need for additional housing units in the study area based on population, vacancy and income characteristics.

2. **Identification of Upcountry Multifamily Projects** -- Overview of in-place and proposed/potential multifamily units in regards to tenure, unit types, sales activity and pricing.

3. **Assessment of Subject Demand** -- Correlation of demand and supply indicators in conjunction with the competitive attributes of the subject to estimate probable pricing and absorption factors.

We have assumed that any subject multifamily units would be within a market-priced project having purchasers across a broad demographic, including first time buyers, young married couples (typically with less than two children), empty nesters, retirees, and investors.

Quantification of Upcountry Housing Unit Demand

We have projected the demand for residential units in Upcountry Maui using standardized formulae employing population forecasts, household size trends, and other market-based factors as follows:

RP/AHS = TRUR X (1 + (VA + NRPA)) = TMUD

Where:

RP is the Resident Population
AHS is the Average Household Size
TRUR is the Total Resident Units Required
VA is a Vacancy Allowance
NRPA is a Non-Resident Purchaser Allowance
TMUD is a Total Market Unit Demand

Each of the variables in the formula is based on historic statistics compiled by the Federal Home Loan Bank, U.S. Census Bureau, State of Hawaii DBEDT, other recognized governmental sources, and researched market data.

These past and current indicators were translated into estimates based on temperate trending interpretations. Our emphasis was on letting the data "speak for itself" through our projections, as opposed to making large-scale adjustments for subjectively anticipated lifestyle or market evolutions.

In this regard, our forecasts are representative of moderate future housing requirements, and could be understated if some movements continue as strongly as in recent years; such as the trend towards smaller household sizes and an increasing influx of non-resident (foreign) purchasers into the market.

Additionally, as noted, public and private planners consider governmental population projections to be restrained relative to probable occurrence.

The "Total Market Unit Demand" conclusions resulting from equation application are intended to quantify the total number of residences which will be needed in the study region over a 20-year projection period (2002 through 2021) in order to manifest a reasonably stable market with all purchaser/tenant demand segments served.

Currently, the Upcountry housing market is in a nominal to moderately undersupplied condition, with generally low vacancy rates and appreciating prices over the last several years. Stated governmental policy is to alleviate the unit shortage through increased densities of urban lands and development of feral or nominal agricultural lands at as rapid a pace as the infrastructure and community will bear.

The factors comprising our housing demand equation can be summarized as follows:

Resident Population (RP) -- This variable utilizes population forecasts made by ourselves based on analysis of past state (Series 2020), county, and district forecasts. The concluded figures are comparable to levels projected in the draft Maui County Community Plan technical document prepared by Wilson Okamoto, Inc., et al.

Average Household Size (AHS) -- This factor was calculated using the data as provided by the above-cited sources and census figures. The 2000 census estimated the AHS in the study area was at 3.02 persons.

This figure represents a marginal movement upwards from 3.01 persons in 1990. This stabilization goes against general nationwide trends toward smaller households. The lack of downward movement is undoubtedly due to the continuing shortage of available housing units in the economically expanding and increasing demand community. The average size would be lower in the region were sufficient units made available.

Most Hawaii-oriented sociologists contend the movement to smaller household sizes will continue into the future, assuming enough units are built, until stabilizing at circa 2.5 persons statewide, factoring in longer life-spans, the influx of single persons attracted to the climate and employment opportunities in Maui, and the tendency towards fewer children.

We have forecast that the average household size level would stabilize by the Year 2021 at from 2.86 to 2.94 persons, down meaningfully from current levels, but still above most island locales.

Total Resident Units Required (TRUR) -- This figure is arrived at by dividing the subject area resident population (RP) by the average household size (AHS). It is indicative of the minimum number of residences which would be required to meet basic market needs, assuming there were no vacant units, none uninhabitable due to on-going repair or deleterious conditions, and none occupied by non-resident persons.

For a market to be considered stable (and nominally operative) with acceptable appreciation rates and quality lifestyle opportunities, allowances for such factors must be made.

Vacancy Allowance (VA) -- Federal, state, and local governments have gone on record during the past 15 years calling Maui one of the tightest residential market sectors in the nation, and expressing fears of a deteriorating economy and community structure unless major steps are taken over the long-term to address the shortage. The undersupply condition is a primary reason Maui housing prices are on average among the highest of any locale in the country.

According to HUD, the Urban Land Institute, and other sources, a "healthy" market has a minimum vacancy level of five to six percent of the total number of units in the inventory. This allows for uninhabitable units, units under repair, seasonal fluctuations, a transitional housing margin, a degree of mobility potential, and the ability to service periodic unanticipated population increases. A "slack" in unit occupancy also serves as a margin to cushion against hyper-appreciation during strong demand periods.

Given the history of the Maui housing market and its inability to keep an acceptable vacancy pool available, we believe it will be exceptionally difficult for the desirable vacancy allowance of five percent or more to be achieved on the island during the foreseeable future.

In our demand formula, we have tested vacancy rate allowances of three and five percent of the Total Resident Units Required figure.

Non-Resident Purchaser Allowance (NRPA) -- While most investors strongly desire to rent purchased units to residents in an effort to minimize debt service obligations, there are those who buy a Hawaii home or condominium for personal (family and friends) use, business reasons, or for periodic rental to non-resident "visitors."

These units are not available to meet resident housing demands and are effectively withdrawn from the inventory pool. An allowance must be made for these residences in the general community, which are not to be confused with those specifically intended for tourist-oriented transient rentals (i.e., within a condominium/hotel project in a vacation area).

On the neighbor islands and in Waikiki, there are many units in complexes or subdivisions designed for general residential use, which often sit vacant the vast majority of the time.

Our research indicates some neighbor island non-resort projects have upwards of 30 percent vacant investor-owned units/homes. In resort communities (particularly Mauna Kea Beach, Mauna Lani, and Wailea), up to 90-plus percent of selected complexes are so held.

Well removed from the leeward resort communities and most tourist/vacation oriented development, the demand for non-resident units in Upcountry is not significant. However, the excellent views, good climate and easy access to most Maui amenities, does attract some non-resident purchasers to the area, focused on upper-end homes and units near the golf-course. Based on historic trends, the NRPA should be at a minimum of eight to ten-plus percent in Upcountry. However, public policies and community pressure should help in moderating this trend. We have, therefore, tested conservative, non-resident allowances of four to six percent of total resident household demand.

Total Market Unit Demand (TMUD) -- The solution to our demand formula is quantified by adding the Vacancy Allowance (VA) and Non-Resident Purchaser Allowance (NRPA) to the Total Resident Units Required (TRUR) figure. This is the total number of units which will be needed in the study region in order to meet all reasonable market demands.

The application of the housing demand formula to the subject region is shown on Table 21.

Based on our analysis, the actualization of a healthy and stable housing market in the study area will require the construction of about 5,645 to 8,054 additional housing units in the Upcountry area by the Year 2021. The mid-point demand would be for 6,850 units, almost double the number of current housing units in the study region (7,305) concluded by the 2000 census.

TABLE 21

QUANTIFICATION OF HOUSING UNIT DEMAND FOR THE UPCOUNTRY AREA 2002 Through 2021

Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

	Beginning 2002	2007	2012	2017	End 2021	Additional Units Required by 2021 (1)
Scenario One: Minimum Projections Using Low Population Estimates and Conservative Allowance Factors						
Resident Population	21,402	25,040	28,796	32,540	36,119	
Average Household Size	3.02	3.00	2.98	2.96	2.94	
Total Resident Units Required	7,087	8,347	9,663	10,993	12,285	
Vacancy Allowance (3% of resident unit demand)	213	250	290	330	369	
Non-Resident Purchaser Allowance (4% of resident unit demand)	283	334	387	440	491	
TOTAL MARKET UNIT DEMAND	7,583	8,931	10,340	11,763	13,145	5,645
Scenario Two: Maximum Projections Using High Population Estimates and Optimistic Allowance Factors						
Resident Population	21,402	25,682	30,305	35,154	40,076	
Average Household Size	3.02	2.98	2.94	2.90	2.86	
Total Resident Units Required	7,087	8,618	10,308	12,122	14,012	
Vacancy Allowance (5% of resident unit demand)	354	431	515	606	701	
Non-Resident Purchaser Allowance (6% of resident unit demand)	425	517	618	727	841	
TOTAL MARKET UNIT DEMAND	7,866	9,566	11,442	13,456	15,554	8,054

CONCLUDED HOUSING UNIT DEMAND RANGE

	Existing	2002-2006	2007-2011	2012-2016	2017-2022	Totals
MINIMUM DEMAND						
Periodic	83	1,348	1,409	1,423	1,383	5,645
Cumulative	83	1,431	2,840	4,263	5,645	
MAXIMUM DEMAND						
Periodic	366	1,700	1,876	2,014	2,098	8,054
Cumulative	366	2,066	3,942	5,956	8,054	
MID-POINT DEMAND						
Periodic	225	1,524	1,642	1,718	1,741	6,850
Cumulative	225	1,749	3,391	5,109	6,850	

(1) There were 7,305 housing units in the study area according to 2000 census. In 2002, the number is estimated to by 7,500 units, resulting in a latent market demand for a minimum of 83 units needed to achieve market stability.

Source: Various and The Hallstrom Group, Inc.

Conversion of this estimate of gross demand into pricing equivalents was completed using available data from the U.S. Census, Maui Board of Realtors, and the U.S. Dept. of HUD.

Table 22 illustrates this striation of Upcountry regional housing demand to 2021 into probable percentile demand by sales prices at current dollar levels. The figures correlate both historic actual buying trends and theoretical "affordability" quotients derived using government pricing criteria.

Inherently, a large portion of the demand is generated by lower- to middle-income groups who can have difficulty competing in the high-priced Maui marketplace. Upper-middle and above-income households have more meaningful purchase alternatives.

The subject inventory will be at or below the pricing affordability levels for about 50 percent of the market demand, this equates to 2,800 to 4,000 units being needed for the low to moderate-income segment. There will be insufficient new inventory to service this demand, and there will be a continuing shortfall of moderately priced units under virtually all population growth alternatives.

Given land, subdivision and construction costs, it will be difficult to meet anticipated regional housing demands solely through single family development. Multi-family projects <u>must</u> be pursued in order to keep the Upcountry housing sector in balance. We believe that by 2021 upwards of 20 to 30 percent of all new units in the study area will be multi-family constructions, trending as follows:

ESTIMATE OF MID-POINT FUTURE UPCOUNTRY HOUSING UNIT MIX

	Beginning 2002	2007	2012	2017	End 2021
Total Units	7,500	9,249	10,891	12,610	14,350
Single Family	7,418	8,833	9,965	10,971	11,480
Percent of Total	98.9%	95.5%	91.5%	87.0%	80.0%
Multi-family	82	370	769	1,261	1,722
Percent of Total	1.1%	4.0%	7.0%	10.0%	12.0%

TABLE 22

STRIATED PROJECTIONS OF HOUSING UNIT DEMAND BY SELLING PRICE IN UPCOUNTRY MAUI 2002 THROUGH 2021

Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

Period	Periodic Demand (1) 2002 to 2006	2007 to 2011	2012 to 2016	2017 to 2021	Total Demand 2002-2021
1. Minimum Demand					
Less Than $215,000	411	372	318	280	1,381
Percent of Total Demand	30.00%	26.00%	22.00%	20.00%	24.46%
$215,000 to $375,000	438	472	491	491	1,892
Percent of Total Demand	32.00%	33.00%	34.00%	35.00%	33.51%
$375,000 to $525,000	315	343	361	365	1,384
Percent of Total Demand	23.00%	24.00%	25.00%	26.00%	24.51%
$525,000 to $800,000	137	157	173	168	636
Percent of Total Demand	10.00%	11.00%	12.00%	12.00%	11.26%
Over $800,000	68	86	101	98	353
Percent of Total Demand	5.00%	6.00%	7.00%	7.00%	6.26%
Total Market Demand	1,369	1,430	1,444	1,402	5,645
	100.00%	100.00%	100.00%	100.00%	100.00%
2. Maximum Demand					
Less Than $215,000	538	512	463	438	1,950
Percent of Total Demand	30.00%	26.00%	22.00%	20.00%	24.21%
$215,000 to $375,000	573	649	716	766	2,705
Percent of Total Demand	32.00%	33.00%	34.00%	35.00%	33.58%
$375,000 to $525,000	412	472	526	569	1,980
Percent of Total Demand	23.00%	24.00%	25.00%	26.00%	24.58%
$525,000 to $800,000	179	216	-253	263	911
Percent of Total Demand	10.00%	11.00%	12.00%	12.00%	11.31%
Over $800,000	90	118	147	153	508
Percent of Total Demand	5.00%	6.00%	7.00%	7.00%	6.31%
Total Market Demand	1,792	1,968	2,105	2,189	8,054
	100.00%	100.00%	100.00%	100.00%	100.00%

(1) Assumes existing latent demand is spread evenly over projection period.

Source: Various and The Hallstrom Group, Inc.

The total mid-point demand for multi-family units over the next two decades is estimated at nearly 1,640.

Identification of Upcountry Multi-family Projects

Existing Supply

Presently, there are four "major" multifamily projects (more than 10 units) in-place in the study area. The developments, which contain a total of 82 housing units, are summarized on Table 23.

All of the projects are in Pukalani, three of which are nearby or overlooking the Pukalani Golf Course, the fourth in a residential neighborhood. The first built was Pires Place in Pukalani, a moderate to lower-end 12 unit leasehold development constructed in 1985-86. The other three are moderate and above quality projects, all fee simple offerings, constructed from 1993 through 1999. Cumulatively, they comprise about 1.1 percent of the total number of Upcountry residences (82 out of total 7,500 homes).

The newer condominiums have larger units, ranging from 1,084 to 1,824 square feet, and achieve relatively high selling prices (currently at $205,000 to $345,000). Overall development densities range from 5.5 to 11.5 units per acre. The older leasehold project has smaller units (672 to 1,056 square feet), prices from $135,000 to $215,000, and an effective density of about 5.22 units per acre.(5)

The only other "multi-family" project pursued in Upcountry in recent years is Makawao Highlands, a housing development for first time home buyers. This 22-unit fee simple "single-family condominium" project was built by Maui County on 3.9 rezoned acres in 1995-96.

The developments have nominal amenities. Realtors state demand for the units is generally good, with available listings having relatively low marketing periods and achieving high percentages of the asking price. All have shown appreciation since mid-decade at rates ranging from three to eight percent compounded annually.

Proposed Supply

There is only one proposed multifamily project in the study area at the present time, an 11-unit fee simple condominium planned for 2.34 acres (4.7 units per acre density) at 147 Makawao Avenue. The development, which was to be offered on the market in 2001-02, has

(5) The gross density on the 6.02-acre larger overall parcel is about two units per acre. The actual building site is just over two acres.

TABLE 23

SUMMARY OF MAJOR EXISTING UPCOUNTRY MULTIFAMILY PROJECTS (1)
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

Project Name	Second Division Tax Map Key	Tenure	Year Built	No. of Units	Building Site Size in Acres	Units/Acre Density	Unit Type Beds/Baths	Living Area in Sq. Ft.	Recent Selling Prices (2)
Pires Place	2-3-12-14	Leasehold	1985-86	12	2.3	5.22	1/1	672	$135,000
							2/1	984	$145,000 to $160,000
							3/1	960-1,056	$167,500
							3/2	960	$175,000 to $215,000
Pukalani Fairway Estates	2-3-09-37	Fee	1993	24	4.4	5.45	3/2	1,296-1,461	$205,490 to $305,000
Liholani Golf Villas	2-3-08-37	Fee	1999	26	3.1	8.28	3/2	1,724-1,734	$260,000 to $330,000
Gardens Upcountry	2-3-44-31	Fee	1999	20	1.74	11.47	2/2	1,078-1,824	$205,000 to $345,000

(1) Projects containing 10 or more units.
(2) Sales since January 1, 2000.

Source: Redi-TMK Condominium Guide, and The Hallstrom Group, Inc.

stalled due to permit issues regarding the conversion of an existing structure into some of the units.

Our investigation of assessment data indicates there are only two vacant multifamily zoned parcels in Upcountry, both as minor components within larger projects that have revised their master plans during the last several years.

There is a 117.43 acre parcel within the Kulamalu (Dowling) development which is partially zoned "A-1". It was sold in September 2001 for $3,308,501 (or $.65 per square foot) to Keawe Land LLC. Preliminary plans are to build a series of residential neighborhoods, including multifamily and single family, containing several hundred total units. The first two increments will contain 60 single-family lots along the Pukalani Golf Course having an average lot size of 10,000 square feet. No multi-family projects have been announced, but it is unlikely the total number of multi-family units will exceed 400 total (assuming 50 gross acres of multi-family sites at eight units per acre). The design of Kulamalu may yet again evolve. In any case, it will be several to many years before the first finished condominium product is offered.

There is a 31.31 acre multifamily parcel within the Sports Shinko development adjacent to the Pukalani Fairway Estates condominium. We are aware of no near-term construction plans for the site, which could contain up to 250 total units.

These proposed/possible projects are summarized on Table 24. Overall, while having the potential to provide significant numbers of units, we have doubts as to their ability to provide competitive inventory in a timely manner over the near to mid-term.

Assessment of Subject Demand

The mid-point demand for multifamily units in Upcountry over the next two decades is forecast at 1,640 total units, which will represent a many-fold increase over the presently available condominium inventory in the study area, and a major change in Upcountry development towards denser suburban-type housing. While there are potentially upwards of 650 units of supply within the zoned land base, they are virtually all contained in two sites that are unlikely to be developed to their maximum densities or during the next ten years when the mid-point demand will reach 687 multi-family units.

TABLE 24

SUMMARY OF MAJOR PROPOSED/POTENTIAL UPCOUNTRY MULTIFAMILY PROJECTS (1)

Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

Project Name	Second Division Tax Map Key	Tenure	Status	No. of Units	Site Size in Acres	Units/Acre Density
147 Makawao Avenue	2-3-44-40	Fee	Proposed	11	2.3	4.70
Kulamalu	2-3-8-40	Fee	(2)	400	50.0	8.00
Sports Shinko	2-3-9-39	Fee	(3)	250	31.3	7.99

(1) Projects containing 10 or more units.
(2) Initial phases of project will have 60 single family lots covering about 20 gross acres of the site. There have been no multifamily projects announced to date. We are assuming a maximum of 50 gross acres of 117.4 acre site would be used for multifamily.
(3) No announced plans for "A-1" zoned site.

Source: Hawaii Information Service, Maui News, Interviews, and The Hallstrom Group, Inc.

On a general basis, there is reasonable market support for the subject multifamily units: the demand for inventory (and associated pricing) is increasing; the amount of proposed competitive supply is limited and well-removed from the subject property; and, there are concerns on the timing and ultimate scope of alternative multifamily-potential sites.

The subject inventory will have sufficient characteristics to be competitive in the Upcountry market. The probable current price range would be below that for new single family homes and less than the prices being achieved at the golf course/view projects comprising the majority of existing and potential product. The site will be proximate to the most modern neighborhood and regional commercial businesses in the area, with easy access to primary thoroughfares, and adjacent to parks, open space and civic uses within a well-designed master planned development.

Even were all of the proposed/potential inventory actualized during the projection period, the subject multifamily units could still anticipate achieving a reasonably rapid absorption. This is illustrated by correlating statistical regional multifamily housing "needs" and subjective competitive insights using three analytical methods:

- <u>The Gross Analysis Method</u> -- This is both the simplest and most fundamentally insightful technique. It is a mere comparison between demand for additional units and probable unit supply. If there is more potential demand than potential units, it can be reasonably asserted there will be sufficient demand to absorb all of the proposed subject units.

  The estimated mid-point demand for multi-family development over the next decade in Upcountry is about 687 units, and at 1,640 units during the coming two decades. At a maximum, even if all proposed/potential units were built in a timely manner, the total number would be a maximum of 650 units, resulting in a shortfall of nearly 1,000 units over the next two decades, and a figure sufficient enough to meet all near to mid-term demand even if they were built in a timely manner.

  This method indicates the subject units could be readily absorbed within the projected Upcountry Town Center development time frame of circa six to ten years, apart from any competitive advantage the inventory may have.

- The Residual Method -- In this technique, the identified, proposed and potential Upcountry multi-family projects are placed on a time-line depicting the sales absorption anticipated by the developers, as evidenced by our market survey, or as can be reasonably assumed through historic activity. The analysis is applied in five-year increments. To the extent these projects fall short of the forecast periodic demand for units in the study region, or exceed the total demand, an undersupply or oversupply situation respectively exists.

  By accounting for the total of the known/possible units likely to be built in the competitive market over the next 20 years, it can be reasonably asserted the subject development will "capture" a significant portion of any residual demand. This approach is generally conservative, as it assumes the subject will capture only what is leftover after the other projects garner their anticipated share.

  The tabular presentation of this method for the proposed subject condominium units is shown on Table 25.

  In no single period is there an oversupply situation. In every period during both the first decade and throughout the two-decade projection timeframe demand will exceed supply without the subject inventory.

  As all of the identified potential competitive units are accounted for in the model and a large 300-unit allowance is made for other yet to be announced projects, the Upcountry Town Center units should achieve a high capture rate of the residual demand. Therefore, according to the residual method, the 96 subject condominium units (maximum count) should be absorbed within a four- to eight-year marketing period assuming they come on-line in about 2004.

  Should the total number of units developed be less than the intensities identified (which is highly likely), the residual demand for the subject units will be greater and their absorption period shorter.

- The Market Shares Method accounts for the probable competitiveness of the subject multi-family product regardless of the total level of other inventory being offered. In essence,

TABLE 25

QUANTIFICATION OF SUBJECT UNIT DEMAND USING THE RESIDUAL METHOD BASED ON TOTAL DEMAND FOR MULTIFAMILY UNITS IN UPCOUNTRY MAUI

Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii

USING MID-POINT DEMAND TRENDS AND OPTIMISTIC INVENTORY ADDITION ASSUMPTIONS

Project	TOTAL MULTIFAMILY UNITS	Periodic Unit Absorption			
		2002-2006	2007-2011	2012-2016	2017-2021
147 Makawao Avenue	11	11			
Market Share Percentage		6%			
Kulamalu	400	100	150	150	
Market Share Percentage		52%	44%	45%	
Sports Shinko	250	80	90	80	
Market Share Percentage		42%	26%	24%	
Others (Allowance)	300		100	100	100
Market Share Percentage			29%	30%	100%
Totals	961	191	340	330	100
Upcountry Unit Demand	1,640	288	399	492	461
Shortage or (Excess) Supply	679	97	59	162	361
Potential Residual Subject Unit Demand					
at 95% Capture Rate	645	92	56	154	343
at 85% Capture Rate	577	82	50	138	307
at 75% Capture Rate	509	73	44	122	271

Source: Identified projects & The Hallstrom Group, Inc.

it is an estimate of how much of the total new condominium unit demand in Upcountry Maui the subject could expect to achieve on an annual basis in light of its locational, pricing, and amenity characteristics.

This "pure competitiveness" technique is generally moderate to optimistic in application and requires some subjective variables, but is perhaps the most appropriate and "classic" approach.

Given the type, location and amenities of the proposed subject product and competitive market, we believe the multi-family component could readily achieve a maximum annual market share of 20 to 33 percent of the total competitive demand following a brief market exposure and ramp-up period. The estimated average market capture rate over the entire sell-out period would be 16.8 to 28.9 percent.

The mid-point capture rate, which is reasonable given the competitiveness analysis and the limited alternatives, would equate to a 21.3 percent share of the total Upcountry multi-family housing sector during a mid-point 6.1-year sell-out period. This equates to an average absorption of 16 units annually.

Table 26 displays the subject condominium unit absorption forecasts. It is anticipated full sell-out will take from five to just over seven years.

Based on our correlated analysis, we forecast the 96 multi-family units at Upcountry Town Center will be absorbed in about a six-year timeframe from initial offering.

ECONOMIC IMPACT ANALYSIS

The development of the Upcountry Town Center community will result in significant expenditures that will favorably impact the Maui economy on both a direct and indirect basis, increasing the level of capital investment and capital flow in the region, which will in turn create employment and widen the tax base.

TABLE 26

SUMMARY OF SUBJECT PROJECTED MULTIFAMILY DEMAND LEVELS
USING THE MARKET SHARES METHOD
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii
Assuming 60 Units Beginning Sales in 2004

Scenario One: Using Conservative Market Share Rates

Sales Year	Total Upcountry Unit Demand	Effective Subject Share	Indicated Total Subject Absorption
1	58	14.00%	8
2	58	16.00%	9
3	58	18.00%	10
4	80	20.00%	16
5	80	20.00%	16
6	80	20.00%	16
7	80	20.00%	16
8	80	6.00%	5
Totals	572	16.84%	96

Scenario Two: Using Optimistic Market Share Rates

Sales Year	Total Upcountry Unit Demand	Effective Subject Share	Indicated Total Subject Absorption
1	58	20.00%	12
2	58	25.00%	14
3	58	33.00%	19
4	80	33.00%	26
5	80	31.00%	25
Totals	333	28.88%	96

ANALYSIS MID-POINT			
6.1	452	21.27%	96

Source: The Hallstrom Group, Inc.

From a direct perspective, the proposed 107,000 square feet of retail space, 79,900 square feet of office/medical space, 46,760 square feet of cottage industrial improvements, and up to eight acres of multi-family residential development will create numerous construction, equipment operator and specialty trade jobs on- and off-site during the planning and emplacement of the infrastructure and building of the facilities. After completion and absorption of the Upcountry Town Center components over an estimated 8-year total development period, there will be additional on-going employment positions created by the businesses in the shopping center, office and industrial buildings, by the staff in the residential project, and upkeep of the premises.

The development will provide among the largest concentration of jobs and business activities in the upcountry region within a modern, accessible, efficient master planned project. The economic benefits created by local consumer spending will now remain in the local community by providing needed opportunities for entrepreneurs and businesses, employment for area families, and easy access to neighborhood shopping conveniences.

Currently, a substantial portion of the economic activity of Makawao and Pukalani, including daily shoppers, workers, capital and business leaders, flows downhill into Kahului/Wailuku, furthering congestion and commuting stress, and lessening local benefits that rightly belong in the towns themselves. The Upcountry Town Center will offer the diversity of land use types and infrastructure necessary to capture regional benefits within the Upcountry community.

Numerous island businesses will enjoy significant profits specifically for contracting companies constructing the improvements and building material suppliers. Construction trade employment will meaningfully benefit for up to eight years, particularly enhancing the slow regional commercial construction sector.

The general island economy also will benefit from the subject development whose employees, businesses and residents will spend their income in off-site shops, restaurants, and service establishments throughout Maui.

Indirectly, as these wages, profits, and expenditures move through the regional economy, they will have a ripple, or "multiplier," effect--increasing the amount of capital flowing through the island as a result of the subject.

Construction, operational and other workers earning wages from the Upcountry Town Center and associated off-site efforts will spend the majority of their income on living and entertainment expenses while supporting and patronizing other island businesses. Much of this spending would be re-directed by these businesses to other island industries, and significant portions of these secondary profits would in turn be put back through the region's economic and tax structure.

These substantial <u>direct</u> and <u>indirect</u> economic impacts associated with the proposed subject project, as quantified in the following sections, are all the result of the capital investment and entrepreneurship necessary to convert under-utilized and feral agricultural lands into a competitive mixed-use neighborhood project. The Maui economy will be meaningfully stimulated by the capital investment, on-going business operations, employee wages and expenditures by residents, guests and users within the subject development.

For modeling purposes, we have employed a standardized 10-year projection period, depicting the development, construction and stabilized operation of the subject. This includes one year of infrastructure development, seven years of component construction and absorption, and two years of stabilized "operations" as fully-built.

Our analysis is based on the development of the multi-family component with 96 market-priced condominium units on an 8.0 net acre site. With the exception of resident population totals, the economic impacts associated with 96 market multi-family and 120 senior housing units are extremely similar, generally within rounding parameters. To the extent the number of units built is less than these maximum totals, the impact would nominally decrease.

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parameters. To the extent the number of units built is less than these maximum totals, the impact would nominally decrease.

Capital Investment and Construction Costs

The Upcountry Town Center will bring an estimated $77.9 million in direct development capital to Maui during the seven-year build-out period for the project. A breakdown of the basic expense items, their respective costs and expenditure over time is summarized on Table 27. All figures are expressed in constant year 2001 dollars.

Also shown are anticipated contractor and supplier profits flowing to local businesses as a result of the project.

Infrastructure cost estimates were prepared by Tanaka Engineers, Inc., of Maui in January 2001. The $9.7 million estimate included all on- and off-site "backbone" and finish infrastructure and site work, and allowances for water source contribution and drainage systems.

Retail construction and office/medical construction costs were estimated at an average of $200 per square foot "all in", including tenant improvements. This is at the conservative to middle portion of the overall range for Hawaii of $165 to $240-plus per square foot for Class A, turnkey commercial construction.

The 91,000-square-foot retail center would be built in years 1 and 2, opening in the fourth quarter of the second year. The 6,000-square-foot Maui Fresh project would be built in years 2 and 3, opening mid-year, and the two retail pad buildings, totaling 10,000 square feet of floor space would be built in years 3 and 4.

The 79,900 square feet of medical/office space would be built over a four year period beginning in year 3, peaking in year 5. The estimated floor space areas for the commercial components were provided by Group 70 International.

The total construction cost for the retail components is estimated at $22.3 million, and at $16.0 million for the office/medical uses.

Cottage industrial construction costs are estimated at $165 per square foot, "all in." The costs are lower than for commercial uses dealing with large numbers of "retail" patrons, as construction materials, designs and finish are not as critical to operating success.

TABLE 27

CONSTRUCTION COSTS AND CONTRACTOR AND SUPPLIER PROFIT ESTIMATES

Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii
In Constant 2001 Dollars

Assuming Market Multifamily Development of Residential Site

Development Year	1	2	3	4	5	6	7	8	9	10	Totals
Construction Costs (1)											
Infrastructure	$5,819,175	$3,879,450									$9,698,625
Retail Construction (2)	$6,060,600	$12,139,400	$2,730,000	$1,365,000							$22,295,000
Office/Medical Construction (2)			$3,995,000	$3,995,000	$5,593,000	$2,397,000					$15,980,000
Industrial Construction (3)			$1,541,694	$1,541,694	$1,541,694	$1,541,694	$1,541,694				$7,708,470
Multifamily Housing Construction (4)		$5,550,000	$5,550,000	$5,550,000	$5,550,000						$22,200,000
TOTAL CONSTRUCTION COSTS	$11,879,775	$21,568,850	$13,816,694	$12,451,694	$12,684,694	$3,938,694	$1,541,694	$0	$0	$0	$77,882,095
CONTRACTOR'S PROFIT	$1,187,978	$2,156,885	$1,381,669	$1,245,169	$1,268,469	$393,869	$154,169	$0	$0	$0	$7,788,210
SUPPLIER'S PROFIT	$416,999	$823,960	$552,668	$498,068	$507,388	$157,548	$61,668	$0	$0	$0	$3,018,298

(1) Direct costs only.
(2) Includes all tenant improvements. Average construction cost of $200 per square foot "all in".
(3) Includes all tenant improvements. Average construction cost of $165 per square foot "all in".
(4) Estimated average construction cost of $231,250 per unit.

Source: The Hallstrom Group, Inc.

It is estimated the 3.25 net site acres within the nine cottage industrial lots will support some 46,761 total square feet of finished floor space, assuming a floor area ratio of 0.33. Construction of the finished improvements is depicted as commencing in year 3 of the model and being completed by the end of year 7.

The estimated total construction cost, including the minimal site and landscaping work typically associated with this use type, is $7.7 million in current dollars.

Multi-family housing construction was modeled as being built in four phases of 24 units each, assuming a maximum total of 96 units on an eight-acre site. The probable density will be in the range of eight to 12 units per acre, and the total site area will likely be between six and eight acres, resulting in a total of 48 to 96 units. This is at the upper-end of the density range for multi-family construction in Upcountry, but consistent with the characteristics of the Upcountry Town Center project. The first increment and common element would be constructed beginning in year 2, after completion of site infrastructure, with the first units being sold and occupied by the end of year 3. Phase II would be built in year 4 and the entire development will require about six years from ground-breaking to sell-out. The units are envisioned to be market-priced.

The complex would likely have a mix of two-bedroom (30 percent) and three-bedroom (70 percent) units, with a living area range of 1,200 to 1,600 square feet, averaging 1,475 square feet. The estimated construction cost of the units is $150 per square foot, with additional common area expenses of $10,000 per unit, resulting in a total cost of $231,250 per unit. The development cost of the entire facility is projected at $16,650,000.

If the senior housing alternative were pursued, it would likely be built in four phases of 30 units each, assuming a maximum 120-unit project. The units are envisioned to be priced at the "moderate" affordability criteria for the senior housing demographic or at rents not to exceed 30 percent of the 100 to 140 percent of median household income group.

The complex would likely have a mix of one-bedroom (70 percent), studio (25 percent) and two-bedroom (5 percent) units, with an overall average living area of 660 square feet per unit. The estimated construction cost of the units is $150 per square foot, with additional common area expenses of $10,000 per unit, resulting in a total cost of

$109,000 per unit. The development cost of the entire facility under senior use is projected at $13,080,000.

The subject undertaking will represent a meaningful boost to the Maui construction and supplier industries over a seven-year period, particularly for Upcountry tradespersons in the commercial/industrial sectors in which demand has been muted due to a scarcity of development sites. While the Maui construction industry is moving into a growth cycle, the market was significantly strained during the 1990s. The overall scale of investment is equivalent to the construction efforts of a major hotel development.

The Upcountry Town Center will infuse an anticipated average of $11.13 million annually into the Maui building industry over seven years, the equivalent of a three to five percent boost over recent yearly construction levels.

Maui weathered the 1990's recession better than most locales statewide, and employment in the depleted construction trades has risen meaningfully over the past four years, but still remains ten-plus percent below the levels achieved in the late 1980s and early 1990s. Employment is currently at about 2,800 in the Maui construction trade, up one-third since the mid to late 1990s job count of 2,000 to 2,200, but still 300 positions below the 3,100 worker level of 1989-1991.

Despite short-term gains, long-term recovery and stabilization efforts in the construction industry have been hampered by the 1997-98 Asian monetary crises; the reduced asset values and earnings of major in-state companies; and the limited flow of investment capital and developer interest in undertaking major new projects. Apart from upscale residential, there are limited favorable mid-term opportunities for full recovery in construction employment. Many skilled tradesman have left the island or moved into other occupations over the past ten years, failing to pass their knowledge and experience onto the next generation of workers, damaging the long-term health of the foundational construction industry.

Based on preliminary building permit data, a total of up to $250 million of construction will be put in-place on Maui in 2001-2002, nearly $30 million more than in 2000, and commensurate with the average of $250.4 million annually since 1988. The focus of the industry is and will be upscale resort/residential construction, major timeshare projects, and commercial/industrial uses in Kahului and Wailuku.

Operating Economic Activity

The three "operating" land use components of the Upcountry Town Center master plan will generate an estimated $89.14 million per year in on-site economic activity on a stabilized basis, totaling some $607.93 million during the ten-year projection model. Our projections are displayed on Table 28.

The primary contributor will be the retail component, which includes the 101,000 square feet of floor space in the shopping center along with the Maui Fresh and Waiulu Farms operations. Gross sales of circa $400 per square foot annually (typical for modern neighborhood centers in Hawaii) were projected at the retail and restaurant spaces. The total stabilized retail/restaurant sales on-site are estimated at $48.8 million annually.

"Sales" at the office/medical component (typically services) were estimated as ranging from $150 to $600 per square foot per year, averaging $300, and at $350 per square foot annually for the cottage industrial development. These uses will contribute $24.0 and $16.4 million annually in economic activity on a stabilized basis.

Employment Opportunities Created

Based on indicators provided by the construction and operation of comparable sized projects coupled with Hawaii industry averages, we have estimated the demand for on- and off-site, full-time equivalent employment positions associated with laying of initial infrastructure systems; building of the finished commercial, industrial and residential components; on-going operation of the tenant businesses of the development; and upkeep of the premises.

The employment opportunities created in construction of the subject development will not primarily be "new" jobs requiring new Maui residents but will be additional opportunities for resident construction workers and related local businesses.

Employment in the retail, office/medical and cottage industrial operations will be a combination of new positions, relocation of existing jobs and expansion of area businesses. These jobs will run from entry level retail to upper-end business owners and professionals, and will help absorb the more than 1,600 resident young adults who enter the Maui workforce each year.

TABLE 28

PROJECTION OF OPERATING ECONOMIC ACTIVITY
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii
In Constant 2001 Dollars

Development Year	2	3	4	5	6	7	8	9	10	Total
1. Retail Component										
Total Square Feet (1)	69,700	97,000	107,000	107,000	107,000	107,000	107,000	107,000	107,000	
Average $/SF/Yr	$80	$360	$380	$400	$400	$400	$400	$400	$400	
Total Sales/Year (2)	$11,576,000	$40,920,000	$46,660,000	$48,800,000	$48,800,000	$48,800,000	$48,800,000	$48,800,000	$48,800,000	$391,956,000
2. Office/Medical Component										
Total Square Feet (3)			20,000	40,000	66,600	79,900	79,900	79,900	79,900	
Average $/SF/Yr			$270	$280	$290	$300	$300	$300	$300	
Total Sales/Year			$5,400,000	$11,196,000	$19,320,660	$23,970,000	$23,970,000	$23,970,000	$23,970,000	$131,796,660
3. Industrial Component										
Total Square Feet (3)			10,098	20,196	31,614	41,712	46,761	46,761	46,761	
Average $/SF/Yr			$315	$327	$338	$350	$350	$350	$350	
Total Sales/Year			$3,180,870	$6,597,124	$10,696,439	$14,599,200	$16,366,350	$16,366,350	$16,366,350	$84,172,683
ANNUAL OPERATING ECONOMIC ACTIVITY	$11,576,000	$40,920,000	$55,240,870	$66,593,124	$78,817,099	$87,369,200	$89,136,350	$89,136,350	$89,136,350	$607,925,343

Note: All estimates assumes full-occupancy of available spac

(1) Lease-up of center begins towards end of year 2, with 70% occupied by year-end and sales at 20% of stabilized level. Sales per square foot are also below stabilized levels in Year 3 and 4 to account for final lease-up
(2) Total includes $2 million annually added for gross sales at an expanded Waiulu Farms operation and $4 million for gas station operation at Maui Fresh
(3) First building opens at beginning of Year 4. "Sales" require four years to reach stabilized level as new businesses op
(4) First units open at beginning of Year 4

Source: The Hallstrom Group, Inc

We consider it doubtful that most positions in the completed Upcountry Town Center would attract in-migrating workers. While some professional positions and entrepreneurs may relocate to take advantage of new opportunities, the most probable employee pool is comprised of Upcountry residents who are new to the workforce or seeking a job closer to their residence.

It is assumed the off-site/indirect work created will be steered towards existing Maui supply, equipment providers, and other service companies, which despite the up-tick in the Maui economy over the past several years remain in a "lean" period relative to the massive development activity of the late 1980s.

According to the State of Hawaii Department of Labor and Industry Relations, the current number of jobs in the Maui construction industry is 2,800 positions (June 2001), a minor increase from the previous year, but well below the annual average of 3,100 jobs that existed during the late 1980s and the first two years of this decade. Overall, unemployment on the island of Maui is presently at about 3.8 percent, down several points from the mid-1990s but still above the virtual full-employment figure of 1988-1991. The rate of joblessness in the building trades is estimated to range up to 10-plus percent.

The Upcountry Town Center will provide needed employment opportunities in the construction, supply and building support industries during an estimated seven-year site development and construction period. The planning process, currently underway, is anticipated to require about two years; on-site backbone and first phase subdivision infrastructure some 24 months, and other construction about five years.

Our employment estimates on are based on full-time "worker/years," although one worker/year (or circa 2,000 working hours) may be comprised of many employees involved in specialized tasks of a much shorter duration.

Estimates based on a ten-year projection period of construction and stabilized operation and the associated number of employment opportunities created are displayed on the top of Table 29. Included are the full-time equivalent off-site and support employment opportunities which will be provided to Maui businesses as a result of the project. Also shown are the retail, office and industrial workers in the finished on-site improvements which also include

TABLE 29

EMPLOYEE JOB COUNT AND WAGE ESTIMATES
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii
In Constant 2001 Dollars
Assuming Market Multifamily Development of Residential Site

Development Year	1	2	3	4	5	6	7	8	9	10	Totals
Worker Requirements (1)											
Infrastructure	20	17									37
Retail Construction (2)	50	75	16	10							151
Office/Medical Construction (3)			24	30	30	20	15				119
Industrial Construction (4)			13	13	13	13	9				61
Multifamily Housing Construction (5)		36	36	36	36						144
Retail Tenant Employees (6)		175	243	268	268	268	268	268	268	268	2,294
Office/Medical Tenant Employees (7)				57	114	190	228	228	228	228	1,273
Industrial Tenant Employees (8)				20	40	63	85	93	93	93	487
Maint. & Condominium Staff		7	16	18	21	21	21	21	21	21	167
Off-Site Employees (9)	23	102	115	149	172	190	207	201	201	201	1,562
TOTAL EMPLOYMENT CREATED	93	412	463	601	694	765	833	811	811	811	6,295

Development Year	1	2	3	4	5	6	7	8	9	10	Totals
Worker Wages											
Infrastructure	$900,000	$765,000	$0	$0	$0	$0	$0	$0	$0	$0	$1,665,000
Retail Construction	$2,250,000	$3,375,000	$720,000	$450,000	$0	$0	$0	$0	$0	$0	$6,795,000
Office/Medical Construction	$0	$0	$1,080,000	$1,350,000	$1,350,000	$900,000	$675,000	$0	$0	$0	$5,355,000
Industrial Construction	$0	$0	$585,000	$585,000	$585,000	$585,000	$405,000	$0	$0	$0	$2,745,000
Multifamily Housing Construction	$0	$1,620,000	$1,620,000	$1,620,000	$1,620,000	$0	$0	$0	$0	$0	$6,480,000
Retail Tenant Employees	$0	$5,250,000	$7,290,000	$8,040,000	$8,040,000	$8,040,000	$8,040,000	$8,040,000	$8,040,000	$8,040,000	$68,820,000
Office/Medical Tenant Employees	$0	$0	$0	$1,710,000	$3,420,000	$5,700,000	$6,840,000	$6,840,000	$6,840,000	$6,840,000	$38,190,000
Industrial Tenant Employees	$0	$0	$0	$600,000	$1,200,000	$1,890,000	$2,550,000	$2,790,000	$2,790,000	$2,790,000	$14,610,000
Maint. & Condominium Staff	$0	$175,000	$400,000	$450,000	$525,000	$525,000	$525,000	$525,000	$525,000	$525,000	$4,175,000
Off-Site Employees	$646,800	$2,864,400	$3,215,520	$4,176,480	$4,823,280	$5,313,000	$5,784,240	$5,636,400	$5,636,400	$5,636,400	$43,732,920
TOTAL ANNUAL WAGES PAID	$3,796,800	$14,049,400	$14,910,520	$18,981,480	$21,563,280	$22,953,000	$24,819,240	$23,831,400	$23,831,400	$23,831,400	$192,567,920

(1) All job counts expressed as "full-time" equivalent positions.
(2) Based on 1.4 worker years for every 1,000 square feet of finished space.
(3) Based on 1.5 worker years for every 1,000 square feet of finished space.
(4) Based on 1.3 worker years for every 1,000 square feet of finished space.
(5) Based on 1.5 worker years per dwelling unit.
(6) Based on one worker for every 400 square feet of floor space.
(7) Based on one worker for every 350 square feet of floor space.
(8) Based on one worker for every 500 square feet of floor space.
(9) Off-site employees at 33% of on-site workers.

Source: Various, and The Hallstrom Group, Inc.

maintenance/trade workers, and senior housing staff, which will be required to service the finished community improvements over time.

The projections are founded on examples provided by various commercial, industrial and residential projects undertaken in Hawaii over the past 12 years, and via formulae expressing relationships between total worker wages/benefits and construction task costs.

Infrastructure employment forecasts are taken from discussions with developers, review of project records and ratios of direct costs to job creation (assuming 24 percent of costs flow to wages and benefits, with an average wage of $45,000/year).[6]

Retail and office/medical construction is anticipated to require an average of 1.4 and 1.5 worker/years for every 1,000 square feet of finished floor space, respectively. Cottage industrial construction is estimated at 1.3 worker/years per 1,000 square feet. Multi-family residential construction will utilize 1.5 worker/years per unit.

The finished improvements will require land and improvement maintenance and staff workers which will, in total, equal some 34 worker/years annually. This is one worker/year for every 12 multi-family housing units and for every 10,000 square feet of commercial and industrial floor space.

Construction and operational worker levels would be similar for both the market multi-family and senior housing alternatives.

Operational (on-going business) employees were estimated based on worker per square foot averages for similar uses seen in comparable businesses statewide. Retail employment ranges from about 150 square feet per position (as in food service or small retail outlets) to upwards of 1,200 square feet per worker (as at a big box retailer). We have utilized an average ratio of one worker/year for each 400 square feet of finished floor space.

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(6) Construction site jobs run the range from $8 per hour for a day laborer to $40-plus per hour for specialized workers. For specialty trade and union construction positions, wages average $28 per hour and about $54,000 per year as of year-end 2000, according to the state Department of Labor and Industry. We have employed a conservative average of $45,000 per year, or $22.50 per hour, as an average wage. In addition to wages, an additional amount of 40 percent, or up to $18,000 annually would be spent by employers on taxes, workers compensation, payroll overhead, health benefits, etc.

Office/medical floor space is generally more densely populated with workers, ranging from 125 to 500 square feet of floor space per worker. We have employed a modest average of one position per 350 square feet, reflecting the lower employee density in medical offices, which are expected to be a major tenant component.

Cottage industries are estimated to employ one full-time equivalent position per 500 square feet of finished floor space. These uses may have a widely varying ratio (up to 2,000 square feet per employee), but we have assumed there will be few warehouse type users that would raise the averages this high.

Off-site employees were estimated at 33 percent of on-site workers, and are comprised of three groups:

- Numerous off-site building industry positions will also be enhanced by the Upcountry Town Center development, including such jobs as administration, office help, material providers, equipment maintenance and specialty tasks. Analysis of Maui County labor trends from 1980 through 2000 demonstrate a linkage equal to 20 to 40 percent between the creation of on-site positions and related off-site employment.

- Off-site support businesses, including contractor/retail/counter sales, fuel providers, shipping, storage and professional services will also benefit. A conservative job creation relationship of five to ten percent of on-site positions was used (or, one off-site support worker/year for each 10 to 20 on-site worker/years).

- Extrapolation of state Department of Business Economic Development and Tourism (DBEDT) data, along with indicators provided by other state agencies and First Hawaiian Bank studies, demonstrate that each Hawaii worker creates demand for services (and related employment) during and directly attributable to the work day at up to five to 20 percent ratio. These positions include food businesses, providers of tools and trade goods, payroll/financial and insurance businesses, medical requirements and other secondary indirect/off-site employment.

During the ten-year modeling period for the project, the number of worker/years created on- and off-site by the development varies from

93 to 833 positions annually, totaling 6,295 worker/years. Of this total, 4,733 worker/years (an annual average of 473 positions) are direct construction-oriented or on-going operational positions; and 1,562 are off-site worker requirements.

On a stabilized basis, after the completion of construction and absorption of the components, the project will generate some 811 permanent full-time equivalent employment opportunities--609 directly related to on-site activities, and 201 indirect positions throughout the island.

The on-site employment created during the subject development period represents about a .75 percent increase in total jobs available in Maui County (473 additional jobs per year to a current job count of about 63,000), and could potentially lower unemployment in the construction industry by up to three points.

Additional employment will be created by the expenditures of the employees, business owners and residents of the development. These monies spent into the Maui economy are forecast to reach $29.36 million per year on a stabilized basis. Based on DBEDT data stating each $70,000 to $85,000 spent creates one position, an additional 345 to 419 secondary jobs will emerge on the island due to the wages of Upcountry Town Center employees and residents being spent in the community.

Wage Income Generated

In accordance with data compiled by the state Department of Labor and Industry Relations, as tempered through our analysis, we have estimated the personal income (in the form of wages) which will flow to Maui workers as a result of the Upcountry Town Center project.

The current average wage of full-time construction workers is estimated conservatively at $45,000 per year, with an overall range of $16,000 to $70,000-plus per year. For unionized and specialty workers, the average would be about $54,000 for general tradesmen and for laborers, less. This estimate was applied to the construction job counts for infrastructure, retail, office/medical, cottage industrial and multi-family residential components.

Retail/restaurant personnel (including owners, management and employees) are assumed to receive total wages of $30,000 per year on average, or $15 per hour, as are office/medical and cottage industrial positions. These positions range from entry level retail and restaurant positions, paying $6 to $10 per hour, to professionals with billing rates exceeding $200 per hour. According to the state, retail workers average $9.44 per house (year-end 2000), wholesale trade at $12.41 hourly, and manufacturing positions at $13.93 per hour.

Maintenance and grounds/landscape workers are projected to receive average pay equivalent to $25,000 per year. Off-site building and support industry jobs were estimated to receive an average pay of $30,000 annually.

Overall project average wages are equal to $30,591 per worker/year created during the ten-year development projection period, and $29,385 annually on a stabilized basis.

Application of these wage estimates to the employment forecasts generates personal income (wage) projections directly resulting from subject development as shown on Table 29. The wage figures are all presented in constant 2001 dollars, and will undoubtedly escalate over time in accordance with inflationary pressures.

In the first year of development, the "Total Annual Wages Generated" by the subject development effort would be $3,796,800, increasing to a high of $24,819,240, as the number of finished space workers escalate and construction is completed in Year 7. After completion of all construction, the on-going business operations, maintenance/condominium staff, off-site and indirect employment associated with the built-out Upcountry Town Center would result in average annual wages of $23.8 million thereafter in uninflated 2001 dollars.

Over the first ten years of the development and "operation," on- and off-site, direct and indirect worker wages would total $192.6 million, with 77.3 percent of this figure (or $148.8 million) directly attributable to on-site construction and operation of the project.

Development Costs as Profit Income

While the significant majority of the materials needed to build the subject components must be imported to Maui, a portion of the construction costs spent in the development will flow to local businesses in the form of contractor profits and supplier profits.

Typically, within the industry net contractor profit margins are expected to be at 8 to 20 percent of total construction costs. We have used a conservative ten percent figure. Supplier profits were extrapolated at four percent of total costs (supplies/materials equate to 50 to 60 percent of total cost, with a profit margin for the supplier of six to eight percent).

Application of these estimates to the forecast development parameters of the subject project was shown on Table 27.

The total Contractor's Profit ranges from $399,419 to $1,522,669 per year, with a cumulative profit of $7.2 million over the construction period. The total annual Supplier's Profit ranges from a low of $61,668 to a high of $609,068, and equates to $2.8 million over the seven-year construction time frame.

Population, Demographics, Income and Expenditures

The population of the subject development will be comprised of three groups:

- Transient users/consumers patronizing the on-site businesses;
- Employees/owners of the businesses working on site; and
- Residents and guests of the multi-family residential component.

The number of transient users will vary meaningfully from day-to-day and during each business day. This group will primarily be comprised of area residents, with a secondary tourist component and some passersby. Total patronage in the Upcountry Town Center will likely range from 2,000 to 5,000 consumers daily.[7]

The stabilized on-site worker population of 612 persons will be primarily regional (Upcountry) residents with lesser numbers commuting from central and south Maui.

The demographic data for these population groups were summarized on Table 1. Both patrons and workers are transitory/part-time

(7) Extrapolated based on an average patron expenditure range of $33 to $81 per visit. Traffic and engineering studies are being prepared which will more precisely identify total project users.

members of the on-site subject "community", presenting no meaningful demand for public services.

If the residential component is developed to maximum density on an eight-acre site (maximum size), with 96 market-priced units, the estimated full-time resident population would be 288 persons at full occupancy. This forecast is based on census data demonstrating that the average household size in the study area is 3.0 persons. We would expect the owners/occupants to generally reflect regional demographic trends.

It is anticipated the vast majority (if not all) of the full-time residents in the subject project, whether market multi-family or senior housing units, will be current Maui residents relocating to the project. Few newcomers to the island would be attracted to a limited amenity upcountry condominium development.

There will additionally be overnight guests in the units from time to time. We have made an allowance of one guest per 20 units to account for this subordinate population group. The average daily guest count would be five persons.

Under this alternative, the total de facto resident population of the Upcountry Town Center upon completion of development will be, on average, 293 persons. Of the full-time residents, it is estimated that 67, or 23 percent (.7 per unit) will be in the juvenile school age group.

The targeted group of unit purchasers will be in the "moderate" to "market" income category, and the population of the project will place significant discretionary expenditures into the Maui economy. The guests will also contribute to the island economy via their expenditures.

We estimate that full-time resident households will spend about 40 percent of their total income on local discretionary purchases. The per capita income range is estimated at $16,000 to $22,400 per person, averaging $19,200. The daily per capita spending by guests is forecast to be at $40 per day (less than one-quarter of typical Maui visitors). These expenditures pay for all food, entertainment, household goods, locally purchased fixtures and furnishings, utilities, clothing and other daily items.

By build-out, the total resident/guest discretionary expenditures made by subject project users in the local market will be at $2.3 million annually on a stabilized basis, in 2001 dollars. During the 10-year development and stabilization model period, the total sum of the expenditures will be $13.3 million.

The total full-time resident income amount was quantified for use in estimating state income taxes to be paid. The average per capita income on Maui in 2001 will be about $16,000 per persons, based on 2000 census figures. Subject full-time residents are expected to be in the 100 to 140 percent of median income category, or an average of some $19,200 in income per persons annually.

On a stabilized basis after build-out, the total annual full-time resident income at the subject would be $5.5 million. Our estimates of population, income and expenditures for residents of the Upcountry Town Center are shown on *Table 30*.

If the residential component is developed with 120 senior housing units (a maximum of 15 units per acre on an eight-acre site), the estimated full-time resident population would be 221 persons at full occupancy. This forecast is based on census data demonstrating that approximately 70 percent of senior householders on Maui are in multiple-persons "families", averaging 2.2 persons per unit. The remaining 30 percent are single-person households. The average household size would be 1.84 persons.

There will additionally be overnight guests in the units from time to time. We have made an allowance of one guest per 25 units to account for this subordinate population group. The average daily guest count would be five persons.

The total de facto resident population of the Upcountry Town Center upon completion of development of a senior housing complex will be, on average, 226 persons. Of the full-time residents, it is estimated that <u>none</u> will be in the juvenile school age group.

While the targeted group of seniors will be in the "moderate" income category, the population of the project will nonetheless place significant discretionary expenditures into the Maui economy. The guests will also contribute to the island economy via their expenditures.

TABLE 30

POPULATION, DISCRETIONARY EXPENDITURES AND RESIDENT INCOME ESTIMATES

Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii
In Constant 2001 Dollars
Assuming Market Multifamily Development of Residential Site

Development Year	3	4	5	6	7	8	9	10	Totals
Cumulative Residential Development									
Total Occupied Multifamily Units	15	33	53	75	96	96	96	96	
Resident/Guest Population									
Residents (1)	45	99	159	225	288	288	288	288	
Guests (2)	1	2	3	4	5	5	5	5	
Total De Facto Population	46	101	162	229	293	293	293	293	
Estimated School Age Children	11	23	37	53	67	67	67	67	
RESIDENT/GUEST DISCRETIONARY EXPENDITURES (3)	$356,550	$784,410	$1,259,810	$1,782,750	$2,281,920	$2,281,920	$2,281,920	$2,281,920	$13,311,200
RESIDENT INCOME (4)	$864,000	$1,900,800	$3,052,800	$4,320,000	$5,529,600	$5,529,600	$5,529,600	$5,529,600	$32,256,000

(1) Assuming full occupancy of units with average household size of 3.0 persons, of which 0.7 persons are estimated as school age.
(2) Assuming average of one overnight guest daily per 20 units.
(3) Estimated at 40 percent of total income for residents and $40 per day for guests.
(4) Estimated as ranging from $16,000 to $22,400 per person, with an average of $19,200.

Source: The Hallstrom Group, Inc.

By build-out, the total senior housing resident/guest discretionary expenditures made by subject project users in the local market will be at $1.77 million annually on a stabilized basis, in 2001 dollars. During the 10-year development and stabilization model period, the total sum of the expenditures will be $8.84 million. On a stabilized basis after build-out, the total annual full-time resident income at the subject would be $4.25 million.

Summary of Direct, Local Economic Impacts

The various direct, local economic impacts which will flow to the subject region as a result of the subject development are summarized on Table 31.

The annual Total Base Economic Impact increases from $5,401,777 in Year 1 of the development effort to a high of $115,249,670 in Year 8 (in 2001 dollars). Over the decade development and stabilization projection period, the total is $824.6 million. Fueled by the "sales" of the on-site businesses, discretionary expenditures by full-time residents, and employment associated with on-going commercial/industrial operations and building maintenance, the estimated stabilized annual base impact thereafter is $115.2 million.

These dollars will be spent, than re-spent, on goods and services on the island, diminishing in impact on the local economy with each turnover as a portion flows off Maui for goods, services and financing commitments. First Hawaiian Bank studies have concluded the appropriate economic multiplier rates in Hawaii are from 1.2 to 3.5 times (or 20 to 250 percent) of the base impact amount. Mainland studies (by the Urban Institute and others) tend toward the upper end of this range, and reach multipliers as high as 4.0.

Due to the need to import more than 80-plus percent of supplies/goods used on Maui, the multiplier impact for the island is not as great as for mainland locales, particularly for construction-based expenditures. We have therefore tested multiplier rates at the mid-point of the market spectrum, ranging from 1.8 to 2.8 times. Or, each direct, local dollar spent creates another $.80 to $1.80 in additional direct, local economic activity.

On a conservative basis, using a relatively low-end multiplier effect ratio of 2.0, the total overall direct impact on the Maui economy resulting from the Upcountry Town Center would be $1.65 billion over

TABLE 31

SUMMARY OF ECONOMIC IMPACTS ASSOCIATED WITH DEVELOPMENT
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii
In Constant 2001 Dollars
Assuming Market Multifamily Development of Residential Site

Development Year	1	2	3	4	5	6	7	8	9	10	Totals
ANNUAL WAGES GENERATED	$3,796,800	$14,049,400	$14,910,520	$18,981,480	$21,563,280	$22,953,000	$24,819,240	$23,831,400	$23,831,400	$23,831,400	$192,567,920
CONTRACTOR'S PROFIT	$1,187,978	$2,156,885	$1,381,669	$1,245,169	$1,268,469	$393,869	$154,169	$0	$0	$0	$7,788,210
SUPPLIER'S PROFIT	$416,999	$823,960	$552,668	$498,068	$507,388	$157,548	$61,668	$0	$0	$0	$3,018,298
DISCRETIONARY EXPENDITURES			$356,550	$784,410	$1,259,810	$1,782,750	$2,281,920	$2,281,920	$2,281,920	$2,281,920	$13,311,200
OPERATING ECONOMIC ACTIVITY		$11,576,000	$40,920,000	$55,240,870	$66,593,124	$78,817,099	$87,369,200	$89,136,350	$89,136,350	$89,136,350	$607,925,343
TOTAL BASE ECONOMIC IMPACT	$5,401,777	$28,606,245	$58,121,407	$76,749,997	$91,192,072	$104,104,266	$114,686,197	$115,249,670	$115,249,670	$115,249,670	$824,610,970
Multiplier Effect Ratio	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TOTAL OVERALL IMPACT	$10,803,554	$57,212,489	$116,242,814	$153,499,994	$182,384,143	$208,208,532	$229,372,394	$230,499,340	$230,499,340	$230,499,340	$1,649,221,941

Source: The Hallstrom Group, Inc.

the ten-year projection period (in constant 2001 dollars). On a stabilized annual basis thereafter, the overall impact would be at $230.5 million.

This is equivalent to about two large hotel operations.

PUBLIC COST/BENEFIT ASSESSMENT

The purpose of this analysis is to delineate the direct areas in which the proposed subject mixed-use commercial, industrial, and residential development will potentially impact the sphere of public agency resources, and quantify (where possible) the costs of providing expanded services to the project, versus the economic benefits that accrue to the community through an increase in local and state tax payments.

As with the economic impact analysis, this assessment was completed assuming the residential component was developed as a market-priced multi-family project having 96 units (maximum density on the maximum size site). As this alternative has the largest *potential de facto* resident totals (293 persons), it results in the highest public costs estimate. If the senior housing or a less dense alternative is built, the costs would be less than those forecast herein.

For most developments, potential direct costs to governmental services and programs include:

-- Police Protection
-- Fire Protection
-- Public Oversight Agencies
-- Infrastructure Services
-- Recreational Demands
-- Educational Needs
-- Infrastructure Costs
-- Various Other Services and Financial Commitments

As a privately funded and built project focusing on commercial/industrial uses many of these costs will not be increased on the state or county levels as a result of the proposed Upcountry Town Center. There will be no increased educational or recreational needs directly attributable to the subject development; the major public infrastructure items (highway and primary water/sewer mains) are already in place; and the development will require no specific public subsidies, welfare services, bonding or capital improvements.

Direct tax benefits to the state and county coffers will primarily flow from the project and its operation over time from three major sources:

- -- Real Property Taxes
- -- Gross Excise Tax Receipts
- -- State Income Taxes

Some cost/benefit issues are considered as off-setting, or "a wash," as the cost of the services to the government is theoretically directly reimbursed in the form of user fees. Building permits and utility hook-up fees are two prime examples. Other such items include workers compensation premiums and benefits; utility operations and associated use billing rates; and business oversight/registration verses licensing fees. These items are excluded from this study.

A concern of this analysis is the integration of the subject project into the overall state and Maui governmental services plan on both an actual and pro rata perspective.

From an actual public service cost perspective to county and state agencies, the Upcountry Town Center will represent only a fraction of the urban lands in use on the island. Given the vast number of housing units, resorts, businesses, and agricultural lands on Maui, it is difficult to assert that of themselves the subject improvements and users will create the need for expansion of existing public services.

No new schools, parks, highways, recreational facilities, service agencies, hospitals, or other public enterprises will be required specifically because of this project. The impact on the total regional land base will be minimal. There is a fire/rescue station on the site and support facilities available in Pukalani and Makawao to service the residents, businesses and buildings in the project. Regional public infrastructure systems were generally designed with the capacity to service development in the Pukalani area.

Many components will provide privately financed benefits to the community support systems, including medical services; public open space; and local drainage, water and access enhancement.

However, the need for additional services is a cumulative effect, each project, each resident, tourist and, to a lesser degree, business adds a little bit to the community base until increased "need thresholds" are reached.

In regards to some services, the effective actual impact may not be apparent from a cost perspective, merely creating nominally greater demands which can be readily met through existing agencies and facilities without the need for additional workers or funds.

Our analysis of Maui County and state budgets indicate the actual effect of governmental services demand arising from the Upcountry Town Center development would not meaningfully create a need to specifically expand county and state services.

As an alternative to actual cost estimates, which are often disparate and have difficulty accounting for substantial indirect or atypical items, it is most common to project public costs on a per capita allocation.

While this is wholly appropriate only for residential developments, as public costs and services generally accrue to where a person lives (or in the case of a tourist, where they are lodging), it is not considered to be necessarily accurate for the industrial or commercial components of a project. By their very nature, industrial/commercial businesses are private enterprises responsible for their own costs and benefits.

Yet government services are holistic in nature, providing a foundation throughout a community, regardless of actual, specific impact on any given land holding. A business may not have a need for parks or schools, but they are essential to the patrons and workers and create the climate in which the business operates. Similarly, government administration, capital projects and public welfare items may have no direct relation to a particular project, but provide the economic underpinnings that enhances overall commercial success.

Thus actual cost estimates often are conservative and may understate indirect and intangible costs, particularly those borne by the state. But it can be problematic to determine an appropriate per capita cost basis to quantify the overall community costs associated with a primarily commercial/industrial development.

We have therefore looked at the public costs issue from both perspectives, on an actual cost and per capita allocation bases.

Public Costs

Actual Costs

The county of Maui will directly incur several areas of cost increases as a result of the Upcountry Town Center, primarily in regards to emergency services. Based on analysis of response frequencies, time/cost data, and discussions with affected agencies we have made general estimates for these items as summarized below.

Police/Enforcement -- Using a base cost of $125 per hour for a responding officer (wages, benefits, support, overhead and amortized equipment), we estimate the annual additional police/enforcement cost to the county of Maui on a stabilized basis after project build-out will be $188,750.

This is comprised of:

- One miscellaneous call per day at an average of two total officer hours each. (2 hrs. x $125/hr. x 365)
- One "minor" traffic accident or incident each week requiring on average five hours of officer time. (5 hrs. x $125 x 52)
- One "major" traffic accident or incident each month requiring on average of 20 hours of officer time. (20 hrs. x $125 x 12)

This demand is the equivalent of 1 to 1.5 new officer positions.

Fire Protection -- This is based on a crew cost of $750/hour (four to five firemen, wages, benefits, overhead and amortized equipment). We estimate that at build-out, the yearly additional costs to Maui County resulting from the project is $189,000 per year.

This is comprised of:

- One "minor" fire/rescue per week requiring one crew for a total of three hours (response and clean-up). (3 hrs. x $750/hr. x 52)
- One "major" fire/rescue every other month requiring two crews for a total of eight hours each. (2 crews x 8 hrs. x $750/hr. x 6)

Emergency Medical Response -- This is based on average cost per response of $500, with an average of three calls per week. The total cost to the county would be $78,000 per year on a stabilized basis after build-out. ($500/response x 3 per week x 52)

Road Maintenance -- An allowance of $50,000 per year was made for this item.

The total annual cost to the county on a stabilized basis at build out of the subject development would be $505,750. This cost would be reached on an escalating basis over time beginning in year 2 and increasing in accordance with the number of operating businesses and residents in the master planned project.

State of Hawaii costs would include highway frontage work, health inspections of food service establishments and other minor oversight duties. An allowance of $200,000 per year was made for these items, increasing to the stabilized level as the master-planned project is built out.

Per Capita Costs

An alternative method for determining public costs is through per capita expenditures incurred by the State of Hawaii and Maui County in accordance with the de facto population area of the jurisdiction. This is founded on the principal that each individual on the island equitably benefits from all governmental costs, regardless of type or focus throughout the day, with each new member of the community (whether resident or visitor) creating a proportionate new cost burden in their daily home and working life.

As previously noted, this is an atypical application as most costs are viewed as accruing to residential aspects of a persons lifestyle and land use. We have included it as a means of demonstrating the overall public fiscal impact potential of the proposed subject project even when viewed from this maximum potential cost perspective. This method sets the absolute upper limit on all public costs (actual, indirect and inferred).

According to the state Financial Services database, the state expects to spend a total of $7.278 billion on services, salaries, infrastructure, and financing in 2002. The total de facto population in the state on an average daily basis at year-end 2000 was about 1,380,000 persons, including residents, tourists, and military personnel.

The per capita expenditure by the state will thus be about $5,275 for 2001, an increase of over eight percent from 2000. From 1979 through 1999, costs increased at a rate of just over five percent annually compounded.

The resident and guest de facto population of the subject will be 293 persons. Thus, on a per capita basis, the state will spend approximately $1,545,575 per year on servicing the project residential component.

The average daily worker population at the subject at build-out will be 610 persons, a figure reached in year 8 of the development process. Assuming that each worker spends about one-quarter of their life on the job (or at their place of employment), the allocated state cost per worker would be $1,319 per year, or $804,590 total annually for the commercial and industrial components. The total "costs" to the state purse at stabilization by the project using the per capita allowance method as applied to residents and workers would be $2.35 million yearly in constant year 2001 dollars.

Analyzed on a similar basis, the county of Maui's budget for the island government in fiscal year 2000 is $215,639,947, which represents an escalation over time at over 6.6 percent compounded annually since 1998.

The current de facto population in Maui County is some 172,000 persons (comprised of 122,000 residents and 50,000 visitors). The resulting de facto per capita county expenditure for this year is therefore anticipated to be $1,254.

The residential component with a de facto population of 293 persons, thus constitutes a total county obligation of $367,422 annually on a per capita basis.

Using a 25 percent of total county cost share as being attributable to each worker while on the job, the average annual amount spent by Maui County to support the workers at the proposed Upcountry Town Center is $314 per worker.

Application of this figure to the total on-site worker population at subject build out would be $191,540 annually in costs to the county government on a stabilized basis (610 workers x $314).

Total Public Costs -- On an estimated actual cost basis, the state and county expenses associated with the subject development would reach a stabilized maximum of $705,750 at build-out in year 8 in 2001 dollars.

On a per capita allowance basis, which is a fully inclusive perspective, and atypically comprehensive for what is a primarily commercial/industrial development, the absolute maximum for all direct, indirect and inferred costs to the state and county would be $2.91 million annually.

Public Fiscal Benefits

Real Property Taxes -- Property taxes paid by landowners in the subject project were calculated using the 2000-2001 tax rates for both land and buildings, improved and unimproved.

Assessed values for the sites underlying the various Upcountry Town Center components were based on the envisioned selling prices of the finished lots, with the multi-family residential site (assuming eight-acre maximum size) at $8 per square foot, the retail land at $14 to $25 per square foot, office/medial sites at $14 to $18 per square foot, and cottage industrial at $17 to $20 per square foot. It was assumed the open space, roadways and agricultural lands would have a nominal assessed value.

The improvement assessments are based on the projected development/construction costs of the finished buildings as previously presented. This may result in a slight understatement of assessments on the improvements, as market value often exceeds reproduction expense.

It was assumed the land and improvements would be classified as apartment, commercial or industrial and be taxed at rates from $5.04 to $6.89 annually per $1,000 of assessed value.

Land taxes are based on an unserviced value of $75,000 per acre, or $3,060,000 total, for 40.8 useable acres of the subject site in year 1, increasing to $14,565,123 total value in year 2 as the subdivision infrastructure is finished, and is being absorbed at market lot prices. The assessed values of the finished improvements are added as of the year of their construction.

All real property value of the subject holding is assumed to be vested in the completed "salable" components, with no assessment placed against open spaces, roads, or other community systems.

The total real property tax to be paid to Maui County in 2001 dollars ranges from $20,533 in year 1 of development, to a stabilized level of $991,617 at build-out in year 7 and beyond. Over the ten year projection period, the county will receive some $7.63 million in real property tax payments from the subject project.

State Income Tax -- The state will receive income taxes from three sources:

- the wages of the workers associated with the construction, maintenance, and operation of the Upcountry Town Center components;

- the corporate profits from contractors and suppliers serving the construction and maintenance phases of the development, and as generated by on-going industrial, retail, and office/medical operations; and

- the household income of full-time residents of the multi-family complex.

According to DBEDT data, individual State of Hawaii income tax liability as a ratio to gross income has ranged from about 5.5 to 5.9 percent during the past decade, with the more current figures tending toward the mid to upper-end of the range. We have employed an effective tax rate of 5.80 percent of gross income for individual workers and full-time residents.

The effective tax rate for the <u>corporate income</u> is estimated at 2.00 percent of gross operating profits, based on available DBEDT statistics.

The total income tax revenues to be received by the state are projected at $252,314 in the first year of construction increasing to a maximum level at year 7 of $2.03 million annually in constant 2001 dollars.

On a stabilized basis, after build-out, the permanent worker incomes, building maintenance workers, and operating businesses, would pay an annual state income tax of $1.98 million.

Over the ten-year study period, the cumulative income taxes paid are estimated at $15.12 million.

We have not included any corporate income or other taxes which will be paid by Maui Land and Pineapple, Co., as a result of its profits from undertaking the Upcountry Town Center development, or from the secondary jobs created by the discretionary spending of workers and businesses. Such items have the potential to be substantial contributions to the state coffers.

<u>State Gross Excise Tax</u> -- This 4.166 percent of expenditures tax was applied against:

- the total estimated construction contract costs;
- the total gross sales of the industrial, mixed-use commercial and quarrying businesses; and
- the discretionary expenditures of the worker and resident population of the subject (estimated at 40 percent of total wages and income).

The anticipated state excise tax receipts arising from the subject development grow from an estimated $494,911 in the first year of development to a peak of $3,808,485. Over the ten-year study period, the receipts total $29.13 million and stabilize at circa $3.8 million per year.

We have not included any excise tax revenues associated with the direct, local "multiplier effect" expenditures on Maui, or those created in the secondary market by the suppliers to the operating businesses or secondary worker expenditures.

Total Public Benefits (Revenues) -- In constant 2001 dollars, the aggregate annual tax revenues flowing from the subject development at full project build-out range from:

- $20,533 to $991,617 per year for the county of Maui, stabilizing over time at the higher figure, totaling $7.63 million over the ten-year development projection time-frame;
- $747,225 to $5,785,678 annually for the State of Hawaii, stabilizing at $5,785,678 per year, and cumulatively at $44.24 million over the decade long projection period; and
- $767,758 to $6,777,295 per year for total tax receipts (county and state), totaling $51.88 million for the first decade of the Upcountry Town Center development. The stabilized annual revenue to the state and county would be $6.78 million.

Correlation

Our public cost/benefit assessment is comprehensively displayed on Table 32, which also contains the correlation of public service costs (per capita basis) with the anticipated tax revenue benefits.

Table 33 summarizes our costs/benefits findings on both an actual cost and per capita allowance basis for the entire project.

TABLE 32

PUBLIC COST/BENEFIT SUMMARY TABLE
Market Study of the Proposed Upcountry Town Center
Pukalani, Maui, Hawaii
In Constant 2001 Dollars
Assuming Market Multifamily Development of Residential Site

Development Year	1	2	3	4	5	6	7	8	9	Stabilized 10	Total 1-10
PUBLIC BENEFITS (Revenues)											
1. REAL PROPERTY TAXES											
Cumulative Assessed Values											
Improvements		$23,750,000	$37,566,694	$50,018,388	$62,703,082	$66,641,776	$68,183,470	$68,183,470	$68,183,470	$68,183,470	
Land (1)	$3,060,000	$14,565,123	$14,565,123	$14,565,123	$14,565,123	$14,565,123	$14,565,123	$14,565,123	$14,565,123	$14,565,123	
Total Assessed Value	$3,060,000	$38,315,123	$52,131,817	$64,583,511	$77,268,205	$81,206,899	$82,748,593	$82,748,593	$82,748,593	$82,748,593	
TOTAL REAL PROPERTY TAXES	$20,533	$409,094	$590,231	$753,473	$919,769	$971,406	$991,617	$991,617	$991,617	$991,617	$7,630,976
2. STATE INCOME TAXES											
Taxable Personal Income	$3,796,800	$14,049,400	$15,774,520	$20,882,280	$24,616,080	$27,273,000	$30,348,840	$29,361,000	$29,361,000	$29,361,000	$224,823,920
Taxable Corporate Profits	$1,604,977	$4,717,245	$8,125,820	$10,147,029	$11,953,797	$12,641,394	$13,663,505	$13,712,741	$13,712,741	$13,712,741	$103,991,989
Personal Taxes Paid	$220,214	$814,865	$914,922	$1,211,172	$1,427,733	$1,581,834	$1,760,233	$1,702,938	$1,702,938	$1,702,938	$13,039,787
Corporate Taxes Paid	$32,100	$94,345	$162,516	$202,941	$239,076	$252,828	$273,270	$274,255	$274,255	$274,255	$2,079,840
TOTAL STATE INCOME TAXES	$252,314	$909,210	$1,077,439	$1,414,113	$1,666,809	$1,834,662	$2,033,503	$1,977,193	$1,977,193	$1,977,193	$15,119,627
3. STATE GROSS EXCISE TAX											
Taxable Transactions											
Construction Contracts	$11,879,775	$21,568,850	$13,816,694	$12,451,694	$12,684,694	$3,938,694	$1,541,694	$0	$0	$0	$77,882,095
Commercial Operations		$11,576,000	$40,920,000	$55,240,870	$66,593,124	$78,817,099	$87,369,200	$89,136,350	$89,136,350	$89,136,350	$607,925,343
Discretionary Expenditures			$356,550	$784,410	$1,259,810	$1,782,750	$2,281,920	$2,281,920	$2,281,920	$2,281,920	$13,311,200
Total Taxable Transactions	$11,879,775	$33,144,850	$55,093,244	$68,476,974	$80,537,628	$84,538,543	$91,192,814	$91,418,270	$91,418,270	$91,418,270	$699,118,638
TOTAL STATE EXCISE TAX	$494,911	$1,380,814	$2,295,185	$2,852,751	$3,355,198	$3,521,876	$3,799,093	$3,808,485	$3,808,485	$3,808,485	$29,125,282
TOTAL GROSS PUBLIC REVENUES											
To Maui County (Item #1)	$20,533	$409,094	$590,231	$753,473	$919,769	$971,406	$991,617	$991,617	$991,617	$991,617	$7,630,976
To State (Items #2 & 3)	$747,225	$2,290,025	$3,372,623	$4,266,864	$5,022,006	$5,356,538	$5,832,595	$5,785,678	$5,785,678	$5,785,678	$44,244,910
AGGREGATE TAX REVENUES	$767,758	$2,699,119	$3,962,854	$5,020,337	$5,941,776	$6,327,943	$6,824,213	$6,777,295	$6,777,295	$6,777,295	$51,875,885
PUBLIC COSTS (Expenses)											
State	$0	$240,013	$582,888	$1,009,635	$1,436,910	$1,921,419	$2,338,408	$2,348,958	$2,348,958	$2,348,958	$14,576,144
County	$0	$57,057	$138,567	$240,016	$341,590	$456,770	$555,898	$558,406	$558,406	$558,406	$3,465,116
TOTAL PUBLIC COSTS	$0	$297,070	$721,455	$1,249,651	$1,778,500	$2,378,188	$2,894,306	$2,907,364	$2,907,364	$2,907,364	$18,041,259
TOTAL NET PUBLIC BENEFITS											
To State	$747,225	$2,050,012	$2,789,736	$3,257,229	$3,585,096	$3,435,119	$3,494,188	$3,436,720	$3,436,720	$3,436,720	$29,668,766
To Maui County	$20,533	$352,037	$451,664	$513,457	$578,180	$514,636	$435,719	$433,211	$433,211	$433,211	$4,165,860
AGGREGATE NET BENEFITS	$767,758	$2,402,050	$3,241,400	$3,770,686	$4,163,276	$3,949,755	$3,929,907	$3,869,932	$3,869,932	$3,869,932	$33,834,626

(1) Entitled land valued at $75,000 per acre, with 22.43 acres of finished land at prices of $5 to $21 per square foot. Waiulu Farms estimated land value of $250,000, improvements at $500,000.

Source: The Hallstrom Group, Inc.

TABLE 33

SUMMARY OF ANNUALIZED PRIMARY GOVERNMENTAL TAX RECEIPTS AND PUBLIC SERVICE COSTS

Market Study of the Proposed Upcountry Town Center

Pukalani, Maui, Hawaii

	State of Hawaii					
	Estimated Actual Cost Comparison			Indicated Per Capita Allocation Comparison		
Annually On Stabilized Basis At Build-Out	Yearly Receipts -	Yearly Costs =	Net Benefits or (Costs)	Yearly Receipts -	Yearly Costs =	Net Benefits or (Costs)
Total Project	$5,785,678	($200,000)	$5,585,678	$5,785,678	($2,348,958)	$3,436,720

	Maui County					
	Estimated Actual Cost Comparison			Indicated Per Capita Allocation Comparison		
Annually On Stabilized Basis At Build-Out	Yearly Receipts -	Yearly Costs =	Net Benefits or (Costs)	Yearly Receipts -	Yearly Costs =	Net Benefits or (Costs)
Total Project	$991,617	($505,750)	$485,867	$991,617	($558,406)	$433,211

Source: The Hallstrom Group, Inc.

As can be seen, regardless of the cost methodology adopted, in no single year do public coffers suffer a net loss.

CERTIFICATION

The undersigned do hereby certify that, to the best of our knowledge and belief, the statements of fact contained in this report are true and correct. It is further certified that the reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are our personal, impartial, and unbiased professional analyses, opinions, and conclusions. We further certify that we have no present or prospective interest in the property that is the subject of this report, and have no personal interest with respect to the parties involved. We have no bias with respect to the property that is the subject of this report or the parties involved with this assignment. Our engagement in this assignment was not contingent upon developing or reporting predetermined results. Our compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal. The appraisal analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute, and the Uniform Standards of Professional Appraisal Practice. The use of this report is subject to the requirements of the Appraisal Institute relating to review by duly authorized representatives. The undersigned certify that they have made personal inspections of the property that is the subject of this report. No other persons provided significant real property appraisal assistance other than the undersigned.

The Appraisal Institute conducts programs of continuing education for their designated members. As of the date of this report, James E. Hallstrom, Jr. has completed the requirements of the continuing education program of the Appraisal Institute.

James E. Hallstrom, Jr., MAI, CRE
Hawaii State Certified
General Appraiser, CGA-178
Exp. Date December 31, 2003

Tom W. Holliday / Snt
Tom W. Holliday

/as

3674OR01

ADDENDUM
Dated October 8, 2003
to the

Market Study, Economic Impact Analysis
and Public Cost/Benefit Assessment
of the Proposed

UPCOUNTRY TOWN CENTER

to be located at

Pukalani, Maui, Hawaii

UPCOUNTRY TOWN CENTER'S RELATIONSHIP TO THE KULAMALU TOWN CENTER

The Kulamalu Town Center project has moved forward significantly since the initial Market study was completed several years ago. The development has been well-received by the market, the type of proposed uses and timing has more clearly defined, and its probable relationship with the proposed Upcountry Town Center can now be reasonably assessed.

Market Acceptance.
According to realtors handling sales, virtually all of the lots made available by the developer have been reserved; with only the topographically-challenged parcel at the entry to the project still listed for sale. The absorption speed and pricing bespeak of the general market strength on Maui and specific upcountry demand for business/commercial-oriented building lots. Demand was particularly high for the smaller parcels among the 19 lots, which have an overall size range of one-half to 2.5 acres, with rapid sell-out and remaining interest in the product type. Selling prices have ranged from $515,000 to $1,600,000.

Probable Uses and Development Timing.
Completion of the subdivision infrastructure and initial lot closings are anticipated for early 2004. Numerous purchasers have announced site development plans, and anticipate beginning construction shortly thereafter. At least one purchaser/builder is already offering space in a proposed multi-tenant office building. Among the currently envisioned uses are: Institute for Astronomy, Medical (Physician Offices), Fitness Club, Office Building(s), and a Skilled Nursing Facility.

An entertainment complex and several business-oriented uses are also being considered for the project. At present, there is no retail being proposed outside of a possible small market (near mini-mart size at only 10,000 square feet), and there are no restaurants as yet, and no automotive-oriented uses will be permitted. Given the market response and proposed development to date, it is likely Kulamalu will achieve its anticipated absorption and build-out timeframe, with substantial levels of completed floor space by 2005-06.

Relationship to the Upcountry Town Center.
With Kulamalu moving forward as anticipated, its relationship with the proposed subject project can be better assessed.

First, the timing of Kulamalu Town Center fits in well-with the timing of the Upcountry Town Center. Kulamalu is helping meet some currently unmet community demands, but will be effectively built-out by the time the subject product comes on-line in three to four years.

Second, the currently envisioned uses at Kulamalu will not address all sectors of commercial land use demands in Upcountry. The project will have no meaningful retail or light (cottage) industrial uses; for which there is acute demand in the community. By

2005, the unmet demand for retail/service floor space in the study area will total (mid-point) some 76,000 square feet, for light industrial space the demand will be some 146,000 square feet. While Kulumalu will help meet regional needs for business/office and some other use types, it will not fully satiate demand in any single category apart (perhaps) from the entertainment/recreation sector. There will still remain unmet demand for senior housing and services, medical and clinic space, and office/business uses.

Third, the two projects will not be in direct competition for major use types. The driving components of the Upcountry Town Center are the retail and cottage industrial uses, which are not represented at Kulamalu. Conversely, business/office and entertainment uses which are expected to comprise much of the Kulamalu development are not significant components of Upcountry Town Center.

Fourth, the competitive location and attributes of the Upcountry Town Center site continue to be superior to Kulamalu for most uses. There are many retail/commercial users which would not consider the Kulamalu frontage, access, lay-out and lot size to be amenable to their business, and would not go to Upcountry at that location. The subject will provide the characteristics necessary to support these uses. Further, Kulamalu is not in a position to exploit tourist traffic to Haleakala summit, thus the potential positive impacts on the Upcountry economy from this massive flow of potential consumers is lost.

Fifth, the "Maui Fresh" concept, featuring made-in-Maui products and goods, which is proposed by ML&P for a portion of the Upcountry site, is not a feasible option for Kulamalu due to location, access, size and price issues. Without the Upcountry Town Center, this opportunity for local farmers and artisans to have a place to sell goods and access the visitor stream will not be actualized.

Appendix B

Traffic Impact Assessment for the Upcountry Town Center

TRAFFIC IMPACT ASSESSMENT STUDY

UPCOUNTRY TOWN CENTER

PUKALANI, MAUI, HAWAII

July 2003

PARSONS BRINCKERHOFF QUADE & DOUGLAS

Over a Century of Engineering Excellence

TRAFFIC IMPACT ASSESSMENT STUDY

UPCOUNTRY TOWN CENTER

Pukalani, Maui, Hawaii

July 2003

Prepared For:

Maui Land & Pineapple Company. Inc.
120 Kane Street
Kahului, Hawaii 96732

Prepared By:

Parsons Brinckerhoff Quade & Douglas, Inc.
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PBQD Reference Number:
16352A-01

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I. INTRODUCTION

Maui Land & Pineapple Company, Inc. proposes a multi-use development called the Upcountry Town Center on a triangular parcel of land in Pukalani, Maui. The parcel is bordered by Haleakala Highway (Pukalani Bypass), Old Haleakala Highway, and Makawao Avenue. The location of the proposed development is shown in Figure 1.

A community of developments is planned including a retail center, a small office center, cottage industrial lots, senior/multi-family residential, and a Maui Fresh outlet. Plans include relocating the existing Wai Ulu Farms Feed Store and Stable on the site. The existing Pukalani Superette located on Makawao Avenue near Old Haleakala Highway plans to move into the proposed development. A large portion of the site will remain in open space. A conceptual site plan is shown in Figure 2.

Access to the proposed development is proposed at 3 driveways on Makawao Avenue, one driveway on Old Haleakala Highway, and one driveway on Haleakala Highway.

The Upcountry Town Center (UTC) site would provide more convenient shopping for the Upcountry Maui area in a mixed-use village concept. Locating the proposed development adjacent to Haleakala Highway provides traffic from Pukalani, Makawao, and Kula direct access to the site and minimizes travel through sensitive areas within these towns.

As part of the Town Center concept and in keeping with the country feel of the area, it is also proposed to include diagonal parking along Makawao Avenue between two of the UTC access driveways. These diagonal spaces would serve primarily commercial uses located adjacent to Makawao Avenue within UTC and echo the 90-degree parking now fronting the existing Pukalani Superette. The concept is to keep Makawao Avenue a low-speed roadway that would encourage residents to treat this area as a Town Center.

The proposed development is projected to be completed by the year 2006. The purpose of this report is to document the study assumptions and methodology and to summarize the findings and recommendations regarding traffic impacts of the proposed Upcountry Town Center.

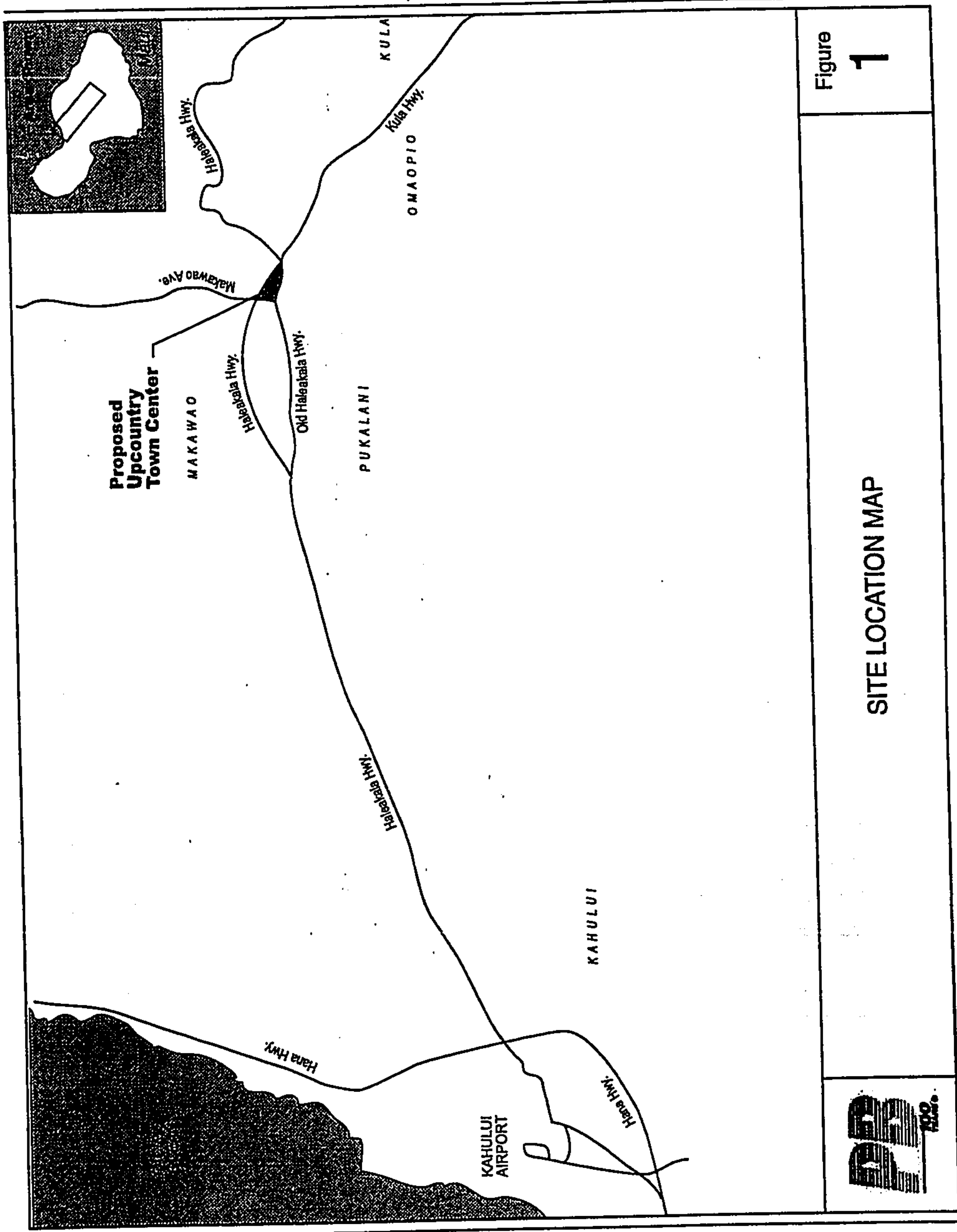
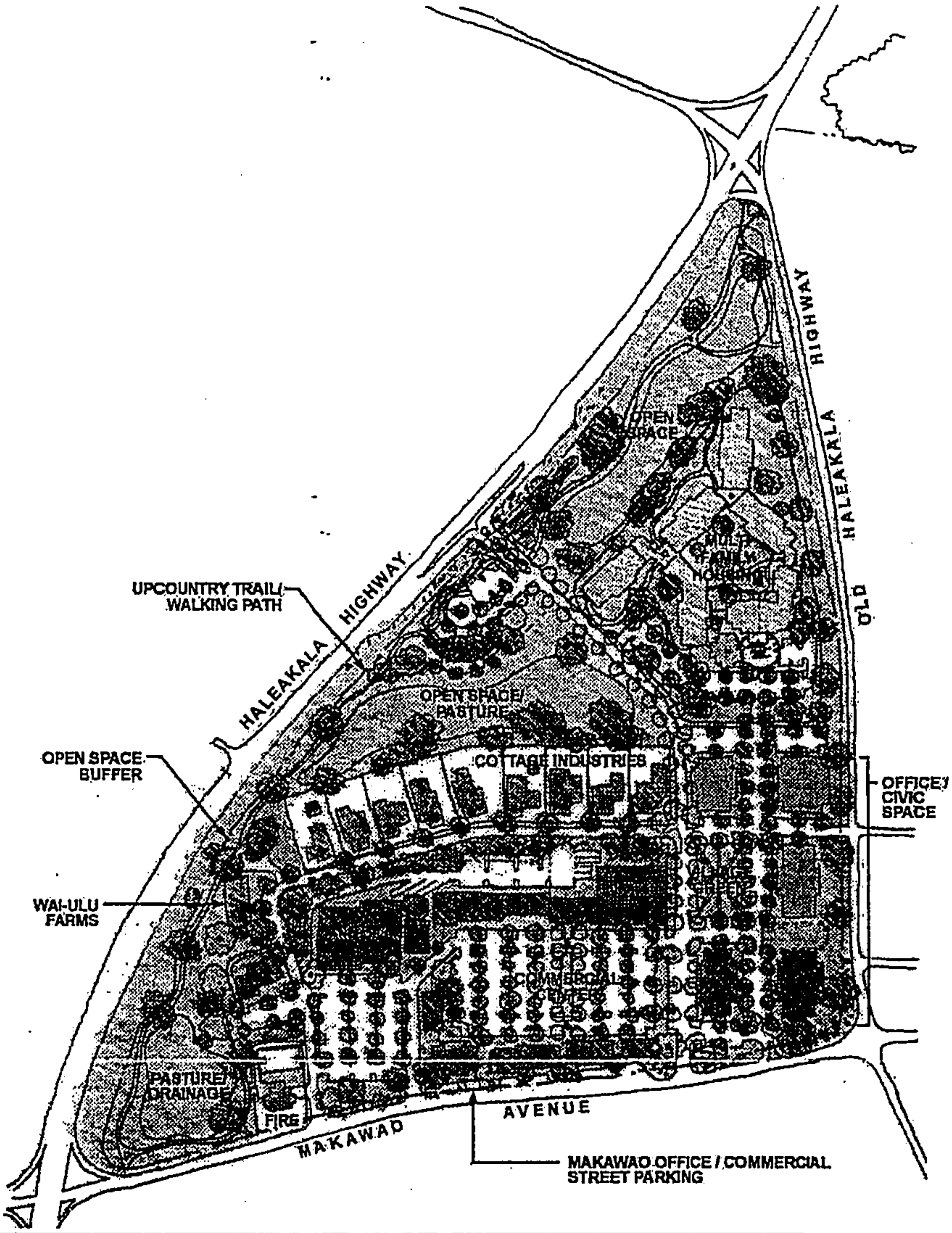


Figure
1
SITE LOCATION MAP
Proposed
Upcountry
Town Center
KULA
OMAOPIO
MAKAWAO
PUKALANI
KAHULUI
KAHULUI
AIRPORT
Haleakala Hwy.
Kula Hwy.
Makawao Ave.
Old Haleakala Hwy.
Hana Hwy.
Maui



CONCEPTUAL SITE PLAN

Figure 2

II. EXISTING CONDITIONS

The Upcountry Town Center parcel is bordered by Haleakala Highway (Pukalani Bypass), Old Haleakala Highway, and Makawao Avenue. The existing roadway conditions and intersection operations are described in the following sections.

A. Existing Roadway System

1. Existing Roadways

Roadways within the study area include:

- Haleakala Highway (Pukalani Bypass)
- Old Haleakala Highway
- Makawao Avenue

a. Haleakala Highway

Haleakala Highway generally runs diagonally along the northeastern edge of the proposed development. It is a four-lane arterial roadway providing regional access to the Upcountry area of Maui. Adjacent to the site, it is a four-lane roadway with a posted speed limit of 45 mph. Both Makawao Avenue and Old Haleakala Highway intersect it at signalized intersections.

b. Old Haleakala Highway

Old Haleakala Highway provides primary east-west circulation within Pukalani town. It is a two-lane, two-way roadway with separate left turn lanes provided at selected intersections. The posted speed limit is 30 mph. It intersects both Makawao Avenue and Haleakala Highway at signalized intersections.

c. Makawao Avenue

Makawao Avenue is a two-lane, two-way collector roadway providing access to both Makawao and Pukalani from Haleakala Highway. The posted speed limit is 30 mph. It intersects Old Haleakala Highway opposite Loha Street. Loha Street provides access into a residential subdivision within Pukalani.

2. Existing Intersections

Three existing intersections were evaluated. They are: 1) Haleakala Highway/Makawao Avenue, 2) Haleakala Highway/Old Haleakala Highway/Kula Highway (Five Trees), and 3) Old Haleakala Highway/Makawao Avenue.

B. Existing Traffic Volumes

Turning movement counts were conducted on Monday, May 7, 2001 and Tuesday, May 8, 2001 during the morning and afternoon peak periods. Figure 3 summarizes the existing peak hour volumes at the study area intersections.

C. Existing Intersection Operations

The intersections were analyzed using the methodologies for signalized intersections outlined in the 2000 Highway Capacity Manual (HCM). Operating conditions at an intersection are expressed as a qualitative measure known as Level of Service (LOS). Letter designations ranging from 'A' through 'F' are used, with LOS 'A' representing very low delay conditions and LOS 'F' representing over-saturation conditions. Appendix A provides a more detailed description of Level of Service.

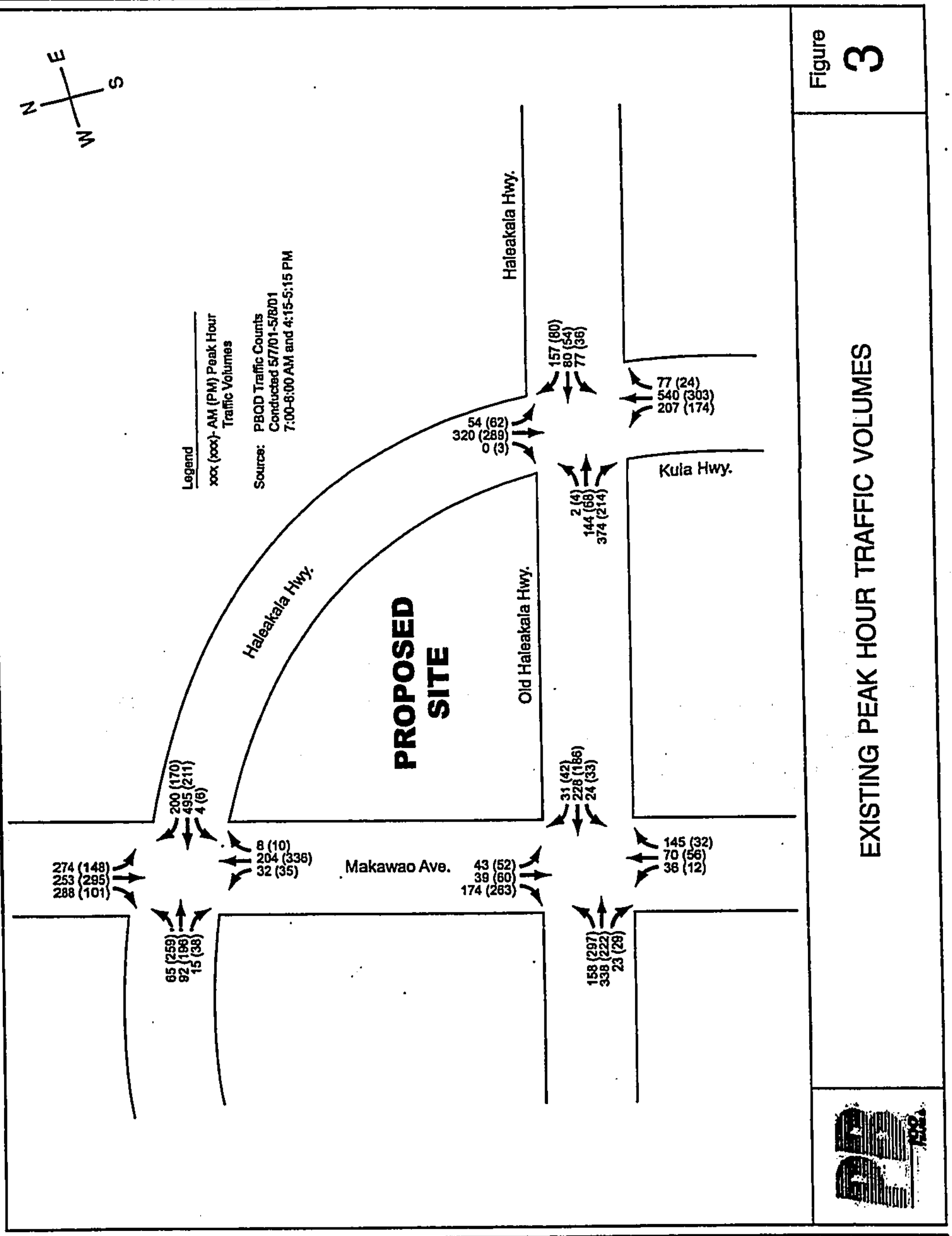


Figure 3

EXISTING PEAK HOUR TRAFFIC VOLUMES

The results of the analyses are shown in Table 1. The results of the analyses indicate that the Haleakala/Kula/Old Haleakala and Old Haleakala/Makawao intersections operate very well, at LOS B for both AM and PM peak hour time periods. The Haleakala/Makawao intersection operates in an acceptable LOS C or better, with estimated average delays of less than 30 seconds per vehicle on most approaches. During the morning peak hour, southbound traffic from Makawao turning into Kahului-bound Haleakala Highway experiences queuing for part of the peak hour but are able to be processed through the intersection without excessive delay.

Table 1

Existing Conditions

Level of Service Summary

INTERSECTION	A.M. Peak Hour LOS	A.M. Peak Hour DELAY (sec/veh)	P.M. Peak Hour LOS	P.M. Peak Hour DELAY (sec/veh)
Haleakala Highway/Makawao Avenue Intersection	C	28.0	C	29.0
Haleakala Highway/Old Haleakala Highway/Kula Highway Intersection	B	18.4	B	17.1
Old Haleakala Highway/Makawao Avenue Intersection	B	12.5	B	10.6

Copies of the analysis worksheets are included in Appendix B of this report.

III. YEAR 2006 TRAFFIC CONDITIONS - WITHOUT UPCOUNTRY TOWN CENTER

The Upcountry Town Center is projected to be completed in the year 2006. Traffic operations were evaluated for two future conditions to determine the impacts of development: Year 2006 without the Upcountry Town Center and Year 2006 with the Upcountry Town Center. This section of the report addresses the future traffic condition without the proposed Upcountry Town Center.

A. Year 2006 Traffic Volumes, Without Upcountry Town Center

To project the growth of traffic not associated with the proposed Upcountry Town Center, key developments within the Year 2006 time frame were identified. Within recent years, the most significant development constructed in the vicinity of the project site included the King Kekaulike High School and Kamehameha School.

The King Kekaulike High School was at full occupancy by the 2000-2001 school year. The existing traffic counts shown in this report were conducted in April 2001 and, therefore, include traffic from King Kekaulike High School.

Kamehameha School is planned to contain grades Kindergarten to 12. During 2001, it only included grades Kindergarten through 7. By the year 2006, all grades will be represented at the school. Based on telephone conversations with Kamehameha School staff, it was determined that students are bused in from most areas of Maui. The exceptions are east Maui and the Upcountry areas. The incremental traffic generated by the grades to be added between 2001 and 2006 were estimated using trip generations rates for elementary, middle school, and high school documented in the Institute of Transportation Engineers publication, Trip Generation, Sixth Edition. These trips were allocated to areas of Maui based on population documented in the 2002 Maui Data Book, published by the Business Research Library. Based on these population statistics, 67.4 percent of the students are bused into Kamehameha School. 8.3 percent come from Kula and are intercepted by Kamehameha School before reaching the study analysis area. 24.3 percent come from either the Upcountry area or the east Maui areas. For the purposes of this study, half of this traffic was assumed to be generated by the Pukalani area and half of this traffic was assumed to be generated or enter the study area via Makawao.

There are no other known approved plans in the immediate vicinity of the proposed Upcountry Town Center that would influence traffic within the study area by the analysis year 2006. To account for overall ambient traffic growth in the area, a 1 percent annual growth rate was applied to the year 2001 counted traffic volumes to grow them to year 2006 traffic volumes.

Therefore, the projected year 2006 peak hour traffic volumes are the sum of the year 2001 counted traffic volumes growth factored to reflect a 1 percent annual growth rate and the incremental Kamehameha School traffic.

The resulting Year 2006 traffic volumes without the Upcountry Town Center are shown in Figure 4.

B. Year 2006 Intersection Operations Without Upcountry Town Center

The volumes in Figure 4 were analyzed using the 2000 Highway Capacity Manual methodologies for unsignalized intersections. Table 2 summarizes the results.

The level of service analysis indicates that the study area intersections will continue to operate acceptably in Year 2006. The Haleakala Highway/Makawao Avenue intersection will continue to operate at LOS C with slightly greater delay due to the projected growth in traffic volumes. Operations at the Old Haleakala Highway/Kula Highway/ Haleakala Highway intersection will be heavier at LOS C, but will still operate well. The Old Haleakala/Makawao Avenue intersection will continue to operate well at LOS B.

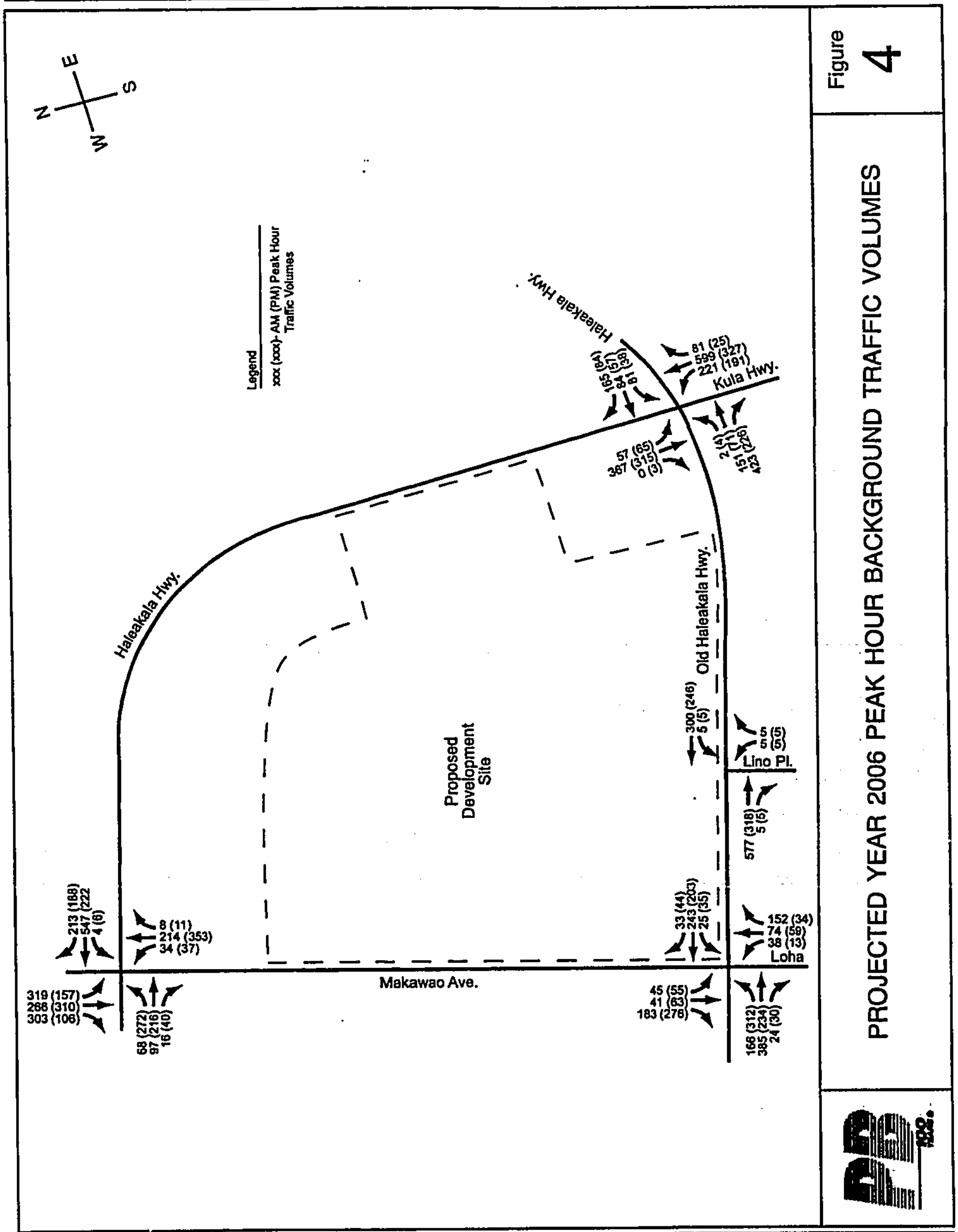


Figure
4
PROJECTED YEAR 2006 PEAK HOUR BACKGROUND TRAFFIC VOLUMES
Legend
xxx (xxx)- AM (PM) Peak Hour Traffic Volumes
Haleakala Hwy.
Kula Hwy.
Old Haleakala Hwy.
Lino Pl.
Loha
Makawao Ave.
Proposed Development Site

Table 2

Year 2006 Without Upcountry Town Center

Level of Service Summary

INTERSECTION	A.M. Peak Hour LOS	A.M. Peak Hour DELAY (sec/veh)	P.M. Peak Hour LOS	P.M. Peak Hour DELAY (sec/veh)
Haleakala Highway/Makawao Avenue Intersection	C	29.4	C	26.0
Haleakala Highway/Old Haleakala Highway/Kula Highway Intersection	C	22.7	B	18.3
Old Haleakala Highway/Makawao Avenue Intersection	B	13.0	B	11.6

Copies of the analysis worksheets are included in Appendix B of this report.

IV. YEAR 2006 TRAFFIC CONDITIONS - WITH UPCOUNTRY TOWN CENTER

The trips generated by the Upcountry Town Center were added to the Year 2006 traffic volumes without Upcountry Town Center to forecast the future traffic conditions with the Upcountry Town Center. Intersection analyses were then conducted for these traffic conditions.

A. Vehicle Trips Generated

Trip generation was based on the ITE publication, Trip Generation, 6th Edition. Table 3 documents the land uses assumed and summarizes the estimated vehicular trips generated by the proposed development. The trip generation rates for peak hour of adjacent street traffic were used. As shown, the proposed development is expected to generate between 380 and 555 vehicles per hour (vph) per direction during the PM peak hour. The AM peak hour trips are less, with about 285 vph in the peak direction inbound.

The trips generated by the Upcountry Town Center were assumed to be distributed as a combination of direct trips and linked trips. The linked trips especially refer to retail trips that divert from their main home to work or work to home trips to shop at the proposed development. One of the benefits of the proposed development is that it would provide shopping opportunities that could lessen the need for Upcountry residents to drive into Kahului. Another benefit of the proposed development is the redirection of a portion of the retail trips out of Pukalani and onto the Pukalani Bypass. People living in Makawao and Kula would be more likely to stay on Haleakala Highway than to turn into Pukalani on Old Haleakala Highway. These people would access the proposed development directly from Haleakala Highway or through Makawao Avenue. This could lessen the traffic load on Old Haleakala Highway through Pukalani. It was assumed that 30 percent of the retail component trips during the PM peak hour would be linked trips. This translates to about 90 vehicles per hour (vph). Of these 90 vph, it was estimated that approximately 70 vph would shift from Old Haleakala Highway to Haleakala Highway (Pukalani Bypass). Figure 5 illustrates the assignment of the trips generated by the Upcountry Town Center development. This assignment includes all trips generated, included linked trips. The background traffic volumes were adjusted to reflect the effects of the linked trips.

Table 3

Upcountry Town Center

Trip Generation Summary

Land Use	Intensity	AM Peak Hour		PM Peak Hour	
		In	Out	In	Out
Retail: Shopping Center (820)	101,000 sq ft	98	63	303	329
Office/Civic Program: General Office Building (710)	79,900 sq ft	137	19	29	140
Cottage Industrial Lots: General Light Industrial (110)	141,700 sq ft	38	5	5	40
Residential Senior/Multi-family (220)	150 dwelling units	7	4	9	6
Maui Fresh Venue: (854)	6,000 sq ft	7	3	36	39
Total		287	94	382	554

Note: Trip Generation rates documented in Trip Generation, 6th Edition.

B. Year 2006 Traffic Volumes - With Upcountry Town Center

The trips generated by the Upcountry Town Center and the Year 2006 baseline traffic volumes were combined to estimate the Year 2006 Traffic Volumes With Upcountry Town Center. The traffic volumes are shown in Figure 6.

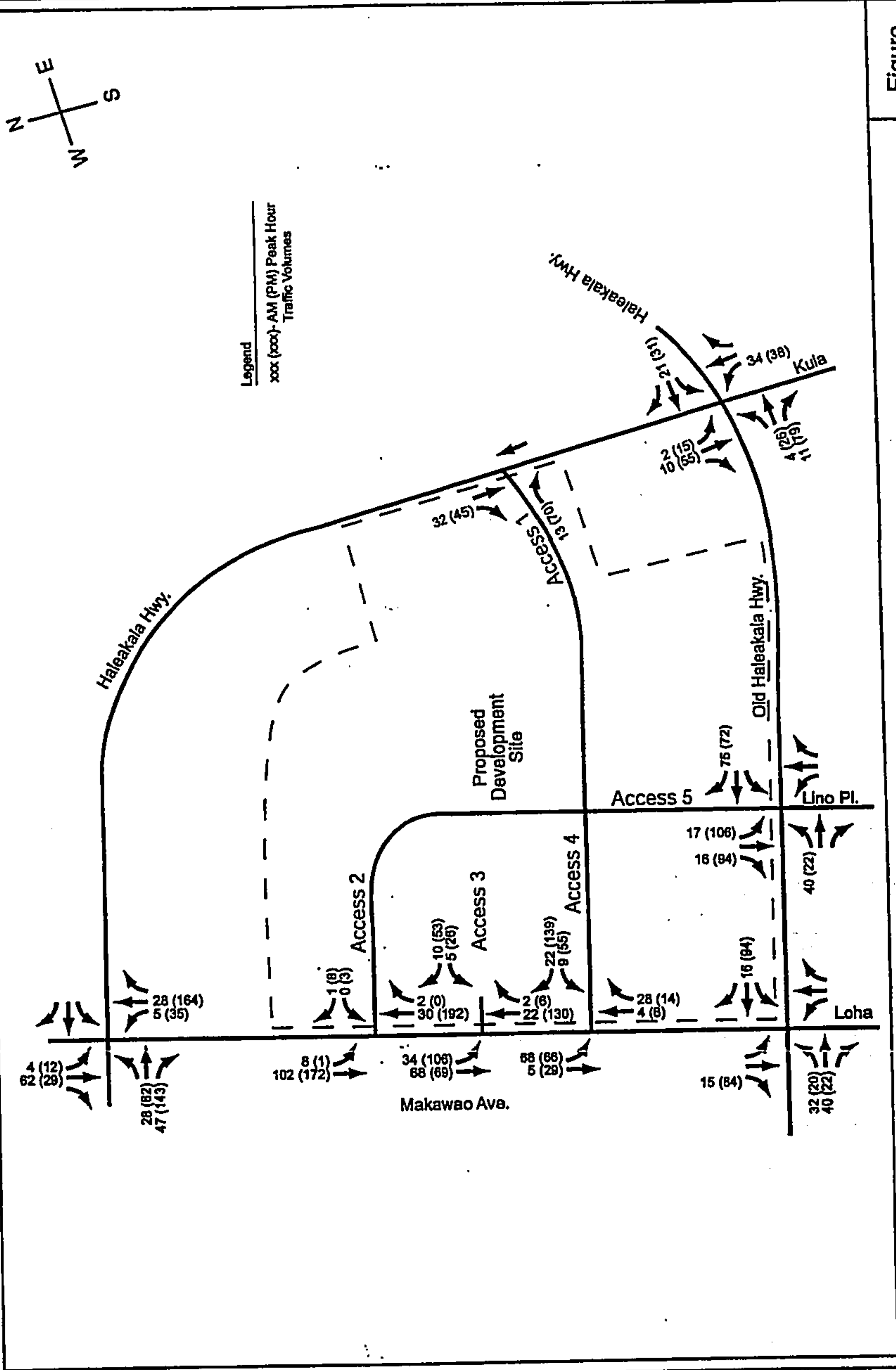


Figure 5

SITE GENERATED TRAFFIC VOLUMES

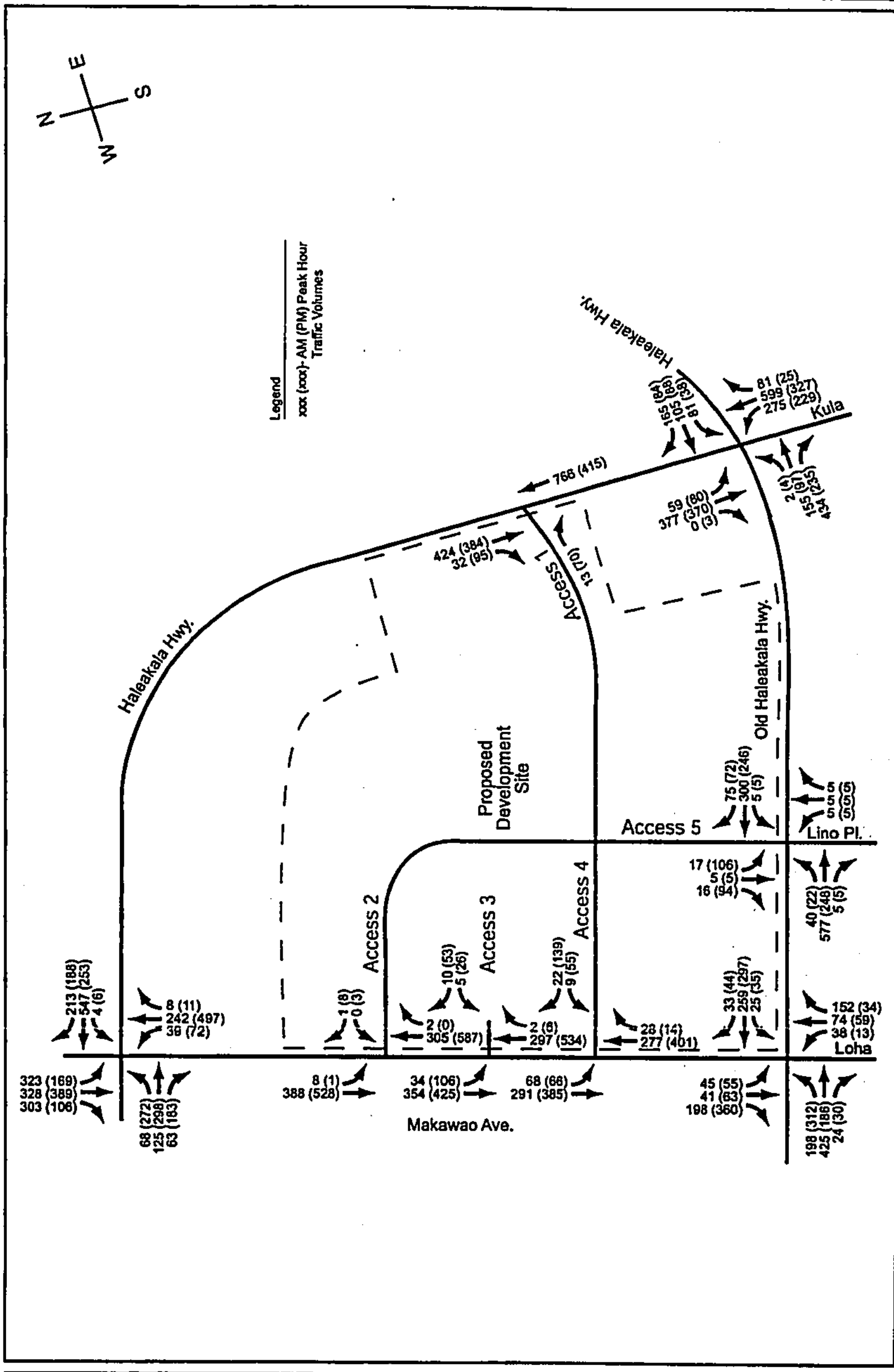


Figure 6

PROJECTED YEAR 2006 PEAK HOUR TRAFFIC VOLUMES WITH UPCOUNTRY TOWN CENTER

C. Year 2006 Intersection Operations With Upcountry Town Center

The peak hour volumes in Figure 6 were analyzed using the <u>2000 Highway Capacity Manual</u> methodologies for signalized and unsignalized intersections. Table 4 summarizes the results of the analyses.

Table 4

Year 2006 With Project Conditions
Level of Service Summary

INTERSECTION	A.M. Peak Hour LOS	A.M. Peak Hour DELAY (sec/veh)	P.M. Peak Hour LOS	P.M. Peak Hour DELAY (sec/veh)
Haleakala Highway/Makawao Avenue				
Intersection	C	23.7	C	31.9
Haleakala Highway/Old Haleakala Highway/Kula Highway				
Intersection	C	22.4	B	21.9
Old Haleakala Highway/Makawao Avenue				
Intersection	B	14.6	B	14.8
Access 1/Haleakala Highway				
Intersection – EB Right-Turn	B	11.2	B	11.5
Access 2//Makawao Avenue				
Intersection – WB Approach	B	10.1	C	15.8
Access 3/Makawao Avenue				
Intersection – WB Approach	B	11.8	C	19.4
Access 4/Makawao Avenue				
Intersection – WB Approach	B	11.9	C	16.1
Access 5/Old Haleakala Highway				
Intersection – Milo Lane Approach	C	21.5	B	13.6
Intersection –Access 5 Approach	C	20.8	C	15.5

Copies of the analysis worksheets are included in Appendix B of this report.

As shown in Table 4, all intersections are projected to operate acceptably for peak hour conditions at level of service (LOS) C or better for the overall intersection.

The peak hour LOS is maintained through the proposed implementation of improvements at the Haleakala Highway/Makawao Avenue intersection. The improvements consist of providing exclusive right-turn lanes on Haleakala Highway and on the southbound leg of Makawao Avenue. These geometric improvements coupled with a modification of the existing traffic signal to provide an exclusive left-turn phase on Makawao Avenue, would enable the intersection to accommodate the proposed development. The need for these improvements are to accommodate projected increases in traffic as it shifts from Old Haleakala Highway to Haleakala Highway (Bypass). Consequently, the Old Haleakala/Makawao intersection is projected to operate as well as it would in the scenario without the proposed project. The Old Haleakala/Haleakala/Kula intersection is also projected to operate well .

The project access intersections are projected to operate well. The unsignalized intersections on Makawao Avenue and on Old Haleakala Highway are projected to operate well with STOP-sign control on the project driveway approaches. Selective widening of Makawao Avenue is recommended to provide space for median left-turn lanes at the proposed project access driveways. Care must be taken to coordinate these left-turn lanes and project access driveways with existing access on the west side of Makawao Avenue.

V. SUMMARY, RECOMMENDATIONS AND CONCLUSION

A. Summary of Traffic Analysis

As shown in Table 4 in the previous chapter, this study has shown that with recommended roadway improvements, major adjacent intersections and the project driveway intersection on Haleakala Highway (Pukalani Bypass) are projected to operate well for peak hour conditions and can accommodate traffic generated by the proposed Upcountry Town Center (UTC) development. Intersection operations at the unsignalized project driveway intersections on Makawao Avenue and on Old Haleakala Highway are projected to operate well.

The UTC project promotes changes in the nature of Makawao Avenue, and this is expected to affect traffic flow on Makawao Avenue. Currently, Makawao Avenue is posted at 30 mph. It has numerous access driveways along it and some existing instances of 90-degree parking directly adjacent to the roadway (Pukalani Superette). It is the intent of the UTC project to enhance the country feel of Makawao Avenue by echoing the existing diagonal parking in front of the Pukalani Superette with limited new diagonal parking adjacent to the proposed UTC site. Specific recommendations on the implementation of this parking follow in the next section of this chapter, but it is noted here that the effect of this diagonal parking would be to introduce additional traffic friction on this segment of Makawao Avenue. This friction is not projected to impact traffic operations at the Haleakala Highway/Makawao Avenue or the Old Haleakala Highway/Makawao Avenue intersections. It would probably slow traffic down on Makawao Avenue between these two intersections, which is consistent with the goal of creating a country Town Center feel for the area.

B. Recommendations

1. <u>Configuration of Project Access Driveways</u>

It is recommended that the project access driveways to the proposed development be channelized on their approaches with separate left and right turn lanes.

The three driveways (Accesses 2, 3, and 4) on Makawao Avenue and the driveway (Access 5) on Old Haleakala Highway are recommended to be configured as unsignalized intersections with STOP-sign control on the driveway approaches. Selective widening of Makawao Avenue to provide median left-turn lanes at the proposed project driveways is recommended.

The proposed driveway access on Haleakala Highway (Access 1) is proposed as a right-in/right-out intersection. A right-turn deceleration lane is recommended per State of Hawaii Department of Transportation (SDOT) standards. SDOT will need to approve this new access on Haleakala Highway.

It is recommended to provide an exclusive left-turn lane on Old Haleakala Highway at the proposed project access (Access 5). A westbound left-turn lane on Old Haleakala Highway is recommended for traffic turning into the existing Lino Place, located opposite the proposed project driveway, as well. Access 5 would be STOP-sign controlled on the project driveway approach. Lino Place is an existing roadway and is already STOP-sign controlled on the Lino Place approach.

2. <u>Haleakala Highway/Makawao Avenue Intersection</u>

Intersection improvements are also recommended at the Haleakala Highway/Makawao Avenue intersection. Exclusive right-turn lanes are recommended on Haleakala Highway and on the southbound leg of Makawao Avenue. The existing traffic signal is recommended to be modified to provide an exclusive left-turn phase for Makawao Avenue movements.

3. <u>Diagonal Parking on Makawao Avenue</u>

To create a country town center feel for the Makawao Avenue corridor, it is proposed by UTC to install limited diagonal parking on the east side of Makawao Avenue. The intent is to slow traffic down and provide more commercial activity centered on Makawao Avenue.

The following recommendations apply to the implementation of such parking. These recommendations are based on parameters recommended in a recent article in the ITE Journal (February 2002) entitled, <u>Changing On-Street Parallel Parking to Angle Parking</u>. In this article, the author describes experiences in converting parallel parking to diagonal parking in downtown retail areas. While Makawao Avenue corridor is not an urban downtown area, the intent is to create a country town Main Street feel, which is consistent with the intent of the actions discussed by the author. The author also provides some guidelines with regard to the implementation of parallel to diagonal parking conversions. Table 5 summarizes these guidelines and compares them to the conditions present on Makawao Avenue. Table 5 also contains recommendations on actions that need to be taken to allow Makawao Avenue to operate in this type of environment.

Table 5

Criteria for Implementing Diagonal Parking on Makawao Avenue

Criteria	Guidelines	Existing Makawao Avenue Configuration	Recommended Makawao Avenue Configuration
Daily Traffic Volume	<10,000-12,000 vpd	9,400 vpd	9,400 vpd
Speed Limit	15-20 mph	30 mph	20 mph
Roadway Width	50-52 feet	24 feet	52 feet
Note: Roadway width assumes diagonal parking on one side (east side) of street only.			

The projected Year 2006 daily traffic volume with UTC in place is estimated at approximately 9,400 vehicle trips per day (vpd), near to but below the lower threshold for allowing diagonal parking.

The existing 30 mph speed limit would need to be reduced to 20 mph.

Makawao Avenue needs to be widened to allow the diagonal parking concept to work. The lane configurations are recommended to be: 17-foot southbound lane, 17-foot northbound lane, and 18-foot parking area.

Parking is recommended to be at 60-degree diagonal parking to discourage entry of diagonal parking stalls by southbound vehicles. The diagonal parking area is proposed to be located on the east side of Makawao Avenue between Accesses 3 and 4. It is recommended to end the diagonal parking at least 100 feet north of Access 4 to avoid conflicts with vehicles turning right out of Access 4. Landscaping at Access 4 should allow unobstructed view of the diagonal parking area by a vehicle turning right out of Access 4. Diagonal parking should also be prohibited within 250 feet of any signalized intersection.

A parking overhang area of at least 2 feet is recommended to allow pedestrians full use of sidewalks along Makawao Avenue.

Appropriate traffic signs warning drivers of on-street parking maneuvers are also recommended.

3. Conclusion

Based on the analyses documented in this traffic impact analysis report, it is concluded that the proposed UTC development can be accommodated by the surrounding roadway system with the recommended roadway improvements. The UTC development could be accommodated with or without the diagonal parking concept.

APPENDIX A

LEVEL OF SERVICE DEFINITIONS

The *Highway Capacity Manual* defines six Levels of Service (LOS), labeled A through F, from best to worst conditions. Levels of Service for signalized and unsignalized intersections are defined in terms of average user delays. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time.

For unsignalized intersections, the *Highway Capacity Manual* evaluates gaps in the major street traffic flow and calculates available gaps for left-turns across oncoming traffic and for the left and right-turns onto the major roadway from the minor street.

LEVEL-OF-SERVICE A: Little or no delay.

LEVEL-OF-SERVICE B: Short traffic delays.

LEVEL-OF-SERVICE C: Average traffic delays.

LEVEL-OF-SERVICE D: Long traffic delays.

LEVEL-OF-SERVICE E: Very long traffic delays.

LEVEL-OF-SERVICE F: Demand volume exceeds capacity, resulting in extreme delays with queuing that may cause severe congestion and affect other movements at the intersection.

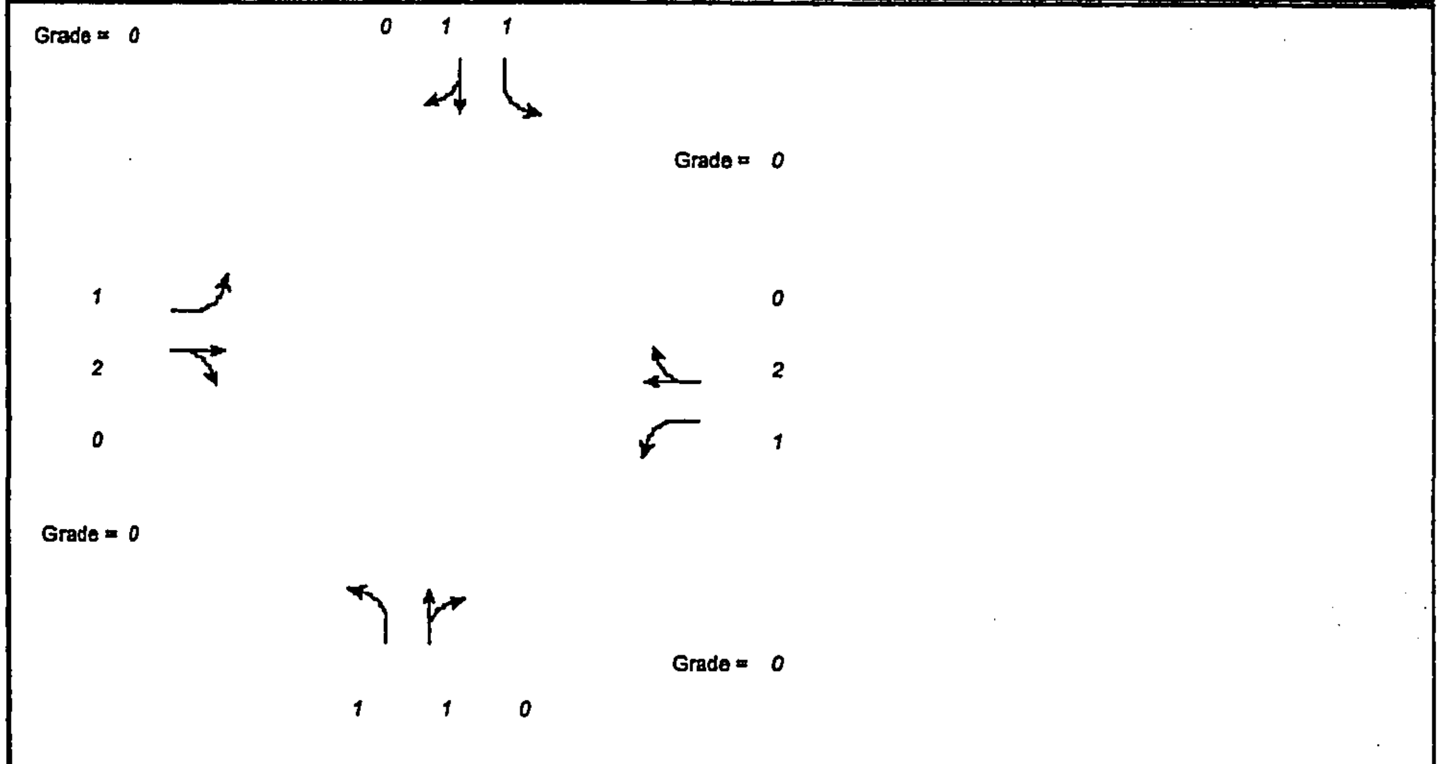
APPENDIX B

INTERSECTION LEVEL OF SERVICE WORKSHEETS

INPUT WORKSHEET

General Information		Site Information	
Analyst	*Laurel Chun*	Intersection	*Haleakala/Makawao*
Agency or Co.	*Parsons Brinckerhoff*	Area Type	*All other areas*
Date Performed	*5/31/2001*	Jurisdiction	*Maui*
Time Period	*AM Peak Hour*	Analysis Year	*Existing 2001*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	65	92	15	4	495	200	32	204	8	274	253	288
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	P	P	P	P	P	P	P	P	P	P	P	P
Startup lost time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ext. eff. green	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Arrival type	3	3		3	3		3	3		3	3	
Ped volume		0			0			0			0	
Bicycle volume		0			0			0				
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr	0	0		0	0		0	0		0	0	
Ped timing		0.0			0.0			3.0			0.0	

	Excl. Left	Thru & RT	03	04	NS Perm	06	07	08
Timing	G = 10.0	G = 20.0	G =	G =	G = 30.0	G =	G =	G =
	Y = 3.0	Y = 4.0	Y =	Y =	Y = 4.0	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25 | Cycle Length C = 73.0

CAPACITY AND LOS WORKSHEET

General Information

Project Description *MLP Upcountry Development - Existing Conditions (5/8/01)*

Capacity Analysis

	EB			WB			NB			SB		
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj. flow rate	72	119		4	772		36	236		304	601	
Satflow rate	1805	3533		1805	3454		372	1889		1105	1748	
Lost time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Green ratio	0.14	0.27		0.14	0.27		0.41	0.41		0.41	0.41	
Lane group cap.	247	968		247	946		153	776		454	718	
v/c ratio	0.29	0.12		0.02	0.82		0.24	0.30		0.67	0.84	
Flow ratio	0.04	0.03		0.00	0.22		0.10	0.12		0.28	0.34	
Crit. lane group	Y	N		N	Y		N	N		N	Y	
Sum flow ratios	0.61											
Lost time/cycle	13.00											
Critical v/c ratio	0.74											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj. flow rate	72	119		4	772		36	236		304	601	
Lane group cap.	247	968		247	946		153	776		454	718	
v/c ratio	0.29	0.12		0.02	0.82		0.24	0.30		0.67	0.84	
Green ratio	0.14	0.27		0.14	0.27		0.41	0.41		0.41	0.41	
Unif. delay d1	28.3	19.9		27.2	24.8		14.0	14.5		17.5	19.3	
Delay factor k	0.50	0.50		0.50	0.50		0.50	0.50		0.50	0.50	
Increm. delay d2	3.0	0.3		0.1	7.7		3.6	1.0		7.6	11.2	
PF factor	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Control delay	31.3	20.2		27.4	32.5		17.6	15.5		25.1	30.5	
Lane group LOS	C	C		C	C		B	B		C	C	
Apprch. delay	24.4			32.5			15.8			28.7		
Approach LOS	C			C			B			C		
Intersec. delay	28.0			Intersection LOS						C		

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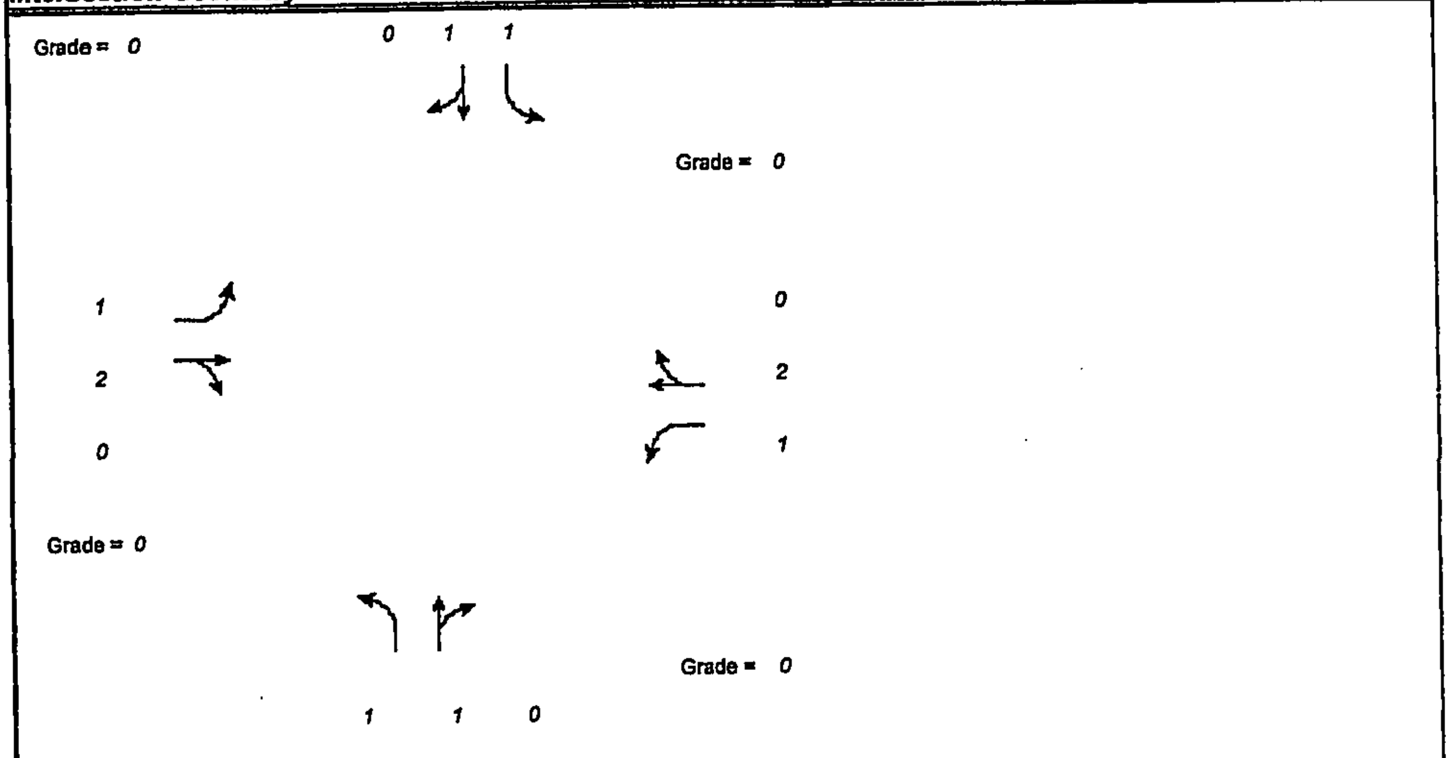
INPUT WORKSHEET

General Information		Site Information	
Analyst	*Laurel Chun*	Intersection	*Haleakala/Makawao*
Agency or Co.	*Parsons Brinckerhoff*	Area Type	*All other areas*
Date Performed	*5/31/2001*	Jurisdiction	*Maui*
Time Period	*PM Peak Hour*	Analysis Year	*Existing 2001*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	259	196	38	6	211	170	35	336	10	148	295	101
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	P	P	P	P	P	P	P	P	P	P	P	P
Startup lost time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ext. eff. green	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Arrival type	3	3		3	3		3	3		3	3	
Ped volume	0			0			0			0		
Bicycle volume	0			0			0					
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr	0	0		0	0		0	0		0	0	
Ped timing	0.0			0.0			3.0			0.0		

	Excl. Left	Thru & RT	03	04	NS Perm	06	07	08
Timing	G = 20.0	G = 20.0	G =	G =	G = 30.0	G =	G =	G =
	Y = 3.0	Y = 4.0	Y =	Y =	Y = 4.0	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 83.0			

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CAPACITY AND LOS WORKSHEET

General Information

Project Description *MLP Upcountry Development-Existing Conditions (5/7/01)*

Capacity Analysis

	EB			WB			NB			SB		
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj. flow rate	288	260		7	423		39	384		164	440	
Satflow rate	1805	3523		1805	3368		574	1892		698	1827	
Lost time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Green ratio	0.24	0.24		0.24	0.24		0.36	0.36		0.36	0.36	
Lane group cap.	435	849		435	812		207	684		252	660	
v/c ratio	0.66	0.31		0.02	0.52		0.19	0.56		0.65	0.67	
Flow ratio	0.16	0.07		0.00	0.13		0.07	0.20		0.23	0.24	
Crit. lane group	Y	N		N	Y		N	N		N	Y	
Sum flow ratios	0.53											
Lost time/cycle	13.00											
Critical v/c ratio	0.62											

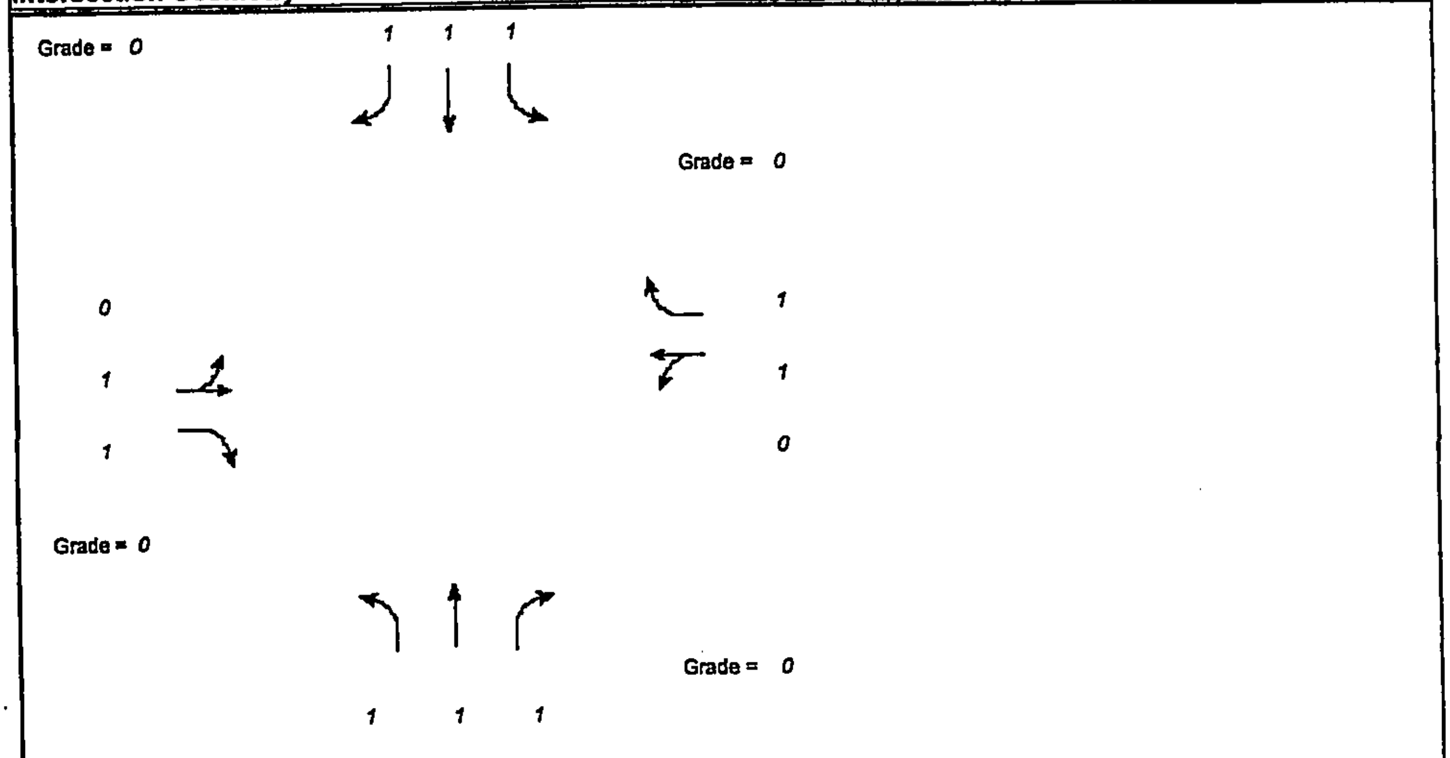
Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj. flow rate	288	260		7	423		39	384		164	440	
Lane group cap.	435	849		435	812		207	684		252	660	
v/c ratio	0.66	0.31		0.02	0.52		0.19	0.56		0.65	0.67	
Green ratio	0.24	0.24		0.24	0.24		0.36	0.36		0.36	0.36	
Unif. delay d1	28.4	25.8		24.0	27.3		18.2	21.2		22.1	22.3	
Delay factor k	0.50	0.50		0.50	0.50		0.50	0.50		0.50	0.50	
Increm. delay d2	7.7	0.9		0.1	2.4		2.0	3.3		12.3	5.3	
PF factor	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Control delay	36.2	26.7		24.1	29.7		20.2	24.5		34.5	27.6	
Lane group LOS	D	C		C	C		C	C		C	C	
Apprch. delay	31.7			29.6			24.1			29.4		
Approach LOS	C			C			C			C		
Intersec. delay	29.0			Intersection LOS						C		

INPUT WORKSHEET

General Information		Site Information	
Analyst	*Laurel Chun*	Intersection	*Haleakala/Kula*
Agency or Co.	*Parsons Brinckerhoff*	Area Type	*All other areas*
Date Performed	*5/31/2001*	Jurisdiction	*Maui*
Time Period	*AM Peak Hour*	Analysis Year	*Existing 2001*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	2	144	374	77	80	157	207	540	77	54	320	0
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	P	P	P	P	P	P	P	P	P	P	P	P
Startup lost time		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Ext. eff. green		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Arrival type		3	3		3	3	3	3	3	3	3	3
Ped volume	0			0			0			0		
Bicycle volume												
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr		0	0		0	0	0	0	0	0	0	0
Ped timing	0.0			0.0			3.0			0.0		

	EW Perm	02	03	04	Excl. Left	NS Perm	07	08
Timing	G = 15.0	G =	G =	G =	G = 10.0	G = 25.0	G =	G =
	Y = 4.0	Y =	Y =	Y =	Y = 3.0	Y = 4.0	Y =	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 63.0			

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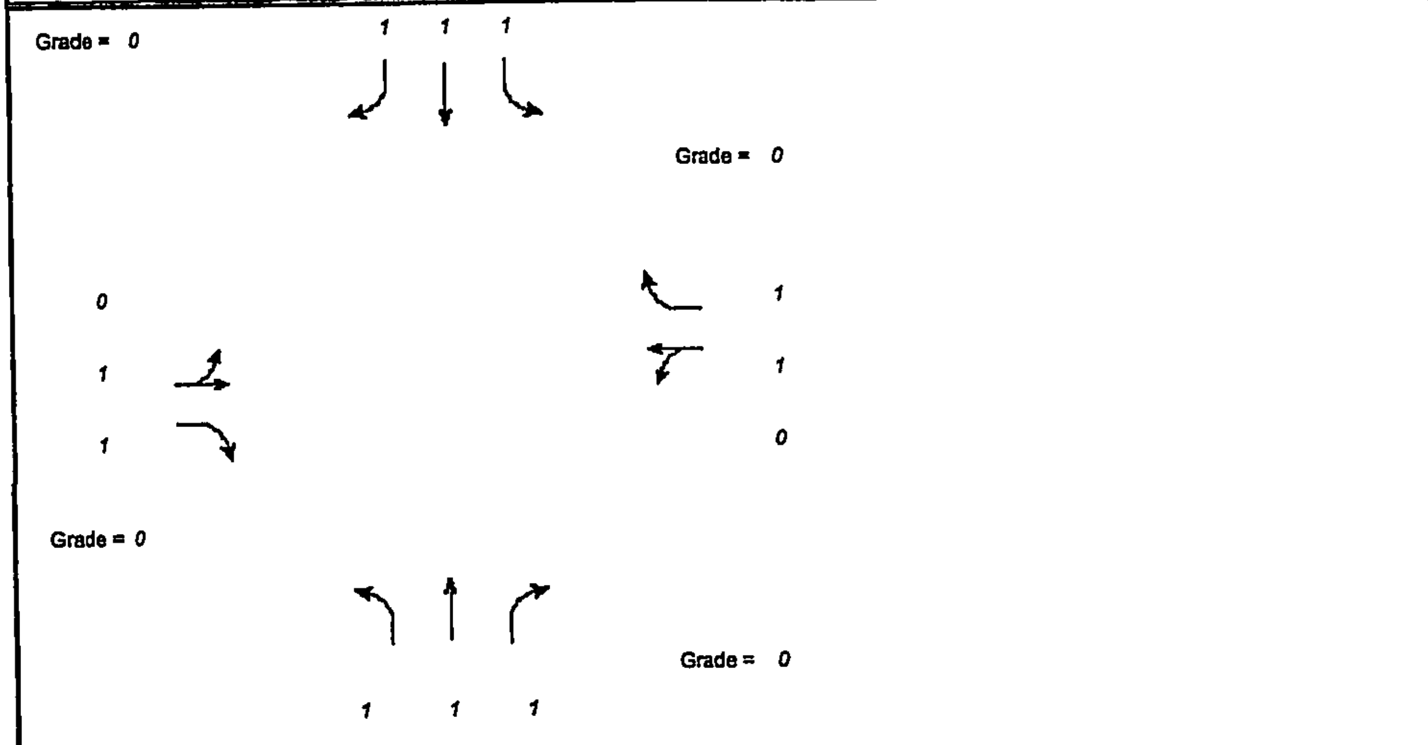
CAPACITY AND LOS WORKSHEET												
General Information												
Project Description	*MLP Upcountry Development-Existing Conditions (5/8/01)*											
Capacity Analysis												
	EB			WB			NB			SB		
Lane group		*LT*	*R*		*LT*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
Adj. flow rate		*162*	*416*		*175*	*174*	*230*	*600*	*86*	*60*	*356*	*0*
Satflow rate		*1893*	*1615*		*1141*	*1615*	*1805*	*1900*	*1615*	*1805*	*1900*	*1615*
Lost time		*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Green ratio		*0.24*	*0.48*		*0.24*	*0.48*	*0.60*	*0.40*	*0.40*	*0.60*	*0.40*	*0.40*
Lane group cap.		*451*	*769*		*272*	*769*	*606*	*754*	*641*	*435*	*754*	*641*
v/c ratio		*0.36*	*0.54*		*0.64*	*0.23*	*0.38*	*0.80*	*0.13*	*0.14*	*0.47*	*0.00*
Flow ratio		*0.09*	*0.26*		*0.15*	*0.11*		*0.32*	*0.05*		*0.19*	*0.00*
Crit. lane group		*N*	*N*		*Y*	*N*	*N*	*N*	*N*	*N*	*N*	*N*
Sum flow ratios	*0.60*											
Lost time/cycle	*15.00*											
Critical v/c ratio	*0.78*											
Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
Lane group		*LT*	*R*		*LT*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
Adj. flow rate		*162*	*416*		*175*	*174*	*230*	*600*	*86*	*60*	*356*	*0*
Lane group cap.		*451*	*769*		*272*	*769*	*606*	*754*	*641*	*435*	*754*	*641*
v/c ratio		*0.36*	*0.54*		*0.64*	*0.23*	*0.38*	*0.80*	*0.13*	*0.14*	*0.47*	*0.00*
Green ratio		*0.24*	*0.48*		*0.24*	*0.48*	*0.60*	*0.40*	*0.40*	*0.60*	*0.40*	*0.40*
Unif. delay d1		*20.0*	*11.6*		*21.6*	*9.7*	*6.6*	*16.7*	*12.1*	*8.2*	*14.1*	*11.5*
Delay factor k		*0.50*	*0.50*		*0.50*	*0.50*	*0.50*	*0.50*	*0.50*	*0.50*	*0.50*	*0.50*
Increm. delay d2		*2.2*	*2.7*		*11.2*	*0.7*	*1.8*	*8.5*	*0.4*	*0.7*	*2.1*	*0.0*
PF factor		*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Control delay		*22.2*	*14.4*		*32.8*	*10.4*	*8.4*	*25.3*	*12.5*	*8.9*	*16.2*	*11.5*
Lane group LOS		*C*	*B*		*C*	*B*	*A*	*C*	*B*	*A*	*B*	*B*
Apprch. delay	*16.6*			*21.6*			*19.8*			*15.2*		
Approach LOS	*B*			*C*			*B*			*B*		
Intersec. delay	*18.4*			Intersection LOS						*B*		

INPUT WORKSHEET

General Information		Site Information	
Analyst	*Laurel Chun*	Intersection	*Haleakala/Kula*
Agency or Co.	*Parsons Brinckerhoff*	Area Type	*All other areas*
Date Performed	*5/31/2001*	Jurisdiction	*Maui*
Time Period	*PM Peak Hour*	Analysis Year	*Existing 2001*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	4	68	214	36	54	80	174	303	24	62	289	3
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	P	P	P	P	P	P	P	P	P	P	P	P
Startup lost time		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Ext. eff. green		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Arrival type		3	3		3	3	3	3	3	3	3	3
Ped volume	0			0			0			0		
Bicycle volume												
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr		0	0		0	0	0	0	0	0	0	0
Ped timing	0.0			0.0			3.0			0.0		

	EW Perm	02	03	04	Excl. Left	NB Only	Thru & RT	08
Timing	G = 10.0	G =	G =	G =	G = 10.0	G = 10.0	G = 20.0	G =
	Y = 4.0	Y =	Y =	Y =	Y = 3.0	Y = 3.0	Y = 4.0	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 66.0			

CAPACITY AND LOS WORKSHEET

General Information

Project Description *MLP Upcountry Development-Existing Conditions (5/7/01)*

Capacity Analysis

	EB			WB			NB			SB		
Lane group		LT	R		LT	R	L	T	R	L	T	R
Adj. flow rate		80	238		100	89	193	337	27	69	321	3
Satflow rate		1868	1615		1496	1615	1805	1900	1615	1805	1900	1615
Lost time		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Green ratio		0.15	0.58		0.15	0.38	0.35	0.50	0.50	0.15	0.30	0.30
Lane group cap.		283	930		227	612	629	950	808	273	576	489
v/c ratio		0.28	0.26		0.44	0.15	0.31	0.35	0.03	0.25	0.56	0.01
Flow ratio		0.04	0.15		0.07	0.06	0.11	0.18	0.02	0.04	0.17	0.00
Crit. lane group		N	N		Y	N	Y	N	N	N	Y	N
Sum flow ratios	0.34											
Lost time/cycle	13.00											
Critical v/c ratio	0.43											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane group		LT	R		LT	R	L	T	R	L	T	R
Adj. flow rate		80	238		100	89	193	337	27	69	321	3
Lane group cap.		283	930		227	612	629	950	808	273	576	489
v/c ratio		0.28	0.26		0.44	0.15	0.31	0.35	0.03	0.25	0.56	0.01
Green ratio		0.15	0.58		0.15	0.38	0.35	0.50	0.50	0.15	0.30	0.30
Unif. delay d1		24.8	7.0		25.5	13.5	15.7	10.0	8.4	24.7	19.3	16.1
Delay factor k		0.50	0.50		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Increm. delay d2		2.5	0.7		6.1	0.5	1.3	1.0	0.1	2.2	3.9	0.0
PF factor		1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Control delay		27.3	7.6		31.6	14.0	16.9	11.1	8.5	26.9	23.1	16.1
Lane group LOS		C	A		C	B	B	B	A	C	C	B
Apprch. delay	12.6			23.3			13.0			23.8		
Approach LOS	B			C			B			C		
Intersec. delay	17.1			Intersection LOS						B		

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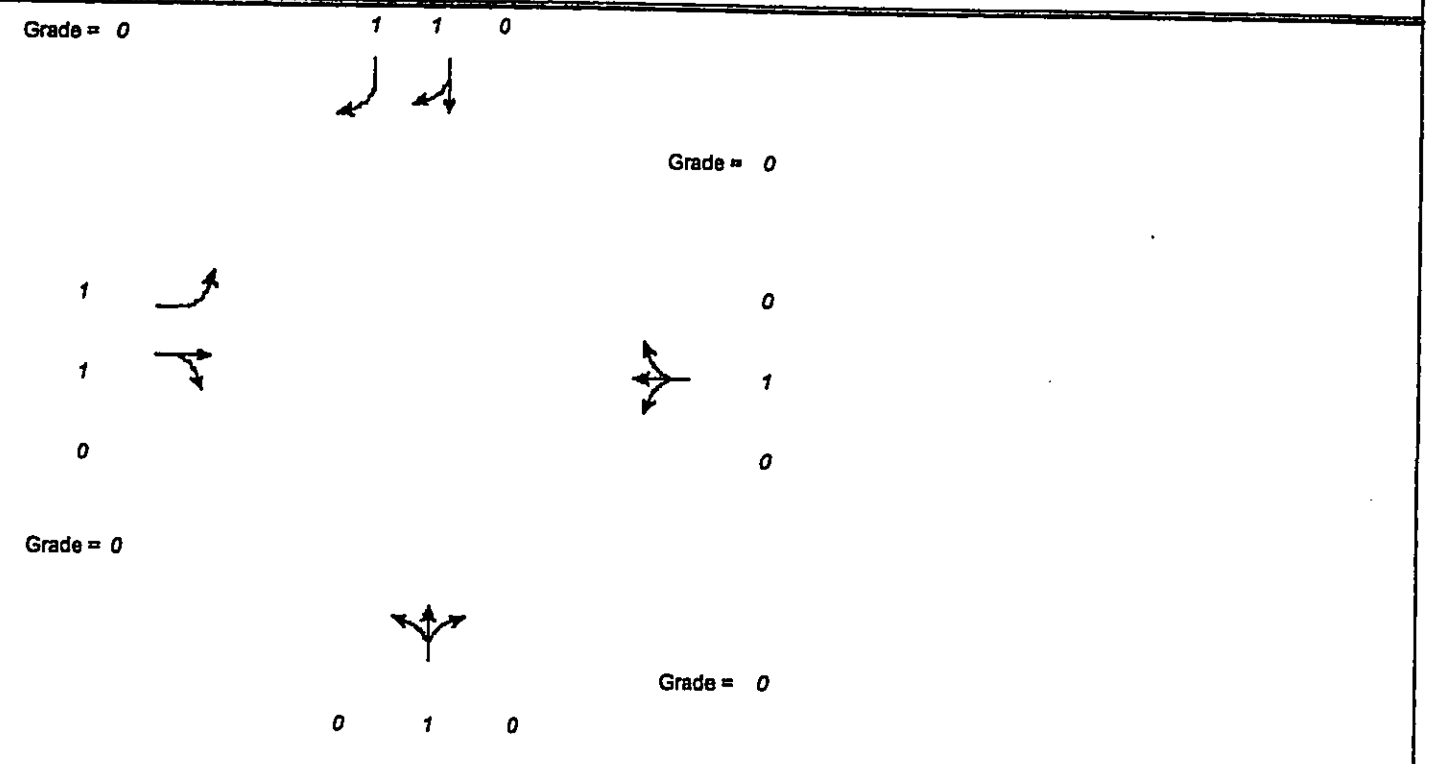
INPUT WORKSHEET

General Information		Site Information	
Analyst	*Laurel Chun*	Intersection	*Old Haleakala/Makawao*
Agency or Co.	*Parsons Brinckerhoff*	Area Type	*All other areas*
Date Performed	*5/31/2001*	Jurisdiction	*Maui*
Time Period	*AM Peak Hour*	Analysis Year	*Existing 2001*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	158	338	23	24	228	31	36	70	145	43	39	174
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time	2.0	2.0			2.0			2.0			2.0	2.0
Ext. eff. green	2.0	2.0			2.0			2.0			2.0	2.0
Arrival type	3	3			3			3			3	3
Ped volume		0			0			0			0	
Bicycle volume												
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr	0	0			0			0			0	0
Ped timing		0.0			0.0			3.0			0.0	

	EB Only	EW Perm	03	04	NS Perm	06	07	08
Timing	G = 10.0	G = 15.0	G =	G =	G = 15.0	G =	G =	G =
	Y = 3.0	Y = 4.0	Y =	Y =	Y = 4.0	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 53.0		

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CAPACITY AND LOS WORKSHEET

General Information

Project Description *MLP Upcountry Development-Existing Conditions (5/8/01)*

Capacity Analysis

	EB			WB			NB			SB		
Lane group	*L*	*TR*			*LTR*			*LTR*			*LT*	*R*
Adj. flow rate	*176*	*402*			*314*			*279*			*91*	*193*
Satflow rate	*1805*	*1882*			*1768*			*1656*			*1471*	*1615*
Lost time	*2.0*	*2.0*			*2.0*			*2.0*			*2.0*	*2.0*
Green ratio	*0.53*	*0.53*			*0.28*			*0.28*			*0.28*	*0.57*
Lane group cap.	*582*	*994*			*500*			*469*			*416*	*914*
v/c ratio	*0.30*	*0.40*			*0.63*			*0.59*			*0.22*	*0.21*
Flow ratio		*0.21*			*0.18*			*0.17*			*0.06*	*0.12*
Crit. lane group	*N*	*N*			*Y*			*Y*			*N*	*N*
Sum flow ratios	*0.44*											
Lost time/cycle	*15.00*											
Critical v/c ratio	*0.62*											

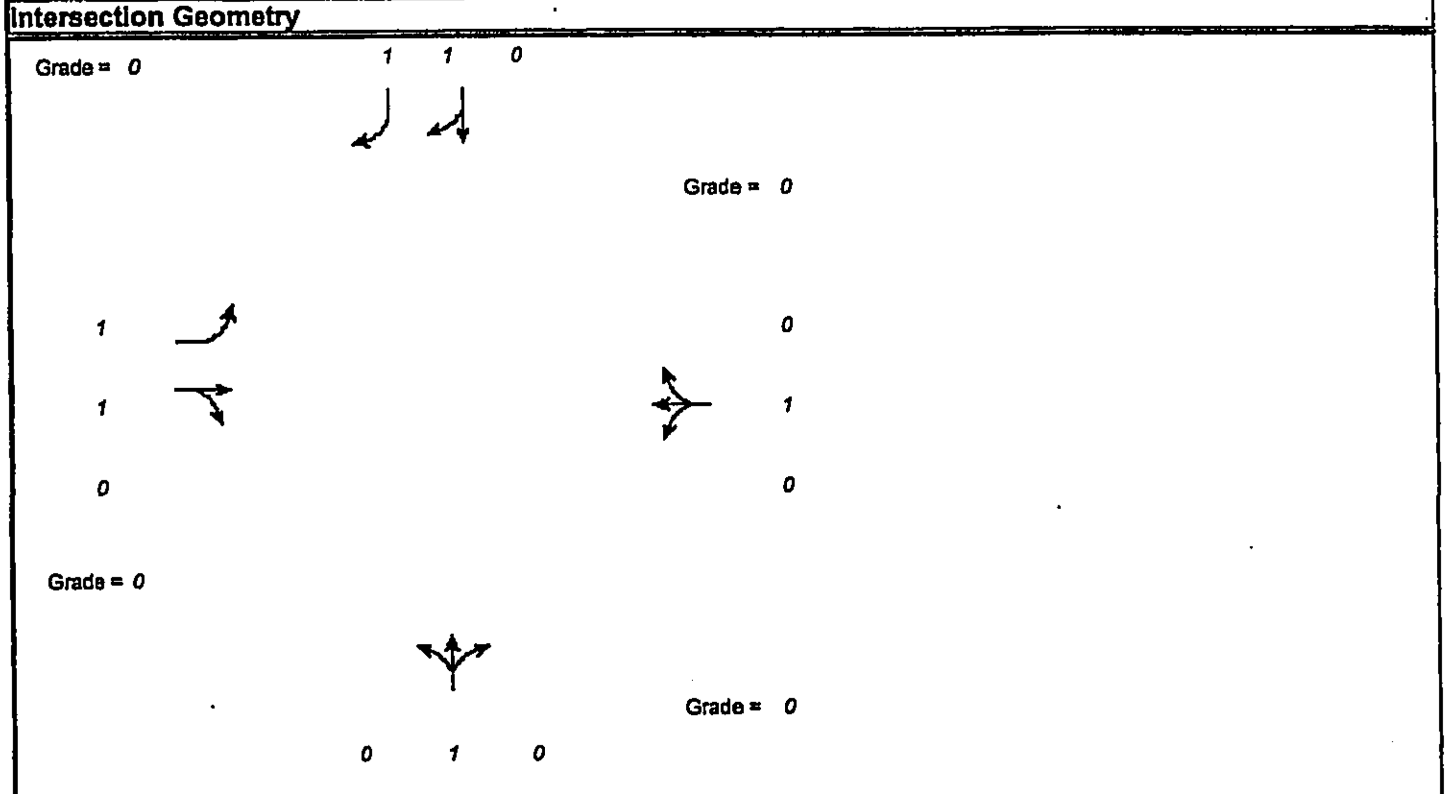
Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane group	*L*	*TR*			*LTR*			*LTR*			*LT*	*R*
Adj. flow rate	*176*	*402*			*314*			*279*			*91*	*193*
Lane group cap.	*582*	*994*			*500*			*469*			*416*	*914*
v/c ratio	*0.30*	*0.40*			*0.63*			*0.59*			*0.22*	*0.21*
Green ratio	*0.53*	*0.53*			*0.28*			*0.28*			*0.28*	*0.57*
Unif. delay d1	*7.8*	*7.5*			*16.6*			*16.4*			*14.5*	*5.7*
Delay factor k	*0.11*	*0.11*			*0.21*			*0.18*			*0.11*	*0.11*
Increm. delay d2	*0.3*	*0.3*			*2.5*			*2.1*			*0.3*	*0.1*
PF factor	*1.000*	*1.000*			*1.000*			*1.000*			*1.000*	*1.000*
Control delay	*8.1*	*7.8*			*19.1*			*18.4*			*14.8*	*5.8*
Lane group LOS	*A*	*A*			*B*			*B*			*B*	*A*
Apprch. delay	*7.9*			*19.1*			*18.4*			*8.7*		
Approach LOS	*A*			*B*			*B*			*A*		
Intersec. delay	*12.5*			Intersection LOS						*B*		

INPUT WORKSHEET

General Information		Site Information	
Analyst	Laurel Chun	Intersection	Old Haleakala/Makawao
Agency or Co.	Parsons Brinckerhoff	Area Type	All other areas
Date Performed	5/31/2001	Jurisdiction	Maui
Time Period	PM Peak Hour	Analysis Year	Existing 2001

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	297	222	29	33	186	42	12	56	32	52	60	263
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time	2.0	2.0			2.0			2.0			2.0	2.0
Ext. eff. green	2.0	2.0			2.0			2.0			2.0	2.0
Arrival type	3	3			3			3			3	3
Ped volume	0			0			0			0		
Bicycle volume												
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr	0	0			0			0			0	0
Ped timing	0.0			0.0			3.0			0.0		

	EB Only	EW Perm	03	04	NS Perm	06	07	08
Timing	G = 10.0	G = 10.0	G =	G =	G = 10.0	G =	G =	G =
	Y = 3.0	Y = 4.0	Y =	Y =	Y = 4.0	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 43.0			

CAPACITY AND LOS WORKSHEET												
General Information												
Project Description	*MLP Upcountry Development-Existing Condtiions (5/7/01)*											
Capacity Analysis												
	EB			WB			NB			SB		
Lane group	*L*	*TR*			*LTR*			*LTR*			*LT*	*R*
Adj. flow rate	*330*	*279*			*291*			*111*			*125*	*292*
Satflow rate	*1805*	*1867*			*1704*			*1733*			*1517*	*1615*
Lost time	*2.0*	*2.0*			*2.0*			*2.0*			*2.0*	*2.0*
Green ratio	*0.53*	*0.53*			*0.23*			*0.23*			*0.23*	*0.58*
Lane group cap.	*672*	*999*			*396*			*403*			*353*	*939*
v/c ratio	*0.49*	*0.28*			*0.73*			*0.28*			*0.35*	*0.31*
Flow ratio		*0.15*			*0.17*			*0.06*			*0.08*	*0.18*
Crit. lane group	*N*	*N*			*Y*			*N*			*Y*	*N*
Sum flow ratios	*0.44*											
Lost time/cycle	*15.00*											
Critical v/c ratio	*0.67*											
Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
Lane group	*L*	*TR*			*LTR*			*LTR*			*LT*	*R*
Adj. flow rate	*330*	*279*			*291*			*111*			*125*	*292*
Lane group cap.	*672*	*999*			*396*			*403*			*353*	*939*
v/c ratio	*0.49*	*0.28*			*0.73*			*0.28*			*0.35*	*0.31*
Green ratio	*0.53*	*0.53*			*0.23*			*0.23*			*0.23*	*0.58*
Unif. delay d1	*6.6*	*5.5*			*15.3*			*13.5*			*13.8*	*4.6*
Delay factor k	*0.11*	*0.11*			*0.29*			*0.11*			*0.11*	*0.11*
Increm. delay d2	*0.6*	*0.2*			*7.0*			*0.4*			*0.6*	*0.2*
PF factor	*1.000*	*1.000*			*1.000*			*1.000*			*1.000*	*1.000*
Control delay	*7.1*	*5.6*			*22.3*			*13.9*			*14.4*	*4.8*
Lane group LOS	*A*	*A*			*C*			*B*			*B*	*A*
Apprch. delay	*6.4*			*22.3*			*13.9*			*7.7*		
Approach LOS	*A*			*C*			*B*			*A*		
Intersec. delay	*10.6*			Intersection LOS						*B*		

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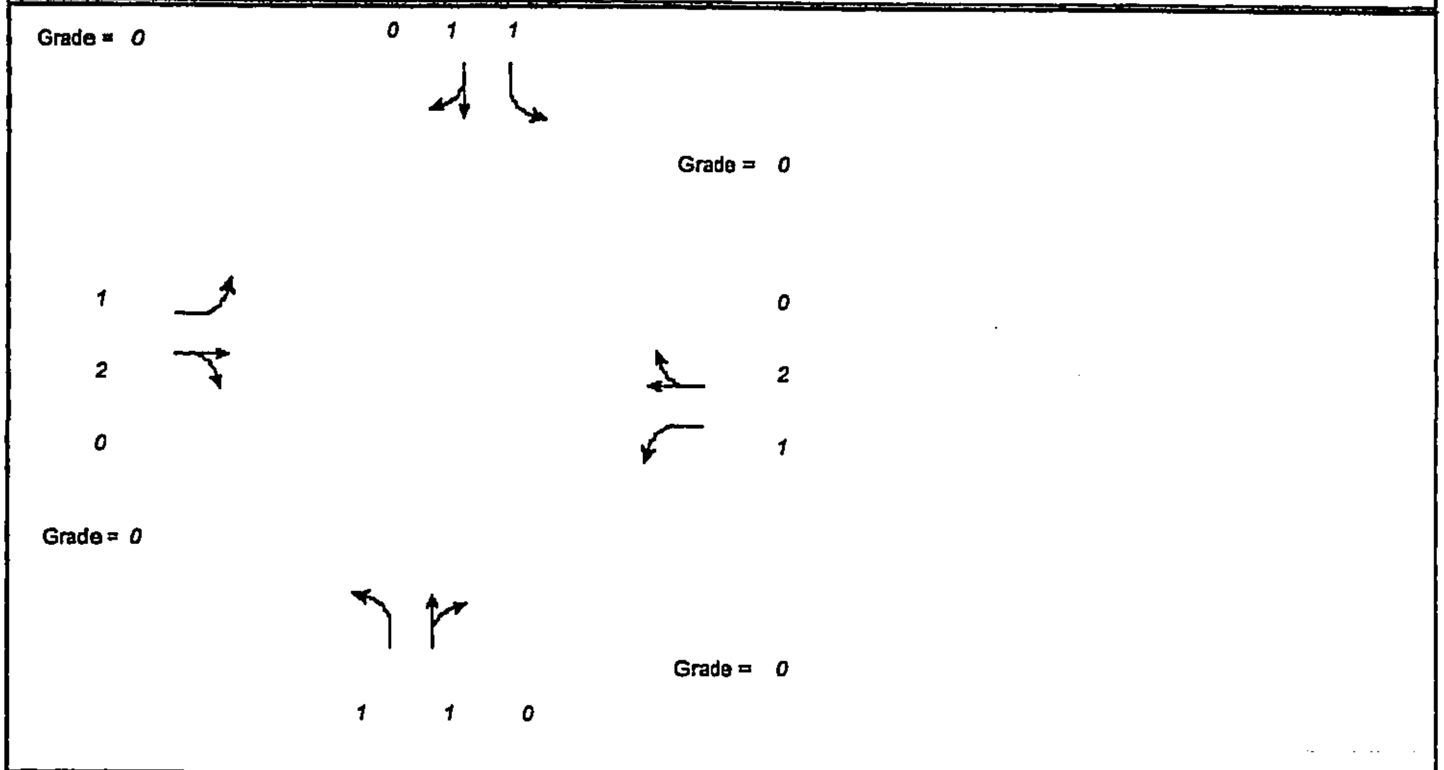
INPUT WORKSHEET

General Information		Site Information	
Analyst	Ryan Yoshimura	Intersection	Haleakala/Makawao
Agency or Co.	Parsons Brinckerhoff	Area Type	All other areas
Date Performed	7/10/2003	Jurisdiction	Maui
Time Period	AM Peak Hour	Analysis Year	2006 w/o Project

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	68	97	16	4	547	213	34	214	8	319	266	303
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	P	P	P	P	P	P	P	P	P	P	P	P
Startup lost time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ext. eff. green	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Arrival type	3	3		3	3		3	3		3	3	
Ped volume		0			0			0			0	
Bicycle volume		0			0			0				
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr	0	0		0	0		0	0		0	0	
Ped timing		0.0			0.0			3.0			0.0	

	Excl. Left	Thru & RT	03	04	NS Perm	06	07	08
Timing	G = 10.0	G = 24.0	G =	G =	G = 40.0	G =	G =	G =
	Y = 3.0	Y = 3.0	Y =	Y =	Y = 4.0	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 85.0			

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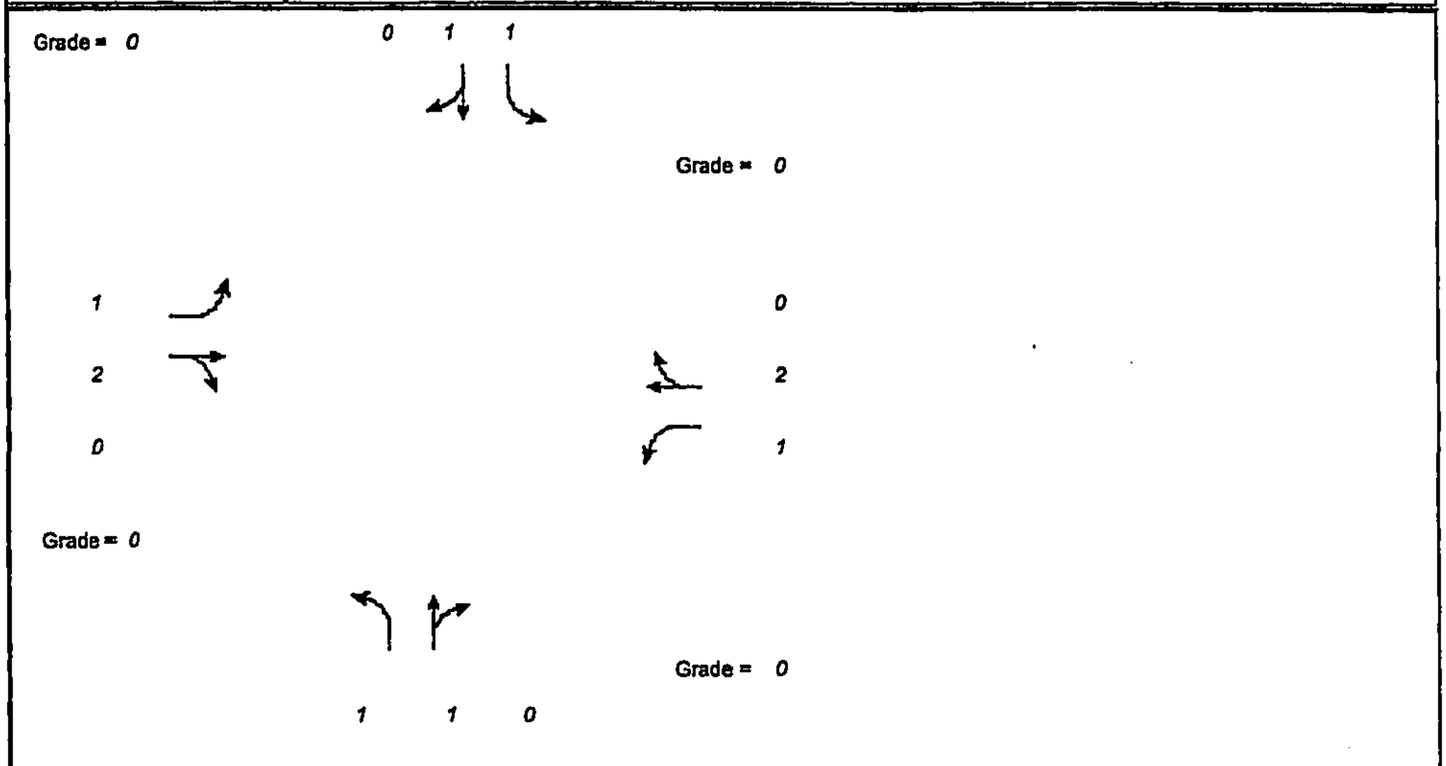
CAPACITY AND LOS WORKSHEET												
General Information												
Project Description	*MLP Upcountry - Projected Year 2006 Without Project*											
Capacity Analysis												
	EB			WB			NB			SB		
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj. flow rate	76	126		4	845		38	247		354	633	
Satflow rate	1805	3533		1805	3458		415	1890		1089	1748	
Lost time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Green ratio	0.12	0.28		0.12	0.28		0.47	0.47		0.47	0.47	
Lane group cap.	212	998		212	976		195	889		512	823	
v/c ratio	0.36	0.13		0.02	0.87		0.19	0.28		0.69	0.77	
Flow ratio	0.04	0.04		0.00	0.24		0.09	0.13		0.33	0.36	
Crit. lane group	Y	N		N	Y		N	N		N	Y	
Sum flow ratios	0.65											
Lost time/cycle	11.00											
Critical v/c ratio	0.75											

Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj. flow rate	76	126		4	845		38	247		354	633	
Lane group cap.	212	998		212	976		195	889		512	823	
v/c ratio	0.36	0.13		0.02	0.87		0.19	0.28		0.69	0.77	
Green ratio	0.12	0.28		0.12	0.28		0.47	0.47		0.47	0.47	
Unif. delay d1	34.5	22.7		33.2	29.0		13.1	13.7		17.7	18.7	
Delay factor k	0.50	0.50		0.50	0.50		0.50	0.50		0.50	0.50	
Increm. delay d2	4.7	0.3		0.2	10.2		2.2	0.8		7.5	6.8	
PF factor	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Control delay	39.2	23.0		33.3	39.2		15.3	14.5		25.1	25.5	
Lane group LOS	D	C		C	D		B	B		C	C	
Apprch. delay	29.1			39.1			14.6			25.4		
Approach LOS	C			D			B			C		
Intersec. delay	29.4			Intersection LOS						C		

INPUT WORKSHEET

General Information		Site Information	
Analyst	*Ryan Yoshimura*	Intersection	*Haleakala/Makawao*
Agency or Co.	*Parsons Brinckerhoff*	Area Type	*All other areas*
Date Performed	*7/10/03*	Jurisdiction	*Maui*
Time Period	*PM Peak Hour*	Analysis Year	*2006 Without*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	272	216	40	6	222	188	37	353	11	157	310	106
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	A	A	A	A	A	A	P	P	P	P	P	P
Startup lost time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ext. eff. green	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Arrival type	3	3		3	3		3	3		3	3	
Ped volume		0			0			0			0	
Bicycle volume		0			0			0				
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr	0	0		0	0		0	0		0	0	
Ped timing		0.0			0.0			3.0			0.0	

	Excl. Left	EB Only	Thru & RT	04	NS Perm	06	07	08
Timing	G = 8.0	G = 9.0	G = 15.0	G =	G = 30.0	G =	G =	G =
	Y = 3.0	Y = 3.0	Y = 4.0	Y =	Y = 4.0	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 78.0			

CAPACITY AND LOS WORKSHEET

General Information

Project Description *MLP Upcountry Development-Projected Year 2006 Without Dev.*

Capacity Analysis

	EB			WB			NB			SB		
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj. flow rate	302	284		7	456		41	404		174	462	
Satflow rate	1805	3526		1805	3362		580	1892		701	1827	
Lost time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Green ratio	0.26	0.35		0.10	0.19		0.38	0.38		0.38	0.38	
Lane group cap.	463	1221		185	647		223	728		270	703	
v/c ratio	0.65	0.23		0.04	0.70		0.18	0.55		0.64	0.66	
Flow ratio	0.17	0.08		0.00	0.14		0.07	0.21		0.25	0.25	
Crit. lane group	Y	N		N	Y		N	N		N	Y	
Sum flow ratios	0.56											
Lost time/cycle	13.00											
Critical v/c ratio	0.67											

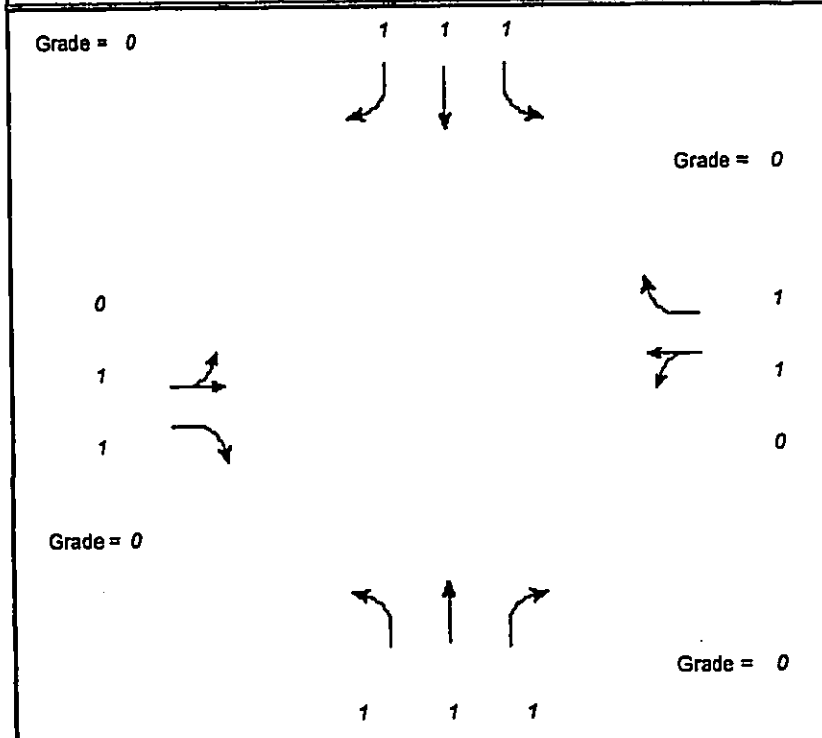
Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj. flow rate	302	284		7	456		41	404		174	462	
Lane group cap.	463	1221		185	647		223	728		270	703	
v/c ratio	0.65	0.23		0.04	0.70		0.18	0.55		0.64	0.66	
Green ratio	0.26	0.35		0.10	0.19		0.38	0.38		0.38	0.38	
Unif. delay d1	25.9	18.1		31.5	29.4		15.9	18.8		19.6	19.8	
Delay factor k	0.23	0.11		0.11	0.27		0.50	0.50		0.50	0.50	
Increm. delay d2	3.3	0.1		0.1	3.5		1.8	3.0		11.3	4.8	
PF factor	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Control delay	29.2	18.2		31.6	32.9		17.7	21.8		30.9	24.5	
Lane group LOS	C	B		C	C		B	C		C	C	
Apprch. delay	23.9			32.9			21.4			26.3		
Approach LOS	C			C			C			C		
Intersec. delay	26.0			Intersection LOS						C		

INPUT WORKSHEET

General Information		Site Information	
Analyst	Ryan Yoshimura	Intersection	Haleakala/Kula
Agency or Co.	Parsons Brinckerhoff	Area Type	All other areas
Date Performed	7/10/03	Jurisdiction	Maui
Time Period	AM Peak Hour	Analysis Year	2006 Without

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	2	151	423	81	84	165	221	599	81	57	367	0
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Ext. eff. green		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Arrival type		3	3		3	3	3	3	3	3	3	3
Ped volume		0			0			0			0	
Bicycle volume												
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr		0	0		0	0	0	0	0	0	0	0
Ped timing		0.0			0.0			3.0			0.0	

	EW Perm	02	03	04	Excl. Left	NB Only	Thru & RT	08
Timing	G = 22.0	G =	G =	G =	G = 12.0	G = 10.0	G = 25.0	G =
	Y = 4.0	Y =	Y =	Y =	Y = 3.0	Y = 3.0	Y = 4.0	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 85.0			

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CAPACITY AND LOS WORKSHEET

General Information

Project Description *MLP Upcountry Development-Projected Year 2006 Without Dev.*

Capacity Analysis

	EB			WB			NB			SB		
Lane group		LT	R		LT	R	L	T	R	L	T	R
Adj. flow rate		170	470		183	183	246	666	90	63	408	0
Satflow rate		1895	1615		1135	1615	1805	1900	1615	1805	1900	1615
Lost time		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Green ratio		0.26	0.61		0.26	0.46	0.29	0.45	0.45	0.14	0.29	0.29
Lane group cap.		490	988		294	741	531	849	722	255	559	475
v/c ratio		0.35	0.48		0.62	0.25	0.46	0.78	0.12	0.25	0.73	0.00
Flow ratio		0.09	0.29		0.16	0.11	0.14	0.35	0.06	0.03	0.21	0.00
Crit. lane group		N	N		Y	N	N	Y	N	Y	N	N
Sum flow ratios	0.55											
Lost time/cycle	13.00											
Critical v/c ratio	0.65											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane group		LT	R		LT	R	L	T	R	L	T	R
Adj. flow rate		170	470		183	183	246	666	90	63	408	0
Lane group cap.		490	988		294	741	531	849	722	255	559	475
v/c ratio		0.35	0.48		0.62	0.25	0.46	0.78	0.12	0.25	0.73	0.00
Green ratio		0.26	0.61		0.26	0.46	0.29	0.45	0.45	0.14	0.29	0.29
Unif. delay d1		25.7	9.0		27.8	14.0	24.5	20.0	13.8	32.5	27.0	21.2
Delay factor k		0.11	0.11		0.21	0.11	0.11	0.33	0.11	0.11	0.29	0.11
Increm. delay d2		0.4	0.4		4.1	0.2	0.6	4.9	0.1	0.5	4.8	0.0
PF factor		1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Control delay		26.1	9.4		31.9	14.2	25.2	24.9	13.8	33.0	31.8	21.2
Lane group LOS		C	A		C	B	C	C	B	C	C	C
Apprch. delay	13.8			23.0			24.0			32.0		
Approach LOS	B			C			C			C		
Intersec. delay	22.7			Intersection LOS						C		

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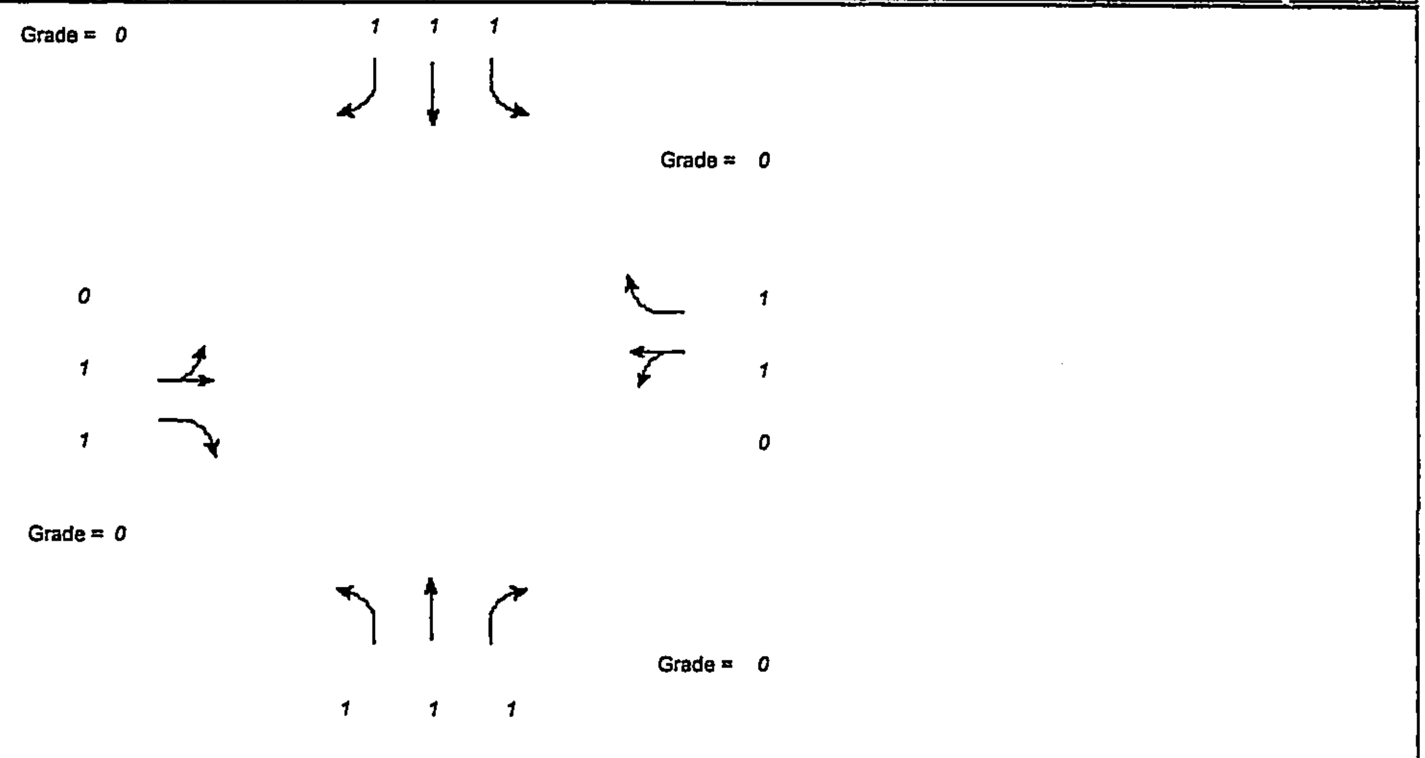
INPUT WORKSHEET

General Information		Site Information	
Analyst	*Ryan Yoshimura*	Intersection	*Haleakala/Kula*
Agency or Co.	*Parsons Brinckerhoff*	Area Type	*All other areas*
Date Performed	*7/10/03*	Jurisdiction	*Maui*
Time Period	*PM Peak Hour*	Analysis Year	*2006 Without*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	4	71	226	38	57	84	191	327	25	65	315	3
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Ext. eff. green		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Arrival type		3	3		3	3	3	3	3	3	3	3
Ped volume		0			0			0			0	
Bicycle volume												
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr		0	0		0	0	0	0	0	0	0	0
Ped timing		0.0			0.0			3.0			0.0	

	EW Perm	02	03	04	Excl. Left	NB Only	Thru & RT	08
Timing	G = 16.0	G =	G =	G =	G = 11.0	G = 10.0	G = 25.0	G =
	Y = 4.0	Y =	Y =	Y =	Y = 3.0	Y = 3.0	Y = 4.0	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 78.0			

CAPACITY AND LOS WORKSHEET

General Information

Project Description *MLP Upcountry Development-Projected Year 2006 Without Dev.*

Capacity Analysis

	EB			WB			NB			SB		
Lane group		LT	R		LT	R	L	T	R	L	T	R
Adj. flow rate		83	251		105	93	212	363	28	72	350	3
Satflow rate		1877	1615		1624	1615	1805	1900	1615	1805	1900	1615
Lost time		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Green ratio		0.21	0.58		0.21	0.41	0.31	0.49	0.49	0.14	0.32	0.32
Lane group cap.		385	932		333	663	555	926	787	255	609	518
v/c ratio		0.22	0.27		0.32	0.14	0.38	0.39	0.04	0.28	0.57	0.01
Flow ratio		0.04	0.16		0.06	0.06	0.12	0.19	0.02	0.04	0.18	0.00
Crit. lane group		N	N		Y	N	Y	N	N	N	Y	N
Sum flow ratios	0.37											
Lost time/cycle	13.00											
Critical v/c ratio	0.44											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane group		LT	R		LT	R	L	T	R	L	T	R
Adj. flow rate		83	251		105	93	212	363	28	72	350	3
Lane group cap.		385	932		333	663	555	926	787	255	609	518
v/c ratio		0.22	0.27		0.32	0.14	0.38	0.39	0.04	0.28	0.57	0.01
Green ratio		0.21	0.58		0.21	0.41	0.31	0.49	0.49	0.14	0.32	0.32
Unif. delay d1		25.8	8.3		26.3	14.4	21.2	12.7	10.4	30.0	22.1	18.0
Delay factor k		0.11	0.11		0.11	0.11	0.11	0.11	0.11	0.11	0.17	0.11
Increm. delay d2		0.3	0.2		0.5	0.1	0.4	0.3	0.0	0.6	1.3	0.0
PF factor		1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Control delay		26.1	8.4		26.9	14.5	21.6	13.0	10.5	30.6	23.4	18.0
Lane group LOS		C	A		C	B	C	B	B	C	C	B
Apprch. delay	12.8			21.1			15.9			24.6		
Approach LOS	B			C			B			C		
Intersec. delay	18.3			Intersection LOS						B		

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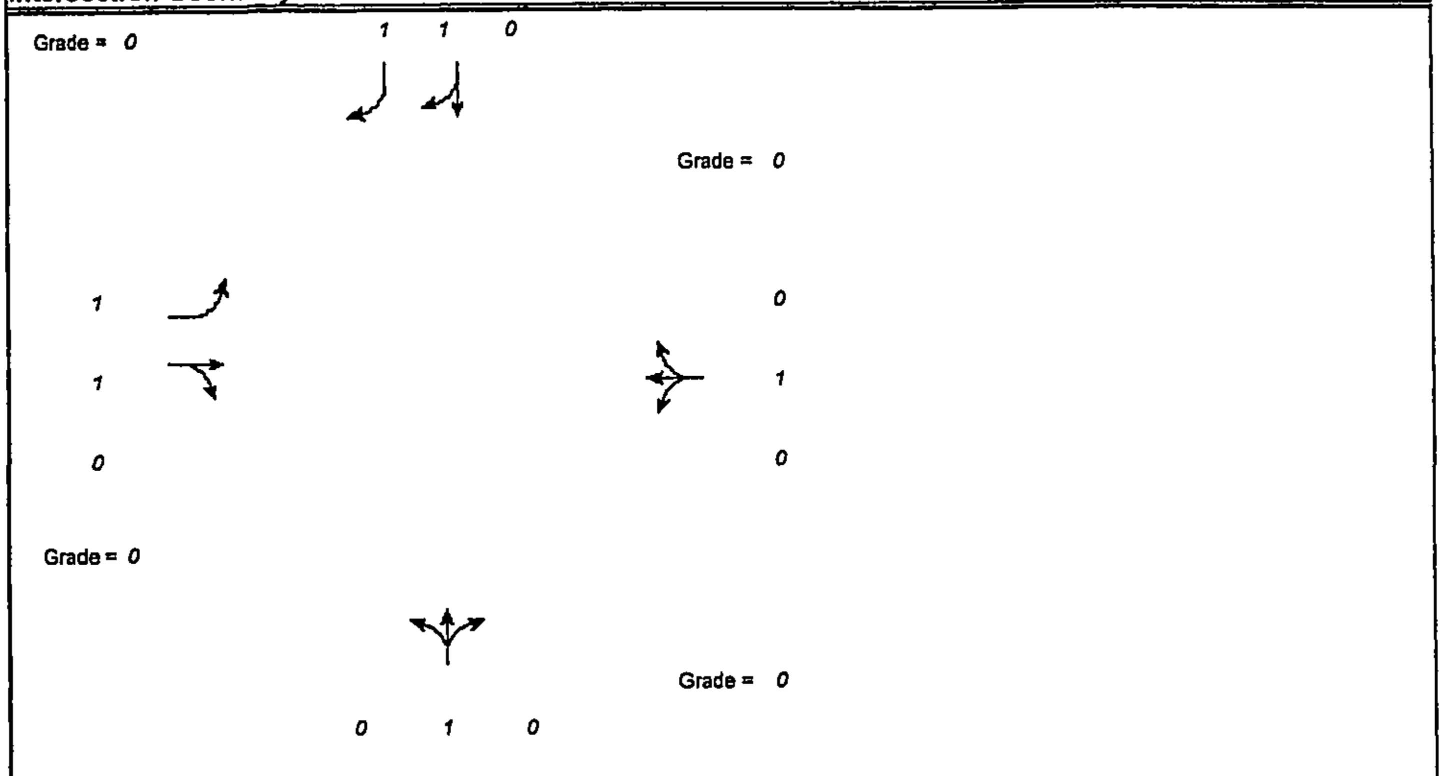
INPUT WORKSHEET

General Information		Site Information	
Analyst	Ryan Yoshimura	Intersection	Old Haleakala/Makawao
Agency or Co.	Parsons Brinckerhoff	Area Type	All other areas
Date Performed	7/10/03	Jurisdiction	Maui
Time Period	AM Peak Hour	Analysis Year	2006 Without

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	166	385	24	25	243	33	38	74	152	45	41	183
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time	2.0	2.0			2.0			2.0			2.0	2.0
Ext. eff. green	2.0	2.0			2.0			2.0			2.0	2.0
Arrival type	3	3			3			3			3	3
Ped volume		0			0			0			0	
Bicycle volume												
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr	0	0			0			0			0	0
Ped timing		0.0			0.0			3.0			0.0	

	EB Only	EW Perm	03	04	NS Perm	06	07	08
Timing	G = 10.0	G = 15.0	G =	G =	G = 15.0	G =	G =	G =
	Y = 3.0	Y = 4.0	Y =	Y =	Y = 4.0	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 53.0			

CAPACITY AND LOS WORKSHEET

General Information

Project Description *MLP Upcountry Development-Projected Year 2006 Without Dev.*

Capacity Analysis

	EB			WB			NB			SB		
Lane group	L	TR			LTR			LTR			LT	R
Adj. flow rate	184	455			335			293			96	203
Satflow rate	1805	1883			1759			1654			1441	1615
Lost time	2.0	2.0			2.0			2.0			2.0	2.0
Green ratio	0.53	0.53			0.28			0.28			0.28	0.57
Lane group cap.	568	995			498			468			408	914
v/c ratio	0.32	0.46			0.67			0.63			0.24	0.22
Flow ratio		0.24			0.19			0.18			0.07	0.13
Crit. lane group	N	N			Y			Y			N	N
Sum flow ratios	0.47											
Lost time/cycle	15.00											
Critical v/c ratio	0.65											

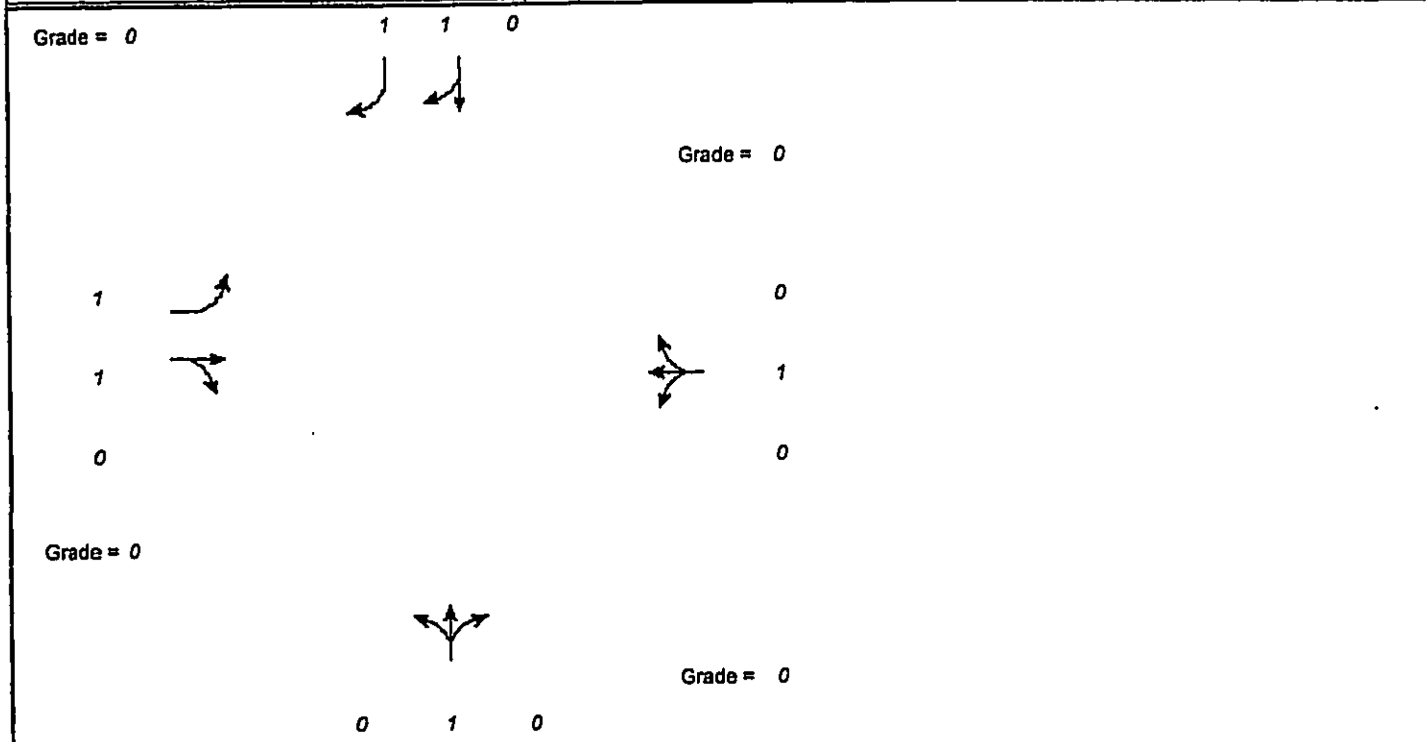
Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane group	L	TR			LTR			LTR			LT	R
Adj. flow rate	184	455			335			293			96	203
Lane group cap.	568	995			498			468			408	914
v/c ratio	0.32	0.46			0.67			0.63			0.24	0.22
Green ratio	0.53	0.53			0.28			0.28			0.28	0.57
Unif. delay d1	8.0	7.8			16.8			16.6			14.6	5.7
Delay factor k	0.11	0.11			0.24			0.21			0.11	0.11
Increm. delay d2	0.3	0.3			3.5			2.6			0.3	0.1
PF factor	1.000	1.000			1.000			1.000			1.000	1.000
Control delay	8.3	8.1			20.4			19.2			14.9	5.8
Lane group LOS	A	A			C			B			B	A
Apprch. delay	8.2			20.4			19.2			8.7		
Approach LOS	A			C			B			A		
Intersec. delay	13.0			Intersection LOS						B		

INPUT WORKSHEET

General Information		Site Information	
Analyst	Ryan Yoshimura	Intersection	Old Haleakala/Makawao
Agency or Co.	Parsons Brinckerhoff	Area Type	All other areas
Date Performed	7/10/03	Jurisdiction	Maui
Time Period	PM Peak Hour	Analysis Year	2006 Without Project 2

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	312	234	30	35	203	44	13	59	34	55	63	276
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time	2.0	2.0			2.0			2.0			2.0	2.0
Ext. eff. green	2.0	2.0			2.0			2.0			2.0	2.0
Arrival type	3	3			3			3			3	3
Ped volume	0			0			0			0		
Bicycle volume												
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr	0	0			0			0			0	0
Ped timing	0.0			0.0			3.0			0.0		

	EB Only	EW Perm	03	04	NS Perm	06	07	08
Timing	G = 10.0	G = 15.0	G =	G =	G = 15.0	G =	G =	G =
	Y = 3.0	Y = 4.0	Y =	Y =	Y = 4.0	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 53.0			

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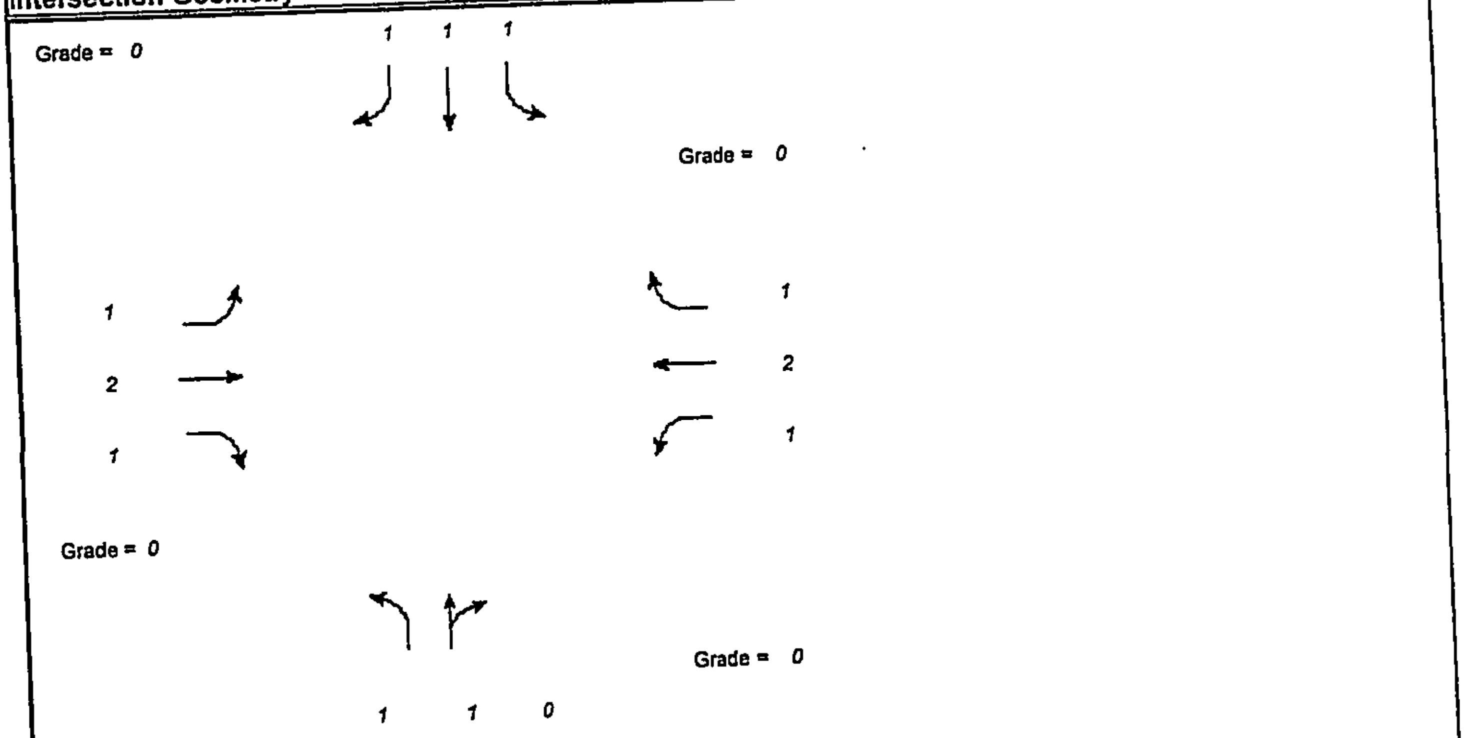
CAPACITY AND LOS WORKSHEET											
General Information											
Project Description *MLP Upcountry Development-Projected Year 2006 Without Dev. 2*											
Capacity Analysis											
	EB			WB			NB			SB	
Lane group	*L*	*TR*			*LTR*			*LTR*			*LT*	*R*
Adj. flow rate	*347*	*293*			*314*			*118*			*131*	*307*
Satflow rate	*1805*	*1868*			*1725*			*1746*			*1552*	*1615*
Lost time	*2.0*	*2.0*			*2.0*			*2.0*			*2.0*	*2.0*
Green ratio	*0.53*	*0.53*			*0.28*			*0.28*			*0.28*	*0.57*
Lane group cap.	*590*	*987*			*488*			*494*			*439*	*914*
v/c ratio	*0.59*	*0.30*			*0.64*			*0.24*			*0.30*	*0.34*
Flow ratio		*0.16*			*0.18*			*0.07*			*0.08*	*0.19*
Crit. lane group	*N*	*N*			*Y*			*N*			*Y*	*N*
Sum flow ratios	*0.46*											
Lost time/cycle	*15.00*											
Critical v/c ratio	*0.64*											
Lane Group Capacity, Control Delay, and LOS Determination											
	EB			WB			NB			SB	
Lane group	*L*	*TR*			*LTR*			*LTR*			*LT*	*R*
Adj. flow rate	*347*	*293*			*314*			*118*			*131*	*307*
Lane group cap.	*590*	*987*			*488*			*494*			*439*	*914*
v/c ratio	*0.59*	*0.30*			*0.64*			*0.24*			*0.30*	*0.34*
Green ratio	*0.53*	*0.53*			*0.28*			*0.28*			*0.28*	*0.57*
Unif. delay d1	*8.7*	*7.0*			*16.7*			*14.6*			*14.9*	*6.2*
Delay factor k	*0.18*	*0.11*			*0.22*			*0.11*			*0.11*	*0.11*
Increm. delay d2	*1.5*	*0.2*			*2.9*			*0.3*			*0.4*	*0.2*
PF factor	*1.000*	*1.000*			*1.000*			*1.000*			*1.000*	*1.000*
Control delay	*10.3*	*7.2*			*19.6*			*14.9*			*15.3*	*6.4*
Lane group LOS	*B*	*A*			*B*			*B*			*B*	*A*
Apprch. delay	*8.8*			*19.6*			*14.9*			*9.0*	
Approach LOS	*A*			*B*			*B*			*A*	
Intersec. delay	*11.6*			Intersection LOS						*B*	

INPUT WORKSHEET

General Information		Site Information	
Analyst	*Ryan Yoshimura*	Intersection	*Haleakala/Makawao*
Agency or Co.	*Parsons Brinckerhoff*	Area Type	*All other areas*
Date Performed	*7/10/2003*	Jurisdiction	*Maui*
Time Period	*AM Peak Hour*	Analysis Year	*2006 with Project*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	68	125	63	4	547	213	39	242	8	323	328	303
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Ext. eff. green	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Arrival type	3	3	3	3	3	3	3	3		3	3	3
Ped volume	0			0			0			0		
Bicycle volume	0			0			0					
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr	0	0	0	0	0	0	0	0		0	0	0
Ped timing	0.0			0.0			3.0			0.0		

	Excl. Left	Thru & RT	03	04	Excl. Left	NS Perm	07	08
Timing	G = 9.0	G = 23.0	G =	G =	G = 9.0	G = 25.0	G =	G =
	Y = 3.0	Y = 4.0	Y =	Y =	Y = 3.0	Y = 4.0	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 82.0		

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CAPACITY AND LOS WORKSHEET

General Information

Project Description *MLP Upcountry - Projected Year 2006 With Project*

Capacity Analysis

	EB			WB			NB			SB		
Lane group	L	T	R	L	T	R	L	TR		L	T	R
Adj. flow rate	76	139	70	4	608	237	43	278		359	364	337
Satflow rate	1805	3610	1615	1805	3610	1615	1805	1891		1805	1900	1615
Lost time	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Green ratio	0.11	0.28	0.45	0.11	0.28	0.45	0.45	0.30		0.45	0.30	0.48
Lane group cap.	198	1013	729	198	1013	729	378	577		446	579	768
v/c ratio	0.38	0.14	0.10	0.02	0.60	0.33	0.11	0.48		0.80	0.63	0.44
Flow ratio	0.04	0.04	0.04	0.00	0.17	0.15		0.15			0.19	0.21
Crit. lane group	Y	N	N	N	Y	N	N	N		N	N	N
Sum flow ratios												
Lost time/cycle	13.00											
Critical v/c ratio												

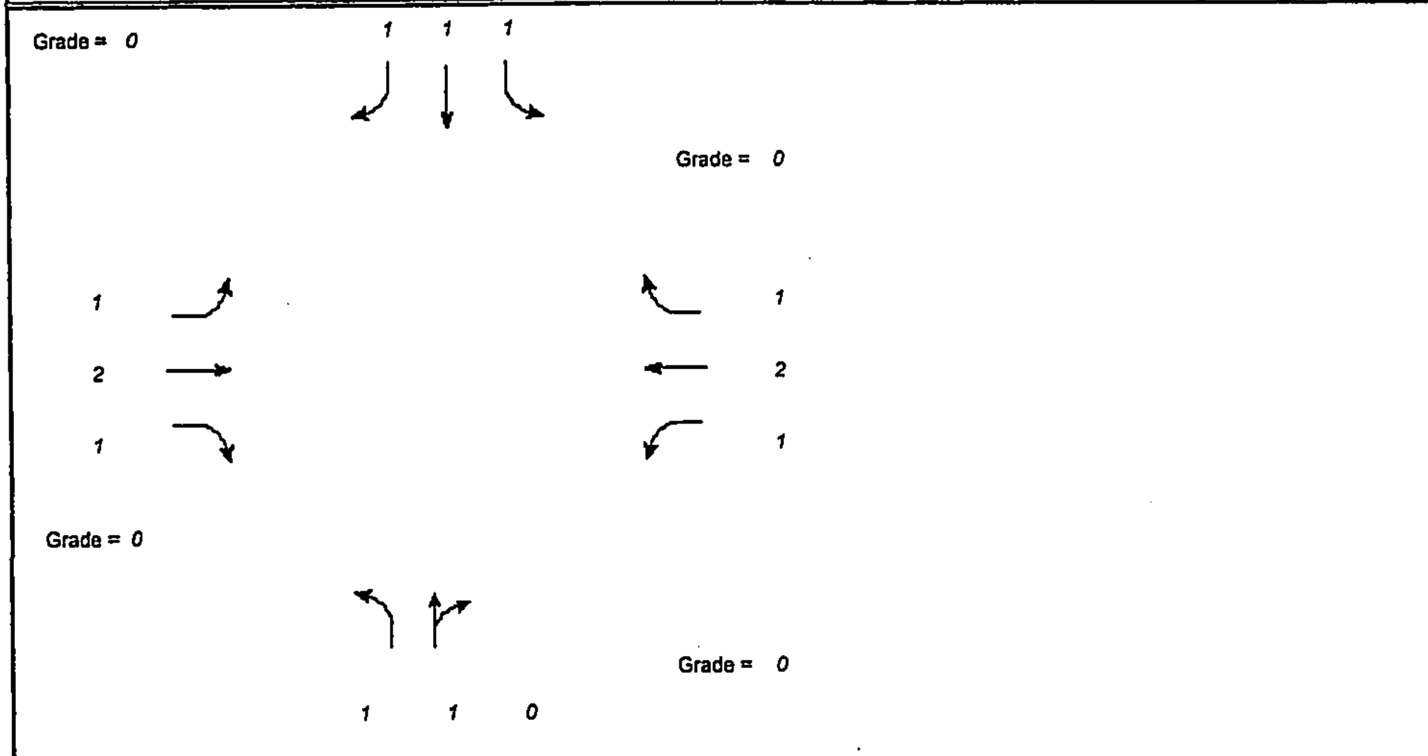
Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane group	L	T	R	L	T	R	L	TR		L	T	R
Adj. flow rate	76	139	70	4	608	237	43	278		359	364	337
Lane group cap.	198	1013	729	198	1013	729	378	577		446	579	768
v/c ratio	0.38	0.14	0.10	0.02	0.60	0.33	0.11	0.48		0.80	0.63	0.44
Green ratio	0.11	0.28	0.45	0.11	0.28	0.45	0.45	0.30		0.45	0.30	0.48
Unif. delay d1	33.9	22.1	12.9	32.6	25.5	14.5	14.0	23.2		21.2	24.5	14.2
Delay factor k	0.11	0.11	0.11	0.11	0.19	0.11	0.11	0.11		0.35	0.21	0.11
Increm. delay d2	1.2	0.1	0.1	0.0	1.0	0.3	0.1	0.6		10.4	2.2	0.4
PF factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000
Control delay	35.2	22.1	13.0	32.6	26.5	14.7	14.1	23.9		31.6	26.7	14.7
Lane group LOS	D	C	B	C	C	B	B	C		C	C	B
Apprch. delay	23.4			23.3			22.6			24.5		
Approach LOS	C			C			C			C		
Intersec. delay	23.7			Intersection LOS						C		

INPUT WORKSHEET

General Information		Site Information	
Analyst	Ryan Yoshimura	Intersection	Haleakala/Makawao
Agency or Co.	Parsons Brinckerhoff	Area Type	All other areas
Date Performed	7/10/2003	Jurisdiction	Maui
Time Period	PM Peak Hour	Analysis Year	2006 With Project

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	272	298	183	6	253	188	72	497	11	169	339	106
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Ext. eff. green	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Arrival type	3	3	3	3	3	3	3	3		3	3	3
Ped volume	0			0			0			0		
Bicycle volume	0			0			0					
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr	0	0	0	0	0	0	0	0		0	0	0
Ped timing	0.0			0.0			3.0			0.0		

	Excl. Left	Thru & RT	03	04	Excl. Left	NS Perm	07	08
Timing	G = 20.0	G = 15.0	G =	G =	G = 8.0	G = 31.0	G =	G =
	Y = 3.0	Y = 4.0	Y =	Y =	Y = 3.0	Y = 4.0	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 90.0		

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CAPACITY AND LOS WORKSHEET												
General Information												
Project Description	*MLP Upcountry Development-Projected Year 2006 With Project*											
Capacity Analysis												
	EB			WB			NB			SB		
Lane group	L	T	R	L	T	R	L	TR		L	T	R
Adj. flow rate	302	331	203	7	281	209	80	564		188	377	118
Satflow rate	1805	3610	1615	1805	3610	1615	1805	1894		1805	1900	1615
Lost time	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Green ratio	0.22	0.17	0.31	0.22	0.17	0.31	0.47	0.34		0.47	0.34	0.34
Lane group cap.	401	602	502	401	602	502	378	652		265	654	556
v/c ratio	0.75	0.55	0.40	0.02	0.47	0.42	0.21	0.87		0.71	0.58	0.21
Flow ratio	0.17	0.09	0.13	0.00	0.08	0.13		0.30			0.20	0.07
Crit. lane group	Y	Y	N	N	N	N	N	N		N	N	N
Sum flow ratios	0.66											
Lost time/cycle	18.00											
Critical v/c ratio	0.82											
Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
Lane group	L	T	R	L	T	R	L	TR		L	T	R
Adj. flow rate	302	331	203	7	281	209	80	564		188	377	118
Lane group cap.	401	602	502	401	602	502	378	652		265	654	556
v/c ratio	0.75	0.55	0.40	0.02	0.47	0.42	0.21	0.87		0.71	0.58	0.21
Green ratio	0.22	0.17	0.31	0.22	0.17	0.31	0.47	0.34		0.47	0.34	0.34
Unif. delay d1	32.7	34.4	24.4	27.3	33.9	24.5	14.9	27.5		19.0	24.1	20.9
Delay factor k	0.31	0.15	0.11	0.11	0.11	0.11	0.11	0.39		0.27	0.17	0.11
Increm. delay d2	7.9	1.1	0.5	0.0	0.6	0.6	0.3	11.7		8.5	1.3	0.2
PF factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000
Control delay	40.6	35.5	25.0	27.3	34.5	25.1	15.1	39.3		27.5	25.4	21.1
Lane group LOS	D	D	C	C	C	C	B	D		C	C	C
Apprch. delay	34.8			30.4			36.3			25.2		
Approach LOS	C			C			D			C		
Intersec. delay	31.9			Intersection LOS						C		

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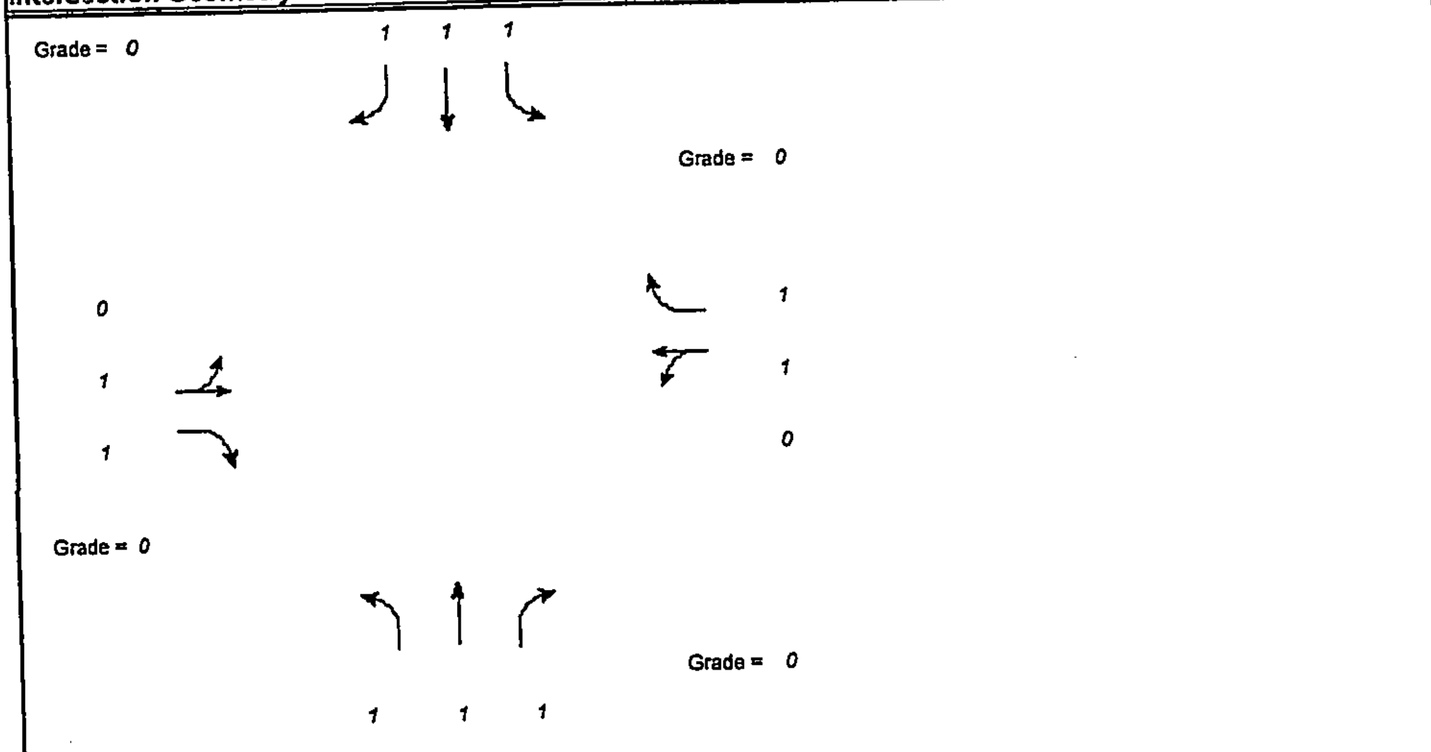
INPUT WORKSHEET

General Information		Site Information	
Analyst	*Ryan Yoshimura*	Intersection	*Haleakala/Kula*
Agency or Co.	*Parsons Brinckerhoff*	Area Type	*All other areas*
Date Performed	*7/10/2003*	Jurisdiction	*Maui*
Time Period	*AM Peak Hour*	Analysis Year	*2006 With Project*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	2	155	434	81	105	165	275	599	81	59	377	0
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Ext. eff. green		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Arrival type		3	3		3	3	3	3	3	3	3	3
Ped volume	0			0			0			0		
Bicycle volume												
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr		0	0		0	0	0	0	0	0	0	0
Ped timing	0.0			0.0			3.0			0.0		

	EW Perm	02	03	04	Excl. Left	NB Only	Thru & RT	08
Timing	G = 21.0	G =	G =	G =	G = 10.0	G = 10.0	G = 25.0	G =
	Y = 4.0	Y =	Y =	Y =	Y = 3.0	Y = 3.0	Y = 4.0	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 82.0			

HCS2000™ Version 4.1

CAPACITY AND LOS WORKSHEET

General Information

Project Description *MLP Upcountry Development-Projected Year 2006 With Dev.*

Capacity Analysis

	EB			WB			NB			SB		
Lane group		*LT*	*R*		*LT*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
Adj. flow rate		*174*	*482*		*207*	*183*	*306*	*666*	*90*	*66*	*419*	*0*
Satflow rate		*1895*	*1615*		*1145*	*1615*	*1805*	*1900*	*1615*	*1805*	*1900*	*1615*
Lost time		*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Green ratio		*0.26*	*0.60*		*0.26*	*0.44*	*0.28*	*0.46*	*0.46*	*0.12*	*0.30*	*0.30*
Lane group cap.		*485*	*965*		*293*	*709*	*506*	*880*	*748*	*220*	*579*	*492*
v/c ratio		*0.36*	*0.50*		*0.71*	*0.26*	*0.60*	*0.76*	*0.12*	*0.30*	*0.72*	*0.00*
Flow ratio		*0.09*	*0.30*		*0.18*	*0.11*	*0.17*	*0.35*	*0.06*	*0.04*	*0.22*	*0.00*
Crit. lane group		*N*	*N*		*Y*	*N*	*Y*	*N*	*N*	*N*	*Y*	*N*
Sum flow ratios	*0.57*											
Lost time/cycle	*13.00*											
Critical v/c ratio	*0.68*											

Lane Group Capacity, Control Delay, and LOS Determination

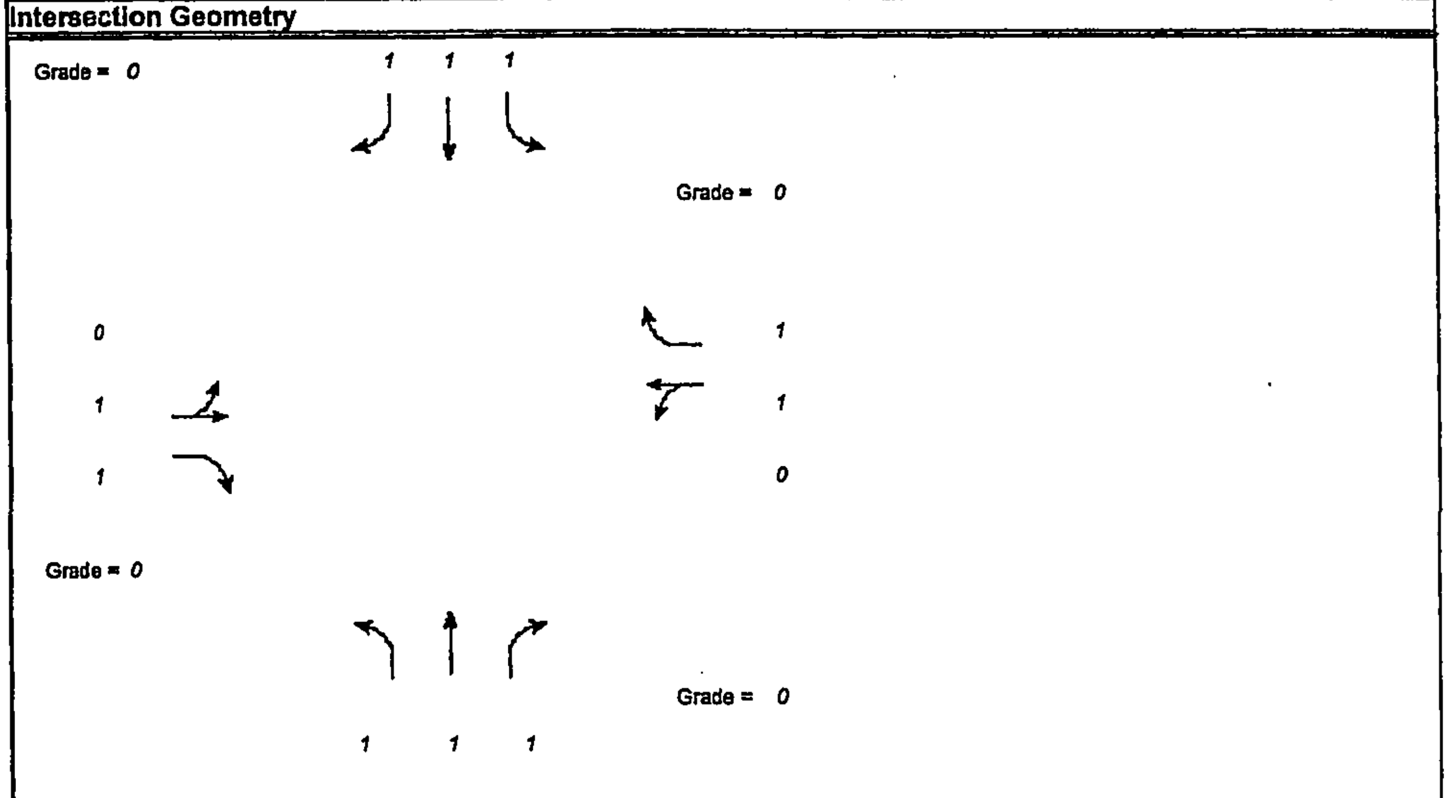
	EB			WB			NB			SB		
Lane group		*LT*	*R*		*LT*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
Adj. flow rate		*174*	*482*		*207*	*183*	*306*	*666*	*90*	*66*	*419*	*0*
Lane group cap.		*485*	*965*		*293*	*709*	*506*	*880*	*748*	*220*	*579*	*492*
v/c ratio		*0.36*	*0.50*		*0.71*	*0.26*	*0.60*	*0.76*	*0.12*	*0.30*	*0.72*	*0.00*
Green ratio		*0.26*	*0.60*		*0.26*	*0.44*	*0.28*	*0.46*	*0.46*	*0.12*	*0.30*	*0.30*
Unif. delay d1		*25.0*	*9.5*		*27.7*	*14.6*	*25.6*	*18.2*	*12.5*	*32.8*	*25.4*	*19.8*
Delay factor k		*0.11*	*0.11*		*0.27*	*0.11*	*0.19*	*0.31*	*0.11*	*0.11*	*0.28*	*0.11*
Increm. delay d2		*0.5*	*0.4*		*7.6*	*0.2*	*2.1*	*3.8*	*0.1*	*0.8*	*4.5*	*0.0*
PF factor		*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Control delay		*25.4*	*9.9*		*35.3*	*14.7*	*27.6*	*22.0*	*12.6*	*33.6*	*29.9*	*19.8*
Lane group LOS		*C*	*A*		*D*	*B*	*C*	*C*	*B*	*C*	*C*	*B*
Apprch. delay	*14.0*			*25.6*			*22.8*			*30.4*		
Approach LOS	*B*			*C*			*C*			*C*		
Intersec. delay	*22.4*			Intersection LOS						*C*		

HCS2000™ Version 4.1

INPUT WORKSHEET

General Information		Site Information	
Analyst	Ryan Yoshimura	Intersection	Haleakala/Kula
Agency or Co.	Parsons Brinckerhoff	Area Type	All other areas
Date Performed	7/10/2003	Jurisdiction	Maui
Time Period	PM Peak Hour	Analysis Year	2006 with Project

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	4	97	235	38	88	84	229	327	25	80	370	3
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Ext. eff. green		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Arrival type		3	3		3	3	3	3	3	3	3	3
Ped volume	0			0			0			0		
Bicycle volume												
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr		0	0		0	0	0	0	0	0	0	0
Ped timing	0.0			0.0			3.0			0.0		

	EW Perm	02	03	04	Excl. Left	NB Only	Thru & RT	08
Timing	G = 17.0	G =	G =	G =	G = 15.0	G = 12.0	G = 30.0	G =
	Y = 4.0	Y =	Y =	Y =	Y = 3.0	Y = 3.0	Y = 4.0	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 90.0			

CAPACITY AND LOS WORKSHEET

General Information

Project Description *MLP Upcountry Development-Projected Year 2006 With Project*

Capacity Analysis

	EB			WB			NB			SB		
Lane group		LT	R		LT	R	L	T	R	L	T	R
Adj. flow rate		112	261		140	93	254	363	28	89	411	3
Satflow rate		1881	1615		1503	1615	1805	1900	1615	1805	1900	1615
Lost time		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Green ratio		0.19	0.58		0.19	0.41	0.33	0.50	0.50	0.17	0.33	0.33
Lane group cap.		355	933		284	664	602	950	808	301	633	538
v/c ratio		0.32	0.28		0.49	0.14	0.42	0.38	0.03	0.30	0.65	0.01
Flow ratio		0.06	0.16		0.09	0.06	0.14	0.19	0.02	0.05	0.22	0.00
Crit. lane group		N	N		Y	N	Y	N	N	N	Y	N
Sum flow ratios	0.45											
Lost time/cycle	13.00											
Critical v/c ratio	0.53											

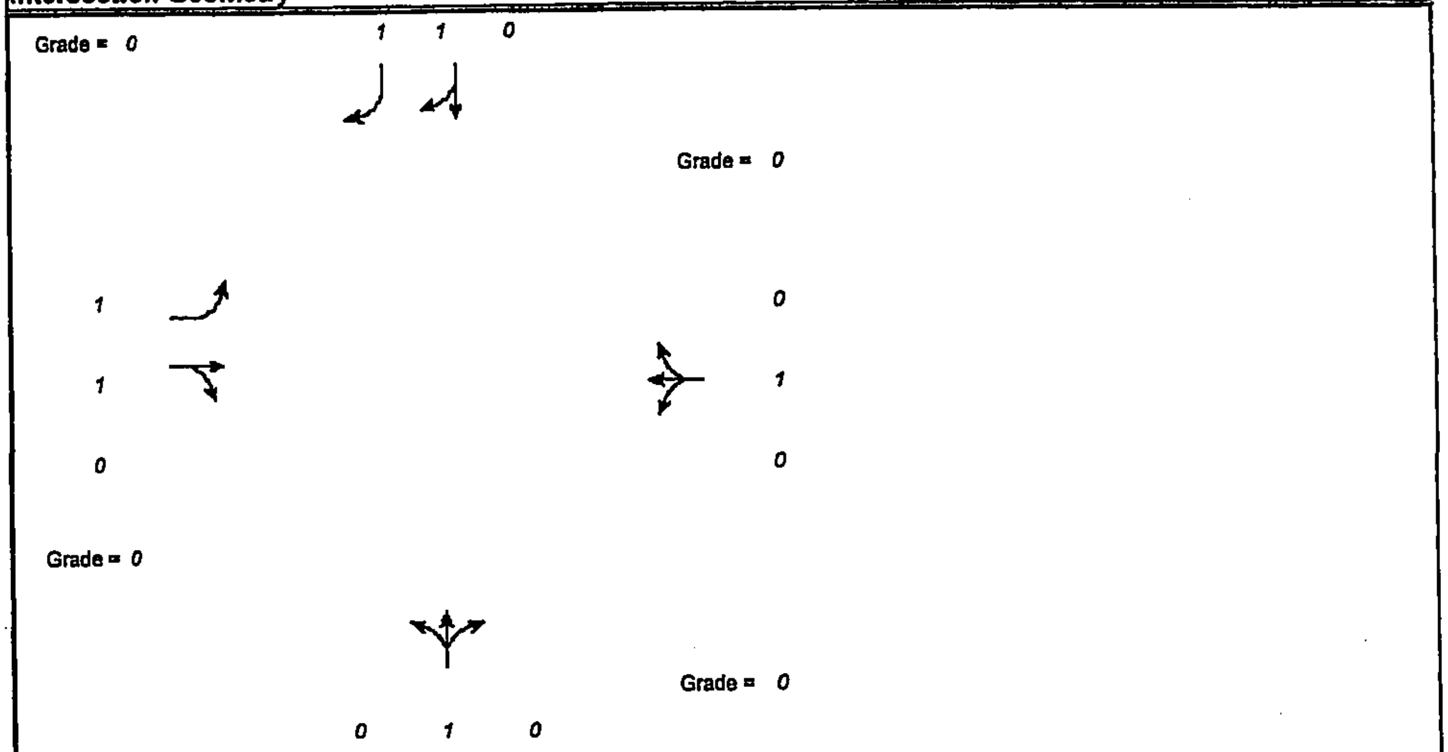
Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane group		LT	R		LT	R	L	T	R	L	T	R
Adj. flow rate		112	261		140	93	254	363	28	89	411	3
Lane group cap.		355	933		284	664	602	950	808	301	633	538
v/c ratio		0.32	0.28		0.49	0.14	0.42	0.38	0.03	0.30	0.65	0.01
Green ratio		0.19	0.58		0.19	0.41	0.33	0.50	0.50	0.17	0.33	0.33
Unif. delay d1		31.5	9.6		32.6	16.6	23.3	13.9	11.4	32.9	25.5	20.0
Delay factor k		0.11	0.11		0.11	0.11	0.11	0.11	0.11	0.11	0.23	0.11
Increm. delay d2		0.5	0.2		1.3	0.1	0.5	0.3	0.0	0.6	2.3	0.0
PF factor		1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Control delay		32.0	9.7		34.0	16.7	23.8	14.2	11.5	33.4	27.9	20.0+
Lane group LOS		C	A		C	B	C	B	B	C	C	C
Apprch. delay	16.4			27.1			17.8			28.8		
Approach LOS	B			C			B			C		
Intersec. delay	21.9			Intersection LOS						C		

INPUT WORKSHEET

General Information		Site Information	
Analyst	Ryan Yoshimura	Intersection	Old Haleakala/Makawao
Agency or Co.	Parsons Brinckerhoff	Area Type	All other areas
Date Performed	7/10/03	Jurisdiction	Maui
Time Period	AM Peak Hour	Analysis Year	2006 With Project

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	198	425	24	25	259	33	38	74	152	45	41	198
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time	2.0	2.0			2.0			2.0			2.0	2.0
Ext. eff. green	2.0	2.0			2.0			2.0			2.0	2.0
Arrival type	3	3			3			3			3	3
Ped volume		0			0			0			0	
Bicycle volume												
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr	0	0			0			0			0	0
Ped timing		0.0			0.0			3.0			0.0	

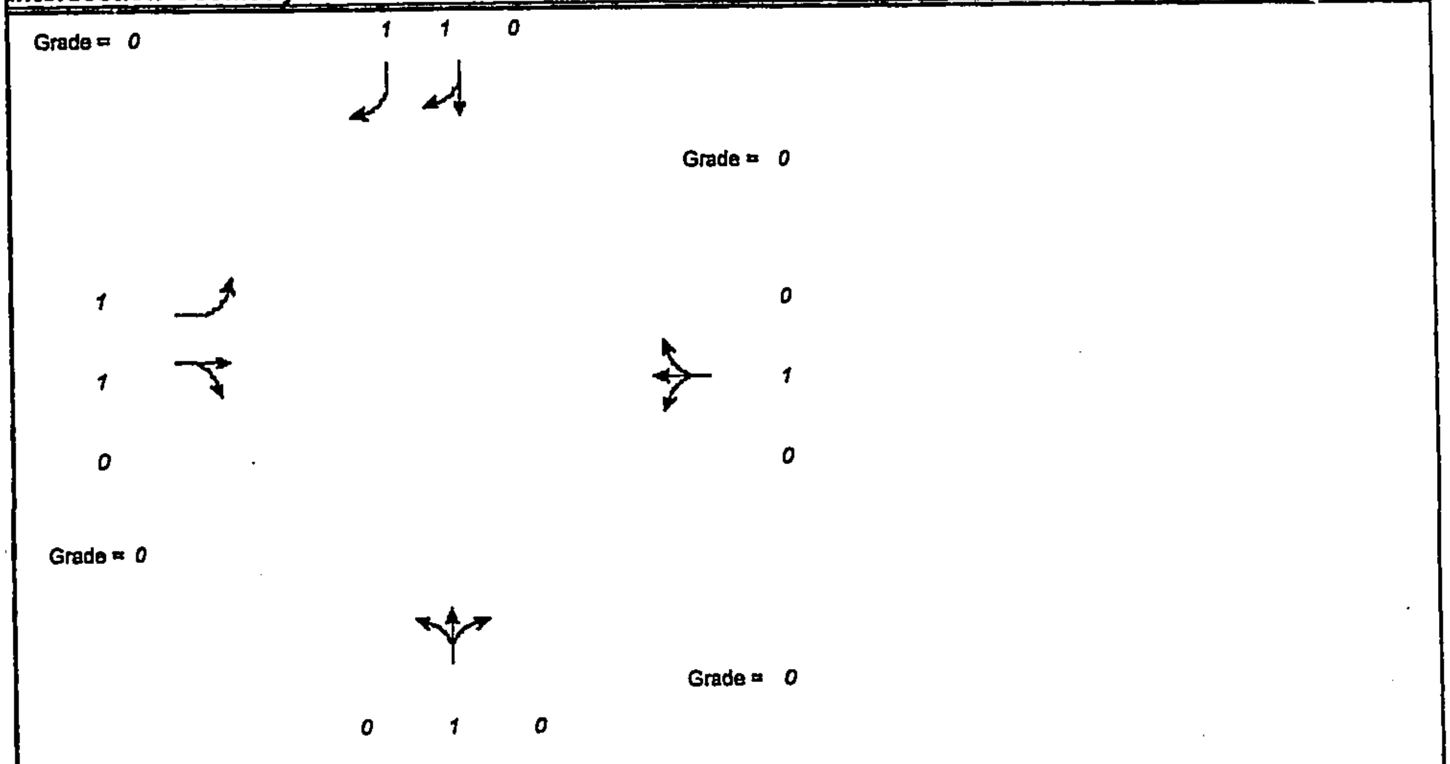
	EB Only	EW Perm	03	04	NS Perm	06	07	08
Timing	G = 10.0	G = 15.0	G =	G =	G = 15.0	G =	G =	G =
	Y = 3.0	Y = 4.0	Y =	Y =	Y = 4.0	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 53.0		

CAPACITY AND LOS WORKSHEET												
General Information												
Project Description *MLP Upcountry Development-Projected Year 2006 With Project*												
Capacity Analysis												
	EB			WB			NB			SB		
Lane group	L	TR			LTR			LTR			LT	R
Adj. flow rate	220	499			353			293			96	220
Satflow rate	1805	1885			1758			1654			1441	1615
Lost time	2.0	2.0			2.0			2.0			2.0	2.0
Green ratio	0.53	0.53			0.28			0.28			0.28	0.28
Lane group cap.	557	996			498			468			408	457
v/c ratio	0.39	0.50			0.71			0.63			0.24	0.48
Flow ratio		0.26			0.20			0.18			0.07	0.14
Crit. lane group	N	N			Y			Y			N	N
Sum flow ratios	0.50											
Lost time/cycle	15.00											
Critical v/c ratio	0.70											
Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
Lane group	L	TR			LTR			LTR			LT	R
Adj. flow rate	220	499			353			293			96	220
Lane group cap.	557	996			498			468			408	457
v/c ratio	0.39	0.50			0.71			0.63			0.24	0.48
Green ratio	0.53	0.53			0.28			0.28			0.28	0.28
Unif. delay d1	8.3	8.0			17.0			16.6			14.6	15.8
Delay factor k	0.11	0.11			0.27			0.21			0.11	0.11
Increm. delay d2	0.5	0.4			4.6			2.6			0.3	0.8
PF factor	1.000	1.000			1.000			1.000			1.000	1.000
Control delay	8.8	8.4			21.7			19.2			14.9	16.6
Lane group LOS	A	A			C			B			B	B
Apprch. delay	8.5			21.7			19.2			16.1		
Approach LOS	A			C			B			B		
Intersec. delay	14.6			Intersection LOS						B		

INPUT WORKSHEET

General Information		Site Information	
Analyst	*Ryan Yoshimura*	Intersection	*Old Haleakala/Makawao*
Agency or Co.	*Parsons Brinckerhoff*	Area Type	*All other areas*
Date Performed	*7/10/03*	Jurisdiction	*Maui*
Time Period	*PM Peak Hour*	Analysis Year	*2006 With Project*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	312	186	30	35	297	44	13	59	34	55	63	360
% Heavy veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time	2.0	2.0			2.0			2.0			2.0	2.0
Ext. eff. green	2.0	2.0			2.0			2.0			2.0	2.0
Arrival type	3	3			3			3			3	3
Ped volume		0			0			0			0	
Bicycle volume												
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/hr												
Bus stops/hr	0	0			0			0			0	0
Ped timing		0.0			0.0			3.0			0.0	

	EB Only	EW Perm	03	04	NS Perm	06	07	08
Timing	G = 10.0	G = 15.0	G =	G =	G = 15.0	G =	G =	G =
	Y = 3.0	Y = 4.0	Y =	Y =	Y = 4.0	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25 — Cycle Length C = 53.0

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CAPACITY AND LOS WORKSHEET												
General Information												
Project Description *MLP Upcountry Development-Projected Year 2006 With Project*												
Capacity Analysis												
	EB			WB			NB			SB		
Lane group	*L*	*TR*			*LTR*			*LTR*			*LT*	*R*
Adj. flow rate	*347*	*240*			*418*			*118*			*131*	*400*
Satflow rate	*1805*	*1861*			*1776*			*1746*			*1552*	*1615*
Lost time	*2.0*	*2.0*			*2.0*			*2.0*			*2.0*	*2.0*
Green ratio	*0.53*	*0.53*			*0.28*			*0.28*			*0.28*	*0.57*
Lane group cap.	*541*	*983*			*503*			*494*			*439*	*914*
v/c ratio	*0.64*	*0.24*			*0.83*			*0.24*			*0.30*	*0.44*
Flow ratio		*0.13*			*0.24*			*0.07*			*0.08*	*0.25*
Crit. lane group	*N*	*N*			*Y*			*N*			*Y*	*N*
Sum flow ratios	*0.51*											
Lost time/cycle	*15.00*											
Critical v/c ratio	*0.71*											
Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
Lane group	*L*	*TR*			*LTR*			*LTR*			*LT*	*R*
Adj. flow rate	*347*	*240*			*418*			*118*			*131*	*400*
Lane group cap.	*541*	*983*			*503*			*494*			*439*	*914*
v/c ratio	*0.64*	*0.24*			*0.83*			*0.24*			*0.30*	*0.44*
Green ratio	*0.53*	*0.53*			*0.28*			*0.28*			*0.28*	*0.57*
Unif. delay d1	*9.2*	*6.8*			*17.8*			*14.6*			*14.9*	*6.6*
Delay factor k	*0.22*	*0.11*			*0.37*			*0.11*			*0.11*	*0.11*
Increm. delay d2	*2.6*	*0.1*			*11.3*			*0.3*			*0.4*	*0.3*
PF factor	*1.000*	*1.000*			*1.000*			*1.000*			*1.000*	*1.000*
Control delay	*11.8*	*6.9*			*29.1*			*14.9*			*15.3*	*7.0*
Lane group LOS	*B*	*A*			*C*			*B*			*B*	*A*
Apprch. delay	*9.8*			*29.1*			*14.9*			*9.0*		
Approach LOS	*A*			*C*			*B*			*A*		
Intersec. delay	*14.8*			Intersection LOS						*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Ryan Yoshimura*
Agency/Co.	*PBQD*
Date Performed	*7/10/03*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Haleakala\Access Road 1*
Jurisdiction	*Maui*
Analysis Year	*2006 With Project*
Project ID	*MLP Upcountry Development-Projected Year 2006 With Project*

East/West Street: *Access Road 1*
North/South Street: *Haleakala*
Intersection Orientation: *North-South*
Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*766*	*0*	*0*	*424*	*32*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*0*	*851*	*0*	*0*	*471*	*35*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*1*
Configuration		*T*			*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*0*	*0*	*13*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*0*	*0*	*14*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (vph)								*14*
C (m) (vph)								*597*
v/c								*0.02*
95% queue length								*0.07*
Control Delay								*11.2*
LOS								*B*
Approach Delay	--	--				*11.2*		
Approach LOS	--	--				*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Ryan Yoshimura*	Intersection	*Haleakala\Access Road 1*
Agency/Co.	*PBQD*	Jurisdiction	*Maui*
Date Performed	*7/10/03*	Analysis Year	*2006 With Project*
Analysis Time Period	*PM Peak Hour*	Project ID	*MLP Upcountry Development-Projected Year 2006 With Project*

East/West Street: *Access Road 1*	North/South Street: *Haleakala*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*415*	*0*	*0*	*384*	*95*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*0*	*461*	*0*	*0*	*426*	*105*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*1*
Configuration		*T*			*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*0*	*0*	*70*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*0*	*0*	*77*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (vph)								*77*
C (m) (vph)								*633*
v/c								*0.12*
95% queue length								*0.41*
Control Delay								*11.5*
LOS								*B*
Approach Delay	--	--				*11.5*		
Approach LOS	--	--				*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	Ryan Yoshimura	Intersection	Makawao\Access Road 2
Agency/Co.	PBQD	Jurisdiction	Maui
Date Performed	7/10/03	Analysis Year	2006 With Project
Analysis Time Period	AM Peak Hour	Project ID	MLP Upcountry Development-Projected Year 2006 With Project

East/West Street: Access Road 2	North/South Street: Makawao
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	305	2	8	388	0
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	338	2	8	431	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	1	28	0	39
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	1	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		8	0		1			
C (m) (vph)		1230	362		708			
v/c		0.01	0.00		0.00			
95% queue length		0.02	0.00		0.00			
Control Delay		7.9	14.9		10.1			
LOS		A	B		B			
Approach Delay	--	--	10.1					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Ryan Yoshimura*
Agency/Co.	*PBQD*
Date Performed	*7/10/03*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Makawao\Access Road 2*
Jurisdiction	*Maui*
Analysis Year	*2006 With Project*
Project ID	*MLP Upcountry Development-Projected Year 2006 With Project*

East/West Street: *Access Road 2*
North/South Street: *Makawao*
Intersection Orientation: *North-South*
Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*587*	*0*	*1*	*528*	*0*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*0*	*652*	*0*	*1*	*586*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*3*	*0*	*8*	*28*	*0*	*39*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR	*3*	*0*	*8*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*1*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*	*L*		*R*			
v (vph)		*1*	*3*		*8*			
C (m) (vph)		*944*	*195*		*471*			
v/c		*0.00*	*0.02*		*0.02*			
95% queue length		*0.00*	*0.05*		*0.05*			
Control Delay		*8.8*	*23.7*		*12.8*			
LOS		*A*	*C*		*B*			
Approach Delay	--	--	*15.8*					
Approach LOS	--	--	*C*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	Ryan Yoshimura	Intersection	Makawao\Access Rd. 3
Agency/Co.	PBQD	Jurisdiction	Maui
Date Performed	7/10/03	Analysis Year	2006 With Project
Analysis Time Period	AM Peak Hour	Project ID	MLP Upcountry Development-Projected Year 2006 With Project

East/West Street: Access Road 3	North/South Street: Makawao
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	297	2	34	354	0
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	330	2	37	393	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	5	0	10	28	0	39
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	5	0	11	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		37	5		11			
C (m) (vph)		1239	347		715			
v/c		0.03	0.01		0.02			
95% queue length		0.09	0.04		0.05			
Control Delay		8.0	15.5		10.1			
LOS		A	C		B			
Approach Delay	--	--	11.8					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Ryan Yoshimura*	Intersection	*Makawao\Access Rd. 3*
Agency/Co.	*PBQD*	Jurisdiction	*Maui*
Date Performed	*7/10/03*	Analysis Year	*2006 With Project*
Analysis Time Period	*PM Peak Hour*	Project ID	*MLP Upcountry Development-Projected Year 2006 With Project*

East/West Street: *Access Road 3*	North/South Street: *Makawao*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	534	6	106	425	0
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	593	6	117	472	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	26	0	53	28	0	39
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	28	0	58	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		117	28		58			
C (m) (vph)		988	158		507			
v/c		0.12	0.18		0.11			
95% queue length		0.40	0.62		0.38			
Control Delay		9.1	32.6		13.0			
LOS		A	D		B			
Approach Delay	--	--	19.4					
Approach LOS	--	--	C					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	Ryan Yoshimura	Intersection	Makawao\Access Road 4
Agency/Co.	PBQD	Jurisdiction	Maui
Date Performed	7/10/03	Analysis Year	2006 With Project
Analysis Time Period	AM Peak Hour	Project ID	MLP Upcountry Development-Projected Year 2006 With Project

East/West Street: Access Road 4	North/South Street: Makawao
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	277	28	68	291	0
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	307	31	75	323	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	9	0	22	28	0	39
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	10	0	24	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		75	10		24			
C (m) (vph)		1232	337		724			
v/c		0.06	0.03		0.03			
95% queue length		0.19	0.09		0.10			
Control Delay		8.1	16.0		10.1			
LOS		A	C		B			
Approach Delay	--	--	11.9					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information	
Analyst	Ryan Yoshimura
Agency/Co.	PBQD
Date Performed	7/10/03
Analysis Time Period	PM Peak Hour

Site Information	
Intersection	Makawao\Access Road 4
Jurisdiction	Maui
Analysis Year	2006 With Project
Project ID	MLP Upcountry Development-Prcjected Year 2006 With Project

East/West Street: Access Road 4	North/South Street: Makawao
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	401	14	66	385	0
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	445	15	73	427	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	55	0	139	28	0	39
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	61	0	154	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		73	61		154			
C (m) (vph)		1112	246		612			
v/c		0.07	0.25		0.25			
95% queue length		0.21	0.95		0.99			
Control Delay		8.5	24.4		12.8			
LOS		A	C		B			
Approach Delay	--	--	16.1					
Approach LOS	--	--	C					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Ryan Yoshimura*	Intersection	*Old Hale\Access Rd 5*
Agency/Co.	*PBQD*	Jurisdiction	*Maui*
Date Performed	*7/10/03*	Analysis Year	*2006 With Project*
Analysis Time Period	*AM Peak Hour*	Project ID	*MLP Upcountry Development-Projected Year 2006 With Project*

East/West Street: *Old Haleakala*	North/South Street: *Access Road 5*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	40	577	5	5	300	75
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	44	641	5	5	333	83
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			1
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	5	5	5	17	5	16
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	5	5	5	18	5	17
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			1
Lanes	0	1	0	0	1	1
Configuration		LTR		LT		R

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR		LT		R
v (vph)	44	5		15		23		17
C (m) (vph)	1238	949		233		176		677
v/c	0.04	0.01		0.06		0.13		0.03
95% queue length	0.11	0.02		0.20		0.44		0.08
Control Delay	8.0	8.8		21.5		28.5		10.5
LOS	A	A		C		D		B
Approach Delay	--	--	21.5			20.8		
Approach LOS	--	--	C			C		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Ryan Yoshimura
Agency/Co.	PBQD
Date Performed	7/10/03
Analysis Time Period	PM Peak Hour

Site Information

Intersection	Old Hale\Access Rd. 5
Jurisdiction	Maui
Analysis Year	2006 With Project
Project ID	MLP Upcountry Development-Projected Year 2006 With Project

East/West Street: Old Haleakala	North/South Street: Access Road 5
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	22	248	5	5	246	72
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	24	275	5	5	273	80
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			1
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	5	5	5	106	5	94
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	5	5	5	117	5	104
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			1
Lanes	0	1	0	0	1	1
Configuration		LTR		LT		R

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR		LT		R
v (vph)	24	5		15		122		104
C (m) (vph)	1302	1294		433		369		732
v/c	0.02	0.00		0.03		0.33		0.14
95% queue length	0.06	0.01		0.11		1.42		0.49
Control Delay	7.8	7.8		13.6		19.5		10.7
LOS	A	A		B		C		B
Approach Delay	--	--	13.6			15.5		
Approach LOS	--	--	B			C		

Appendix C

Botanical Resources of the Pukalani Triangle Site

BOTANICAL SURVEY
MLP UPCOUNTRY MAUI PROJECT
PUKALANI, MAKAWAO DISTRICT, MAUI

by

Winona P. Char

CHAR & ASSOCIATES
Botanical Consultants
Honolulu, Hawai'i

Prepared for: Group 70 International

February 2001

BOTANICAL SURVEY
MLP UPCOUNTRY MAUI PROJECT
PUKALANI, MAKAWAO DISTRICT, MAUI

INTRODUCTION

The approximately 40-acre Maui Land and Pine (MLP) property is a triangular-shaped parcel located in Pukalani, Maui. It is bounded by Pukalani Bypass Highway, Makawao Avenue, and Haleakala Highway; the site does not include the existing Fire Station along Makawao Avenue. The majority of the site is currently in pineapple cultivation. Several old Corn Mill Camp buildings are found along the Bypass Highway.

A rural country town center to serve the various Upcountry Maui communities is proposed for the site. One or two of the existing Corn Mill Camp buildings would be maintained and renovated to serve as theme buildings.

Field studies to assess the botanical resources on the ±40-acre project site were conducted on 25 January 2001 by a team of two botanists. The primary objectives of the survey were to:

1) provide a general description of the vegetation on the site;
2) inventory the flora;
3) search for threatened and endangered species as well as species of concern; and
4) identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

SURVEY METHODS

Prior to undertaking the field studies, a search was made of the pertinent literature to familiarize the principal investigator with other botanical studies conducted in the general area. Topographic maps, site plan maps, and soil maps (based on aerial photos) were examined to determine vegetation cover patterns, terrain characteristics, access, boundaries, and reference points.

A walk-through survey method was used. Notes were made on plant associations and distribution, substrate types, drainage, exposure, disturbances, topography, etc. Plant identifications were made in the field; plants which could not be positively identified were collected for later determination in the herbarium, and for comparison with the recent taxonomic literature.

The species recorded are indicative of the season ("rainy" vs. "dry") and the environmental conditions at the time of the survey. A survey taken at a different time of the year and under varying environmental conditions would no doubt yield slight variations in the species list, especially of the weedy, annual plants.

DESCRIPTION OF THE VEGETATION

Two major vegetation types are recognized on the project site. Actively cultivated pineapple fields occupy the majority of the site while ruderal vegetation occurs on the overgrown areas around the Corn Mill buildings and along the margins of the parcel. An inventory of all the plants found within these two vegetation types is presented in the checklist at the end of the report.

The soils on the site belong to the Haliimaile series. These are well-drained, dark reddish-brown colored, silty clay loam soils. Runoff is medium and the erosion hazard is moderate (Foote et al.

1972). Soils of the Haliimaile series are used for pineapple, pasture, and homesites. The topography on the site is gently sloping.

Ruderal Vegetation

Ruderal or weedy vegetation is found on the uncultivated portions of the property. Along Makawao Avenue and Haleakala Highway, the narrow band of ruderal vegetation bordering the pineapple fields consists primarily of lumpy mats of California grass (*Brachiaria mutica*) with an assortment of weedy species associated with agricultural lands. These include spiny amaranth (*Amaranthus spinosus*), cheese weed (*Malva parviflora*), Spanish needle (*Bidens pilosa*), false mallow (*Malvastrum coromandelianum*), weed verbena (*Verbena litoralis*), sourbush (*Pluchea carolinensis*), and swollen fingergrass (*Chloris barbata*). Taller clumps of Guinea grass (*Panicum maximum*) and elephant grass (*Pennisetum purpureum*) are scattered here and there. Tangled clumps of *Neonotonia wightii*, a vining member of the pea family, and wild bittermelon (*Momordica charantia*) are locally common on the perimeter fence line. Low mats of Kikuyu grass (*Pennisetum clandestinum*) are frequently observed bordering the roadsides. Natal redtop grass (*Melinis repens*) is abundant in some places bordering the Bypass Highway. A few small trees of ironwood (*Casuarina equisetifolia*) and silk oak (*Grevillea robusta*) are also found in this area.

Around the Corn Mill buildings and an actively used corral area with horses, the surrounding unmaintained areas support a weedy mixture of grasses which consist of tall, dense clumps of Guinea grass, Rhodes grass (*Chloris gayana*), California grass, and molasses grass (*Melinis minutiflora*). Shrubs of sourbush, koa haole (*Leucaena leucocephala*), castor bean (*Ricinus communis*), and Christmas berry (*Schinus terebinthifolius*) are occasional.

Other weedy species found here in smaller numbers include sow-thistle (Sonchus oleraceus), indigo (Indigofera suffruticosa), golden crown-beard (Verbesina encelioides), field bindweed (Ipomoea obscura), Spanish needle, and spiny amaranth.

Scattered here and there are a few remnant plantings of ornamental, landscape plants and fruit trees. These include Chinese banyan (Ficus microcarpa), mango (Mangifera indica), jacaranda (Jacaranda mimosifolia), oleander (Nerium oleander), peach (Prunus persica), orange (Citrus sinensis), black-eyed Susan vine (Thunbergia alata), macadamia nut (Macadamia integrifolia), and cypress (Cupressus sp.).

Cultivated Fields

Rows of pineapple plants (Ananas comosus) form a dense cover up to 3 ft. tall on the cultivated portions of the property. Weedy species are few and tend to occur mainly along the margins of the fields and on the dirt roads which cross the property. Rhodes grass, Guinea grass, spiny amaranth, wild bittermelon, Natal redtop, and sourgrass (Digitaria insularis) are occasionally observed in scattered patches. Slender amaranth (Amaranthus viridis) is very common on some of the dirt roads. A few woody components such as African tulip tree, koa haole, and sourbush can be found, but these are rare and occur as young plants or saplings.

DISCUSSION AND RECOMMENDATIONS

The vegetation on the ±40-acre project site is dominated by introduced or alien plants. Introduced species are all those plants which were brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact, that is, Cook's arrival in the islands in 1778. Actively cultivated pineapple fields cover the majority of the site while ruderal or weedy vegetation occupies the uncultivated portions of the parcel. Several grasses such as Guinea grass, Rhodes grass, California grass, and Natal redtop are abundant in the ruderal vegetation.

A total of 80 species were inventoried on the site. Seventy-eight (98%) of the plants are introduced species; one (1%) is considered a Polynesian introduction; and one (1%) is native. Koali 'awa (Ipomoea indica), a native vine belonging to the morning glory family (Convolvulaceae), is indigenous, that is, it is native to the Hawaiian Islands and elsewhere. None of the plants found during the survey is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1990). This is not surprising as the site has been actively cultivated and disturbed for a long period of time.

Given the findings above, the proposed use of the site for a rural country town center should not have a significant negative impact on the botanical resources. There are no botanical reasons to impose any restrictions, conditions, or impediments to the development of the site. It is recommended, however, that areas cleared of vegetation be landscaped or grassed over as soon as possible to prevent excessive dust generation.

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PLANT SPECIES LIST -- MLP Upcountry Maui Project

The following checklist is an inventory of all the plants observed on the ±40-acre project site during the field studies. The plant names are arranged by families within each of three groups: Gymnosperms, Dicots, and Monocots. The taxonomy and nomenclature of the Gymnosperms follow St. John (1973), while the flowering plants, Dicots and Monocots, are in accordance with Wagner et al. (1990). The few recent name changes for the flowering plants follow those reported in the Hawaii Biological Survey series (Evenhuis and Miller 1995-1998; Evenhuis and Eldredge 1999-2000).

For each species, the following information is provided:

1. Scientific name with author citation.
2. Common English and/or Hawaiian name(s), when known.
3. Biogeographic status. The following symbols are used:
   - I = indigenous = native to the Hawaiian Islands and also elsewhere.
   - P? = questionably a Polynesian introduction = may have been introduced by the Polynesians prior to Western contact, i.e., Cook's arrival in Hawai'i in 1778, or possibly introduced soon after Western contact.
   - X = introduced or alien = all those plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact (1778).
4. Presence (+) or absence (-) of a particular species within each of two vegetation types recognized on the project site (see text for discussion):
   - r = Ruderal Vegetation
   - c = Cultivated Fields

Scientific name	Common name	Status	Vegetation type r	Vegetation type c
GYMNOSPERMS				
CUPRESSACEAE (Cypress family)				
Cupressus sp.	cypress	X	+	-
FLOWERING PLANTS				
DICOTS				
ACANTHACEAE (Acanthus family)				
Thunbergia alata Bojer	black-eyed Susan vine	X	+	-
AIZOACEAE (Fir-marigold family)				
Tetragonia tetragonioides (Pall.) Kuntze	New Zealand spinach	X	+	-
AMARANTHACEAE (Amaranth family)				
Amaranthus spinosus L.	spiny amaranth, pakai kuku	X	+	+
Amaranthus viridis L.	slender amaranth, pakai	X	+	+
ANACARDIACEAE (Mango family)				
Mangifera indica L.	mango, manako	X	+	-
Schinus terebinthifolius Raddi	Christmas berry	X	+	-
APOCYNACEAE (Dogbane family)				
Nerium oleander L.	oleander, 'oleana	X	+	-
ASCLEPIADACEAE (Milkweed family)				
Asclepias physocarpa (E. Mey.) Schlechter	balloon plant	X	+	+
ASTERACEAE (Daisy family)				
Bidens pilosa L.	Spanish needle, ki, ki nehe	X	+	+
Cirsium vulgare (Savi) Ten.	bull thistle	X	-	+
Crassocephalum crepidioides (Benth.) S. Moore		X	-	+
Emilia fosbergii Nicolson	flora's paintbrush, pualele	X	+	+

Scientific name	Common name	Status	Vegetation type r	Vegetation type c
Hypochoeris radicata L.	hairy cat's ear, gosmore	X	+	–
Lactuca serriola L.	prickly lettuce	X	+	–
Pluchea carolinensis (Jacq.) G. Don	sourbush, pluchea	X	+	+
Senecio madagascariensis Poiret		X	+	–
Sonchus oleraceus L.	sowthistle, pualele	X	+	–
Verbesina encelioides (Cav.) Benth. & Hook.	golden crown-beard	X	+	+
BASELLACEAE (Basella family)				
Anredera cordifolia (Ten.) Steenis	Madeira vine, 'uala hupe	X	+	–
BIGNONIACEAE (Bignonia family)				
Jacaranda mimosifolia D. Don	jacaranda	X	+	–
Spathodea campanulata P. Beauv.	African tulip tree	X	+	+
BRASSICACEAE (Mustard family)				
Lepidium virginicum L.	pepperwort, peppergrass	X	+	–
CACTACEAE (Cactus family)				
Opuntia ficus-indica (L.) Mill.	panini, papipi	X	+	–
CASUARINACEAE (Ironwood family)				
Casuarina equisetifolia L.	common ironwood, paina	X	+	–
CHENOPODIACEAE (Goosefoot family)				
Chenopodium ambrosioides L.	Mexican tea, wormseed	X	+	–
CONVOLVULACEAE (Morning glory family)				
Ipomoea indica (J. Burm.) Merr.	koali 'awa, koali 'awahia	I	+	–
Ipomoea obscura (L.) Ker-Gawl	field bindweed	X	+	+
CUCURBITACEAE (Gourd family)				
Momordica charantia L.	wild bittermelon	X	+	+

Scientific name	Common name	Status	Vegetation type r	Vegetation type c
EUPHORBIACEAE (Spurge family)				
Chamaesyce hirta (L.) Millsp.	hairy spurge, garden spurge	X	+	+
Chamaesyce prostrata (Aiton) Small	prostrate spurge	X	+	-
Euphorbia heterophylla L.	Mexican fireweed, kaliko	X	+	-
Ricinus communis L.	castor bean, koli	X	+	+
FABACEAE (Pea family)				
Chamaecrista nictitans (L.) Moench	partridge pea, lauki	X	+	-
Desmanthus pernambucanus (L.) Thellung	slender mimosa	X	+	-
Desmodium incanum DC	Spanish clover, ka'imi	X	+	-
Indigofera hendecaphylla Jacq.	creeping indigo	X	+	-
Indigofera suffruticosa Mill	indigo, 'iniko	X	+	-
Leucaena leucocephala (Lam.) de Wit	koa haole	X	+	+
Macroptilium latyroides (L.) Urb.	wild bean, cow pea	X	+	-
Medicago polymorpha L.	bur clover	X	+	-
Neonotonia wightii (Wight & Arn.) Lackey		X	+	-
Samanea saman (Jacq.) Merr.	monkeypod	X	+	-
LAMIACEAE (Mint family)				
Stachys arvensis L.	staggerweed	X	+	-
LAURACEAE (Laurel family)				
Persea americana Mill.	avocado, alligator pear	X	+	-
MALVACEAE (Mallow family)				
Abutilon grandifolium (Willd.) Sweet	hairy abutilon, ma'o	X	+	+
Malva parviflora L.	cheese weed	X	+	-
Malvastrum coromandelianum (L.) Garcke	false mallow, hauuoi	X	+	-
Sida rhombifolia L.		X	+	-
MELIACEAE (Mahogany family)				
Melia azedarach L.	Chinaberry, pride-of-India, 'inia	X	+	-

Scientific name	Common name	Status	Vegetation type r	Vegetation type c
MORACEAE (Mulberry family)				
Ficus microcarpa L.f.	Chinese banyan	X	+	-
Morus alba L.	mulberry, kilika	X	+	-
MYRTACEAE (Myrtle family)				
Psidium guajava L.	common guava, kuawa	X	+	-
NYCTAGINACEAE (Four-o'clock family)				
Boerhavia coccinea Mill.		X	+	+
OXALIDACEAE (Wood sorrel family)				
Oxalis corniculata L.	yellow wood sorrel, 'ihi 'ai	P?	+	-
PASSIFLORACEAE (Passion flower family)				
Passiflora edulis forma flavicarpa Degener	liliko'i	X	+	-
PORTULACACEAE (Purslane family)				
Portulaca oleracea L.	common purslane, pigweed	X	+	+
PROTEACEAE (Protea family)				
Grevillea robusta A. Cunn. ex R. Br.	silk oak, silver oak	X	+	-
Macadamia integrifolia Maiden & Betche	macadamia nut	X	+	-
ROSACEAE (Rose family)				
Prunus persica (L.) Batsch.	peach	X	+	-
RUTACEAE (Rue family)				
Citrus sinensis (L.) Osbeck	orange, Kona orange, 'alani	X	+	-
SOLANACEAE (Nightshade family)				
Capsicum frutescens L.	chili pepper, nioi	X	+	-
VERBENACEAE (Verbena family)				
Verbena litoralis Kunth	weed verbena	X	+	+

Scientific name	Common name	Status	Vegetation type r	Vegetation type c
MONOCOTS				
BROMELIACEAE (Pineapple family)				
Ananas comosus (Stickm.) Merr.	pineapple	X	-	+
LILIACEAE (Lily family)				
Asparagus officinalis var. altilis L.	garden asparagus	X	+	-
Asparagus plumosus J.G. Baker	asparagus fern	X	+	-
MUSACEAE (Banana family)				
Musa X paradisiaca L.	banana, mai'a	X	+	-
POACEAE (Grass family)				
Brachiaria mutica (Forssk.) Stapf	California grass, Para grass	X	+	+
Bromus catharticus Vahl	rescue grass	X	+	-
Chloris barbata (L.) Sw.	swollen fingergrass, mau'ulei	X	+	+
Chloris gayana Kunth	Rhodes grass	X	+	+
Cynodon dactylon (L.) Pers.	Bermuda grass, manienie	X	+	+
Digitaria insularis (L.) Mez. ex Ekman	sourgrass	X	-	+
Eragrostis sp.		X	+	-
Melinis minutiflora P. Beauv.	molasses grass	X	+	-
Melinis repens (Willd.) Zizka	Natal redtop, Natal grass	X	+	+
Panicum maximum Jacq.	Guinea grass	X	+	+
Panicum maximum var. trichoglume Eyles ex Robyns	green panicgrass	X	+	-
Pennisetum clandestinum Chiov.	Kikuyu grass	X	+	-
Pennisetum purpureum Schumach.	Napier grass, elephant grass	X	+	+

Appendix D

An Archaeological Inventory Survey of the Upcountry Town Center

ASC015-2

AN ARCHAEOLOGCIAL INVENTORY SURVEY
OF THE UPCOUNTRY TOWN CENTER
MAKAEHA, *AHUPUA'A*, MAKAWAO, MAUI

(TMK 2-3-07:08)

by

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INTRODUCTION

At the request of Group 70 International, Inc. of Honolulu, on behalf of the Maui Land & Pineapple Company, Inc.; Aki Sinoto Consulting of Honolulu, in association with Archaeological Services Hawaii, LLC of Wailuku, undertook an archaeological inventory survey of a parcel of land in Pukalani, Maui Island. The phased development of commercial and community-oriented components are being proposed for the subject area, also known as the "Upcountry Town Center" the owners, Maui Land & Pineapple Company. An initial surface inspection was conducted on March 15, 2001, followed by subsurface testing of selected localities on March 27, 2001.

PROJECT LOCATION

The project area, encompassing 40.574-acres, is situated in Pukalani, Makaeha *ahupua'a*, Makawao District, Maui Island (Fig. 1). The triangular parcel (TMK 2-3-07:08), currently still being used for pineapple cultivation, is bounded on the northwest by Makawao Avenue, on the southwest by Old Haleakala Highway, and on the east by the Pukalani Bypass (new Haleakala) Highway (Figs. 2-4). Across the respective boundaries, the Pukalani Superette and existing residential lots are located along Makawao Road, existing residential lots are also located along the old Haleakala Highway, and open land occupies the eastern side of the new Haleakala Highway. King Kekaulike High School is located across the intersection of Haleakala and Kula Highways at the southern terminus of the project area. The existing Makawao Fire Station is situated in a parcel fronting Makawao Avenue near the northern corner of the project area. Wai Ulu Farms, an existing stable and feed store (Fig. 5), is located adjacent to the fire station across the paved access road. Several remnant warehouse buildings from the "Corn Mill Camp" era (Figs. 6-7), located behind (southeast) the fire station, are occupied by month-to-month tenants. On a promontory overlooking the northern portions of the parcel, located south of the warehouses, is a wooden water tank (Fig. 8, top). Located west of the tank and unpaved road is the remnant base for another water tank (Fig. 8, bottom).

ENVIRONMENT

The project area occurs on the northwestern slope of Haleakala, on a plateau between Kailua Gulch to the northeast and Kaluapulani Gulch to the southwest. Elevation in the project area ranges from c. 1640 to 1740 feet above mean sea level. Rainfall averages between 20 to 50 inches annually, with most occurring during the months of October to April.

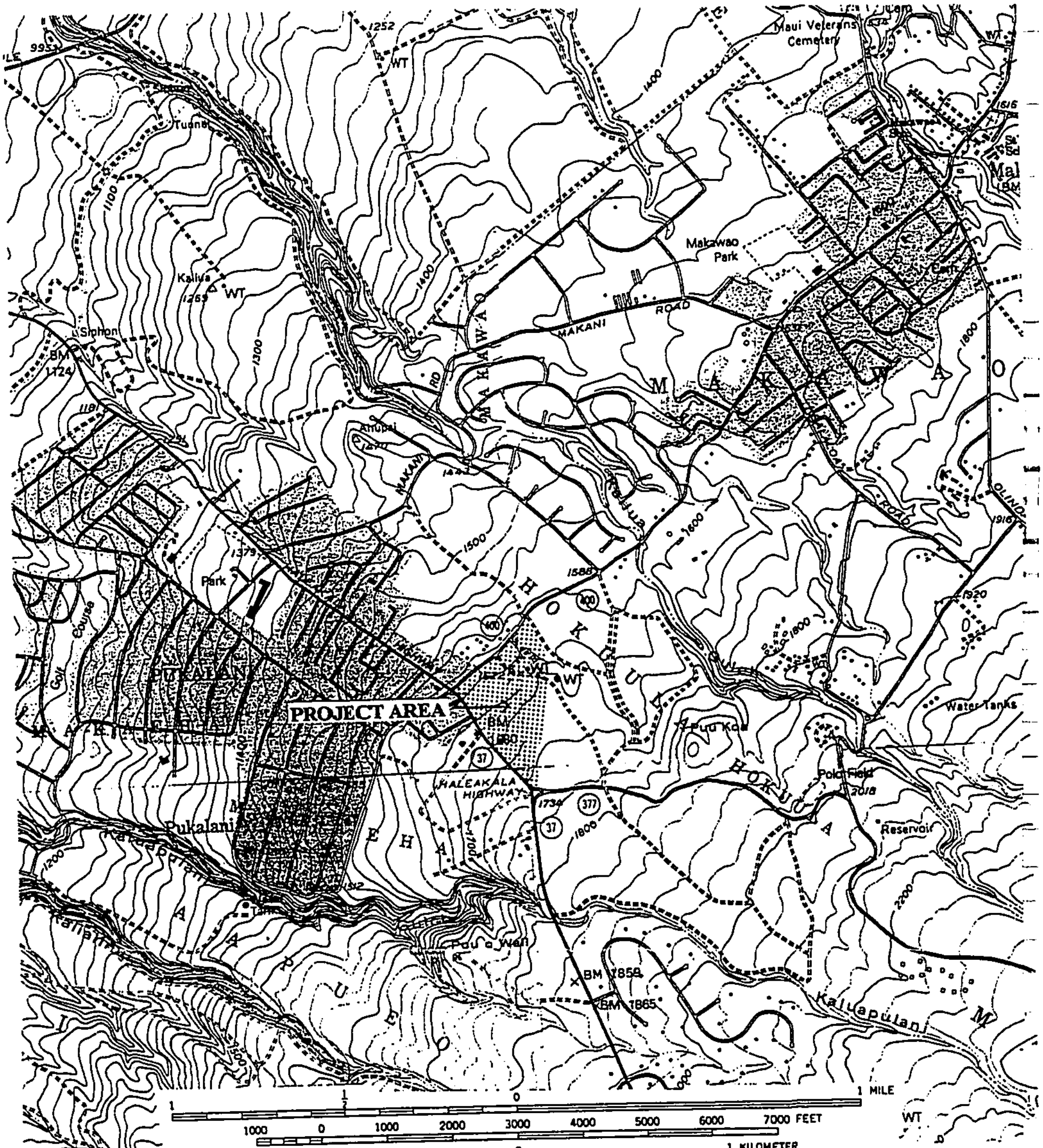


Figure 1. Project Area on USGS Paia, Haiku, Kilohana, and Puu O Kali Quadrangles

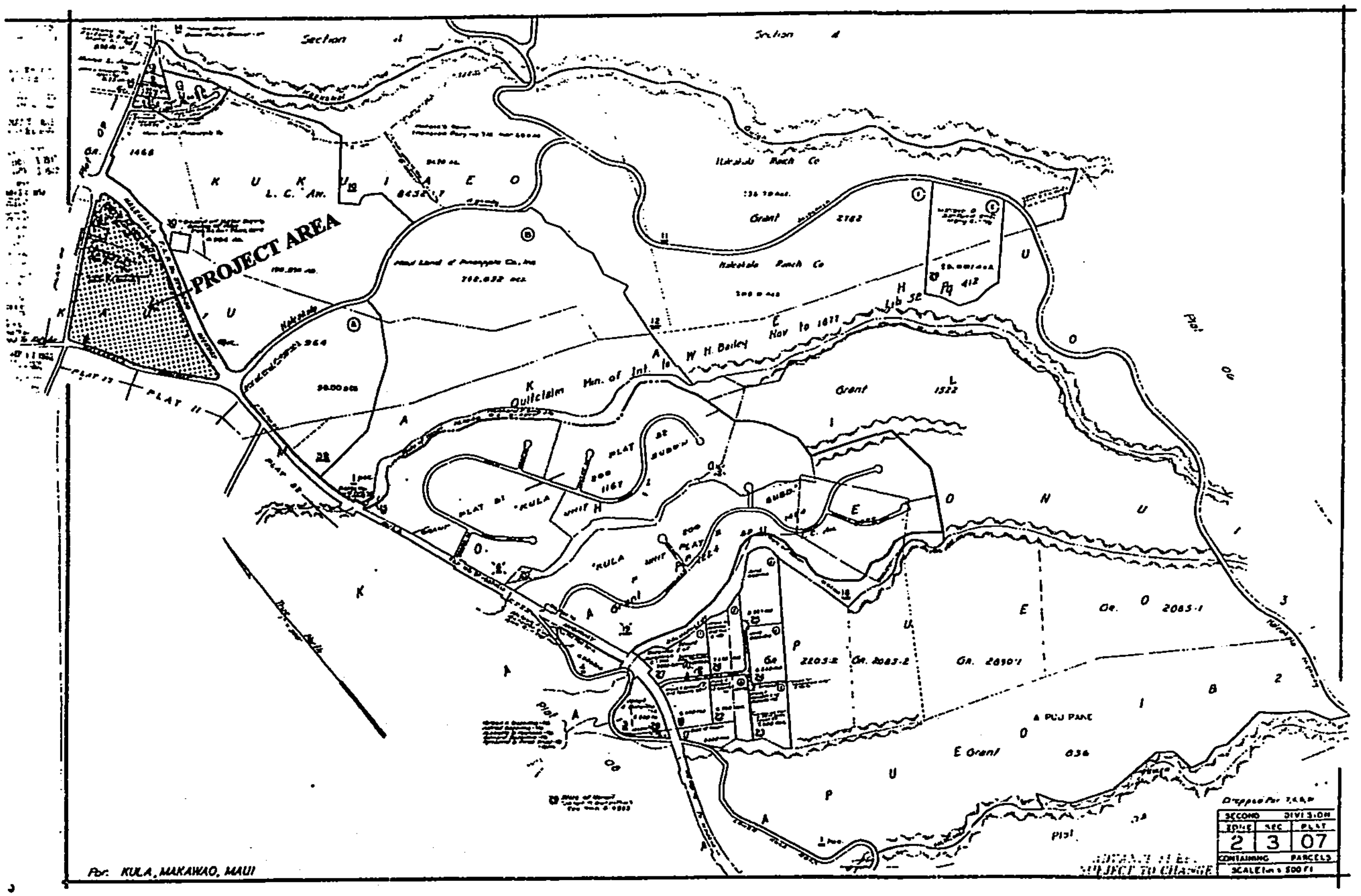


Figure 2. Project Area on TMK 2-3-07

Figure 3. (top) Overview of Project Area from Pukalani Superette Parking Lot, to south
(bottom) Overview of Lower Portion of Project Area, to northwest

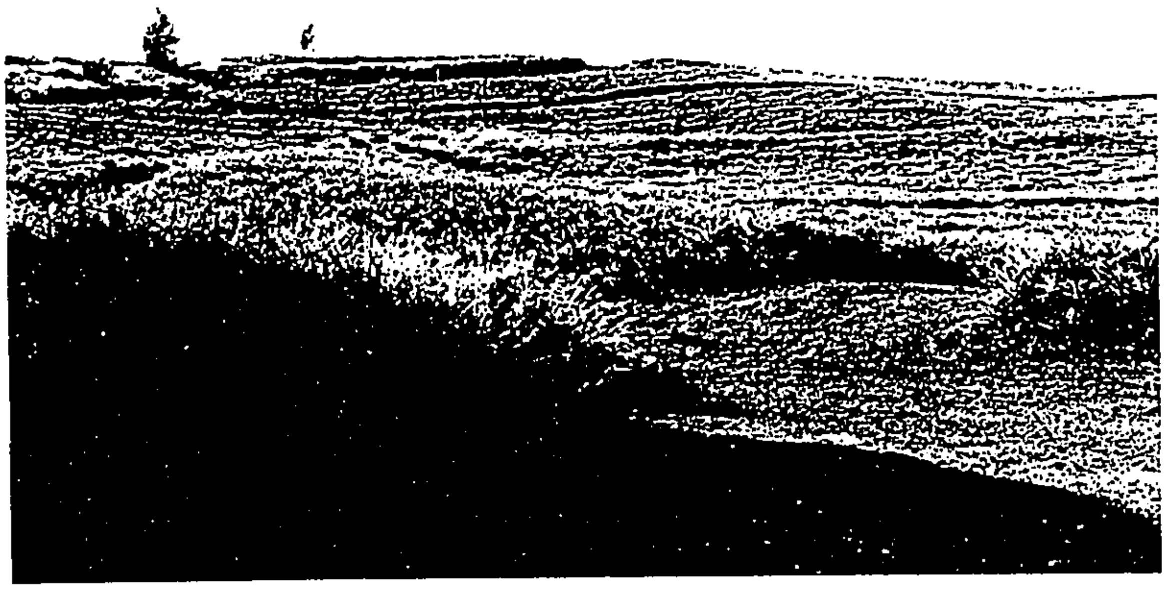
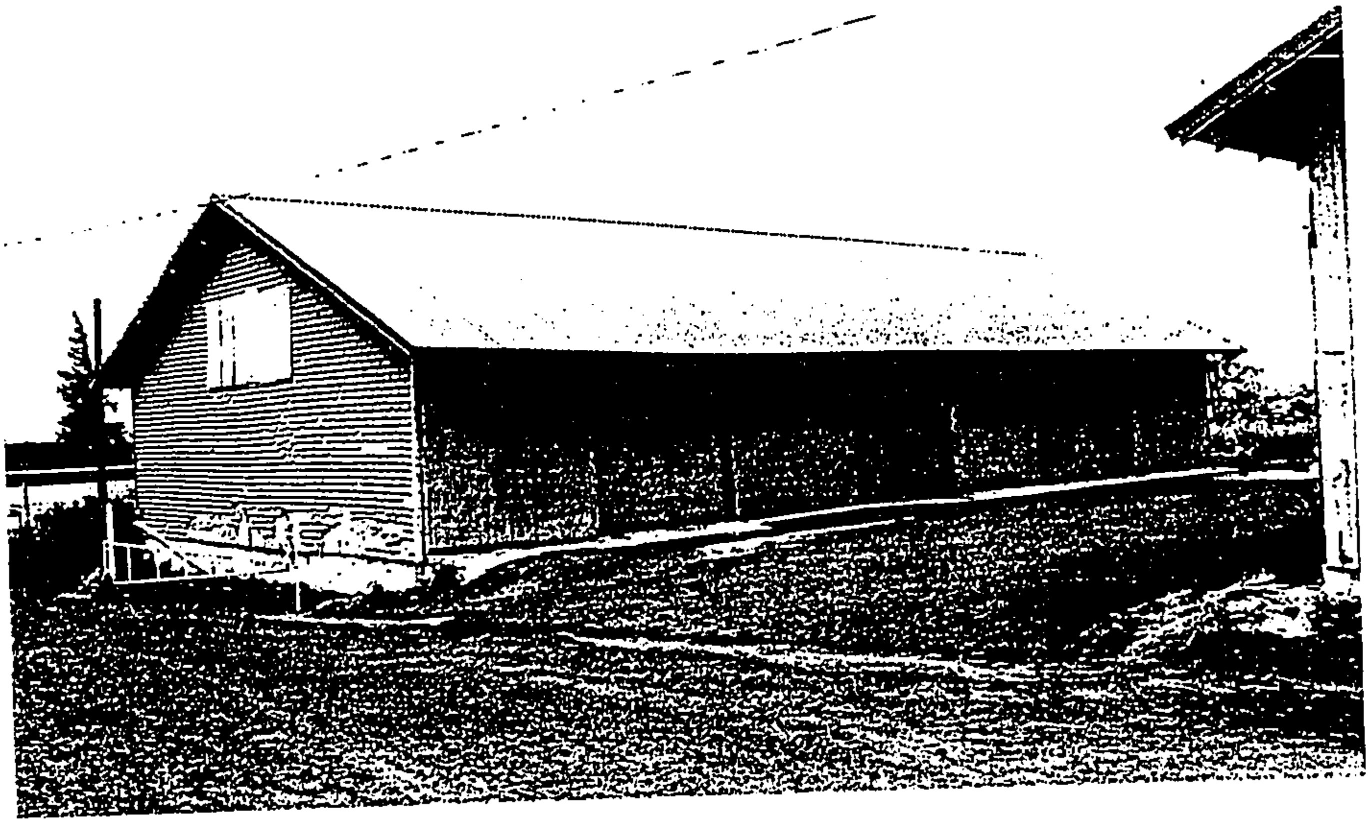


Figure 4. (top) Overview of Lower Portion of Project Area, to south
(bottom) Overview of Upper Portion of Project Area, to south

Figure 5. (top) Overview of Wai Ulu Farms at Entry, to southwest
(bottom) Overview of Stables at Wai Ulu Farms, to northwest



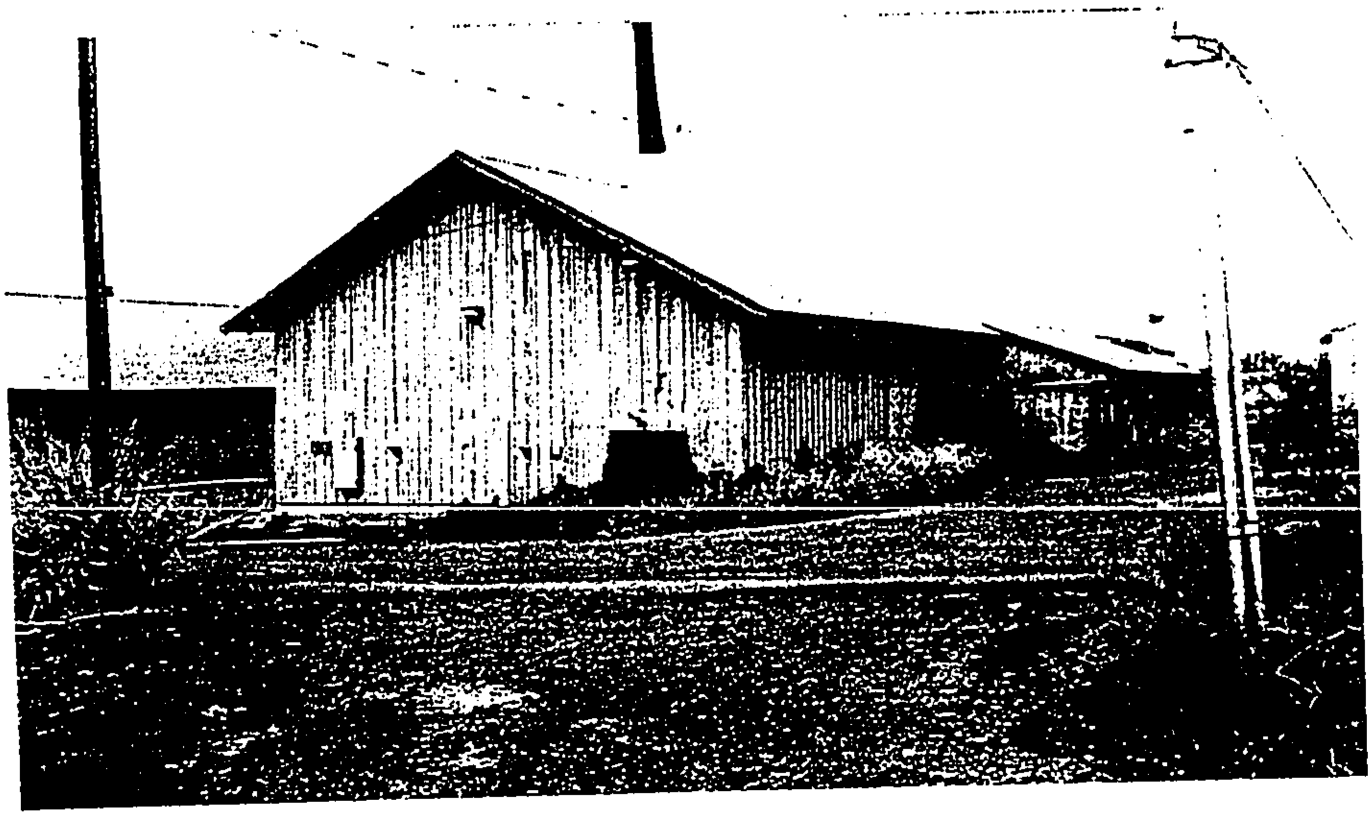


Figure 6. (top) Northern "Corn Mill Camp" Warehouse (Fe. 1), to north
(bottom) Central "Corn Mill Camp" Warehouse (Fe. 2), to northeast

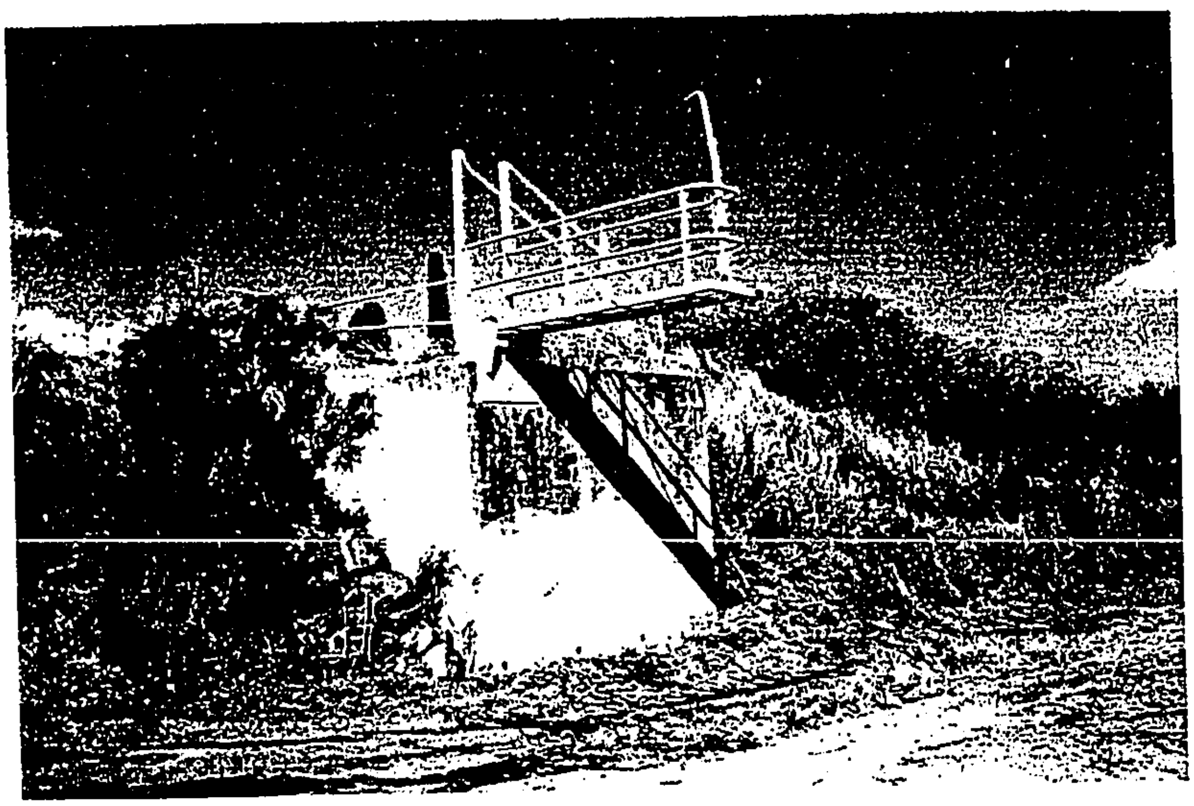


Figure 7. (top) Southern "Corn Mill Camp" Warehouse (Features 3 & 4), to east
(bottom) Corn Mill Camp Loading Dock and seed transfer site (Fe. 1) behind
Warehouses, to north.

Figure 8. (top) Wooden Water Tank (Fe. 5) on Promontory behind Warehouses, Overview to north (bottom) Remnant Concrete Footing for Another Wooden Tank (Fe. 5), to east

The bedrock in the area consists of Pleistocene Age Kula volcanic series lavas (MacDonald and Abbot 1970:321). The Haliimaile series of silty clay soils in the project area have developed in material weathered from these basic igneous rocks and are well-drained soils located on gently to strongly sloping terrain. Permeability is moderately rapid, runoff is slow and increases with the slope. The erosion hazard in this soil is high if not controlled. The surface layer is dark reddish-brown silty clay and the underlying subsoil is a dark reddish-brown silty clay and very dark grayish-brown clay. This soil is used for sugarcane, pineapple, pasture, and home-sites (Foote et al. 1972:35-36).

Currently, the flora within the project area is limited to some dry grasses; weeds; a few *kiawe* (*Prosopis pallida*), mango (*Mangifera indica*), monkey pod (*Samanea saman*), and pine (*Pinus* sp.) trees near the buildings; and *wilelaiki* or Christmas-berry (*Schinus terebinthifolius*) along the peripheral areas. Cultivated pineapple (*Ananas comosus*) dominates the majority of the project parcel.

HISTORICAL BACKGROUND

The *ahupua'a* of Makaeha, the name literally meaning "sore eyes," was once part of the old district of Kula. The boundaries depicted in the USGS quadrangle maps are most likely modern since they appear to incorporate the smaller divisions of Kukuiaeo, Kauu, Makaeha, Kohoilo, and Aapueonui. With the exception of Kukuiaeo, which is listed as an *ahupua'a* in the *Indices of Awards*, whether the three other smaller divisions were at one time considered to be *ahupua'a* or represented smaller land divisions is difficult to determine at this time. Makaeha is not a typical *ahupua'a* encompassing the uplands to the coast. It is located inland of Kailua *ahupua'a* which is cut off from the sea by Wailuku *ahupua'a* and modern district.

Background information regarding the individual land divisions are practically non-existent, thus references to Makawao and Kula will be briefly summarized here. For a more detailed historical summary, the reader is directed to Wong Smith (Appendix in Donham 1990).

Not much is known regarding the pre-contact occupation and use of this specific region. Legendary and mythological references are scarce. Seasonal resource exploitation involving the gathering and harvesting of hardwoods like *koa* (*Acacia koa*), other plants, and animals most likely took place.

Early historic land-use patterns can be considered to reflect that of the late historic period. For instance, during the late prehistoric periods, dry land agriculture, for yam and sweet potato, probably flourished. While prehistoric permanent settlements, such as those to the east and south, have not been clearly indicated in the region of the current project area, the Kula region, more to the southeast, is said to have sustained a relatively large pre-contact permanent population. As discussed by Handy and Handy in *Native Planters in Old Hawaii*:

> All the country below the west and south slopes of Haleakala, specifically Kula, Honua'ula, Kahikinui, and Kaupo, in old Hawaiian times depended on the sweet potato. The leeward flanks of Haleakala were not as favorable for dry or upland taro culture...however, some upland taro was grown up to an altitude of 3000 feet (1972:276).
>
> Kula was always an arid region, throughout its long, low seashore, vast stony *Kula* lands, and broad uplands. Both on the coast, where fishing was good, and on the lower westward slopes of Haleakala, a considerable population existed. *So far as we could learn, Kula supported no Hawaiian taro, and the fishermen in* this section must have depended for vegetable food mainly on *poi* brought from the wetlands of Waikapu and Wailuku to westward across the plain to supplement their usual sweet-potato diet. In recent times, however, Chinese taro has been raised at a considerable elevation. Kula was widely famous for its sweet-potato plantations. *'Uala* was the staple of life here (1972:510-511).

Makawao literally means "forest beginning" (Pukui and Elbert 1986). Early accounts of Makawao consist of descriptions of the area or accounts of notable events that took place. The rain of Makawao is mentioned often in poetical sayings as well as in journals of early visitors (Wong Smith in Donham 1990:A-1). The Hawaiian historian Kamakau mentioned the following event that he estimated to have taken place around 1785:

> When Kekaulike heard that Alapa'i, the ruling chief of Hawaii was at Kohala on his way to war against Maui, he was afraid and fled to Wailuku in his double war canoe named Ke-aka-milo...and the fleet landed at Kapa'ahu at the pit of 'Aihako'ko in Kula [old name for Makawao]. Here on the shore the chiefs prepared a litter for Kekaulike and bore him upland to Haleki'i in Kukahua (1961:69)

By around the 1800s, agriculture in the Kula area underwent a transformation from subsistence to commercial. The arrival of whalers created a demand for fresh produce; vegetables, meat, and fruit. The increase in the number of whaling ships after 1840 caused an increase in demand for fresh produce. Although, at first only sweet potatoes were available, but by the mid-1830s, Irish potatoes were being cultivated. Since, they were so well suited to be raised in Kula, it was soon called the "potato district" (Kuykendall 1965:313).

The Irish potato blight and the California gold rush of 1849 started a potato "boom" and an annual yield of 20,000 barrels of commercial Irish potatoes was estimated in the years between 1847 and 1854. The gold rush also created a market for potatoes, other vegetables, and sugar and molasses. The potato boom was short-lived, but sugar cane and pineapple would have a profound effect upon land-use and tenure over a large part of Maui.

Makawao was involved in an experimental program of land awards created by King Kamehameha III, prior to the Great Mahele. In 1845 and 1846, land in the Makawao District was sold for $1 per acre with the transactions being registered as grants. About 900-acres, in parcels ranging from 5 to 10 acres, were purchased by native Hawaiians. The homesteaders gained title to their lands. Much of the remaining government lands were leased to *haole* ranchers. Around this time, immigrant Chinese farmers began leasing lands in Kula, either from the Hawaiian homesteaders or from the ranchers. A sizeable Chinese population flourished in Kula by the mid-1850s.

Grant 964, consisting of 150-acres, appears to have been one of two such awards associated with the current project area. It was awarded to Kekaha on October 26, 1852, for the sum of $300.00. This grant was not part of the earlier experimental program, being executed some six years later and at twice the cost. The other is Grant 1215 to Lono that is still depicted on the project map.

Several other lands were awarded in the vicinity, but not directly associated with the project parcel. Grant 1468, in Kukuiaeo to the north of the project area to Daniel T. Conde in 1854, consisted of 115.85 acres for $188.00. LCA 8452: *apana 7*, which included all of Kukuiaeo *ahupua'a*, was awarded to A. Keohokaole, the mother of King Kalakaua, Queen Liluokalani, Miriam Likelike Cleghorn, and William Pitt Leleiohoku (2nd).

Interviews conducted with persons familiar with the operation of "Corn Mill Camp" provided much information regarding the history of the camp (Keane 1984 & 1986). The name of the camp was said to come from the cornfields that used to be in the vicinity earlier. The corn was apparently milled and fed to cattle. The Maui Pine operations of the "Corn Mill Camp" was formally started around 1932 following a merger between the Haleakala Ranch pineapple department and the Maui Agricultural Company pineapple department and formed the Haleakala Pineapple Company. Presumably, the camp was part of the Haleakala Ranch pineapple department prior to the merger. One of the warehouse buildings was a big garage where big trucks were kept to service the upcountry fields. After a while operations were centralized in Haliimaile. About 50 houses were located at "Corn Mill Camp." The residents were primarily Japanese with a few Chinese, Korean, and Hawaiian residents. After labor was unionized, many residents moved out of camp to purchase homes in the nearby areas, and the camp was closed in the early 1960s. All of the houses were demolished except for a couple that were moved to other places. One was moved to the vicinity of Camp Maui, the U.S. Marine Base in Makawao.

The Maui Land & Pineapple Company has been continuously cultivating pineapple in the area for nearly 70 years to the present time. The warehouses and other buildings present in the northern portion of the project area are associated with the "Corn Mill Camp."

PREVIOUS ARCHAEOLOGY

The number and scope of archaeological work conducted in Kula, Maui, to date have been limited. No previous archaeological studies have been undertaken within the boundaries of the current project area and no studies were required per the SHPD (see Doc 9905CD28 in Appendix B). However, several studies have been conducted in the immediate vicinity.

Paul H. Rosendahl Inc. conducted an archaeological inventory survey of five potential upcountry Maui high school sites in Haliimaile, Hokuula, Kailua, and Makaeha *ahupua'a*; Makawao District (Donham 1990). Each parcel measured approximately 35 acres and was cultivated in pineapple. Parcels 1 and 5 were located more than a mile away from the current project area. Parcel 2 is located close to the southern terminus of the project area. Parcel 3 is located adjacent to the northeast of the current project area across the Bypass Highway, and Parcel 4 is located to the north and across Makawao Avenue. No archaeological sites were identified during the survey. Four lithic artifacts, including a basalt flake, an *ulu maika* fragment, a complete basalt adz, an adz fragment, and a ceramic sherd were collected from the surface of Parcel 4. A small piece of water-worn coral and Cellana shells were observed on the surface of Parcel 3. Other cultural remains included ceramic sherds in Parcel 1, a horseshoe and metal in Parcel 2, and a complete small adz in Parcel 5. No further work was recommended for Parcels 1-3, and 5; however, additional archival work including land tenure research and cartographic sources was recommended for Parcel 4.

Donham (1992) conducted a field inspection of petroglyphs located near the Kula 200 Subdivision in Makaehu, Makawao District. These petroglyphs, on a vertical rock face along the northern bank of a gulch, were reported to the State Historic Preservation Division by a resident of the Kula 200 Subdivision. A total of 32 separate glyphs, including canoes and paddlers, long canoes with no sails, human figures, and possible lizard figures, were observed on an approximately 20 m long section of the cliff. These petroglyphs were assigned State Site Number 50-50-11-2920.

Environmental Impact Statement Corporation (Bordner 1980) conducted a reconnaissance survey of the proposed Makawao Subdivision. The project area is located northeast of the current project area between Apana Road and Kailua Gulch. No surface archaeological sites were identified during this investigation. The project area was formerly used as a plantation camp; however, no remains of this camp were observed. No further work was recommended.

Xamanek Researches conducted an inventory survey on a 1.78-acre parcel of land located in the *ahupua'a* of Hokuula, Makawao District (Fredericksen 1995). State Site 50-50-05-3929, a rock aggregation, was recorded during the survey. Two manually excavated units and one backhoe trench were excavated at this site. Historic material including metal, bottle glass, plastic and black mulch sheeting, sawn bovine bone, ceramics, kukui nut, water-worn pebbles, and marine shell were recovered from Trench #1 and Test Unit #1. Backhoe Trench #9 was excavated across the rock pile to obtain a stratigraphic profile. A three-layer stratigraphic sequence was revealed during trenching. Layers I and II were mixed with historic material, and Layer III was the basal layer absent of cultural material. A total of 22 backhoe trenches were excavated throughout the parcel. No subsurface cultural remains were encountered in these trenches. No further archaeological work was recommended at Site 3929.

Xamanek Researches conducted an archaeological inventory survey for the Kulamalu water tank and waterline improvements in Hokuula *ahupua'a*, Makawao District (Fredericksen and Fredericksen 1999). State Sites 50-50-10-4677 through 4681 were recorded during the investigation. Sites 4677 and 4680 were historic retaining walls; Site 4678 an excavated cave shelter; Site 4679 a rock shelter; and Site 4681 is a probable historic grave. All of these sites are located beyond the waterline corridor, and will not be impacted during construction of the waterline and tank. Since these sites will not be impacted by the proposed development, no further work was recommended.

SETTLEMENT PATTERN AND SITE EXPECTABILITY

The atypical configuration of Makaeha, as well as some of the surrounding *ahupua'a,* in being truncated from access to the sea, would certainly have influenced the types of sites and their distribution. As indicated by the two preceding sections, no extensive permanent settlements were indicated within this specific region until the historic period. Until that time, the prevailing land-use pattern was most likely associated with the seasonal exploitation of upland forest resources in the form of assorted plants and animals. Thus, the sites associated with such endeavors would consist of rock-shelters, small temporary habitation structures such as C-shapes, and trails. Although, the *Kula* areas further east and south were known for extensive dry-land agricultural pursuits, the current project area, in terms of elevation appeared to have been peripheral or marginal in productivity for prehistoric agricultural activities. Thus, features related to such activity would be limited in extent and consist of small plots and gardens in selected areas in the vicinity of gulches and drainages, where the terrain was more suitable. The places for religious and ceremonial activities such as *heiau* are found in neighboring *ahupua'a* such as Omaopio in corresponding elevations, but none have been recorded in Makaeha. The paucity of prehistoric period sites may also be attributable to the extensive terrain alteration that took place with the advent of large-scale commercial agricultural ventures during the historic period.

By the mid-1800s, much of the upland forests had been cleared for agriculture, both cultivation and cattle grazing. The current project area is devoid of forest trees and interspersed with exotic species associated with landscaping and/or secondary growth following large-scale clearing. Thus, the most likely cultural remains to be encountered in the study area would be historic features and artifacts associated with agricultural pursuits. Some 900 acres of homestead grants were awarded in the Makawao District in a pre-Mahele experimental program and some remains associated with such homesteads could be encountered. The remains of the "Corn Mill Camp" that were present in the area during the early part of the 1900s are still extant in the form of large warehouses and associated buildings.

METHODS

Archaeological and historical literature and documents research was undertaken, not only to gain some insight into the prehistoric and historic background of the project area, but also to enhance the predictability of the nature and extent of potential cultural resources in the subject area. When remains are encountered, interpretation would also be facilitated by the availability of appropriate baseline data. This research was conducted at the State Historic Preservation

Division (SHPD) library of the Department of Land and Natural Resources (DLNR) in Kapolei, the State Survey Office of the Department of Accounting and General Services (DAGS), the Bureau of Conveyances and Land Management Branch of DLNR, the Hawaii State Library, and the Hamilton Library at the University of Hawaii, all in Honolulu. Additional research was undertaken at the Wailuku and Kahului Public Libraries, the Maui library of the SHPD/DLNR, and the Maui Community College Library archives.

Oral informant testimony was sought from several elderly area residents and others familiar with the subject area. Informal interviews were conducted in person and through the telephone. The pertinent information from these informants is presented in the appropriate section of the current report. However, most of the oral information will be presented in the accompanying cultural assessment currently also undergoing preparation.

The initial, walk-through surface survey of the project area revealed no significant surface cultural manifestations with the exception of the warehouse buildings associated with Maui Pine's "Corn Mill Camp" operation. The ensuing subsurface testing used a CAT426C wheeled backhoe with a 24" bucket. Eleven backhoe trenches were placed in selected localities to allow representative sampling of the entire project area. Due to the presence of pineapple fields still in cultivation, the roadways in between the fields, the major access and peripheral roads, and non-cultivated areas in peripheral areas were tested. The areas currently occupied by existing businesses were avoided.

Basically the subsurface testing strategy addressed the following considerations:

1. Since the configurations of the fields change seasonally, the smaller roads in between the planting rows were tested to determine the extent of the till zone;
2. The peripheral roadways and main access roadways were tested in the hopes that these areas avoided repeated disturbances during the tilling of field areas; and
3. Uncultivated locations in peripheral areas were tested to determine whether these areas maintained subsurface integrity as well.

The location of each trench was plotted onto the project area map. A stratigraphic profile of a representative column on a trench sidewall was recorded for each trench. A color photographic record on APS format was obtained for each trench and soil colors were described in reference to Munsell color designations. Project area overviews were also photographically recorded.

The personnel consisted of Lisa Rotunno-Hazuka as project coordinator, Aki Sinoto as project director, and Jeffrey Pantaleo, M.A., as principal investigator. Fieldwork was coordinated by Archaeological Services Hawaii and the historic background research, data syntheses, report write-up, and production were completed by Aki Sinoto Consulting. All procedures followed generally accepted archaeological methods and standards. All field notes, maps, and photographs generated in connection with the current project will be curated and deposited at the Archaeological Services Hawaii office in Wailuku, Maui.

RESULTS OF SURVEY

During the initial surface assessment encompassing the total project area, no surface cultural remains other than the existing "Corn Mill Camp" buildings (State Site 50-50-06-5169) were encountered. Localities were selected for backhoe testing and eleven trenches were excavated (Fig. 9) for the purpose of sampling the subsurface conditions within the project area. No significant cultural remains, either prehistoric or historic, were encountered in any of the trenches.

T-1 was located at the northern apex of the project parcel along a small drainage. T-2 sampled an uncultivated patch of vegetation adjacent to the wooden water tank on the promontory. T-3 tested an earthen berm along the southern boundary of Wai Ulu Farms. T-4 was located between planting rows 2 and 3, counting from the northwest end of the project parcel. T-5 was located between rows 4 and 5. T-6 was located at a road junction between rows 5 and 6. T-7 was located between rows 6 and 7. T-8 was located between rows 9 and 10. T-9 was located at the southern apex of the project area. T-10 was located near the eastern periphery in a road junction. T-11 sampled an earthen embankment adjacent to the Bypass Highway at the eastern periphery.

Outcrop ridges were present in several areas. These areas were characterized by shallow till zones ranging from 0.20 to 0.50m overlying a solid bedrock substrate. Such conditions were encountered at T-1 and T-8. In other areas, surface disturbances were evidenced by the presence of fill and push overlying the till zone, such as in T-1, T-3, T-9, and T-11, all located in peripheral areas. Generally, till zones ranged from 0.40 to 0.60m in thickness overlying Layers I and II, such as in T-4, T-6, and T-10. Very deep till zones were manifest in T-5 (1.50m) and T-7 (1.10m). Saprolytic cobbles and stones were common in Layer II. Layer III, which occurred only in T-1, can probably be attributed to the sorting action of water from the proximity to the drainage. Fragments of black plastic sheeting and irrigation hoses were plentiful in the till zone and aided in defining the extent of the disturbed layer.

Table 1 presents the dimensions and stratigraphic information for each of the 11 trenches. Table 2 presents stratigraphic descriptions for each trench. Representative stratigraphic columns for T-1 through 11 are depicted on Figure 10. Figures 11-21 presents photographic overviews of each tested trench.

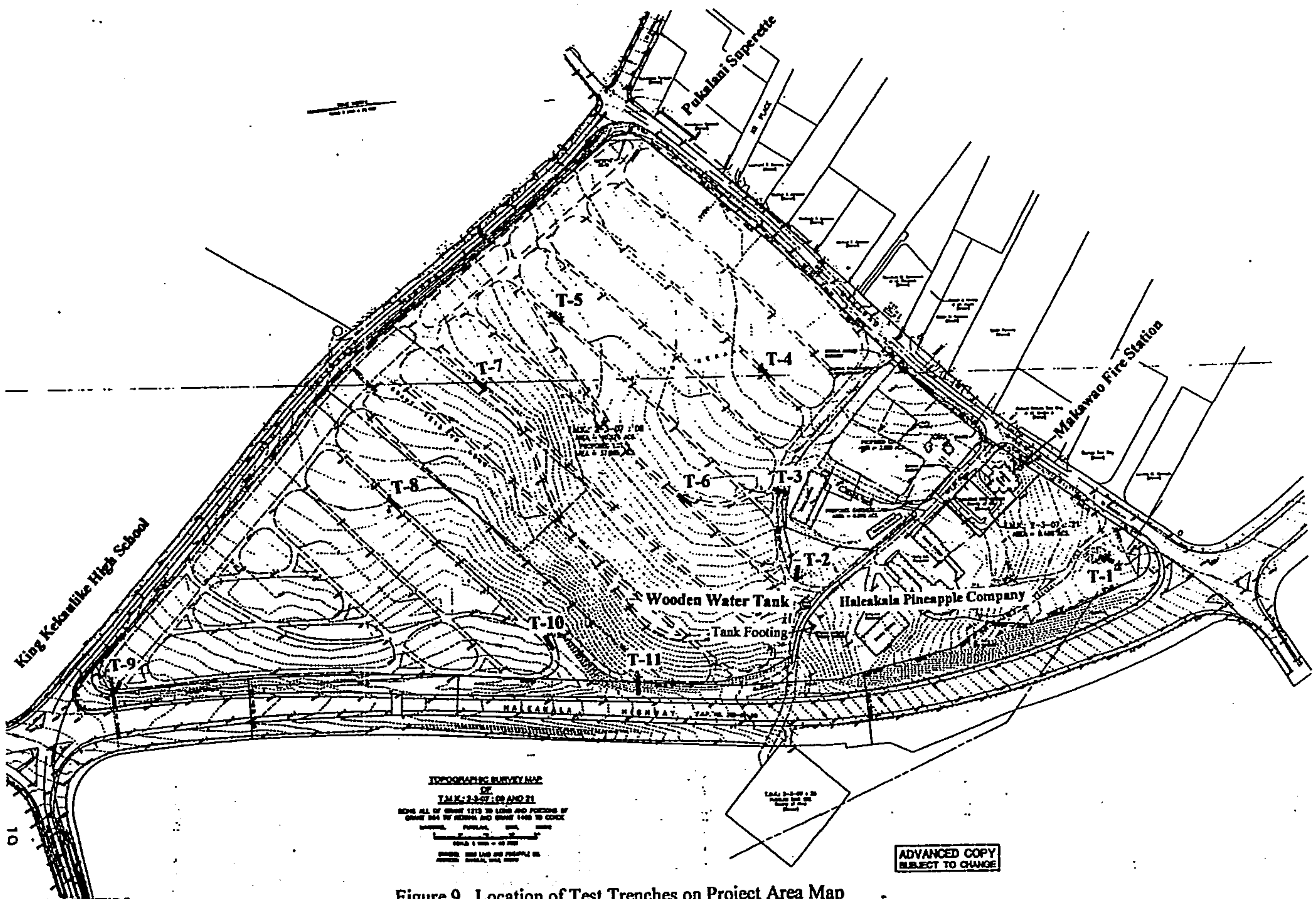


Figure 9. Location of Test Trenches on Project Area Map
(Map by Warren S. Unemori Engineering, Inc.)

Table 1. Dimensions and Stratigraphic Information for T-1 through T-11

T-	LENGTH	WIDTH	DEPTH	ORIENT.	STRATIGRAPHY	CULTURAL
1	6.0m	0.80m	1.70m	200	fill/till/I/II/III	none
2	4.0m	0.80m	0.60m	255	I/II	"
3	5.0m	0.80m	1.50m	015	till-push/I/II	"
4	5.0m	0.80m	2.50m	220	till/I/II	"
5	5.0m	0.80m	2.70m	045	till (deep)/I/II	"
6	5.0m	0.80m	2.30m	050	till/I/II	"
7	5.0m	0.80m	2.60m	220	"	"
8	5.0m	0.80m	1.20m	225	till/bedrock	"
9	5.0m	0.80m	2.00m	120	push/I/II	"
10	5.0m	0.80m	2.30m	250	till/II	"
11	6.5m	0.90m	2.80m	112	push/I/II	"

Table 2. Stratigraphic Descriptions for T-1 through T-11

T-	push/till	I	Color/Munsell	II	Color/Munsell	III	Color/Munsell	Bedrock
1	+/-	crumbly/silt	dk brown	fine silty loam	dk reddish brn	fine clay loam	dk brown	
			10YR 3/3	cobble/gravel	5YR 3/3	homogenous	7.5YR 3/2	
2	-/-	silt loam	dk brown			-		saprolytic
			5YR 3/4					10YR 4/4
3	+/+	hard clayey silt	very dk brown	clay	very dk brown	-		
		.	7.5YR 4/3	sapro-cobbles	10YR 2/2			
4	-/+	silt loam	dk reddish brn	silty clay	"	-		
		sapro-cobbles	5YR 2.5/2	gravel-cobbles	"			
5	"	silt loam	very dk brown	silty clay	"	-		
		sapro-cobbles	7.5YR 2.5/3	sapro-cobbles	"			
6	"	"	"	"	"	-		
		"	"	"	"			
7	"	"	"	"	"	-		
		"	"	"	"			
8	"	-		-		-		v dk gr brn
								10YR 3/2
9	+/-	silt loam	very dk brown	silty clay	dk reddish brn	-		
		sapro-cobbles	7.5YR 2.5/3	sapro-cobbles	5YR 2.5/2			
10	-/+	-		silty clay	black	-		
				sapro-rocks	10YR 2.5/1			
11	+/-	silt loam	dk yellwsh brn	silty clay	v dk gr brn	-		
		homogenous	10YR 3/4	sapro-cobbles	10YR 3/2			

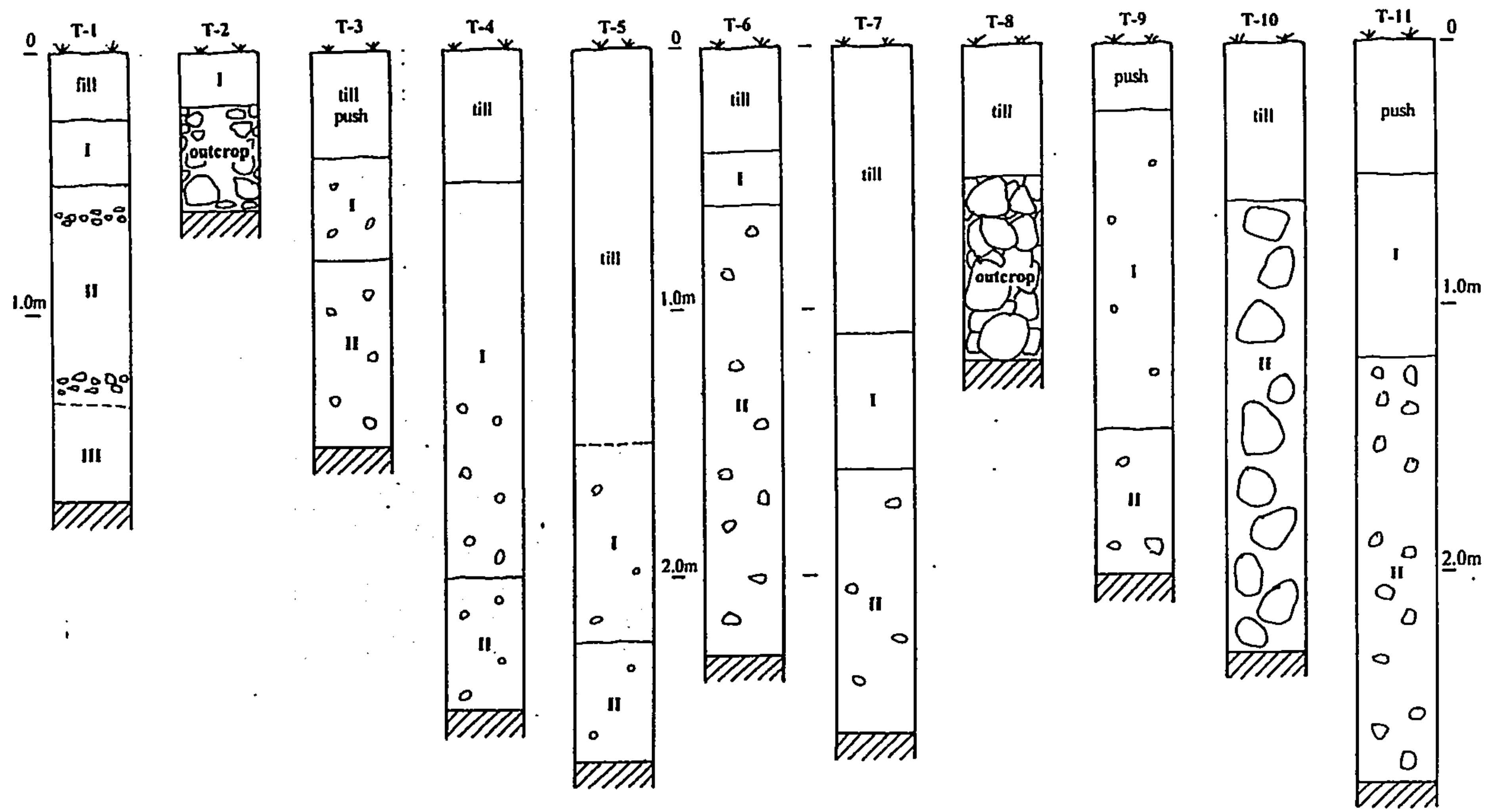


Figure 10. Representative Stratigraphic Columns

Figure 11. NW Face of T-1, to SW

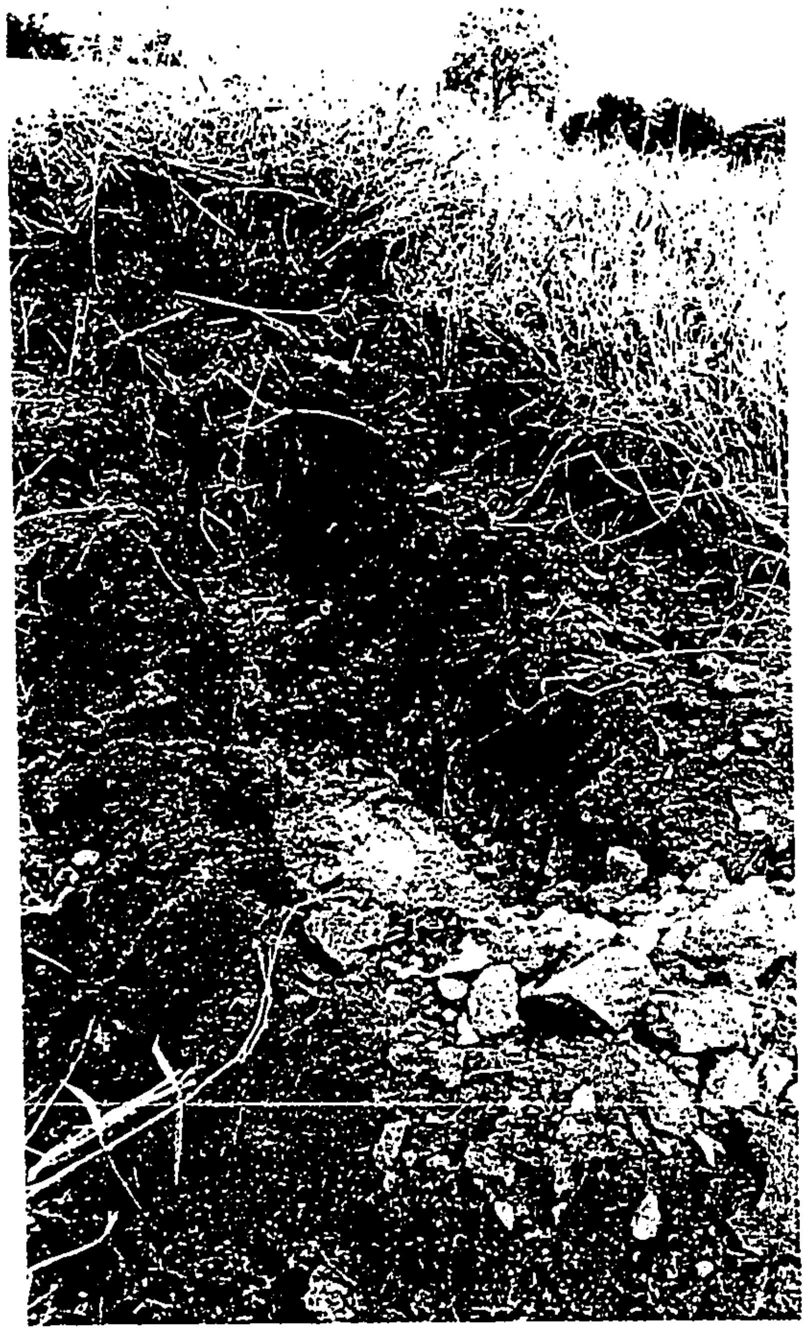


Figure 12. N Face of T-2, Note Shallow Base Rock, to West

Figure 13. W Face of T-3, to N

Figure 14. NW Face of T-4, to SW

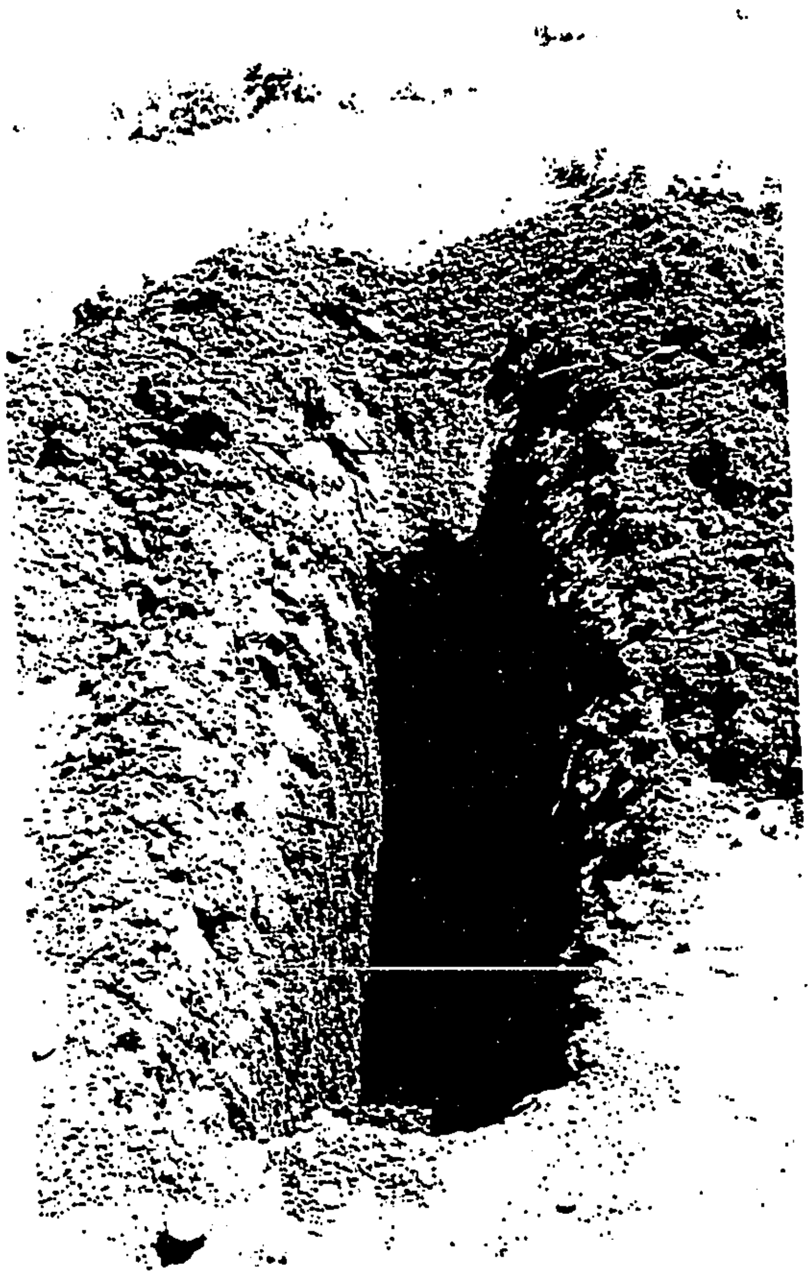


Figure 15. NW Face of T-5, to NE

Figure 16. NW Face of T-6, to SW

Figure 17. NW Face of T-7, to SW

Figure 18. NW Face of T-8, Note Shallow Bedrock, to NE

Figure 19. NE Face of T-9, to NW

Figure 20. NW Face of T-10, to SW

Figure 21. N Face of T-11, to E.

Site 50-50-06-5169

Site 50-50-06-5169 includes remnant structures associated with the "Corn Mill Camp" (Appendix A). Four structures, designated Features 1-4, are located south of the Makawao Fire Station and east of a road easement in the northern corner of the project area (Fig. 22).

Feature 1 is a rectangular structure measuring approximately 27.4 by 12.8 m. It is constructed of wood with a corrugated tin roof and concrete foundation (see Fig. 6). A corrugated tin roof was recently installed over the shingled roof. The northern exterior wall includes one window covered with corrugated tin, and the southern exterior wall includes three corrugated tin entranceways. The western exterior wall exhibits remains of shingles and a boarded window; and the eastern exterior wall exhibits remains of shingles and a concrete loading ramp. This ramp extends east to a concrete loading dock with an iron catwalk (see Fig. 7).

Feature 2, located south and parallel to Feature 1, is a structure measuring approximately 48.7 by 12.8 m (see Fig. 6). This rectangular structure, similar to Feature 1, is constructed of wood and concrete foundation with a new corrugated tin roof, but did not exhibit shingled exterior walls. Three wooden sliding doors are located along the northern wall; one wooden door and three boarded windows are located along the southern exterior wall; two windows covered with corrugated tin are located along the eastern wall; and a probable entrance is located along the lower southern end of the western exterior wall. An extension to the main building occurs along the southern wall. This extension, constructed similar to the main building, includes four boarded windows and a wood door. A separate structure is attached to the eastern end of the main building. This square building is constructed of wood with a corrugated tin roof; however, it was built on top of wooden pillars instead of a concrete foundation. The northern exterior wall exhibits a sliding wooden door and two boarded windows; the eastern exterior wall includes two boarded windows; and the southern exterior wall included a wooden door and two boarded windows. This building is currently used for storing hay, and the main building is currently occupied by the Nature Conservancy.

Feature 3 is located south of Feature 2 and adjacent to the north of Feature 4. This square structure measures approximately 12.2 by 9.1 m, is constructed of wood and corrugated tin with a corrugated tin roof and concrete foundation (see Figure 7). Two entranceways covered with corrugated tin awnings were located along the western exterior wall, and one window covered with a corrugated tin awning was located along the eastern exterior wall. Concrete stairs, constructed in 1958, lead up to each entranceway along the western side. Two windows covered with corrugated tin are located along the northern exterior wall, and two windows covered with corrugated tin are located along the southern exterior wall. This building is secured with an alarm system, and currently being used for storage.

Feature 4 is located adjacent to the south of Feature 3. This rectangular structure measures approximately 33 by 17.3 m, and is constructed of wood with a corrugated tin roof and concrete foundation (see Figure 7). Corrugated tin sliding doors and a wood door are located along the western exterior wall; but no doors or windows were observed along the northern, southern, and eastern exterior walls. A wooden open porch extends approximately 5 meters south of the southern exterior wall. This building is currently being used as a base yard for the Covic Construction Company.

Feature 5 is located southwest of Feature 4 and is a water tank. The tank is constructed of wood that is painted silver and is placed upon a concrete spiral footing. This feature will likely to be reserved for the Upcountry Town Center.

Feature 6 is just east of Feature 5 (water tank) and is the remnants of another water tank and only the spiral base remains.

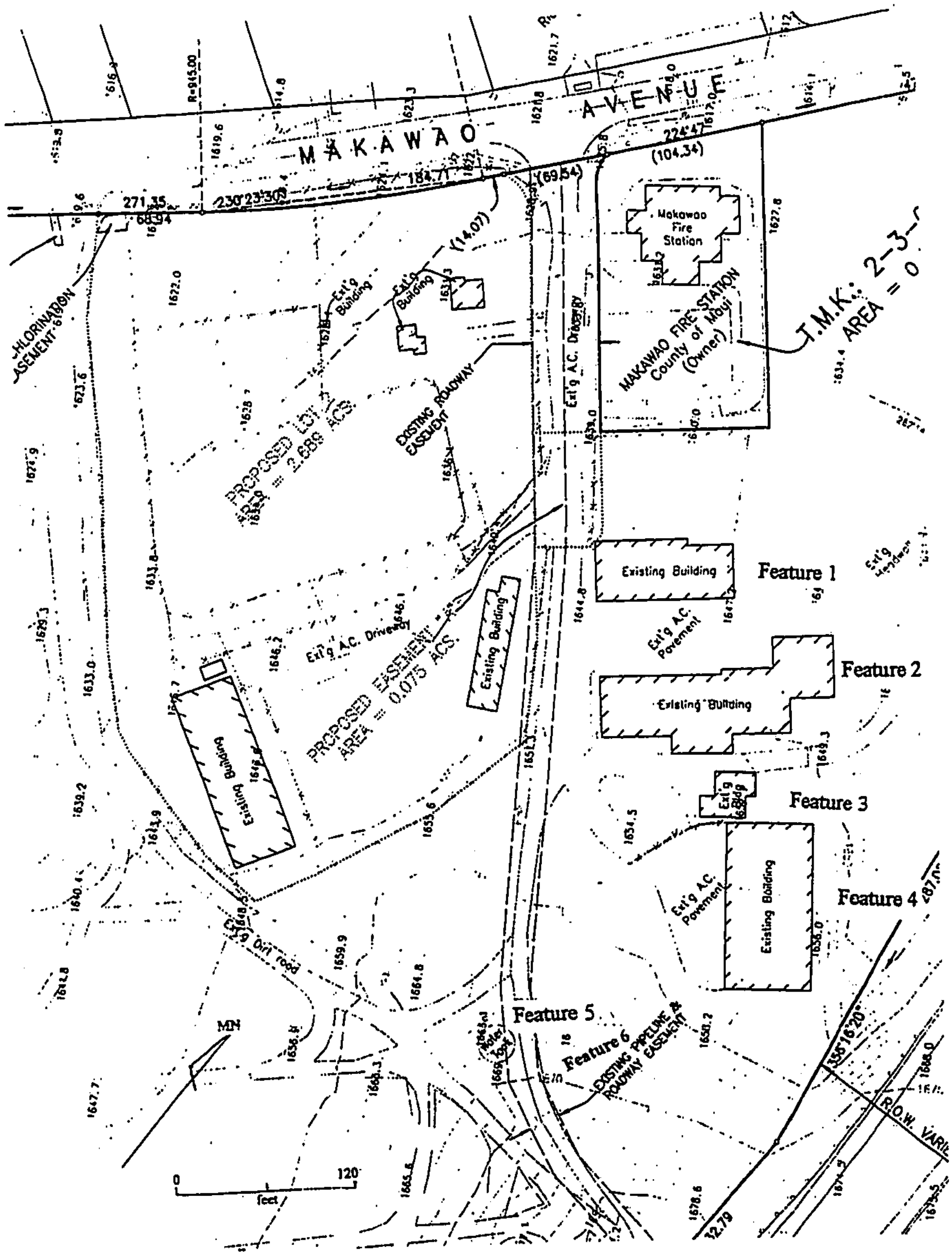


Figure 22. Plan View of Site 50-50-06-5169

DISCUSSION

The negative results of the current inventory survey indicated that the subject area was most likely not intensively utilized for habitation or agricultural activities during the prehistoric and early historic periods. The results of the background data search also supported this conclusion as well. However, with the advent of large-scale commercial agricultural activities, the adverse effects of extensive and compounded land clearing and tilling may have effectively impacted and destroyed any remains that may have once existed.

The results of the backhoe testing show that subsurface cultural remains are also absent in the areas tested. In all of the test trenches, the exposed layers were all culturally sterile. The extent of the till zone, in places exceeding well over a meter in depth, indicated the potential for extensive adverse impact on any extant subsurface remains. The complete absence of even historic portable remains, such as from the "Corn Mill Camp," demonstrated not only the effective removal of such remains during demolition, but also the compounded destructive effects of pineapple cultivation, more so than previously considered.

The existing features 1-6 associated with the former "Corn Mill Camp" are significant reminders of past commercial agricultural activities that began in the early 1920's.

INITIAL SIGNIFICANCE ASSESSMENT

An accurate determination of the actual age of the extant buildings is required in order to consider these remains to be historic (more than 50 years old) properties. Based on the results of the current investigation, Site 50-50-06-5169, buildings associated with the Corn Mill Camp, is considered significant under multiple criteria of the Hawaii Register of Historic Places including:

> **Criterion A**: This specifies association with events or broad patterns important to the history of a region, island, or Hawaii in general;
>
> **Criterion D**: This specifies that the site has yielded or has the potential to yield information significant for our understanding of traditional culture, history, prehistory, and/or foreign influences on traditional culture and history of a region, island, or Hawaii in general; and
>
> **Criterion E**: This applies to sites perceived by the contemporary community as having traditional cultural value.

RECOMMENDATIONS

The proposed development plans call for the preservation of some of the extant structures associated with "Corn Mill Camp." Unfortunately, none of the residential buildings appear to have remained. Appropriate consideration of preservation initiatives and parameters should be undertaken.

Based on the negative subsurface results of the current inventory survey; the evidence for extensive, and most likely compounded, prior disturbances over much of the parcel; considered together with the paucity of cultural remains from the neighboring areas; the project area does not appear to hold much *archaeological significance (except for the extant structures* Features *1 – 6* from the "Corn Mill Camp"). Therefore, no further archaeological procedures appear to be warranted in the currently cultivated portion of the project area and thus, are not recommended prior to commencement of development activities in those areas. However, those portions of the project areas containing Features 1- 4 should have some form of monitoring during demolition and/or development.

Should any inadvertent discoveries be made during construction, work in the immediate area should be halted, and a qualified archaeologist shall be contacted to determine the appropriate procedures.

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APPENDIX A: HISTORIC INVENTORY FORMS

Site # 50-50-06-5169, fe. 1
TMK 2-3-07:08

HISTORIC RESOURCES INVENTORY

IDENTIFICATION

1. Common Name: ____
2. Historic Name, if known: CORN MILL CAMP
3. Street or rural address: ____
   City: Pukalani Zip: ____ County: Makawao
4. Present Owner, if known: MAUI LAND AND PINEAPPLE COMPANY
   Address if different from above: ____
5. Ownership is: ___ Public ✓ Private
6. Present Use: WAREHOUSE Original Use: STORAGE
   Other Past Uses: ____

DESCRIPTION

7. Physical Appearance:
   Style: Rectangular
   Primary Exterior Building Material: ___ Stone ___ Stucco ___ Adobe ___ Other
   Wood: ___ Clapboard ___ Shiplap ✓ Vertical Board ___ Board and Batten
   ✓ Shingle ____ Other
   Roof: ___ Gable ___ Hipped ____ Other ____ Special features
   Roofing Material CORRUGATED TIN
   Roof Trim: ___ Closed Eaves ___ Overhanging Eaves ___ Brackets
   Dormers: ___ Gabled ___ Hipped ___ Shed ___ Eyelid ___ Other
   Porch: ___ Inset ___ Outset ___ Open ___ Enclosed ___ Facade length
   ___ Wraparound ___ Centered ✓ Offset
   Door: ___ Centered ___ Offset ___ Inset ___ Transom ___ Side Panels
   ___ Sidelights ___ Window Sliding ___ Other
   Windows: ___ Double-Hung ___ Sliding ___ Casement ___ Awning ___ Jalousies
   ___ Plate glass CORRUGATED TIN/boarded Other
   Number of panes: ____
   Chimney: ___ Brick ___ Concrete ___ Rock ___ Other
   Interior features: ____
   Other Features: ____

8. Approximate Property Size: Frontage 27.4 × 12.8m Depth ____
   or approximate acreage ____

9. Is the feature ✓ Altered ___ Unaltered? Note when and what alterations on back of sheet.

10. Surroundings: ___ Open Land ___ Scattered Buildings ___ Densely Built-up
    ___ Residential ✓ Commercial ___ Industrial ____ Other

11. Is the structure ✓ on its original site ___ moved ___ unknown

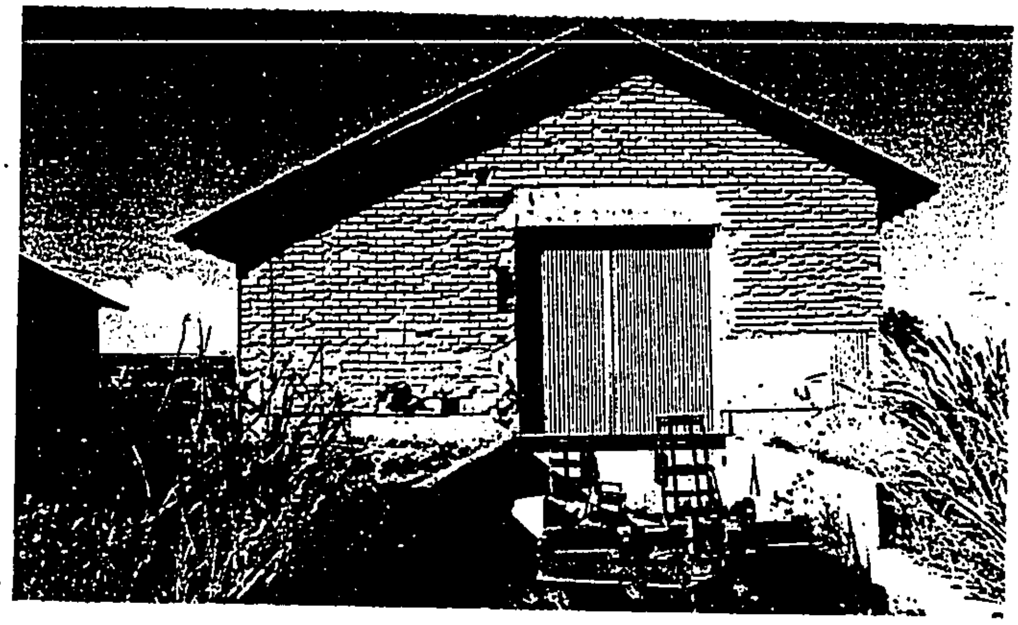
12. Year of initial construction 1932 This date is ___ factual ✓ estimated.

13. Architect (if known) Maui Land and Pineapple

14. Builder (if known) ____

15. Related features: ___ Barn ___ Carriage House ___ Outhouse ___ Shed(s)
    ___ Formal Garden(s) ___ Windmill ___ Watertower/ Tankhouse
    ___ Garage ___ Servants' or Guest House Warehouse ___ Other

16. Date of attached photograph ______________



SIGNIFICANCE

17. Briefly state historical and/or architectural importance, including dates, events, and persons associated with the site, when and what alterations have been made (if known):

Building originally built in the 1930s as part of the "Corn Mill Camp" for a warehouse. Modifications include a new roof and electricity. It is currently used for storage by a towing company.

18. Sources: List books, documents, surveys, personal interviews, and their dates:

[illegible] 1994 - 1995

CREDITS

Date form prepared [illegible] By (name): Archaeological Services Hawaii
Address: [illegible] City: Wailuku Zip: 96793
Phone: (808) 244-[illegible] Organization: ______________

STATE USE ONLY:

Site # 50-50-06-5169, fe. 2
TMK 2-3-07: 08

HISTORIC RESOURCES INVENTORY

IDENTIFICATION

1. Common Name: ______
2. Historic Name, if known: CORN MILL CAMP
3. Street or rural address: ______
   City: Pukalani Zip: ______ County: Makawao
4. Present Owner, if known: Maui Land and Pineapple Company
   Address if different from above: ______
5. Ownership is: ___ Public ✓ Private
6. Present Use: Warehouse Original Use: Storage
   Other Past Uses: ______

DESCRIPTION

7. Physical Appearance:
   Style: Rectangular
   Primary Exterior Building Material: ___ Stone ___ Stucco ___ Adobe ___ Other
   Wood: ___ Clapboard ___ Shiplap ✓ Vertical Board ___ Board and Batten
   ✓ Shingle ___ Other
   Roof: ___ Gable ___ Hipped ___ Other ___ Special features
   Roofing Material Corrugated Tin
   Roof Trim: ___ Closed Eaves ___ Overhanging Eaves ___ Brackets
   Dormers: ___ Gabled ___ Hipped ___ Shed ___ Eyelid ___ Other
   Porch: ___ Inset ___ Outset ___ Open ___ Enclosed ___ Facade length
   ___ Wraparound ___ Centered ___ Offset
   Door: ✓ Centered ___ Offset ___ Inset ___ Transom ___ Side Panels
   ___ Sidelights ___ Window sliding ___ Other
   Windows: ___ Double-Hung ___ Sliding ___ Casement ___ Awning ___ Jalousies
   ___ Plate glass Corrugated Tin / boarded Other
   Number of panes: ______
   Chimney: ___ Brick ___ Concrete ___ Rock ___ Other
   Interior features: ______
   Other Features: ______

8. Approximate Property Size: Frontage 48.7 x 12.8 m Depth ______
   or approximate acreage ______

9. Is the feature ✓ Altered ___ Unaltered? Note when and what alterations on back of sheet.

10. Surroundings: ___ Open Land ___ Scattered Buildings ___ Densely Built-up
    ___ Residential ✓ Commercial ___ Industrial ______ Other

11. Is the structure ✓ on its original site ___ moved ___ unknown

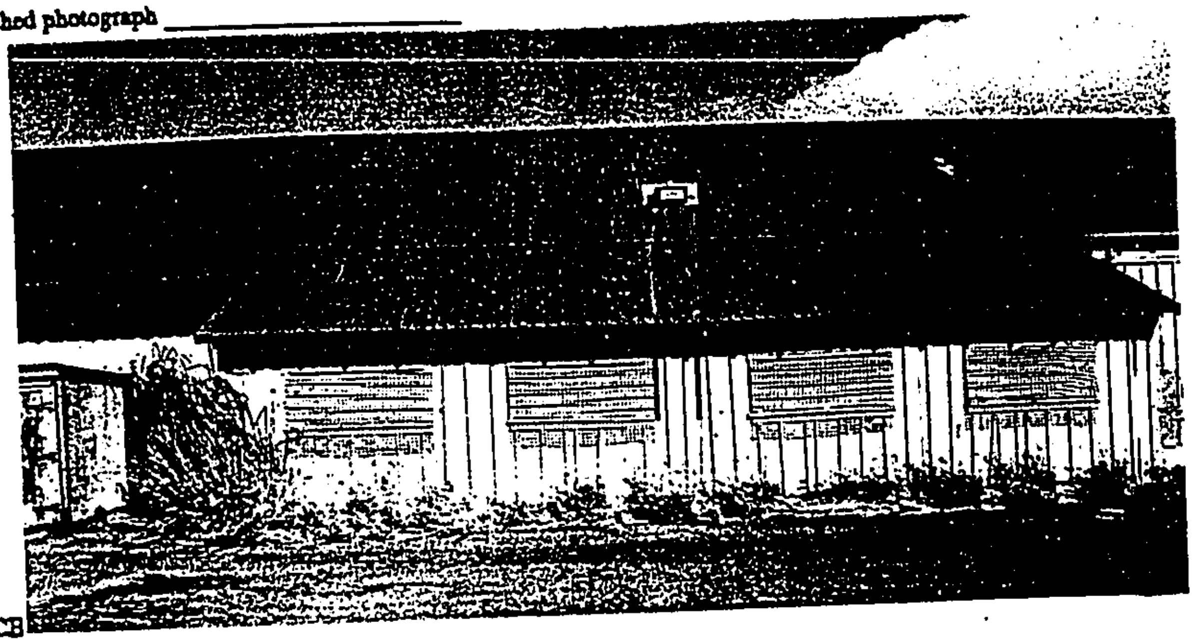
12. Year of initial construction 1932 . This date is ___ factual ✓ estimated.

13. Architect (if known) Maui Land and Pineapple

14. Builder (if known) ______

15. Related features: ___ Barn ___ Carriage House ___ Outhouse ___ Shed(s)
    ___ Formal Garden(s) ___ Windmill ___ Watertower/ Tankhouse
    ___ Garage ___ Servants' or Guest House warehouse Other

16. Date of attached photograph ____________



SIGNIFICANCE

17. Briefly state historical and/or architectural importance, including dates, events, and persons associated with the site, when and what alterations have been made (if known):

Building originally built in the 1930s as part of the "Corn Mill Camp" for a work house. Modifications include a new roof and electricity. It is currently used by the Nature Conservancy

18. Sources: List books, documents, surveys, personal interviews, and their dates:

Keane 1991 & 1996

CREDITS

Date form prepared [illegible] By (name): Architectural Services Hawaii
Address: [illegible] City: [illegible] Zip: [illegible]
Phone: [illegible] 244-[illegible] Organization: ____________

STATE USE ONLY:

Site # 50-50-06-5169, fe 3
TMK 2-3-07:08

HISTORIC RESOURCES INVENTORY

IDENTIFICATION

1. Common Name: ______
2. Historic Name, if known: Corn Mill Camp
3. Street or rural address: ______
   City: Pukalani Zip: ______ County: Makawao
4. Present Owner, if known: Maui Land and Pineapple Company
   Address if different from above: ______
5. Ownership is: ___ Public ✓ Private
6. Present Use: Storage Original Use: Storage
   Other Past Uses: ______

DESCRIPTION

7. Physical Appearance:
   Style: Square
   Primary Exterior Building Material: ___ Stone ___ Stucco ___ Adobe ___ Other
   Wood: ___ Clapboard ___ Shiplap ✓ Vertical Board ___ Board and Batten
   ___ Shingle ___ Other corrugated Tin
   Roof: ___ Gable ___ Hipped ___ Other ___ Special features
   Roofing Material Corrugated Tin
   Roof Trim: ___ Closed Eaves ___ Overhanging Eaves ___ Brackets
   Dormers: ___ Gabled ___ Hipped ___ Shed ___ Eyelid ___ Other
   Porch: ___ Inset ___ Outset ___ Open ___ Enclosed ___ Facade length
   ___ Wraparound ___ Centered ___ Offset
   Door: ✓ Centered ___ Offset ___ Inset ___ Transom ___ Side Panels
   ___ Sidelights ___ Window ___ Other
   Windows: ___ Double-Hung ___ Sliding ___ Casement ___ Awning ___ Jalousies
   ___ Plate glass : Corrugated Tin ___ Other
   Number of panes: ___
   Chimney: ___ Brick ___ Concrete ___ Rock ___ Other
   Interior features: ______
   Other Features: ______

8. Approximate Property Size: Frontage 12.2 x 9.1 m Depth ______
   or approximate acreage ______

9. Is the feature ✓ Altered ___ Unaltered? Note when and what alterations on back of sheet.

10. Surroundings: ___ Open Land ___ Scattered Buildings ___ Densely Built-up
    ___ Residential ✓ Commercial ___ Industrial ___ Other

11. Is the structure ✓ on its original site ___ moved ___ unknown

12. Year of initial construction 1930s This date is ___ factual ✓ estimated.

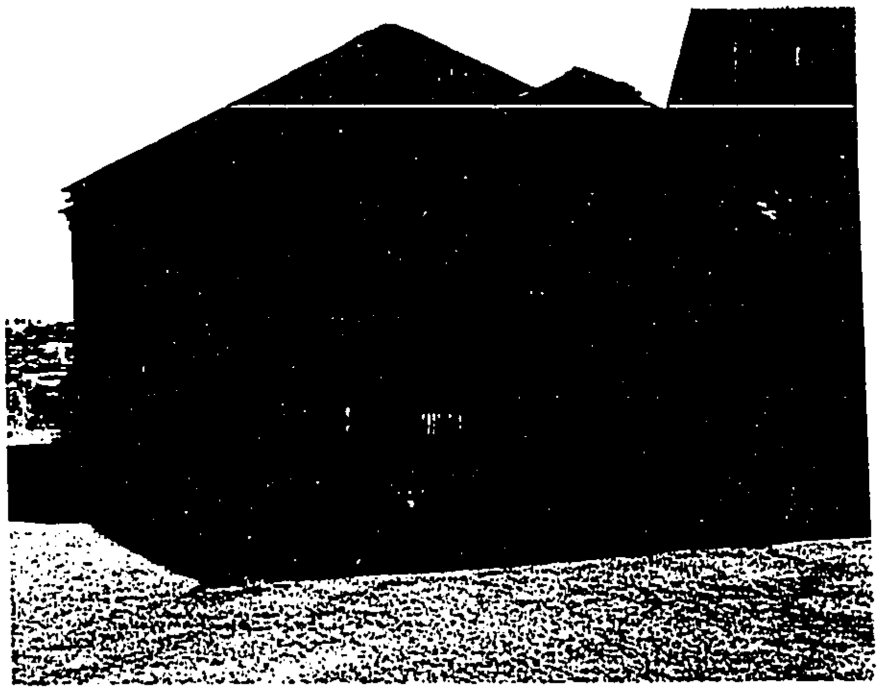
13. Architect (if known) ~~Maui~~ [illegible]

14. Builder (if known) Maui Land and Pineapple

15. Related features: ___ Barn ___ Carriage House ___ Outhouse ___ Shed(s)
    ___ Formal Garden(s) ___ Windmill ___ Watertower/ Tankhouse
    ___ Garage ___ Servants' or Guest House Warehouses Other

DOCUMENTS CAPTURED AS RECEIVED

16. Date of attached photograph



SIGNIFICANCE

17. **Briefly state historical and/or architectural importance, including dates, events, and persons associated with the site, when and what alterations have been made (if known):**

Building was originally constructed in the 1930s as part of the "[illegible] Mill Camp" for storage. Modifications include a new roof, doors and an alarm system. The concrete stairs were built in the [illegible].

18. **Sources: List books, documents, surveys, personal interviews, and their dates:**

[illegible]

CREDITS

Date form prepared [illegible] By (name): [illegible]
Address: [illegible] City: [illegible] Zip: [illegible]
Phone: [illegible] Organization:

STATE USE ONLY:

Site # 50-50-06-5169 Fe. Y
TMK 2-3-07:07

HISTORIC RESOURCES INVENTORY

IDENTIFICATION

1. Common Name:
2. Historic Name, if known: Corn Mill Camp
3. Street or rural address:
City: Pukalani Zip: County: Makawao
4. Present Owner, if known: Maui Land and Pineapple Company
Address if different from above:
5. Ownership is: ___ Public ✓ Private
6. Present Use: Baseyard Original Use: warehouse
Other Past Uses:

DESCRIPTION

7. Physical Appearance:
Style: Rectangular
Primary Exterior Building Material: ___ Stone ___ Stucco ___ Adobe ___ Other
Wood: ___ Clapboard ___ Shiplap ✓ Vertical Board ___ Board and Batten
___ Shingle ___ Other Corrugated Tin
Roof: ___ Gable ___ Hipped ___ Other ___ Special features
Roofing Material Corrugated Tin
Roof Trim: ___ Closed Eaves ___ Overhanging Eaves ___ Brackets
Dormers: ___ Gabled ___ Hipped ___ Shed ___ Eyelid ___ Other
Porch: ___ Inset ___ Outset ✓ Open ___ Enclosed ___ Facade length
___ Wraparound ___ Centered ___ Offset
Door: ✓ Centered ___ Offset ___ Inset ___ Transom ___ Side Panels
___ Sidelights ___ Window corrugated Tin/wood Other
Windows: ___ Double-Hung ___ Sliding ___ Casement ___ Awning ___ Jalousies
___ Plate glass ___ Other
Number of panes:
Chimney: ___ Brick ___ Concrete ___ Rock ___ Other
Interior features:
Other Features:

8. Approximate Property Size: Frontage 33 x 17.3 m Depth
or approximate acreage

9. Is the feature ✓ Altered ___ Unaltered? Note when and what alterations on back of sheet.

10. Surroundings: ___ Open Land ___ Scattered Buildings ___ Densely Built-up
___ Residential ✓ Commercial ___ Industrial ___ Other

11. Is the structure ✓ on its original site ___ moved ___ unknown

12. Year of initial construction 1932 This date is ___ factual ___ estimated.

13. Architect (if known)

14. Builder (if known) Maui Land and Pineapple Company

15. Related features: ___ Barn ___ Carriage House ___ Outhouse ___ Shed(s)
___ Formal Garden(s) ___ Windmill ___ Watertower/ Tankhouse
___ Garage ___ Servants' or Guest House Warehouse Other

16. Date of attached photograph ______________

SIGNIFICANCE

17. Briefly state historical and/or architectural importance, including dates, events, and persons associated with the site, when and what alterations have been made (if known):

Building was originally constructed in the 1930s as part of the "Corn Mill Camp" for storage. Modifications include a new roof and doors.

This was the truck Shed - used for Storage of Supply trucks when rain would Get Bags wet - originally had no doors. per Doug McElvre

18. Sources: List books, documents, surveys, personal interviews, and their dates:

[illegible]

CREDITS

Date form prepared [illegible] By (name): Archaeological Services Hawaii [illegible]
Address: [illegible] City: [illegible] Zip: [illegible]
Phone: [illegible] Organization: ______________

STATE USE ONLY:

APPENDIX B

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

TIMOTHY E. JOHNS, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
JANET E. KAWELO

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

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

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

RECEIVED
JUN 8 1999
LAND USE & CODES ADM.
COUNTY OF MAUI

May 28, 1999

Mr. Glen Ueno
Department of Public Works and Waste Management
Land Use & Codes Administration
250 South High Street
Wailuku, Hawaii 96793

LOG NO: 23507
DOC NO: 9905CD28

Dear Mr. Ueno:

SUBJECT: Historic Preservation Review of a Preliminary Plat Review for the Pukalani Triangle Subdivision (File No. 2.2518)
Maka'ehu Ahupua'a, Makawao District, Island of Maui
TMK: 2-3-07:008 por.

Thank you for the opportunity to comment on this project, which we understand from the submitted preliminary plat, consists of the consolidation of Grant 1215 to Lono and a portion of parcel 8 and resubdivision of Lot 1 (37.885 acres) and Lot 2 (2.689 acres) and designation of easement A. Our review is based on reports, maps and aerial photographs maintained at the State Historic Preservation Office; no field inspection was made of the subject property.

A search of our records reveals that during the 1800s, the subject parcel was part of historic land grants issued for ranching purposes and it was the location of a plantation camp that was destroyed in the 1930s or '40s. Based on aerial photos from the late 1970s, it appears that the proposed project area has been extensively altered by twentieth century commercial pineapple cultivation making it unlikely that significant historic sites have survived. Therefore we believe that this project will have "no effect" on significant historic sites.

Please call Cathleen Dagher at 692-8023 if you have any questions.

Aloha,

Don Hibbard, Administrator
State Historic Preservation Division

CD:jen

Appendix E

Cultural Impact Assessment: The Proposed Phased Development of the Pukalani Triangle

ASC0112-1

CULTURAL IMPACT ASSESSMENT

THE PROPOSED PHASED DEVELOPMENT
OF THE PUKALANI TRIANGLE
MAKAEHA *AHUPUA'A*, MAKAWAO, MAUI

(TMK 2-3-07:08)

by

Aki Sinoto

for

Maui Land and Pineapple Company, Inc.
P.O. Box 187
Kahului, Maui, Hawaii
96732-0187

December 2001

Aki Sinoto Consulting
2333 Kapiolani Blvd. #2704
Honolulu, Hawaii 96826

ASC0112-1

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TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

The current cultural impact assessment was prepared in conjunction with an archaeological inventory survey undertaken by Aki Sinoto Consulting of Honolulu in association with Archaeological Services Hawaii of Wailuku. Both procedures were conducted in support of fulfilling regulatory requirements for a phased development of commercial and community-oriented components in a parcel of land known as the "Pukalani Triangle," being proposed by the owner, Maui Land and Pineapple Company, Inc. (MLP).

PROJECT LOCATION

The project area, encompassing 40.574-acres, is situated in Pukalani, Makaeha *ahupua`a*, Makawao District, Maui Island (Fig. 1). The triangular parcel (TMK 2-3-07:08), currently still being used for pineapple cultivation, is bounded on the northwest by Makawao Avenue, on the southwest by Old Haleakala Highway, and on the east by the Pukalani Bypass (new Haleakala) Highway (Fig. 2). Across the respective boundaries, the Pukalani Superette and existing residential lots are located along Makawao Avenue, existing residential lots are also located along the old Haleakala Highway, and open land occupies the eastern side of the new Haleakala Highway. King Kekaulike High School is located across the intersection of Haleakala and Kula Highways at the southern terminus of the project area. The existing Makawao Fire Station is situated in a parcel fronting Makawao Avenue near the northern corner of the project area. Waiulu Farms, an existing stable and feed store, is located adjacent to the fire station across the paved access road. Several remnant warehouse buildings, from the "Corn Mill Camp" era , located behind (southeast) the fire station, are occupied by the Cremer Construction Company. On a promontory overlooking the northern portions of the parcel, located south of the warehouses, is a functioning wooden water tank. Located west of the tank and unpaved road is the remnant base for another water tank.

MANDATE AND METHODS

This cultural impact assessment follows the methodology and protocol as set forth by the OEQC's *Guidelines for Assessing Cultural Impacts* (November 19, 1997) in meeting Section 343-2 (recently amended by Act 50) of the Hawaii Revised Statutes. This and other statutes, regulations, and laws stipulate the promotion and preservation of cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups. Information obtained through the conduct of informant interviews and other pertinent research was initially used to gauge the levels of current cultural use of the subject area and subsequently applied towards assessing the

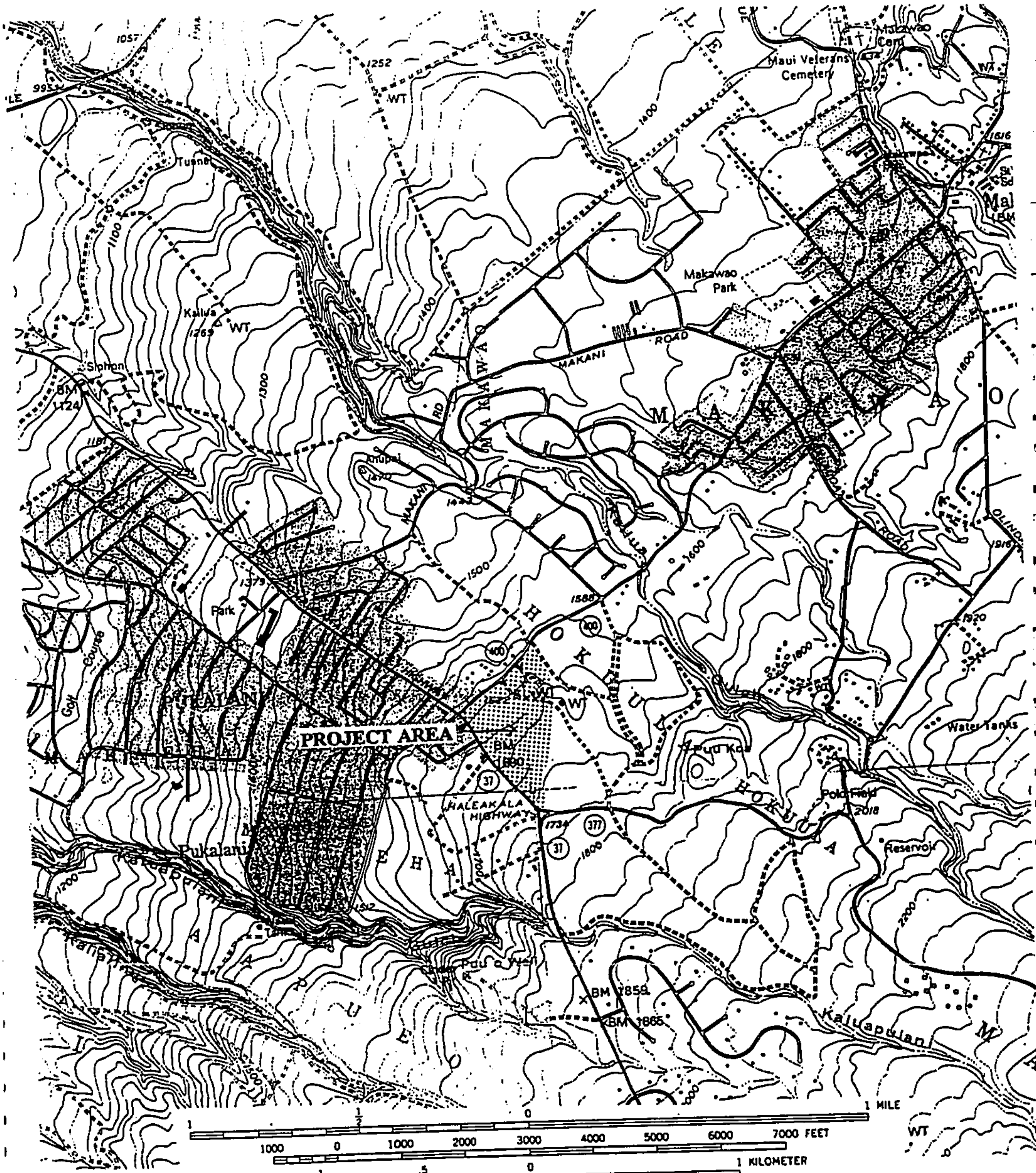

Figure 1. Project Area on USGS Paia, Haiku, Kilohana, and Puu O Kali Quadrangles

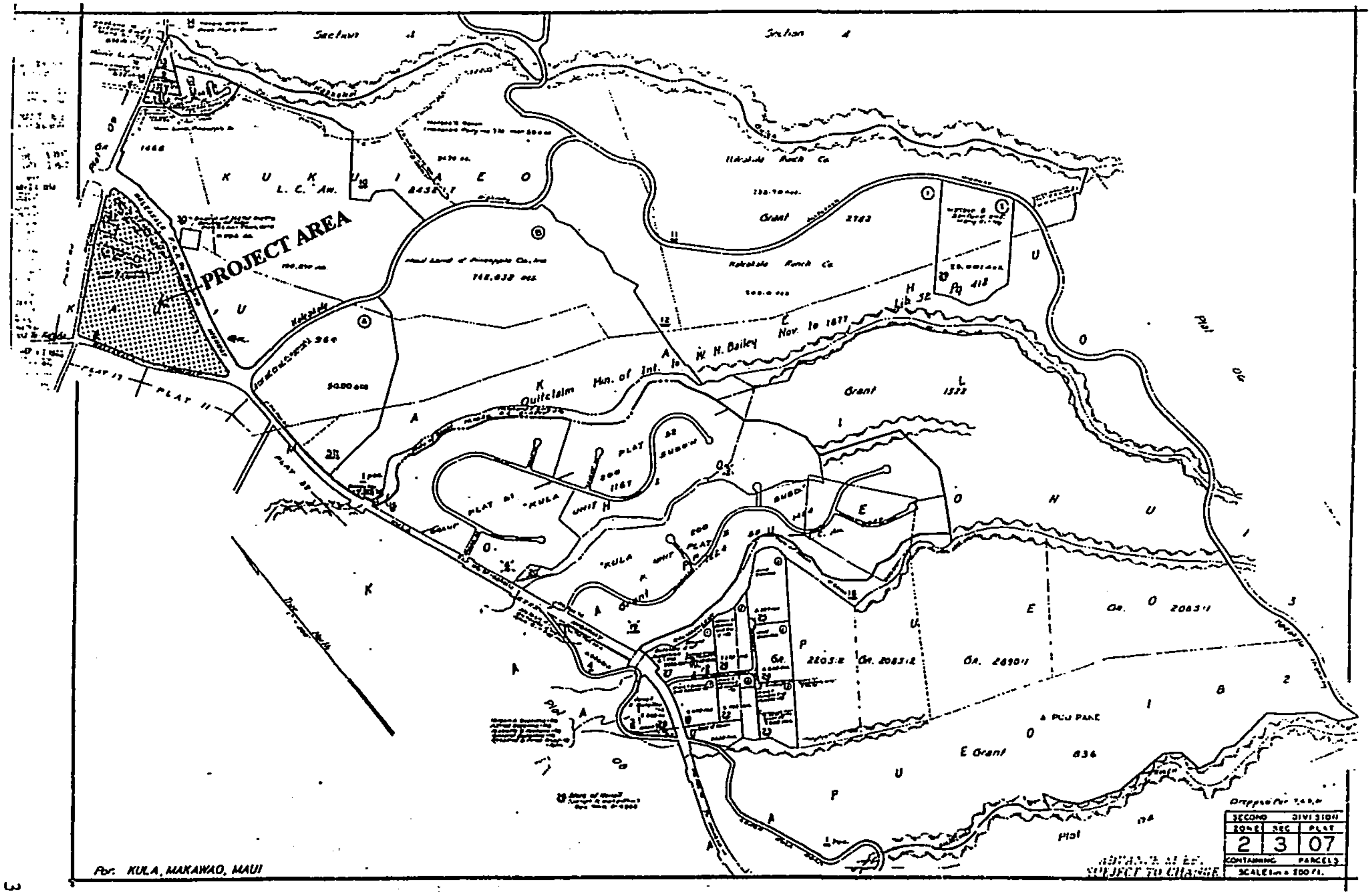

Figure 2. Project Area on TMK 2-3-07

potential impact of the proposed development to existing cultural practices and beliefs. The tasks undertaken included:

1) identifying individuals with expertise regarding the cultural practices and beliefs of the area,
2) conducting informal interviews with identified individuals,
3) conducting documentary research,
4) identifying the resources, practices, and beliefs within the project area, and
5) evaluating the impact of the proposed development and recommend mitigative measures, as warranted.

Initially, Mr. Charles Maxwell, Chairperson of the Maui and Lana'i Island Burial Council and resident of Pukalani, was contacted for references to individuals recommended for consultation. Several names were provided by Mr. Maxwell including that of his wife, who is a well-known *kumu hula* from the subject region. During the course of the various interviews, others were identified and a total of eleven individuals were contacted. Out of this number, six individuals provided pertinent information and primary accounts relevant to the assessment during telephone interviews. Also, information gleaned from transcripts of two interviews that were conducted in 1984 and 1985 by MLP has also been included here.

Literature and historic documents review were conducted in conjunction with this study and the inventory survey. Materials available at the State Historic Preservation Division library in Kapolei; the Department of Accounting and General Services Survey Office, The Department of Land and Natural Resources Bureau of Conveyances, the Hawaii State Library, and the Hamilton Library at UH Manoa, all in Honolulu; and the Maui Community College Library in Wailuku were reviewed.

HISTORICAL BACKGROUND

The *ahupua'a* of Makaeha, the name literally meaning "sore eyes," was once part of the traditional *moku*, or district of Kula. The boundaries depicted in the USGS quandrangle maps are most likely modern since they appear to incorporate the smaller land divisions of Kukuiaeo, Kauu, Makaeha, Kohoilo, and Aapueonui. With the exception of Kukuiaeo which is listed as an *ahupua'a* in the *Indices of Awards* (1929), whether the three other smaller land divisions were at one time considered to be *ahupua'a* or represented smaller land divisions, such as *'ili*, is difficult to confirm. Makaeha is not a typical *ahupua'a* encompassing the uplands to the coast. It is located inland of Kailua *ahupua'a* which is cut off from the sea by the *ahupua'a* and district of Wailuku.

The current level of documentary research showed background information regarding the individual land divisions to be practically non-existent, thus references to the more broader regions of Makawao and Kula will be briefly summarized here. More detailed historical summaries have been included elsewhere (ie. Wong-Smith in Donham 1990).

Relevant portions of the oral accounts given by various informants have been incorporated into some of the following sections, especially for the ranching and pineapple periods.

Prehistoric Period

Not much is known regarding the pre-contact occupation and use of this specific area. Legendary and mythological references are scarce. Seasonal resource exploitation involving the gathering and harvesting of hardwoods like *koa* (*Acacia koa*), other plants, and animals most likely took place. Many of the traditional proverbs or sayings regarding the region refer to the climate and also appear to make fun of the land-locked nature of the area. Two examples of each such sayings are presented below:

> **Ka ua 'Ukiu o Makawao.**
> *The 'Ukiu rain of Makawao.*
> Refers to Makawao, Maui. (Pukui 1983:173)
>
> **Keiki holoholo kuaua o Makawao.**
> *The lad of Makawao who goes about in the rain.*
> Said of a native of that place who is not afraid of being wet. (Pukui 1983:184)
>
> **Kula unahi pikapika he'e.**
> *Kula people, scalers of the suckers of the tentacles of the octopus.*
> Said in fun of the people of Kula, Maui. A Kula chiefess who lived inland did not know what the suckers on an octopus were and tried to scale them as one scales fish. (Pukui 1983:205)
>
> **O Kula I ka hoe hewa.**
> *Kula of the ignorant canoe-paddlers.*
> Said of Kula, Maui, whose people did not know how to paddle canoes because they were uplanders. (Pukui 1983:270)

No archaeological sites have been recorded in the immediate vicinity of the project area. The Hamakua Burial Cave (Site 50-50-05-1264) is located along the edge of Kalialinui Gulch at the southwestern periphery of Pukalani Town, over a mile west of the project area. An inventory survey conducted for the potential locations for an upcountry Maui high school in five neighboring areas recovered several traditional lithic artifacts including flake tools, adze fragments, and an ulumaika as well as an assortment of historic period china fragments and metal tools (Donham 1990). The paucity of extant structural remains may be attributed to the extent and duration of commercial pineapple cultivation in the area. A number of known *heiau* sites are located in Omaopio and Aapueo.

Early Historic Period

Later historic land-use patterns in the region may reflect those of the early historic period. For instance, during the late prehistoric periods, dry land agriculture, for yam and sweet potato, probably flourished. While prehistoric permanent settlements, such as those to the east and south, have not been clearly indicated in the region of the current project area, the *kula* region, more to the southeast, is said to have sustained a relatively large pre-contact permanent population. As discussed by Handy and Handy in *Native Planters in Old Hawaii*:

> All the country below the west and south slopes of Haleakala, specifically Kula, Honua`ula, Kahikinui, and Kaupo, in old Hawaiian times depended on the sweet potato. The leeward flanks of Haleakala were not as favorable for dry or upland taro culture...However, some upland taro was grown up to an altitude of 3000 feet (1972:276).
>
> Kula was always an arid region, throughout its long, low seashore, vast stony *kula* lands, and broad uplands. Both on the coast, where fishing was good, and on the lower westward slopes of Haleakala, a considerable population existed. So far as we could learn, Kula supported no Hawaiian taro, and the fishermen in this section must have depended for vegetable food mainly on *poi* brought from the wet lands of Waikapu and Wailuku to westward across the plain to supplement their usual sweet-potato diet. In recent times, however, Chinese taro has been raised at a considerable elevation. Kula was widely famous for its sweet-potato plantations. *`Uala* was the staple of life here (1972:510-511).

Makawao, literally means "forest beginning" (Pukui and Elbert 1986). Early accounts of Makawao consist of descriptions of the area or accounts of notable events that took place. The rain of Makawao is mentioned often in poetical sayings as well as in journals of early visitors (Wong Smith in Donham 1990:A-1). The Hawaiian historian Kamakau mentioned the following event that he estimated to have taken place around 1785:

> When Kekaulike heard that Alapa`i, the ruling chief of Hawaii was at Kohala on his way to war against Maui, he was afraid and fled to Wailuku in his double war canoe named Ke-aka-milo...and the fleet landed at Kapa`ahu at the pit of `Aihako`ko in Kula [old name for Makawao]. Here on the shore the chiefs prepared a litter for Kekaulike and bore him upland to Haleki`i in Kukahua (1961:69)

The Advent of Commercial Agriculture

By around the 1800s, agriculture in the Kula area underwent a transformation from subsistence to commercial. The arrival of whalers created a demand for fresh produce; vegetables, meat, and fruit. The increase in the number of whaleships after 1840 caused an increase in demand for fresh produce. Although, at first only sweet potatoes were available, by the mid-1830s, Irish potatoes were being cultivated. Since, they were so well-suited to Kula, it was soon called the "potato district" (Kuykendall 1965:313). The Irish potato blight and the California gold rush of 1849 started a potato "boom" and an annual yield of 20,000 barrels of commercial Irish potatoes was estimated in the years between 1847 and 1854. The gold rush also created a market for potatoes, other vegetables, and sugar and molasses. The potato boom was short-lived, but sugar cane and pineapple would have a profound effect upon land-use and tenure over a large part of Maui.

The Mahele Period

Makawao was involved in an experimental program of land awards created by King Kamehameha III, prior to the Great Mahele. In 1845 and 1846, land in the Makawao District was sold for $1 per acre with the transactions being registered as grants. About 900-acres, in parcels ranging from 5 to 10 acres, were purchased by native Hawaiians. The homesteaders gained title to their lands. Much of the remaining government lands were leased to *haole* ranchers. Around this time, immigrant Chinese farmers began leasing lands in Kula, either from the Hawaiian homesteaders or from the ranchers. A sizeable Chinese population flourished in Kula by the mid-1850s.

Grant 964, consisting of 150-acres, appears to have been one of two such awards associated with the current project area. It was awarded to Kekaha on October 26, 1852, for the sum of $300.00. This grant was not part of the earlier experimental program, being executed some six years later and at twice the cost. The other is Grant 1215 to Lono that is still depicted on the project map.

Several other lands were awarded in the vicinity, but not directly associated with the project parcel. Grant 1468, in Kukuiaeo to the north of the project area to Daniel T. Conde in 1854, consisted of 115.85-acres for $188.00. LCA 8452: *apana* 7, which included all of Kukuiaeo *ahupua'a*, was awarded to A. Keohokaole, the mother of King Kalakaua, Queen Liliuokalani, Miriam Likelike Cleghorn, and William Pitt Leleiohoku (2nd).

Ranching and Commercial Pineapple Cultivation

The project area was under the management of Haleakala Ranch During the early 1900s. According to one of the informants, Mr. Frank Gouveia who was a carpenter at Corn Mill Camp, prior to pineapple cultivation, the Pukalani area was pasture for Haleakala and Grove ranches. Cattle ranching and pineapple cultivation were the main activities. Several of the informants suggested that the "Corn Mill Camp" got its name from this period when corn was being grown by the Rice family with a corn mill in Kula, but no confirmation of this was found during the current research. None of those interviewed saw a mill in operation. The ranch also cultivated pineapple with fields and facilities in the Makawao area. Most of the buildings at the Corn Mill

Camp were built by the Haleakala Ranch. According to several of the informants that lived at the camp, including Mr. Mitsugu Jio who moved to the camp in 1926, most of the cottages and facilities were already there, including the large warehouse-type buildings that still exist today. He recalled that the Club House or Social Hall was built later. In 1932, according to Mr. Henry Baldwin, the former superintendant of Corn Mill Camp, the Maui Pineapple Company was formed as a result of a merger between the pineapple departments of Haleakala Ranch and Maui Agricultural Company. He also stated that some of the residents of the camp were former ranch employees, including cowboys.

Corn Mill Camp

The Corn Mill Camp was situated mainly within the current project parcel, but some of the cottages and the baseball field extended across the current Pukalani Bypass Highway. The camp consisted of about 30 houses with associated common structures as well as several support buildings for the pineapple operations, a total of over a hundred structures (Fig 3). During its peak, the camp was occupied by about 50 Japanese families. One unique aspect of Corn Mill Camp was a boarding house facility in which unmarried male workers, some Filipino, lived. They were even provided with a cook for their meals.

Soon after the merger, much of the agricultural operations were centralized in Haliimaile. But the pineapple trucks were left at the Corn Mill Camp garage facility at the three currently existing warehouse buildings. During World War II, pineapple cultivation continued with additional produce, such as sweet potato, being grown. According to Mr. Baldwin's statements, the biggest change that resulted with the war was mechanization. Since many of the workers joined the military, the decrease in manpower spurred mechanization and the development of different types of machinery.

Following the war, the camp continued to be occupied until the late 1960s after the company, through a homeownership program, started selling houses in Haliimaile to the workers following unionization in 1958. Many moved to Haliimaile, but others stayed and bought homes in newly developed subdivisions in Pukalani and Makawao. When Mr. Mitsugu Jio moved out of Corn Mill Camp in 1967, he said there were still about two families left. Others, such as Mr. Alan Tengan, who was born in the Camp in 1942, moved out in 1966. When the camp was abandoned in the early 1970s, all of the houses were demolished except for a couple that were moved to other locations. One was moved to the vicinity of Camp Maui, the U.S. Marine Base in Makawao according to Mr. Louie Cambra.

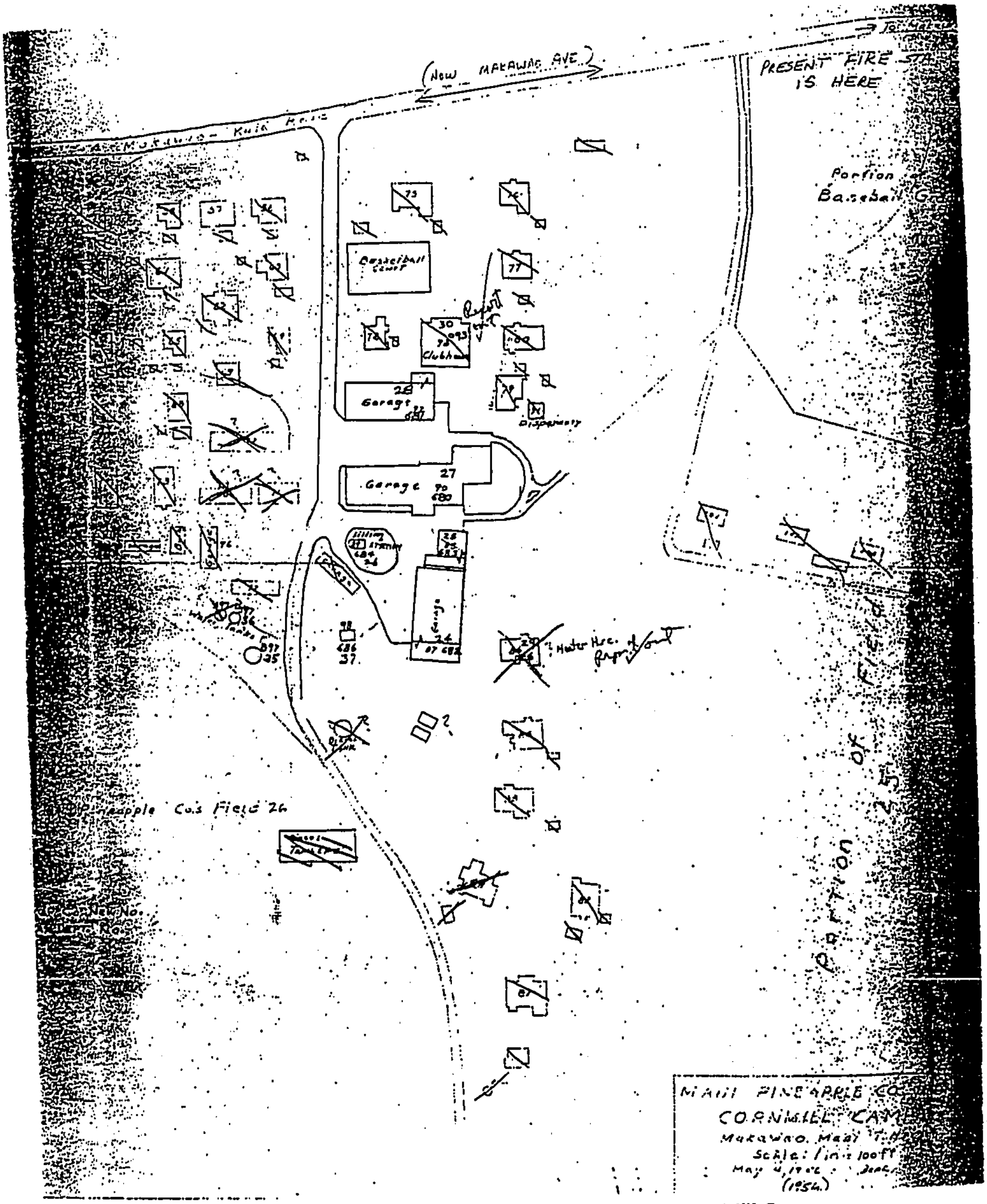

Figure 3. Portion of a 1956 Maui Pineapple Company Map of Corn Mill Camp (Note the three garage buildings, water tank, diesel tank, and basketball court.)

CULTURAL RESOURCES AND PRACTICES

Recently completed archaeological investigations within the project parcel have indicated the absence of surface or subsurface remains of prehistoric or traditional Hawaiian cultural activities (Sinoto and Pantaleo 2001). Several structural remains, however, still exist of the Corn Mill Camp that was located in the project area from the early 1900s to the late 1960s when it was abandoned and most of the components demolished.

TRADITIONAL USE

No traditional resources or any on-going cultural practices, within the project parcel, were identified by the informants. Inferred traditional use of the area may have been for dry land agricultural pursuits, such as the cultivation of sweet potato and yam, and as a zone of access occurring immediately *makai* of the inland zone where the exploitation of forest resources took place.

One of the informants, Mrs. Nina Maxwell, a resident of Pukalani and a *kumu hula* for over 38 years, lamented the absence, in the area, of native plants that she gathers, both for her *hula* and medicinal purposes. These include *a'ahi, lehua, wiliwili, 'ilima, uhaloa,* and *popolo*. She said that in the past she could gather *uhaloa* and *popolo* along sections of Haleakala Highway, but currently they are scarce. Now, she and her husband have started a native garden where she obtains the necessary plants.

HISTORIC USE

Pineapple has been continuously cultivated in the project area for over 80 years, through a succession of companies and mergers, with the Maui Land and Pineapple Company as the current owner. The warehouses and other buildings present in the northern portion of the project area, associated with Corn Mill Camp, have occupied the area for roughly 80 years as well. The advent of commercial agricultural development with immigrant labor and large plantations is the period best represented by the extant structures in the project parcel. The remaining six structural features associated with Corn Mill Camp have been assigned State Site Number 50-50-06-5169.

FINDINGS

The findings of the current Cultural Impact Assessment in regard to the proposed Pukalani Triangle phased development project parcel can be summarized as follows:

1. No continuing cultural practices are currently occurring within the project parcel based upon the findings of archaeological investigations conducted for the subject area and its immediate surrounding environs, as well as the oral testimony obtained from the various individuals interviewed.

2. Five intact structures and one structural remnant, associated with the operation of Corn Mill Camp, are currently still present within a portion of the project area. These consist of three garage buildings with one attached office annex, one functioning water tank, and one remnant base for a possible water or diesel tank. In addition, the existing basketball court located behind the Fire Station was most likely renovation of the original Corn Mill Camp basketball court. These remains have been designated as features of the State Site 50-50-06-5169, Corn Mill Camp Complex (Fig. 4).

3. The individuals interviewed could be categorized into two generationally separate groups, those that moved into Corn Mill Camp as youngsters with their parents or those that were born in the camp. Very few individuals are left today, who lived in the camp as adults during the early years.

4. None of the individuals interviewed, when asked about their thoughts or feelings regarding the proposed development, had any strong opinions either for or against the project. However, they all thought that preserving some symbol of Corn Mill Camp and the pineapple cultivation era was important, but that it was too late to try and maintain the character of that former era. Mr. Henry Baldwin, who passed away in February of 1998, summed it up well:

   > "I just say that I have seen a lot of changes and they are not all for the good, but fortunately I have a place up in Haiku where I have a big area and I enjoy living...I raise cattle, ride my horse every morning and I can still get around...I've got good health so it's alright with me but...little by little they keep closing in on you...Those were the good old days and it will never come back again..."

RECOMMENDATIONS

The following recommendations are not mitigation measures that target any specific aspect of the proposed development, rather they are based on suggestions or feelings of the individuals interviewed.

1. The landscaping and plantings within the proposed development should use native plants; especially those varieties that can be used for lei-making or gathered for medicinal uses.

2. A museum or some sort of interpretive space should be dedicated within the complex, perhaps in one of the preserved buildings. Many innovations in mechanization, as well as erosion control, and varieties of pineapple are items of interest that were locally developed and should be interpreted as a testament to the people who lived and worked in upcountry Maui.

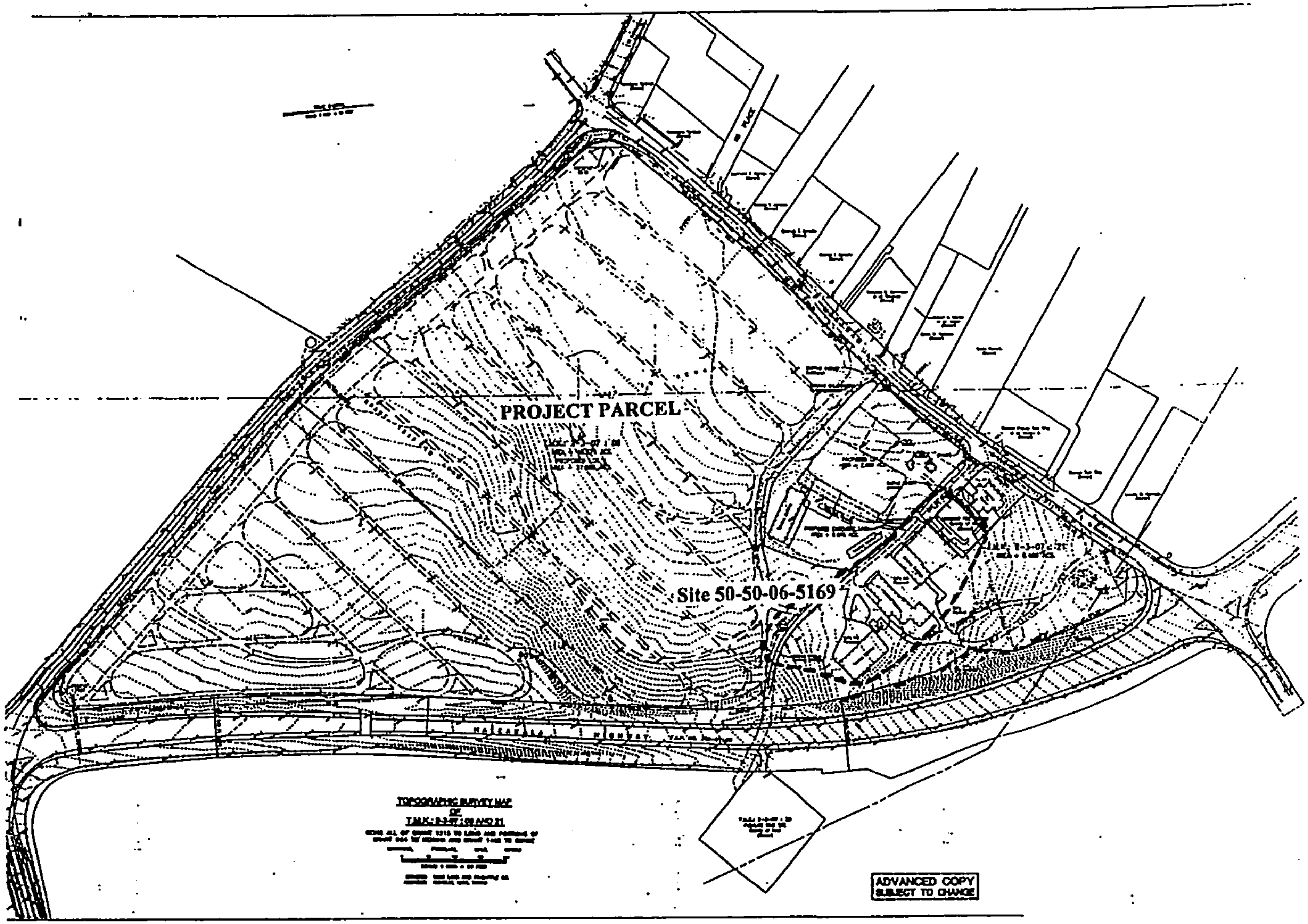

Figure 4. Map of the Project Site with the Location of Site 50-50-06-5169.

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Appendix F

A Survey of Avian and Mammalian Species, Pukalani Triangle Site

REPORT:

A Survey of Avian and Mammalian Species, on the Maui Land & Pineapple Company's Upcountry Maui, Pukalani Triangle Site, Makawao District, Island of Maui, Hawai'i.

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April 2001

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Figures & Tables

Introduction:

This report summarizes the findings of a two day ornithological and mammalian survey of approximately 40 acres of land proposed for development as a rural county town center. The property is located within a triangle formed by the existing Pukalani Bypass Highway, Makawao Avenue and the Haleakala Highway in the Makawao District, Island of Maui, Hawai'i (Figure 1). Fieldwork was conducted on April 2nd and 3rd, 2001.

The primary purpose of the survey was to determine if there were any federally listed endangered, threatened, proposed, or candidate avian or mammalian species on, or in the immediate vicinity of the proposed project site. In addition, we were asked to assess the probability of any usage of the site by listed species given the habitat currently available.

Avian phylogenetic order and nomenclature follows *The American Ornithologist's Union Checklist of North American Birds 7th Edition* (American Ornithologist's Union 1998), and the 42nd supplement to *Check-list of North American Birds* (American Ornithologist's Union 2000). Mammal scientific names follow *Mammals in Hawaii* (Tomich 1986). Plant names follow *Manual of the Flowering Plants of Hawai'i* (Wagner *et al.* 1990).

General Site Description:

The 40 ± acre site gently slopes from mauka to makai; from a maximum elevation of approximately 1725 feet down to slightly less than 1610 feet above mean sea level (Figure 1). The majority of the site is currently under pineapple cultivation. There is a small in-holding in the north-northeastern corner of the site which includes several old Corn Mill Camp buildings, a raised wooden water tank and the Waiulu Farms, an active equestrian stable, riding and feedlot operation (Figure 1).

The vegetation within the project site is predominately pineapple (*Ananas comosus*). The verges of the three paved roadways support a wide mix of predominately alien (introduced to Hawai'i by humans) grass and weedy species, typical of ruderal communities on Maui. The unpaved plantation roads also support numerous clumps of alien grass and weedy species. In the north-northeastern corner there are numerous large Christmas berry bushes (*Schinus terebinthifolius*), several large *ficus* trees and a good assortment of common ornamental plants and fruit trees.

Mammalian Survey Methods:

In an effort to detect the presence of endangered Hawaiian hoary bats (*Lasiurus cinereus semotus*), two stationary remote bat census stations were deployed for one night (Figure 1). Broadband AnaBat II ultrasonic bat detectors coupled to voice activated cassette recorders and remote timing devices were used to detect bat vocalizations. Following techniques developed by Krusic et al. (1996), units were calibrated using a pet ultrasonic

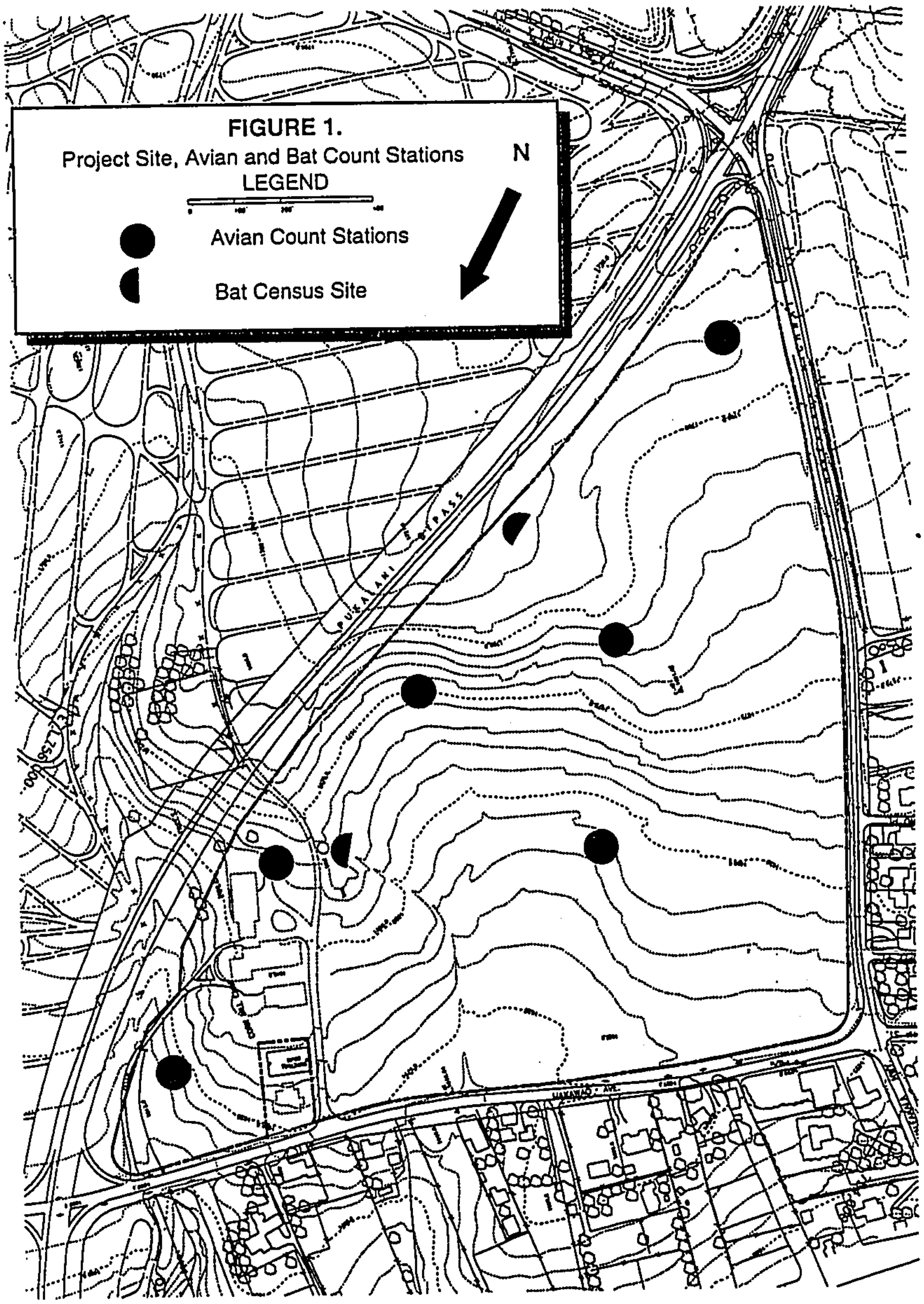
FIGURE 1.
Project Site, Avian and Bat Count Stations
LEGEND
N
Avian Count Stations
Bat Census Site
PUKALANI BYPASS
MAKAWAO AVE.

flea collar. The tapes were reviewed and the number of bat passes recorded were counted. In addition; visual scans were made for bats during crepuscular periods on one evening and one morning.

All other observations of mammalian species were of an incidental nature. With the exception of the Hawaiian hoary bat, all other terrestrial mammals found on the Island of Maui are alien species. Most are ubiquitous, no trapping program was proposed or undertaken to quantify the usage by alien mammalian species of the study site. The survey of mammals other than bats was limited to visual and auditory detection, coupled with observation of scat, tracks and other animal sign. A running tally was kept of all vertebrate species observed and heard while within the project site.

Avian Survey Methods:

The perimeter as well as all paved and unpaved roadways within the site were walked twice during the course of this survey. Six avian count stations were sited within the project site (Figure 1). Eight-minute unlimited distance counts were made at each station (Reynolds *et al.* 1980). Count stations were counted once; additionally, a tally was kept of bird species detected while on the site. Field observations were made with the aid of Leitz 10 X 42 binoculars and by listening for vocalizations. Counts were concentrated during the early morning hours between 0700 hrs. and 1000 hrs., the peak of daily bird activity. An additional two hours were spent on site on the evening of the April 2nd and again in the early morning of April 3rd, in an attempt to detect nocturnally flying seabirds and owls over flying the area. Time not spent counting was used to search the site and the surrounding area for species not detected during count sessions.

Results:

Three mammalian species; domestic dog (*Canis f. familiaris*), cat (*Felis catus*), and horse (*Equus caballus*) were detected within the site. All three species were also seen within Waiulu Farms. Dogs were heard barking in the housing areas located to the west of Hakeakala Highway. Dog sign was well dispersed throughout the site. There was abundant horses sign and tracks along many of the dirt roads within the site.
We did not see either Axis deer (*Axis a. axis*), or small Indian mongoose (*Herpestes a. auropunctatus*), during the course of this survey. It is to be expected that both species utilize resources within the site upon occasion. No rodents were detected; however, it is likely that roof rats (*Rattus r. rattus*), Norway rats (*Rattus norvegicus*) and possibly Polynesian rats (*Rattus exulans hawaiiensis*) as well as European house mice (*Mus domesticus*), utilize resources within the site. Without conducting a trapping program, it is difficult to assess the presence or population densities of these often hard-to-see mammals. All of these introduced mammalian species are deleterious to native plant and avian populations. Hawai'i's sole endemic (native and unique to Hawai'i), terrestrial

mammalian species, the endangered Hawaiian hoary bat, or ‘Ope‘ape‘a, was not detected during the course of this survey.

A total of 147 individual birds of 14 species, representing 9 separate families were detected during station counts (Table 1). An additional three species and one family were recorded as incidental observations while on site, but not during count periods (Table 1). Of the 17 species recorded, 16 are alien to the Hawaiian Islands. The remaining species, Pacific Golden-Plover (*Pluvialis fulva*) is an indigenous (native to Hawai‘i, but also found naturally elsewhere), migratory species.

The most common avian species detected was the Nutmeg Mannikin (*Lonchura punctulata topela*), which accounted for 26.5% of the total individual birds recorded. Three species; Nutmeg Mannikin, House Sparrow (*Passer d. domesticus*), and Zebra Dove (*Geopelia striata*) constituted 60% of the total birds detected during the course of station counts. No avian species listed as endangered, threatened, proposed or as a candidate species by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973, as amended (ESA), or by the State of Hawai‘i under it's endangered species program were detected during the course of this survey (Federal Register 1999a, 1999b, 2001, DLNR 1986)

The findings of both the avian and mammalian studies were consistent with the habitat currently present on the project site.

Discussion:

We detected relatively low vertebrate species diversity and density on the site during the course of this survey. This finding is not unexpected since the habitat currently available for terrestrial vertebrate species on the site is dominated by alien species almost to the exclusion of native ones.

Though we did not detect the endangered Hawaiian hoary bat on or over the site it is possible that there is some utilization of volant insect prey items over the fruit trees located on the north-northeastern corner of the site on a seasonal basis. Historically there have been very few documented sightings of bats from the island of Maui (Tomich 1986; Duvall and Gassman-Duvall 1991; USFWS 1998). It is unlikely that the development of this site will result in any deleterious impacts to this species. Unlike nocturnally flying seabirds which often collide with manmade structures, bats are uniquely adapted to avoid collision with both manmade and natural obstacles. It is likely that following development of the site and the installation of outdoor lighting that the lights will attract moths and other volent insects which may in turn attract bats. Hawaiian hoary bats have regularly been observed harvesting insects attracted to outdoor lighting on both Kaua'i and Hawai‘i (Cooper *et al*, 1995, David 1995, 1996).

TABLE 1

Avian Species Detected Within The Proposed Maui Land and Pineapple Company, Upcountry Maui Site

Common Name	*Scientific Name*	*ST*	*RA*
HERONS - Ardeidae.			
Cattle Egret.	*Bubulcus ibis.*	A	0.680
PHEASANTS & ALLIES – *Phasianidae*			
Gray Francolin.	*Francolinus pondicerianus*	A	6.803
Black Francolin	*Francolinus francolinus*	A	2.041
Ring-necked Pheasant	*Phasianus colchicus.*	A	0.680
PLOVERS - Charadriidae			
Pacific Golden-Plover.	*Pluvialis fulva.*	IM	I
PIGEONS & DOVES - Columbidae			
Rock Dove	*Columbia livia*	A	I
Spotted Dove.	*Streptopelia chinensis.*	A	8.844
Zebra Dove.	*Geopelia striata.*	A	16.327
SILVEREYES - Zosteropidae			
Japanese White-Eye.	*Zosterops japonicus.*	A	4.082
STARLINGS - Sturnidae			
Common Myna.	*Acridotheres tristis.*	A	3.401
CARDULINE FINCHES & ALLIES - Fringillidae			
House Finch.	*Carpodacus mexicanus frontalis*	A	3.401
SALTATORS, CARDINALS & ALLIES - Cardinalidae			
Northern Cardinal.	*Cardinalis cardinalis.*	A	2.041
OLD WORLD SPARROWS - Passeridae			
House Sparrow	*Passer d. domesticus*	A	17.007
WAXBILLS & ALLIES - Estrildidae			
Common Waxbill	*Estrilda a. astrild*	A	I
African Silverbill	*Lonchura cantans*	A	2.041
Nutmeg Mannikin	*Lonchura punctulata topela*	A	26.531
Chestnut Munia	*Lonchura atricapilla.*	A	8.163

KEY TO TABLE 1

ST Status
A Alien Species
IM Indigenous Migrant Species
RA Relative Abundance = # of birds / #stations
I Incidental observation

All avian species detected during the course of this survey are alien to the Hawaiian Islands with the exception of one migratory shorebird, a lone Pacific Golden-Plover recorded as an incidental observation. Pineapple fields do not normally support a diverse array of avian species or numbers. Predictably we recorded the most avian diversity and density within the brushy and ornamentally planted in-holding in the north-northeastern corner of the site. The majority of the birds recorded in the pineapple fields were estrildid finches, seen foraging on seeding Natal redtop (*Rhynchelytrum repens*), an alien grass species, and Spotted and Zebra Doves seen basking and taking dust baths on the dirt roads between the pineapple fields, albeit in small numbers.

It is possible that small numbers of the endangered endemic Hawaiian subspecies of the Dark-rumped Petrel (*Pterodroma phaeopygia sandwichensis*), or Ua'u over-fly the project site between the months of February and November (Hodges and Nagata 2001).

This species was formerly common throughout the Hawaiian Islands (Munro 1960, Banko 1980, Harrison 1990). Within recent historic times this species has been reduced to relictual breeding colonies located at high elevations on Kaua'i, Maui, Hawai'i and on Moloka'i (Banko *et al.* 2001). On Maui there are approximately 900 known nesting burrows, which are mostly located in and around Haleakela's crater rim (Hodges and Nagata 2001).

The primary cause of mortality in species is thought to be predation by alien mammalian species at the nesting colonies (Cooper and Day 1995, Day and Cooper 1998, Ainley *et al.* 2001). Collision with utility structures is considered to be the second most significant cause of mortality of this seabird species in Hawai'i. Nocturnally flying seabirds, especially fledging birds, can become disoriented by exterior lighting on their way to sea in the summer and fall. When disoriented, seabirds often collide with manmade structures and, if not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals (Ainley *et al.* 1995, 1997, 2001, Cooper and Day 1995, 1998, Day and Cooper 1997). There is no suitable nesting habitat within the project site for this species.

Recommendations:

To reduce the potential for interactions between nocturnally flying Dark-rumped Petrels and external lights and other man-made structures, it is recommended that any external lighting planned within the proposed development be shielded so as to prevent upward radiation (Reed *et al.* 1985).

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Appendix G

Upcountry Town Center: Impact on Agriculture

UPCOUNTRY TOWN CENTER:
IMPACT ON AGRICULTURE

Decision Analysts Hawaii, Inc.

UPCOUNTRY TOWN CENTER:
IMPACT ON AGRICULTURE

PREPARED FOR:

MAUI LAND & PINEAPPLE CO., INC.

PREPARED BY:

Decision Analysts Hawaii, Inc.

May 2001

Contents

APPENDICES

EXECUTIVE SUMMARY

PROJECT PROPOSAL

Maui Land & Pineapple Company, Inc. (ML&P), proposes to develop the Upcountry Maui Town Center, which is described briefly below and referred to in this report as "the Project." Most of the Project site has been used as farmland, having been cultivated as part of the Hali'imaile Plantation by Maui Pineapple Company, Ltd. (Maui Pine), a wholly owned subsidiary of ML&P.

The 40.9-acre Project area is centrally located in Pukalani in Upcountry Maui and is bordered completely by roads: Pukalani Bypass Highway along its eastern side, Makawao Avenue along its northwestern side, and Old Haleakala Highway to the southwest.

The Project includes commercial space; civic facilities; offices for professional services; cottage industrial space; and senior residential housing. The components will be connected by streets, streetscape, walkways and landscaping reminiscent of rural country towns. Venues will be available for community services, activities, festivals and farmers' markets. About 10 acres (25%) of the Project area will be landscaped open space that will serve as a buffer between the Pukalani Bypass Highway and the buildings. This open space will also include a public trail/walking path.

Currently, 31 acres (76%) of the Project site is a pineapple field and the rest of the site contains several old Cornmill Camp buildings; Wai Ulu Farms, Inc.; and a fire station on Makawao Avenue. One or two of the old Cornmill Camp buildings on the site will be retained, and space will continue to be made available for Wai Ulu Farms. The fire station is not part of the Project and will remain as it is.

Land uses around the Project site and across the roads from it include retail stores and commercial office space, some homes, and pineapple fields.

LAND CLASSIFICATIONS

Currently, all of the Project area is in the State Agricultural District. Development of the Project will require a change in State Districting from Agriculture to Urban.

At the County level, about 95% of the site is designated as Agriculture in the *Makawao-Pukalani-Kula Community Plan*, and about 5% is designated as open space. Also, the entire area is zoned Agriculture. Implementation of the Project will require a change in the Community Plan and appropriate re-zoning or Project District approval.

AGRICULTURAL CONDITIONS

All or nearly all of the project site has good farm land. This evaluation is based on the favorable soil conditions and soil ratings, the gently or moderately-sloping terrain, the mild sunny climate, available irrigation water, and good road access.

But taking into account the loss of some of the land to existing structures and possible changes to some lands bordering Pukalani Bypass Highway, an estimated 31 acres of good agricultural land remain. This estimate is based on the amount of land that is currently farmed by Maui Pine.

LOCATIONAL ADVANTAGES AND DISADVANTAGES

In terms of location, farmers in Pukalani would be competitive supplying the small Maui Island market. And compared to other farmers in Hawai'i, they would be reasonably competitive supplying mainland markets, as long as their products had long shelf-lives and so could be shipped by surface vessel.

However, compared to farmers on O'ahu, they would be at a disadvantage supplying the Honolulu market. Furthermore, they would be at a disadvantage supplying mainland markets if their products had short shelf-lives and so had to be shipped by air.

IMPACT ON MAUI PINE

The Project will require that 31 acres of land be withdrawn from pineapple cultivation, which amounts to 0.3% of the 10,240 acres currently being farmed by Maui

Pine. Averaged over time, 31 acres yield about 595 tons of pineapple per year which, in turn, generates revenues of about $290,000 per year. Employment associated with farming this amount of land and processing the pineapple amounts to about 3.8 workers receiving an annual payroll of about $107,000.

Compared to other fields of Hali'imaile Plantation, the 31-acre field within the Project area has good agronomic conditions, but it is expensive to farm because it is a small remnant field. When the Pukalani Bypass Highway was constructed in 1994, this field was severed from other, formerly contiguous fields, thereby restricting movement within the plantation and requiring workers to cross the highway with their farm equipment in order to work this small remnant field.

Because the subject field is small and expensive to farm, it is scheduled to be withdrawn from production at the end of the current crop cycle, regardless of whether or not the Project proceeds. The withdrawal of this field is part of an overall downsizing of Maui Pine operations in response to global economic forces and trends, and to capitalize on its competitive advantages.

Regarding cumulative impacts, the Project in combination with other recent and planned developments (about 200 acres of pineapple land) will not reduce cultivated acreage beyond the scheduled downsizing of Maui Pine's two plantations (a reduction of about 2,200 acres). With or without the withdrawal of 31 acres for the Project, Maui Pine will retain sufficient land to meet its lowered production targets. In fact, Maui Pine will be left with an inventory of uncultivated fields.

In view of these findings, the Project will have limited impact on Maui Pine and no mitigation measures are necessary. In fact, the Project could benefit Maui Pine and contribute to its long-term survival because the Project will contribute to the profitability of the parent company, and a portion of these profits could be used, if necessary, by ML&P to help support Maui Pine during lean years.

NUISANCE ISSUES

For new tenants in the Project, nearby pineapple operations are not likely to cause significant nuisance problems because the Project will be separated from pineapple fields by the Pukalani Bypass Highway and buffered by 10 acres of landscaped open space on the Project site. Thus, no additional measures are needed to mitigate potential nuisance problems.

Some of the stores along Old Haleakala Highway and Makawao Avenue are close to and downwind from the pineapple field on the Project site, and lack a landscaped buffer to separate them from the pineapple operations. Because this field will be developed as part of the Project, any existing nuisance problems related to the field will be eliminated once it is withdrawn from cultivation.

Similarly, the *Makawao-Pukalani-Kula Community Plan* envisions that single-family homes will be built on the south side of Old Haleakala Highway across the street from and downwind of the Project site. In view of this situation, withdrawal of pineapple operations preceding development of the Project will prevent agricultural nuisance issues from arising when new homes eventually are built downwind of the site.

Thus, taking into account existing and future residents and store operators in and near the Project, the net effect of the development will be to reduce the potential for nuisance issues related to pineapple operations.

WAI ULU FARMS, INC.

Wai Ulu Farms is an animal-supply store that occupies existing buildings in the Project area. It has been in operation since about 1980, currently employs five full-time employees, and caters to residents of Upcountry Maui, although customers from all over the island to patronize the store.

The growth of Wai Ulu Farms is constrained at its current location because storage space is limited and the year-to-year lease is not conducive to capitalizing expansion.

If the Project is developed, Wai Ulu Farms will move to a nearby building on the site with more storage space, and will arrange for a long-term lease. The owner of the company expects that such a move will improve customer service, increase efficiencies and revenues, and allow him to stock more items to serve his Upcountry Maui market.

The Project will benefit Wai Ulu Farms and no adverse impacts on the company are expected. Furthermore, expansion of Wai Ulu Farms will benefit the Upcountry Maui agricultural community because they will have better service and a greater selection of supplies. As a result, they will be able to purchase more items locally instead of having to drive to Wailuku or Kahului.

IMPACT ON DIVERSIFIED AGRICULTURE

Since none of the land in the Project area or in adjacent fields is planted in diversified crops, the Project will not adversely affect existing diversified-agriculture activities.

The Project commits 31 acres of good agricultural land to a non-agricultural use. However, this commitment of land is not expected to adversely affect the growth of diversified agriculture in view of the vast amount of former plantation agriculture land that is now available on Maui and Statewide.

Regarding benefits, the Project will include a venue for farmers to sell their vegetable, herb and fruit crops directly to consumers. This may contribute to a slight increase in sales by local farmers and higher profit margins because of the direct sales.

OFFSETTING BENEFITS

While the Project will result in the development of some good agricultural land, this loss to agriculture will be offset by the following benefits:

— Commercial space, civic facilities, office space, and cottage industry space provided in a central location to serve the needs of Upcountry Maui.

— Several hundred jobs ranging from unskilled to highly skilled, and including retail workers, restaurant workers, government employees, doctors, nurses, dentists, dental hygienists, attorneys, accountants, receptionists, craftsmen, etc. Additional jobs will be provided by companies that supply goods and services to these on-site businesses and their employees.

— Total payroll exceeding $10 million per year for on-site workers.

— Housing for senior residents.

— A venue for community services, activities, festivals and farmers' markets.

— A public trail/walking path provided in the 10-acre landscaped buffer zone.

This compares with pineapple operations on 31 acres that support about 3.8 workers having a payroll of about $107,000 per year.

CONSISTENCY WITH STATE AND COUNTY PLANS

State and County plans 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, Maui Pine will retain sufficient land and water to meet its lowered production targets. Thus, the Project will have no adverse impact on the economic viability of plantation agriculture. In fact, as previously indicated, the Project may enhance the survival of Maui Pine by contributing to the profitability of the parent company and its ability to support Maui Pine during lean years.

With regard to diversified agriculture, the Project will reduce the availability of agricultural land by a very small amount. However, because of the vast amount of land that has been released from plantation agriculture, ample agricultural land is available on Maui and other islands to accommodate the growth of diversified agriculture.

Thus, the Project will not conflict with the major thrust of the plantation-agriculture portions or the diversified-agriculture portions of State and County plans.

However, the Project is not included in the County's Makawao-Pukalani-Kula Community Plan; instead, the Project site is designated for agricultural use. But this same Plan supports "the centralization of business activities" in general and, in Pukalani, supports "diverse business uses in centralized, consolidated locations."

In this regard, the Project site is the most central location of Upcountry Maui in that a number of major roads converge on the site. Furthermore, development of the site would amount to in-filling the only remaining site in Pukalani that is designated in the Community Plan as Agriculture.

UPCOUNTRY TOWN CENTER: IMPACT ON AGRICULTURE

INTRODUCTION

Maui Land & Pineapple Company, Inc. (ML&P), proposes to develop the Upcountry Maui Town Center, which is described briefly below and referred to in this report as "the Project." Most of the Project site has been used as farmland, having been cultivated as part of the Hali'imaile Plantation by Maui Pineapple Company, Ltd. (Maui Pine), a wholly owned subsidiary of ML&P.

Addressed below are the impacts of the Project on agriculture. The material covers general information on the Project, current and nearby land uses, State and County land classifications, the agricultural conditions of the site, locational advantages and disadvantages, historic and potential agricultural uses of the land, the impact of the Project on Maui Pine, a discussion of nuisance issues, the impact of the Project on Wai Ulu Farms, Inc., the impact of the Project on diversified agriculture, benefits of the Project that will offset adverse agricultural impacts, and consistency of the Project with State and County land-use plans. Three appendices provide additional information on the pineapple industry, Maui Pine, and Hawai'i's agricultural land market.

PROJECT LOCATION AND DESCRIPTION[1,2]

The 40.9-acre Project area is centrally located among the Upcountry Maui communities of Pukalani, Makawao, Hali'imaile, Olinda and Kula on the western slopes of Haleakala.[2] The triangular-shaped site is bordered completely by roads: Pukalani Bypass Highway along its eastern side, Makawao Avenue along its northwestern side, and Old Haleakala Highway to the southwest.

The Project contains several components including commercial space (for Pukalani Superette, a second anchor tenant, and additional retail and dining establishments); potential civic facilities (e.g., library, post office, satellite city hall); offices (for medical, dental and other professional services); cottage industrial space; and senior residential housing. The components will be connected by streets, streetscape, walkways and landscaping reminiscent of rural country towns. Venues will be available for community services, activities, festivals and farmers' markets. About 10 acres (25%) of the Project area will be landscaped open space that will serve as a buffer between the Pukalani Bypass Highway and the buildings. This open space will also include a public trail/walking path.

CURRENT AND NEARBY LAND USES[2]

A total of 31 acres (76%) of the Project site is a pineapple field which will be withdrawn from cultivation to make room for the Project.

The rest of the site contains several old Cornmill Camp buildings along Pukalani Bypass Highway, Wai Ulu Farms and their corrals for boarding horses, and a fire station on Makawao Avenue. One or two of the old Cornmill Camp buildings on the site will be retained, and space will continue to be made available for Wai Ulu Farms. The fire station is not part of the Project and will remain as it is.

Land uses around the Project site and across the roads from it include Pukalani Superette and other retail stores and commercial office space, some homes, and pineapple fields.

LAND CLASSIFICATIONS[2]

Currently, all of the Project area is in the State Agricultural District. Development of the Project will require a change in State Districting from Agriculture to Urban.

At the County level, about 95% of the site is designated as Agriculture in the *Makawao-Pukalani-Kula Community Plan,* and about 5% is designated as open space. Also, the entire area is zoned Agriculture. Implementation of the Project will require a change in the Community Plan and appropriate re-zoning or Project District approval.

AGRICULTURAL CONDITIONS

Soil Types

The land area contains just two soil types:[3]

Soils		Acres (percent)
HgB	Hali'imaile silty clay loam, 3 to 7% slopes	19 (46%)
HgC	Hali'imaile silty clay loam, 7 to 15% slopes	22 (54%)

However, this assessment of soil types is based on conditions prior to construction of the existing structures on the site and the Pukalani Bypass Highway. Construction of the structures covered some of the soils and, because of grading and fill, some of the lands now bordering the highway may have different soil types.

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 (SCS Rating)[3]

The 1972 Land Capability Grouping by the United States Department of Agriculture Soil Conservation Service (SCS), rates soils according to eight levels, ranging from the highest classification level, **I**, to the lowest level, **VIII**.

The HgB soils (about 19 acres, or 46% of the Project area) are rated **IIe**, indicating that they have moderate limitations that reduce the choice of plants or require moderate conservation practices. The HgC soils (about 22 acres, or 54%) are rated IIIe, indicating that they have severe limitations that reduce the choice of plants, require special conservation practices, or both. The subclassification "e" indicates that the soils are subject to erosion.

Agricultural Lands of Importance in the State of Hawai'i (ALISH)[4]

The ALISH ratings were developed in 1977 by the SCS, University of Hawai'i (UH) College of Tropical Agriculture and Human Resources, and the State of Hawai'i, Department of Agriculture. This system classifies land into three 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 currently being 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 of importance to the production of crops.

All or nearly all of the soils in the Project site are rated **Prime**.

Overall Productivity Rating (LSB Rating)[5]

In 1972, the 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 of the soils in the Project site are rated C on the LSB map, but the rating reflects the fact that the land was not irrigated when it was evaluated in 1972. With irrigation, which is now the case, all of the land would be rated A.

Summary Evaluation of Soil Quality

These three soil-rating systems indicate that all or nearly of the Project site has soils that are good for cultivating crops (III or better under the SCS rating, Prime under the ALISH rating, and A under the LSB rating if irrigated).

As before, this assessment of soil types is based on conditions prior to construction of the existing structures on the site and the Pukalani Bypass Highway. Construction of the structures covered some of the soils and, because of grading and fill, some of the lands now bordering the highway may have different soil ratings.

Soil Characteristics

Consistent with the above soil ratings, the agricultural lands exhibit a number of favorable characteristics: they are well-suited for tillability, slopes are gentle to moderate (see below), and the soils are fine in texture, not stony, and well-drained.[3] Also, the soils are strongly acid in the surface layer and medium acid in the subsoil.[5]

Slopes

As indicated by the soil types (see above), about 19 acres have gentle slopes of 3% to 7% (land which is comprised of the higher-quality HgB soils). About 22 acres have moderate slopes of 7% to 15% (land which is comprised of soil type HgC).

Again, this assessment of slopes is based on conditions prior to construction of the Pukalani Bypass Highway. Some of the lands which now border the highway may have steeper slopes.

Elevation

The Project site is at an elevation of about 1,700 feet above sea level. At this intermediate elevation, the land is suitable for crops similar to those being grown at the lower elevations in Kula, but too high for "low-elevation crops" such as those being grown in 'Ewa (about 130 feet) on O'ahu, or "high-elevation crops" such as those being grown in Waimea (about 3,000 feet) on the Big Island.

Climatic Conditions

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

Solar Radiation

The area receives moderate sunshine, with the average daily insolation—as measured by calories per square centimeter—of nearly 400.[6]

Temperatures

Because of its higher elevation, temperatures in Pukalani are somewhat cooler than most other communities in Hawai'i. Temperatures in the winter months (October through April) range from the mid-50s (degrees Fahrenheit) to about 70 degrees, while in the summer months (May through September) they range from about 60 degrees to the mid-70s.

Rainfall

Average annual rainfall in the area is 34 inches per year.[7] Unlike most tropical areas winter, rather than summer, is the rainy season in Hawai'i.

Winds and Storms

The Project area is exposed to prevailing northeasterly tradewinds, and to infrequent storms occurring mostly from the south in the winter months during Kona weather.[7] Because of this exposure to tradewinds and occasional storms, some crops require windbreaks to protect them from wind damage.

Irrigation Water

ML&P relies on rainfall to supply water to its Hali'imaile Plantation fields, and supplements this with irrigation water pumped from the basal aquifer.[8]

Road Access

The fields are reached via a plantation road off Old Haleakala Highway.

Structures

A number of structures have been built on the property which reduces the amount of land available for cultivation. These structures include several old Cornmill Camp buildings along Pukalani Bypass Highway.

Summary

All or nearly all of the project site has good farm land. This evaluation is based on the favorable soil conditions and soil ratings, the gently or moderately-sloping terrain, the mild sunny climate, and available irrigation water. Also, the lands have good access.

But taking into account the loss of some of the land to existing structures and possible changes to some lands bordering Pukalani Bypass Highway, an estimated 31 acres of good agricultural land remain. This estimate is based on the amount of land that is currently farmed by Maui Pine.

LOCATIONAL ADVANTAGES AND DISADVANTAGES

Maui Island Market

Farmers in Upcountry Maui are well-located for servicing the Maui Island market because of their Central Maui location and the short trucking distance to Kahului (about 11 miles), 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 about 117,800 residents and about 17,500 rooms to house visitors.[9,10]

Honolulu Market

All farmers on Maui are at a disadvantage competing against farmers on O'ahu in supplying the Honolulu market due to the interisland shipping costs, delays and extra handling. Comparing barge and air-cargo service, 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.

However, the Honolulu market is comparatively large: in 2000, O'ahu had about 876,200 residents and about 36,300 rooms to house visitors.[9,10]

Mainland Market

Compared to Hawai'i, the mainland market is enormous: in 2000, the U.S. had a total population of 281.4 million people.[9] 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.[11]

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 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 may improve somewhat because the new 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 will allow farmers on Maui to be more competitive in mainland markets. The lift capacity from Maui will be limited, however, because only a small number of flights from Maui use the new aircraft.

Summary

In terms of location, farmers in Pukalani would be competitive supplying the small Maui Island market. And compared to other farmers in Hawai'i, they would be reasonably competitive supplying mainland markets, as long as their products had long shelf-lives and so could be shipped by surface vessel.

However, compared to farmers on O'ahu, they would be at a disadvantage supplying the Honolulu market. Furthermore, they would be at a disadvantage supplying mainland markets if their products had short shelf-lives and so had to be shipped by air.

HISTORIC AND POTENTIAL AGRICULTURAL USES

Since the early 1900s, the land in the Project area has been used for growing pineapple. Aside from pineapple, other crops that could be grown at the site include a variety of vegetables, herbs, and foliage and nursery products (i.e., crops typical of lower-elevation Kula).

However, the site would be unsuitable for a hog farm or other intense livestock operations because of potential nuisance problems: odors and flies would draw complaints from homeowners and store operators close to and downwind from a livestock operation. Also, the area is far too small for a cattle-grazing operation.

PINEAPPLE OPERATIONS

The Project will require that 31 acres of land be withdrawn from pineapple cultivation. Discussed below is the impact of such a withdrawal on Maui Pine.

The Pineapple Industry and Maui Pine

Background information on the pineapple industry and on Maui Pine is presented in Appendices A and B, respectively. As discussed in these Appendices, the pineapple industry had its commercial start in Hawai'i at the turn of the twentieth century and, by 1915, was Hawai'i's second largest industry behind sugar. The industry reached its zenith in Hawai'i in the late 1950s, and has been contracting ever since. Over time, the cultivation and canning of pineapple has shifted and continues to shift to countries having low labor rates, principally countries in Asia, Mexico, Central America, South America, and Africa.

In Hawai'i, all of the canneries eventually were closed, as well as all of the pineapple plantations on the Neighbor Islands—with the single exception of the plantation and cannery operated by Maui Pine. Currently, only three major pineapple companies remain: Maui Pine on Maui, and Dole and Del Monte on O'ahu. Dole and Del Monte grow for the fresh market, taking advantage of the superior air-cargo and surface shipping from Honolulu to the mainland.

In response to global economic forces and trends and to capitalize on its competitive advantages, and following the lead of Dole and Del Monte, Maui Pine is shifting more of its production to the fresh market subject to the transportation limitations, shifting some production outside Hawai'i, and downsizing its Maui operations by about 24% (about 2,200 acres). A large portion of the downsizing will include its Honolua Plantation fields in West Maui—largely because of the comparatively long trucking distance to the cannery and packing plant in Kahului. At the same time, Maui Pine is searching for additional fields in the Wailuku and Makawao Districts because of their proximity to Kahului.

Affected Acreage and Economic Activity[8]

The 31 acres needed to accommodate the Project amount to 0.3% of the 10,240 acres currently being farmed by Maui Pine. Averaged over time (i.e., averaged over a full crop cycle), 31 acres yield about 595 tons of pineapple per year (based on about 19.2 tons per acre per year) which, in turn, generates revenues of about $292,000 per year (based on $491 per ton). Employment associated with farming this amount of land and processing the pineapple amounts to about 3.8 workers receiving an annual payroll of about $107,000.

Compared to other fields of Hali'imaile Plantation, the 31-acre field within the Project area has good agronomic conditions, but it is expensive to farm because it is a small remnant field. When the Pukalani Bypass Highway was constructed in 1994, this field was severed from other, formerly contiguous fields, thereby restricting movement within the plantation and requiring workers to cross the highway with their farm equipment in order to work this small remnant field.

Because the subject field is small and expensive to farm, it is scheduled to be withdrawn from production at the end of the current crop cycle, regardless of whether or not the Project proceeds.

Other Land Development Projects[8]

Other recent and planned reductions in pineapple acreage for land development projects include 169 acres in Kapalua. Thus, land withdrawals for development total about 200 acres (31 acres for the Project and 169 acres in Kapalua).

Impact on Maui Pine

As mentioned above and discussed in Appendix B, Maui Pine is downsizing its operations in response to global economic forces and trends, and to capitalize on its competitive advantages. The 31-acre field within the Project area is included in Maui Pine's downsizing plans.

Regarding cumulative impacts, the Project in combination with other recent and planned developments (about 200 acres of pineapple land) will not reduce cultivated acreage beyond the scheduled downsizing of Maui Pine's two plantations (a reduction of about 2,200 acres). With or without the withdrawal of the 31 acres, Maui Pine will retain sufficient land to meet its lowered production targets. In fact, Maui Pine will be left with an inventory of uncultivated fields.

In view of these findings, the Project will have limited impact on Maui Pine, and no mitigation measures are necessary. In fact, the Project could benefit Maui Pine and contribute to its long-term survival because the Project will contribute to the profitability of the parent company, and a portion of these profits could be used, if necessary, by ML&P to help support Maui Pine during lean years.

NUISANCE ISSUES

Nuisances arising from farm operations can become an issue for residents and store operators as well as for farm operators. Some residents and store operators who are close to and downwind from farming operations may complain about occasional noise, dust, chemical spraying, etc. In turn, farmers may have to change their operations in order to address these complaints. For pineapple, most of the problems occur annually for a period of about one week when a field is being planted or harvested.

However, for new tenants in the Project, nearby pineapple operations are <u>not</u> likely to cause significant nuisance problems because the Project will be (1) separated from pineapple fields by the Pukalani Bypass Highway and (2) on the Project site, separated and buffered by an additional 10 acres of landscaped open space having a width which, with minor exceptions, will exceed 150 feet. Also, before new tenants purchase or lease property, they will be informed that they will be living near pineapple fields. This point will be highlighted in promotional brochures and will be spelled out in the sales and lease contracts. Under these circumstances, buyers and lessees 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.[12]

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

Turning to the existing stores along Old Haleakala Highway and Makawao Avenue, some of them are close to and downwind from the pineapple field on the Project site, and lack a landscaped buffer to separate them from the pineapple operations. Because this field will be developed as part of the Project, any existing nuisance problems related to the field will be eliminated once it is withdrawn from cultivation.

Similarly, the *Makawao-Pukalani-Kula Community Plan* envisions that single-family homes will be built on the south side of Old Haleakala Highway across the street from and downwind of the Project site. In view of this situation, withdrawal of pineapple operations preceding development of the Project will prevent agricultural nuisance issues from arising when new homes eventually are built downwind of the site.

Thus, taking into account existing and future residents and store operators in and near the Project, the net effect of the development will be to reduce the potential for nuisance issues related to pineapple operations.

WAI ULU FARMS, INC.[13]

Current Operations

Wai Ulu Farms is an animal-supply store that occupies existing buildings in the Project area. It specializes in providing high-quality fresh feed and animal-care products for horses, chickens, and a wide variety of other livestock including goats, elk, guinea pigs, chinchillas, turkeys, pheasant, etc. It also sells some pet foods and supplies, sack fertilizers, and offer boarding services for 15 to 20 horses. The company, which has been in operation since about 1980 and currently employs five full-time employees, caters to residents of Upcountry Maui, although customers from all over the island to patronize the store.

The Market for Wai Ulu Farms' products, services and expertise has grown, particularly in the past few years since other retailers in the area who sold some similar products went out of business. However, its growth is constrained at its current location because storage space is limited and the year-to-year lease is not conducive to capitalizing expansion. When shipments are delayed, even by 2 weeks, feed and other products are not available for customers.

Impact of the Project on Wai Ulu Farms

If the Project is developed, Wai Ulu Farms will move to a nearby building on the site that has more space for storing supplies, and will arrange for a long-term lease. The company will also invest in a forklift to move sacked products that are currently handled manually. The owner of the company expects that this will improve customer service and increase efficiencies and revenues. Furthermore, with increased space, he will be in a position to stock items that are not currently available in Upcountry Maui such as sack fertilizers in 1-ton quantities, composts, over-the-counter pest control products, and garden tools.

In summary, the Project will benefit Wai Ulu Farms and no adverse impacts on the company are expected.

Benefits of the Project to Agriculture

If the Project proceeds and Wai Ulu Farms expands, this will benefit the Upcountry Maui agricultural community because they will have better service and a greater selection of supplies. As a result, they will be able to purchase more items locally instead of having to drive to Wailuku or Kahului.

DIVERSIFIED AGRICULTURE

Since none of the land in the Project site or in adjacent fields is planted in diversified crops, the Project will not adversely affect existing diversified-agriculture activities.

However, the Project will commit about 31 acres of good agricultural land to a non-agricultural use (see "Agricultural Conditions" above). However, this commitment will not adversely affect the growth of diversified agriculture. This conclusion is based on the following findings from Appendix C:

— Ample land is available for diversified agriculture

A vast amount of land has been released from plantation agriculture (over 217,900 acres since 1968), and this release of land has far outpaced the demand for land for diversified crops (an increase of about 38,500 acres over this same period). While some of the released land has been converted or is scheduled to be converted to non-agricultural uses, most of it remains available for diversified crops. Thus, ample land is available on Maui, O'ahu, and other islands to accommodate the growth of diversified agriculture.

— Land is not the limiting factor to the growth of diversified agriculture

Consistent with the above, the limiting factor to the growth of diversified agriculture is *not* the *land supply*, but rather the *size of the market* for crops that can be grown *profitably* in Hawai'i.

These findings also apply to Maui. Since 1979, the contraction and eventual closure of Wailuku Sugar Co. and Pioneer Mill released about 13,500 acres, including 6,000+ acres released in 1999.[14]

With regard to the Project, it will involve the loss of far too little good agricultural land to adversely affect the availability of land to farmers on Maui or in other parts of the State, or to adversely affect the growth of diversified agriculture in Hawai'i.

Regarding benefits, the Project will include a venue for farmers to sell their vegetable, herb and fruit crops directly to consumers. This may contribute to a slight increase in sales by local farmers and higher profit margins because of the direct sales.

OFFSETTING BENEFITS

While the Project will result in the development of some good agricultural land, this loss to agriculture will be offset by the following benefits:

— Commercial space, civic facilities, office space, and cottage industry space provided in a central location to serve the needs of Upcountry Maui.

— Several hundred jobs ranging from unskilled to highly skilled, and including retail workers, restaurant workers, government employees, doctors, nurses, dentists, dental hygienists, attorneys, accountants, receptionists, craftsmen, etc.[15] Additional jobs will be provided by companies that supply goods and services to these on-site businesses and their employees.

— Total payroll exceeding $10 million per year for on-site workers.[15]

— Housing for senior residents.

— A venue for community services, activities, festivals and farmers' markets.

— A public trail/walking path provided in the 10-acre landscaped buffer zone.

This compares with pineapple operations on 31 acres that support about 3.8 workers having a payroll of about $107,000 per year.

CONSISTENCY WITH STATE AND COUNTY PLANS

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 *Makawao-Pukalani-Kula Community Plan* call directly or implicitly for preserving the economic viability of plantation agriculture and promoting the growth of diversified agriculture.[16-20] To accomplish this, an adequate supply of agriculturally suitable lands and water must be assured.

With regard to plantation agriculture, Maui Pine is downsizing its plantation in response to global economic forces and trends and to capitalize on its competitive advantages (see "Pineapple Operations" above and Appendix B). Because of this scheduled downsizing, which includes the withdrawal of the fields at the Project site, Maui Pine will retain sufficient land and water to meet its lowered production targets. Thus, the Project will have no adverse impact on the economic viability of plantation agriculture. In fact, as previously indicated, the Project may enhance the survival of Maui Pine by contributing to the profitability of the parent company and its ability to support Maui Pine during lean years.

With regard to diversified agriculture, the Project will reduce the availability of agricultural land by a small amount. However, because of the vast amount of land that has been released from plantation agriculture since the late 1960s, ample agricultural land is available on Maui, O'ahu, and other islands to accommodate the growth of diversified agriculture.

Regarding policies "...to preserve and protect agricultural lands," discussions in the "Agriculture" portion of the *State Functional Plan* recognize that redesignation of lands from Agriculture 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."[19] The enormous contraction in plantation agriculture—resulting in the supply of agricultural land far exceeding demand—constitutes a major change in economic and social conditions. Furthermore, the proposed Project will provide benefits that exceed those provided by current pineapple operations by a factor of several hundred (see above).

However, the Project is not included in the County's *Makawao-Pukalani-Kula Community Plan*; instead, the Project site is designated for agricultural use. But this same Plan supports "the centralization of business activities" in general and, in Pukalani, supports "diverse business uses in centralized, consolidated locations."

In this regard, the Project site is the most central location of Upcountry Maui in that numerous major roads converge on the site: Old Haleakala Highway from Kahului, Pukalani Bypass Highway, Makawao Avenue, Haleakala Highway from the upper part of Kula, and Kula Highway. Furthermore, development of the site would amount to in-filling the only remaining site in Pukalani that is designated in the Community Plan as Agriculture—that is, the area bounded by Kula Highway to the East, Pukalani Bypass Highway to the North, Hamakua Ditch to the West, and the first gulch to the south.

In summary, the Project will not conflict with the major thrust of the plantation-agriculture portions or the diversified-agriculture portions of State plans or County Plans. But the Project will conflict with the designated land use in the Community Plan.

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Appendices

APPENDIX A:
OVERVIEW OF THE PINEAPPLE INDUSTRY

BRIEF HISTORY OF PINEAPPLE IN HAWAI'I

Following earlier commercial attempts in Hawaii and elsewhere, the world pineapple industry had its commercial start at the turn of the twentieth century in Central Oahu.[1,2] In 1898, some California farmers purchased homestead land in Wahiawa where they experimented with growing pineapple, along with a number of other fruits and vegetables. One of the original homesteaders was A. W. Eames, whose farm would evolve into the Del Monte Fresh Produce (Hawaii) Inc. (Del Monte) pineapple operations. In 1900, Jim Dole—a recent arrival from Massachusetts and second cousin of Sanford B. Dole, President of the Republic of Hawaii and then Governor of the Territory of Hawaii—purchased some of the homestead land. His farm became the pineapple operations of Dole Food Co., Inc. (Dole).

The pineapple industry was successful in Hawaii due to a combination of circumstances, but primary among them were the excellent growing conditions; the annexation of Hawaii to the United States as a territory, which thereby eliminated the 35% tariff on processed food products shipped to the U.S. market; technological advances in farming which increased yields and reduced farming costs; technological advances in canning which reduced canning costs and extended the shelf-life of the product; and effective marketing of a "new" and exotic fruit.

By 1915, the pineapple industry was Hawaii's second largest industry behind sugar.[1] By the 1920s, over a dozen plantations were operating on Oahu, Kauai, Maui, Molokai, Lanai and the Big Island.[2] During the 1930s and 1940s, Hawaii supplied 80% of the world's pineapple production and was known as the "Pineapple Capital of the World."[2]

In the late 1950s, Hawaii's pineapple industry had reached its zenith, with about 76,600 acres being farmed by various plantations.[3] In order of production, the major producers included Dole; Libby, McNeill & Libby of Honolulu, Ltd. (Libby); Del Monte; and Maui Pineapple Company, Ltd. (Maui Pine). But in the early 1960s, the industry began to contract as some producers moved their canning operations to countries where labor and other costs were much lower, while other producers left the industry entirely.

By the late 1960s, Libby terminated all its Hawai'i operations. In the mid-1970s, Dole closed its Moloka'i plantation. In the early 1980s, Del Monte closed its Moloka'i plantation and its cannery.[2] Finally, in the early 1990s, Dole closed its Lana'i plantation and its cannery.

Hawaii employment in the pineapple industry declined from about 12,100 jobs in 1960 to 2,350 jobs in 1993, after which the employment data on pineapple were no longer reported by the State in order to avoid disclosure of individual operations.[4]

HAWAII'S CURRENT PINEAPPLE INDUSTRY

Currently, Hawaii has three plantations cultivating pineapple on just two islands: Maui Pine on Maui, and Dole and Del Monte on O'ahu. Also, only Maui Pine still operates a cannery. Even though Hawaii's pineapple industry is much smaller than it once was, the remaining plantations are marginally competitive with overseas growers.

In 2000, these pineapple companies and a few independents farmed 20,700 acres (27% of the area that was planted in the late 1950s) and produced 354,000 tons of pineapple.[5] This amounted to 2.4% of the world's total pineapple supply (down from 80% in the 1930s and 1940s). Compared to foreign countries, Hawai'i was ranked tenth largest producer in 2000.[5,6] Hawai'i's total pineapple production had an estimated farm value of $101.5 million, a figure that excludes the value-added from processing and shipping.

The primary products of Hawai'i's pineapple companies today include fresh pineapple, chilled "fresh-cut" pineapple, pineapple juice and, for Maui Pine, canned pineapple.

Taking advantage of their O'ahu locations and the superior transportation services from Honolulu, Dole and Del Monte grow pineapple for the high-value fresh market on the mainland and in Hawaii—markets which cannot be serviced by low-cost Asian producers. Both companies deliver fresh pineapple to major cities throughout the mainland via air transportation that is made possible by Hawai'i's large visitor industry and the frequent flights from Honolulu to the mainland. The pineapple is carried in the hold of wide-bodied aircraft, and the airlines charge comparatively low backhaul rates. The two companies also deliver fresh pineapple to the West Coast via surface transportation, again at comparatively low backhaul rates.

Most of Maui Pine's production is canned, although a growing share of it is sold fresh (see Appendix B).

The success all three pineapple companies have enjoyed in the fresh market has been enhanced by the development of new varieties that are sweeter, and by the fresh-cut options that are more convenient for the consumer. In the U.S. market, these advances have contributed to an increase in the consumption of fresh pineapple from 1.9 pounds per person in 1995 to 3 pounds per person in 2000.[7]

FOREIGN PINEAPPLE OPERATIONS OF DOLE, DEL MONTE AND MAUI PINE[1,2,8,9]

Outside Hawaii, Dole has pineapple plantations in Honduras, Costa Rica and Ecuador that deliver fresh pineapple to the Midwest, the East Coast, and European markets. In Asia, Dole has a large plantation in the Philippines where pineapple is grown for the canned market for distribution to the United States, Europe, and other countries, and for the fresh market in Japan. Also, Dole grows pineapple in Thailand for the canned market. In Africa, Dole has minority interest in plantations in Cameroon and the Ivory Coast.

Del Monte has a plantation in Costa Rica that delivers fresh pineapple to the East Coast and other U.S. markets via surface transportation. To supply its mainland market, Del Monte receives canned pineapple from a large plantation in the Philippines operated by Del Monte Foods, a separate company.

Following the lead of Dole and Del Monte, Maui Pine has recently become involved in a pineapple plantation in Costa Rica to supply fresh pineapple to the U.S. mainland and Europe, and in a plantation in Indonesia to supply canned pineapple to the U.S. market (see Appendix B).

WORLD PRODUCTION, TRADE AND TRENDS

Pineapple is grown at significant levels in 77 countries throughout the world.[6] The growing regions are generally located in the tropic and subtropic zones—that is, in the area between the Tropic of Cancer north of the equator and the Tropic of Capricorn south of the equator.[2]

In 2000, world pineapple production totaled 13.5 million metric tons.[6] The largest producers were Thailand (17% of world production), the Philippines (11.1%), Brazil (10.1%), China (9.8%), India (8.2%), Nigeria (6.5%), Mexico (3.6%), Colombia (3%), and Costa Rica (3%)—countries having comparatively low labor costs.

Based on 1999 data, about 2.46 million metric tons were exported (19% of the production). This included 1.05 million metric tons sold as fresh pineapple (43% of total exports), 1.06 million metric tons sold as canned pineapple (43%), and the remainder sold as juice or juice concentrate.[6]

For fresh pineapple, major exporters in 1999 were Costa Rica (33.6% of the world export market), Côte d'Ivoire (17.4%), and the Philippines (12.1%).[6] The largest importer was the United States (27.4% of the market), followed by France (16.3%), Japan (8.7%), and Belgium/Luxembourg (8.5%).

For canned pineapple, major exporters were Thailand (45.9% of the world market), the Philippines (17.3%), and Indonesia (12.8%).[6] Again, the largest importer was the United States (35.6% of the market), followed by Germany (11.5%), then Japan (6%).

Although the world pineapple industry is dominated by Del Monte and Dole, a collection of growers in Thailand is a major force in the canned market.

Trends indicate growth in production and exports, especially exports of fresh pineapple. From 1995 to 2000, world production of pineapple grew 7.7%. Those countries showing substantial growth include Costa Rica (up 53.9% since 1995), Ecuador (up 135.2%), and Mexico (up 72.7%).

Trade in pineapple grew at an even faster rate: 13.4% over the 5-year period from 1994 to 1999. The growth occurred in exports of the fresh fruit (up 39.8% from 1994 to 1999), but not the canned fruit (down 4.4%). Countries having increasing exports of fresh pineapple include Costa Rica (up 199.9%), Mexico (up 199%), the United States (i.e., Hawai'i, up 81%), and Côte d'Ivoire (up 36.5%). Countries having increasing exports of canned pineapple include Mexico (up 105.9%) and Indonesia (up 37.3%).

Taiwan was once a major producer for the canned market, but many plantations closed because, like Hawaii, economic advances on the island led to high labor costs that are not competitive with those of Thailand and the Philippines.[9] A decline also occurred in Malaysia for the same reason.

In summary, the following trends are apparent and are expected to continue:

- Growth in world production and consumption of pineapple.
- Growth in the total volume of pineapple traded among countries due to significant growth in the volume of fresh pineapple traded, but little or no growth in the volume of canned pineapple traded.
- For the expanding fresh pineapple market, much of the production increases occurring in Mexico, Central America and Africa (i.e., countries having low labor rates and, compared to Asia, faster delivery to the U.S. and European markets).
- For the canned market, a continued shift in production from various countries around the world to producers in Asia and, more recently, Mexico (i.e., countries having low labor rates).

U.S. TRADE RESTRICTIONS

With one notable exception, imports of fresh and canned pineapple into the United States are not restricted by tariffs or quotas. The exception is the anti-dumping duties that were imposed in 1995 on canned pineapple imported from Thailand. These duties, which were granted by the International Trade Commission (ITC) at the request of Maui Pine and the International Longshore and Warehousemen's Union (ILWU), range from less than 1% to 51%, depending upon the individual company.[8] The duties were recently extended for a five-year period ending in 2005.

In addition, duties of 5.3¢ per liter and 1.3¢ per liter are imposed on imported pineapple juice and pineapple juice concentrate, respectively.[10] However, under the North American Free Trade Agreement (NAFTA), the tariff on Mexican imports was phased out in 1998 for pineapple juice concentrate and will be phased out by 2003 for pineapple juice.

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APPENDIX B: OVERVIEW OF MAUI PINEAPPLE COMPANY, LTD.

BRIEF HISTORY

Maui Pineapple Company, Ltd. (Maui Pine) was formed in 1934 by the merger of two pineapple plantations in Central Maui (Maui Agriculture and Haleakala Ranch) that were owned by Alexander & Baldwin, Inc. (A&B), and a plantation and cannery purchased from California Packing Corporation (Calpac, now Del Monte). In 1962, Maui Pine acquired the West Maui pineapple plantation and cannery of Baldwin Packers. Del Monte's Maui plantation and the two A&B plantations all began operations in 1926, while Baldwin Packers traces its roots back to at least 1912.[1]

To supply cans for their pineapple, Maui Pine and Del Monte jointly operated a can manufacturing company from 1966 until 1977. In 1977, Maui Pine purchased full control of the operation.[2]

LAND AND WATER[3]

Maui Pine farms about 10,240 gross acres (about 9,100 net acres) split between two plantations: Honolua Plantation in West Maui and Hali'imaile Plantation in Central Maui. About 6,740 acres are owned by Maui Pine and about 3,500 acres are leased. In addition, an independent grower supplies about 6% of the pineapple processed by Maui Pine.

Maui Pine relies largely on rainfall to supply water to its fields at Honolua Plantation, and this is supplemented by irrigation water from Honolua Ditch (also known as Honokohau Ditch). Most of the Hali'imaile Plantation fields are irrigated with ground water and surface water.

Because the pineapple plant uses water efficiently, irrigation requirements are comparatively low. For fields in sunny areas having low rainfall, about 1/2 inch of water is applied weekly, which amounts to a daily average of about 1,900 gallons of water per acre. In comparison, daily per-acre water usage exceeds 8,000 gallons for sugarcane, about 4,000 gallons for many diversified crops, and about 3,500 gallons for single-family homes.

CROP CYCLE[3]

Two pineapple crops are typically harvested from each new planting. The first harvest (known as the plant crop) is produced 18 to 23 months after planting, and the second harvest (known as the first ratoon crop) is harvested 12 to 14 months later. A third harvest (known as the second ratoon crop) may also be harvested depending upon conditions affecting the size of the fruit and the yield. The plant crop produces the largest fruit and the largest yield, while the two ratoon crops produce progressively smaller fruit and yields.

After the last crop is harvested, a field is usually fallowed for about a year. During the fallow period, the old plants are left in the field to (1) decompose and enrich the soil, and (2) help control nematodes and insects. After the fallow period, the soil is tilled and prepared for replanting.

PROCESSING AND PACKING[3]

Harvested pineapples are processed at Maui Pine's cannery and packing plant in Kahului. These facilities, plus a company-owned can plant, are located in a Foreign Trade Zone.

The cannery operates most of the year; however, over 40% of production takes place during the summer months. Efforts are underway to smooth out production across the year.

PRODUCTS AND MARKETS[3]

Maui Pine produces a number of products, including: fresh whole pineapple, chilled "fresh-cut" pineapple (precut in wedges and chunks and packaged in plastic), canned pineapple in various styles and grades, pineapple juice, pineapple juice concentrate, fruit punch, fruit juice blends, and fresh pineapple salsa.

Most of the pineapple grown by Maui Pine is canned and sold as store-brand pineapple (e.g., Safeway's Townhouse brand), with "100% HAWAIIAN U.S.A." stamped on the can lid. The canned products are sold principally to large grocery chains, other food processors, wholesale grocers, and to organizations offering a complete buyers' brand program to affiliated chains and wholesalers serving both retail and food service outlets. Two advantages of store-branded sales are favorable shelf space near Dole and Del Monte products, and comparatively low advertising costs.

A growing share of Maui Pine's pineapple is sold as high-value whole fruit and as chilled fresh-cut fruit. This fresh-cut pineapple, a relatively new product, is a high-value use of the fresh fruit that is not suitable for sale whole due to bruising or sunburn. In 1999, Maui Pine received a U.S. patent on its fresh-cut-pineapple technology, which enhances the quality of the product while extending its shelf-life. Fresh products are sold to retail and wholesale grocers in both Hawaii and the continental United States.

Another new product is pineapple juice sold in popular 64-ounce plastic bottles (commonly called "PET" containers). In addition, Maui Pine is test-marketing its fresh pineapple salsa in Hawai'i and California, exploring the market for certified-organic pineapple, and has small test plots of lychee, rambutan, longan, mandarin orange and *kawa*.

SHIPPING[3]

Most of Maui Pine's canned products are shipped overseas on surface vessels—first by barge from Kahului Harbor, then by container ship to the West Coast. Shipping via Honolulu does not add to the transportation costs, however, because Matson absorbs the cost of the Kahului-to-Honolulu barge service. And because of the long shelf-life of canned products, the travel time to Honolulu does not result in lost product.

Most of the fresh products are shipped as air cargo by Hawaiian Airlines—first on inter-island aircraft from Kahului Airport to Honolulu International Airport, then on wide-bodied jets to the West Coast (usually Portland and Seattle). The interisland service adds to the shipping costs, requires extra handling to transfer the product from the smaller interisland aircraft to larger overseas aircraft, and adds travel time which can result in a the loss of fresh product.

The shipping difficulties limit sales of fresh products on the mainland. Surface shipping is impractical because of the long delivery times, especially since shipments from Maui must first be barged to Honolulu then transferred to a container ship. As mentioned above, air shipment via Honolulu adds to the transportation costs, requires extra handling, and adds to the travel time. Direct air cargo from Kahului Airport is the preferred choice, but the runway is too short to allow departure of wide-bodied aircraft with a full load of passengers and cargo in the hold, and relatively few flights provide direct service between Maui and the mainland.

PRODUCTION, SALES AND EXPORTS[3]

In 2000, Maui Pine produced about 175,000 tons of pineapple and grossed $85.9 million in revenues. The sales were down significantly from prior years ($94.5 million in 1999 and $97.7 million in 1998) due primarily to reduced plantings, low yields due to drought conditions, and low prices for canned pineapple.

U.S. sales amounted to 96.7% of total pineapple sales, while export sales (primarily to Japan, Canada and Western Europe) amounted to approximately 3.3% of the total.

Approximately 20 domestic customers accounted for about 64% of sales in 2000. Sales to the U.S. government, mainly the U.S. Department of Agriculture, amounted to approximately 12.3% of the total.

EMPLOYMENT[3]

Maui Pine provides significant employment: about 520 full-time employees and 780 seasonal or intermittent employees in 2000, or about 1,100 full-time-equivalent jobs. Annual payroll in 2000 amounted to $31 million.

In addition to the direct employment provided by Maui Pine, the company indirectly supports an estimated 1,100 jobs through its purchases of goods and services, as well as purchases by its employees.[4] Thus, total employment supported by Maui Pine amounts to about 2,200 direct-plus-indirect jobs.

The skills required of workers vary from the highly skilled (managers, agronomists, engineers, researchers), to skilled (supervisors, technicians, mechanics, equipment operators, journeymen, secretaries, etc.), to semi-skilled (field workers, fruit packers, glove repair workers, clerical help, etc.). Non-management employees are represented by the International Longshoremen's and Warehousemen's Union (ILWU).

Wages, salaries and benefits at Maui Pine are among the highest in the world for agricultural workers. This reflects (1) competition for labor with Hawai'i's visitor industry which has driven up wages, salaries and benefits; (2) negotiations by the ILWU; and (3) health and other benefits required under State law.

PROFITABILITY[3]

The profitability of Maui Pine is inconsistent, primarily because the company competes with low-cost imports of canned pineapple, price fluctuations in the world market, and occasional droughts that adversely affect yields.

COMPETITIVE AND OTHER ADVANTAGES[3]

Despite inconsistent profitability, operating the only pineapple cannery remaining in Hawai'i, competition with imports of low-cost canned pineapple, high labor costs, and a shipping disadvantage vis-a-vis the Dole and Del Monte plantations on Oahu, Maui Pine is continuing its pineapple operations on Maui.

Competitive advantages and other factors that explain Maui Pine's continued *pineapple operation include:*

- The marketing advantage of being the only supplier of canned Hawaiian pineapple—pineapple which is perceived to be higher in quality than pineapple from other areas.
- Their canned-pineapple store-brand marketing program which provides lower advertising costs and presents opportunities to sell other Maui Pine products.
- Limited price protection on canned pineapple provided by anti-dumping duties on canned pineapple produced in Thailand (see Appendix A).
- Success in terms of profitability and growth in sales of whole-fresh pineapple, chilled fresh-cut pineapple, juice sold in plastic bottles, fresh pineapple salsa, etc.
- Ongoing efforts to lower costs and increase productivity in order to remain competitive.
- Low land costs because most of the land is owned by the parent company, Maui Land & Pineapple Company, Inc. (ML&P).
- Pineapple production is a profitable way to hold land over the long term, while providing employment, contributing to Maui's economy, and managing the land to provide attractive open space and greenery.

— A parent company that supports Maui Pine in lean years using profits derived from resort and commercial operations, and from property development.

STRATEGIC PLAN[3]

Capitalizing on its competitive advantages (see above), and consistent with global economic forces and trends (see Appendix A), Maui Pine's strategic plan includes the following components:

— Products and Markets Served from Maui

- Continue to produce canned pineapple on Maui to serve the existing large customer base (i.e., buyers of store-brand canned pineapple), but at a smaller volume and with a focus on the higher-value opportunities.
- Shift more of the Maui production to fresh pineapple, chilled fresh-cut pineapple, and other high-value products for which the market is growing, subject to aircargo limits (e.g., limited aircargo capacity on direct overseas flights from Kahului).
- Continue to explore the market for other pineapple products and other tropical fruits.

— Maui Production and Operations

- By 2005, reduce the volume of pineapple produced on Maui by downsizing the two plantations on the order of 24% (about 2,200 acres). Fields to be retained will be those having a history of low per-unit costs, while fields to be withdrawn will have a history of high per-unit costs—based on the quality and volume of the fruit produced and on the cost of farming, pest control, irrigation, transportation to Kahului, etc. Most of the downsizing will occur at the Honolua Plantation because of the long trucking distance to Kahului. At the same time, Maui Pine is searching for additional land in Central and East Maui that is closer to Kahalui.
- Downsize employment through voluntary, enhanced early retirement.
- Continue efforts to improve operating efficiencies (i.e., lower costs and improve productivity).

— New Operations

- For customers who are unwilling to pay a premium for Hawaiian pineapple, shift a portion of the production to company-affiliated low-cost plantations outside Hawai'i (see next section).

In addition to strengthening the competitiveness of Maui Pine, this strategy will release land for development at Kapalua which will, in turn, contribute to the economic health of the parent company, ML&P. Correspondingly, a healthy parent company will be in a position to contribute to the survival of the pineapple operation during lean years.

OVERSEAS OPERATIONS[3]

Consistent with the above strategic plan, and following the lead of Dole and Del Monte in reaction to global economic forces and trends (see Appendix B), Maui Pine has recently become involved in two overseas pineapple operations.

In 1997, Royal Coast Tropical Fruit Company, Inc. (Royal Coast), a wholly owned subsidiary of Maui Pine, entered into a joint venture with an Indonesian pineapple grower and canner. The joint venture, Premium Tropicals International, LLC, markets and sells Indonesian canned pineapple in the United States.

In 1999, Royal Coast formed a 51%-owned pineapple production subsidiary in Central America. Pineapple cultivated in Central America is sold principally as fresh whole fruit to Maui Pine's customers in the United States and Europe. Sales of Maui Pine's Central American pineapple began in late 2000.

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APPENDIX C:
HAWAI'I'S AGRICULTURAL LAND MARKET

INTRODUCTION

Presented below is an overview of the agricultural land market in Hawai'i. The discussion includes the release of land from plantation agriculture (i.e., sugarcane and pineapple), the growth in land requirements for diversified crops (i.e., all crops other than sugarcane and pineapple), and the availability of land for diversified crops.

RELEASE OF LAND FROM PLANTATION AGRICULTURE

Because Hawai'i's sugar and pineapple industries have contracted substantially over the past three decades, an enormous and growing supply of farm land is available for diversified agriculture and other land uses. Since 1968, land in plantation agriculture has declined from about 305,900 acres to about 88,000 acres in 2001, for a 33-year decrease of over 217,900 acres (an average decrease of about 6,600 acres per year).[1,2] This accounting reflects the recent closures of Pioneer Mill Co., Ltd. (Pioneer Mill) in West Maui and two sugar plantations on Kaua'i.

On Maui, the contraction and eventual closure of Wailuku Sugar Co. and Pioneer Mill released about 13,500 acres since 1979.[3]

GROWTH IN LAND REQUIREMENTS FOR DIVERSIFIED CROPS

Land requirements to accommodate the growth of diversified crops are modest compared to the available supply. As plantation agriculture was contracting, Statewide land requirements for diversified crops grew from 21,600 acres in 1968 to 60,100 acres in 1999, for a 31-year increase of 38,500 acres (an average increase of 1,240 acres per year).[1,2]

Although a great many crops can be grown in Hawai'i's year-round subtropical climate, the modest growth in land requirements for diversified crops reflects the fact that few of them can be grown profitably on a large scale. The primary reasons for this are given below.[4]

—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.

—High overseas transportation costs increase the cost of importing agricultural supplies and equipment and, for export crops, shipping produce to market.

—For a number of crops, consumption volumes in Hawai'i are too small to support large, efficient 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 can be done locally because these farms incur lower costs for land, labor, supplies, fertilizer, pest control, equipment, etc. Furthermore, many of them benefit from large volumes and economies of scale.

In short, the limiting factor to the growth of diversified agriculture is *not* the *land supply*, but rather the *size of the market* for those crops which can be grown *profitably* in Hawai'i.

AVAILABILITY OF LAND FOR DIVERSIFIED AGRICULTURE

As indicated above, a vast amount of land has been released from plantation agriculture, and this release of land has far outpaced the demand for land for diversified crops. As a result, the amount of land in crops has declined from about 327,500 acres in 1968 to an estimated 148,100 acres in 2001, for a net release of over 179,000 acres (an average decrease of more than 5,000 acres per year).[1,2]

Some of this land has been or is scheduled to be converted to urban, forestry or other uses. But, the majority of the 179,000 acres remains available for diversified crops. Much of this land is fallow, is used for grazing, or is in some other low-value land-holding operation. A major issue Statewide is how to use productively the vast amount of high-quality agricultural land that has become available.

On Maui, most of the 6,000+ acres that were released from sugar cultivation by the 1999 closure of Pioneer Mill remain available for diversified agriculture.

Similarly, agricultural lands remain available on Kaua'i, O'ahu, Moloka'i, Lana'i and the Big Island. On O'ahu, most of the 22,500 acres released from sugar production during the 1990s remain available. Fields in Kunia and 'Ewa are regarded as among the best farm land in the State, based on the high solar radiation, high quality soils, and the short trucking distance to the large Honolulu market and, for export markets, to the Honolulu International Airport and Honolulu Harbor.[5] These lands have been leased, but markets for crops grown on the land are still being developed.[6] On the North Shore, various crops are being explored, but most of the former sugarcane land remains fallow.[7]

SUMMARY

In summary, ample land is available on all islands to accommodate the growth of diversified agriculture. Furthermore, the limiting factor to the growth of diversified agriculture is *not* the *land supply*, but rather the *size of the market* for crops that can be grown *profitably* in Hawai'i.

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[4] Decision Analysts Hawai'i, Inc. *Hawai'i's Sugar Industry and Sugarcane Lands: Outlook, Issues and Options.* April 1989.

[5] Decision Analysts Hawai'i, Inc. *Agricultural Lands of Kunia and Central 'Ewa: Agronomic and Locational Advantages, Potential Crops, Crop Budgets.* December 1993.

[6] Discussions with farmers.

[7] Decision Analysts Hawai'i, Inc. "North Shore Planning District, O'ahu: Agricultural Resources, Situation and Outlook." July 1997.

Appendix H

Assessment of Potential Impacts of a 40-Acre Development Site on Groundwater Resources, Upcountry East Maui, Makawao-Pukalani Region

ASSESSMENT OF POTENTIAL IMPACTS OF A 40 ACRE DEVELOPMENT SITE ON GROUNDWATER CONDITIONS

UP-COUNTRY EAST MAUI
MAKAWAO-PUKALANI REGION

John F. Mink
Mink and Yuen, Inc.

December 2001

Revised July 2003

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Location

The proposed development site is on the northwest leeward flank of the East Maui volcano (Haleakala) at elevation approximately 1300 to 1500 feet. The area is semi-arid with average annual rainfall of 30 inches. The accompanying maps place the site in the context of groundwater occurrence.

Geology and Hydrology

At the site the surface consists of 1 to 2 feet of soil and subsoil overlying some tens of feet of the weathered Kula formation. The Kula formation constitutes the terminal lava flows of the East Maui volcano, and its lavas are thick and massive basaltic andesites. The layering of the lavas is often interrupted by local unconformities composed of volcanic ejecta (ash, cinders), accumulation of sediments resulting from erosion, and soil beds which formed during long intervals of volcanic inactivity. Beneath the Kula formation is the main shield-building formation, the Honomanu basalt. The Honomanu basalt is a primal basalt which consists of many thin lava layers that were laid down during geologically continuous volcanic activity. As a rule, not enough time passed between individual eruptions to allow formation of unconformities similar to those in the Kula formation.

High level groundwater may be perched in the Kula formation on local unconformities, but occurrences are discontinuous and do not comprise exploitable aquifers except on a small scale. In a few areas the perched water may be sufficient to serve households. Where the formation is incised by deep gulches, springs from perched water may drain from valley walls.

The zones of saturation in the Kula formation normally lie within a few to tens of feet above the formation contact with the underlying Honomanu basalt. The Honomanu basalt is highly permeable, and the high level groundwater draining to it from the Kula formation freely percolates to the water table a few feet above sea level. The Honomanu basalt section between the Kula and the basal water table is unsaturated.

The principal aquifer in all of East Maui west of Maliko Gulch is the Honomanu basalt. Fresh to brackish groundwater occurs as a basal lens that floats on sea water in accord with the Ghyben-Herzberg principle which states that because of the lower density of fresh water (1.000) compared to that of sea water (1.025), in a static system 40 feet of fresh water will extend below sea level for every foot the water table lies above sea level. Although the constraining conditions of uniform densities, a static column of water and immiscibility never occur in nature, the 40 to 1 ratio gives a good estimate of the thickness of the fresh-brackish lens.

Groundwater Occurrence and Behavior

In the areas underlying the proposed development and to which the site is tributary, sporadic high level groundwater may occur, but the principal and ultimate recipient of water which percolates below the ground surface is the Honomanu basal aquifer. The head (water table elevation above sea level) in the Honomanu basal aquifer directly beneath the site is approximately 5 to 7 feet, which implies that potable water may be developable. The nearest wells drilled into the basal aquifer are at the Pukalani golf course (State no. 5021-01) about a mile due west and in Omaopio (4821-01 and 4822-01) about 3 miles to the southwest (see attached Regional Map). Recently a new well was completed for the Maui County Department of Water Supply at the Pookela water tank near Makawao.

The Pukalani well yields non-potable brackish water containing 400 to 500 mg/l chloride. The maximum upper limit normally assigned for potable water is 250 mg/l chloride, but Maui County Department of Water Supply attempts to provide water having less than 160 mg/L The two Omaopio wells have been tested at rates too low to prove the potability of the water. Well 4821-01 was pumped at 82 gpm and yielded water having 190 mg/l chloride; well 4822-01 was pumped at 38 to 50 gpm, yielding water with 60 mg/L All three wells were drilled from ground elevations between 1000 and 1200 feet and had to penetrate to just above sea level before encountering the basal aquifer. The recently drilled well was successfully tested at 1400 gpm (2 mgd) and yielded very fresh water having less than 20 mg/l chloride. It was drilled from an elevation of 1,810 feet to 140 feet below sea level and encountered a water table elevation of 11.1 feet, which is unexpectedly high.

A well drilled last year at Haliimaile (5220-01) to the north of the development site has a basal aquifer head of 5 feet, and after 4 days of pumping at 700 gpm (1 mgd) yielded water with just 61 mg/l chloride. A well to supply the development is planned at a site approximately 3,000 feet northeast of the Pookela well (5118-02). Pumping from this proposed well is not expected to affect production from the Pookela well.

Of the existing five wells referred to above and the proposed well, only the Pukalani golf course well lies down the groundwater gradient from the development site. The attached maps illustrates the probable head contours and groundwater flow directions in the basal aquifer based on the limited data base for the region. The head contours are gentle arcs, and the groundwater flow direction, which is perpendicular to the contours, is in the northwest quadrant. Down gradient of the proposed development site are, in addition to the Pukalani well, several HC&S very large capacity pumping stations, located in the Paia Aquifer System, which yield brackish water for irrigation of sugar cane. There exists no realistic opportunity to develop potable groundwater down gradient of the site except, perhaps, at very low pumping rates. The inland boundary of irrigated sugar cane starts within a mile of the site. Groundwater below the cane fields is affected by cultivation practices, including potential leaching of agricultural chemicals.

Residual contamination from agricultural chemicals employed in pineapple cultivation may affect groundwater in both the Kula and Honomanu formations, but based on current information contamination greater than the acceptable limit is not expected.

Potential Impacts on Groundwater Caused by the Development Site

The proposed development is in the Makawao Aquifer System, which is up-gradient of and hydraulically continuous with the Paia Aquifer System. Groundwater in the Paia Aquifer System is heavily exploited by HC&S for irrigation. Throughout most of the System the water is too brackish to be useful for domestic consumption, but toward Maliko Gulch, where the effects of return irrigation water are muted, two wells (H'poko 1, 5420-02, and H'poko 2, 5320-01) are pumped by the Department of Water Supply during drought emergencies. Potable water can be developed in the Makawao Aquifer System, as was proved when the Haliimaile and Pookela wells were completed recently.

The sustainable yield of the Makawao Aquifer System is 7 mgd according to the State Water Resources Protection Plan. Current and anticipated production from existing wells is less than 2 mgd (just over 1 mgd from the Haliimaile well and less than 1 mgd from the Pukalani well). The proposed well at Pookela is expected to produce potable water at a capacity of 1 to 2.0 mgd when production is required. However, because of the expense of pumping, its use is likely to be restricted to drought periods when surface water supplies are limited. Attempts to find a potable groundwater supply downgradient of the development site would likely fail.

The projected demand for the development will be about 0.247 mgd. There are a number of potential sites where new wells could be located in the Makawao Aquifer System. The yield from the new well which is surplus to the demand of the development will be offered to the County Department of Water Supply. Development of the new source will not have a significant adverse effect on the sustainable yield of the Makawao Aquifer System.

The existing non-sugar cane and non-pineapple activities in the Makawao Aquifer System are not known to have affected the quality or quantity of groundwater in the Honomanu aquifer, nor can it be expected that the proposed development, which is on a much smaller scale than existing developments, will contribute to detectable contamination. Percolate water from the site is not tributary to any existing or proposed potable wells.

The development will produce approximately 50,000 gallons per day of wastewater, which will be treated by methods approved by the State Department of Health before disposal into the ground. The percolate will travel through about 1 foot of soil, 2 feet of subsoil, then approximately 10 to 50 feet of saprolite before encountering the unaltered Kula formation. There it will mix with high level perched water before continuing through the unconformity separating the Kula from the Honomanu basalt. It will have to pass through about 1,000 feet of unsaturated Honomanu basalt before reaching the water table of the basal aquifer. The tortuous route of travel will remove bacteria and associated biologicals. Nitrogen and other inorganic constituents will eventually infiltrate to the aquifer but in quantities too small to be detectable after mixing with the resident groundwater. Groundwater pumped from wells in the Makawao Aquifer System does not manifest wastewater contamination even though wastewater disposal is by means of septic tanks and cesspools.

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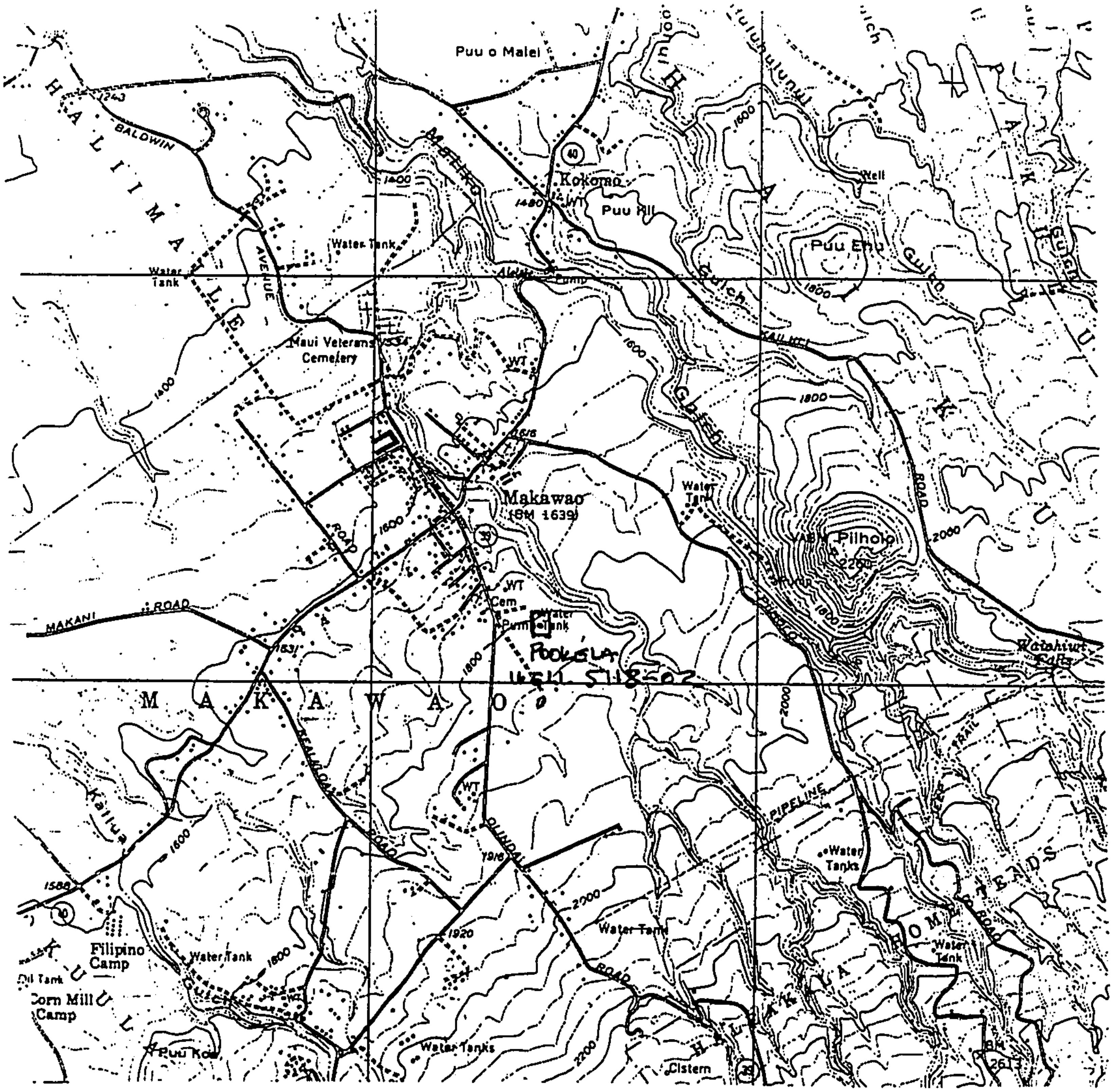

Puu o Malei
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Water Tank
Maui Veterans Cemetery
Makawao
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Pilholo
2260
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Cem
Water Tank
MAKANI ROAD
M A K A W A O
BALDWIN
AVENUE
PIPELINE
Water Tanks
Filipino Camp
Oil Tank
Corn Mill Camp
Puu Koa
Cistern
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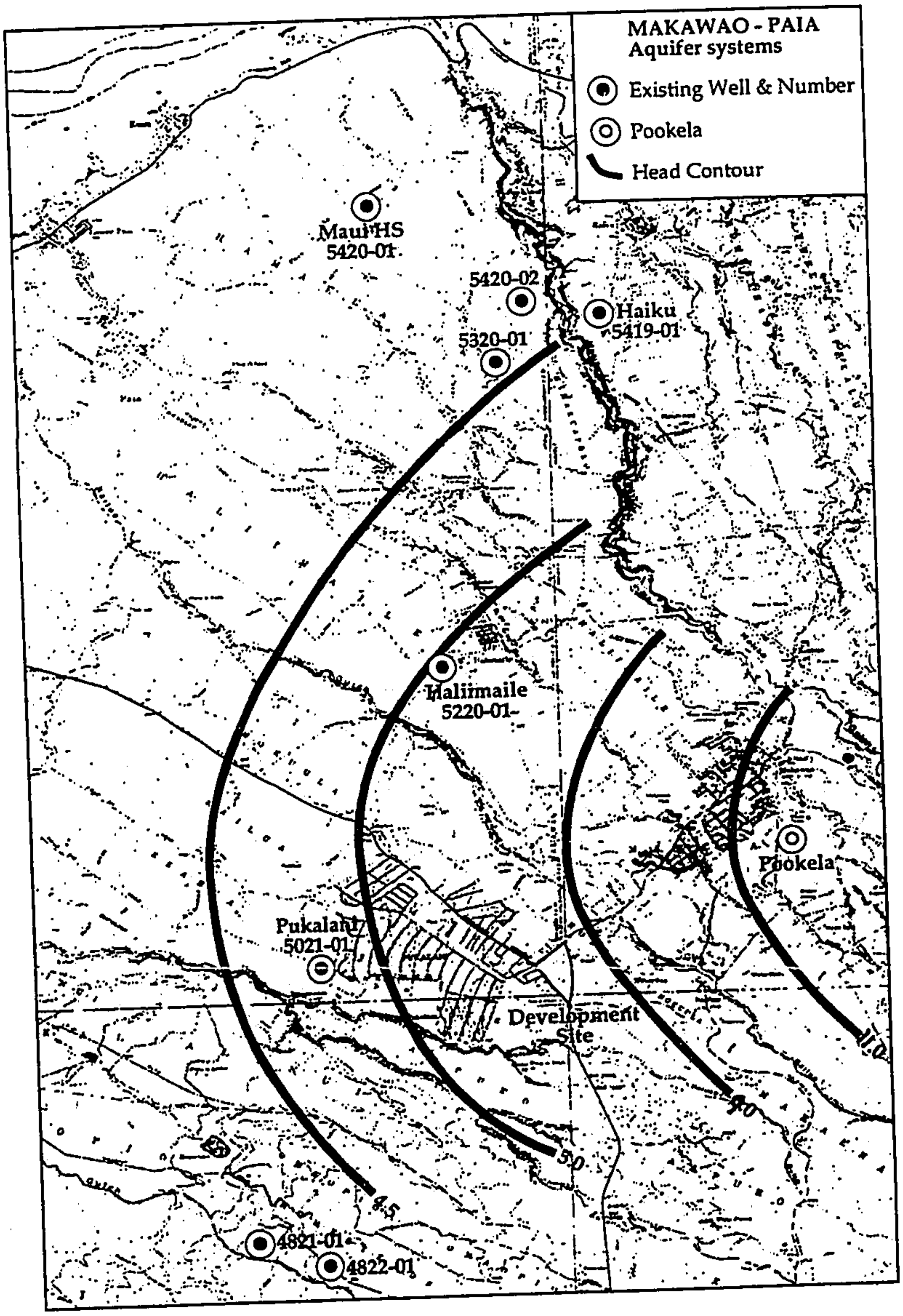
MAKAWAO - PAIA
Aquifer systems
Existing Well & Number
Pookela
Head Contour
Maui HS
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5420-02
Haiku
5419-01
5320-01
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4821-01
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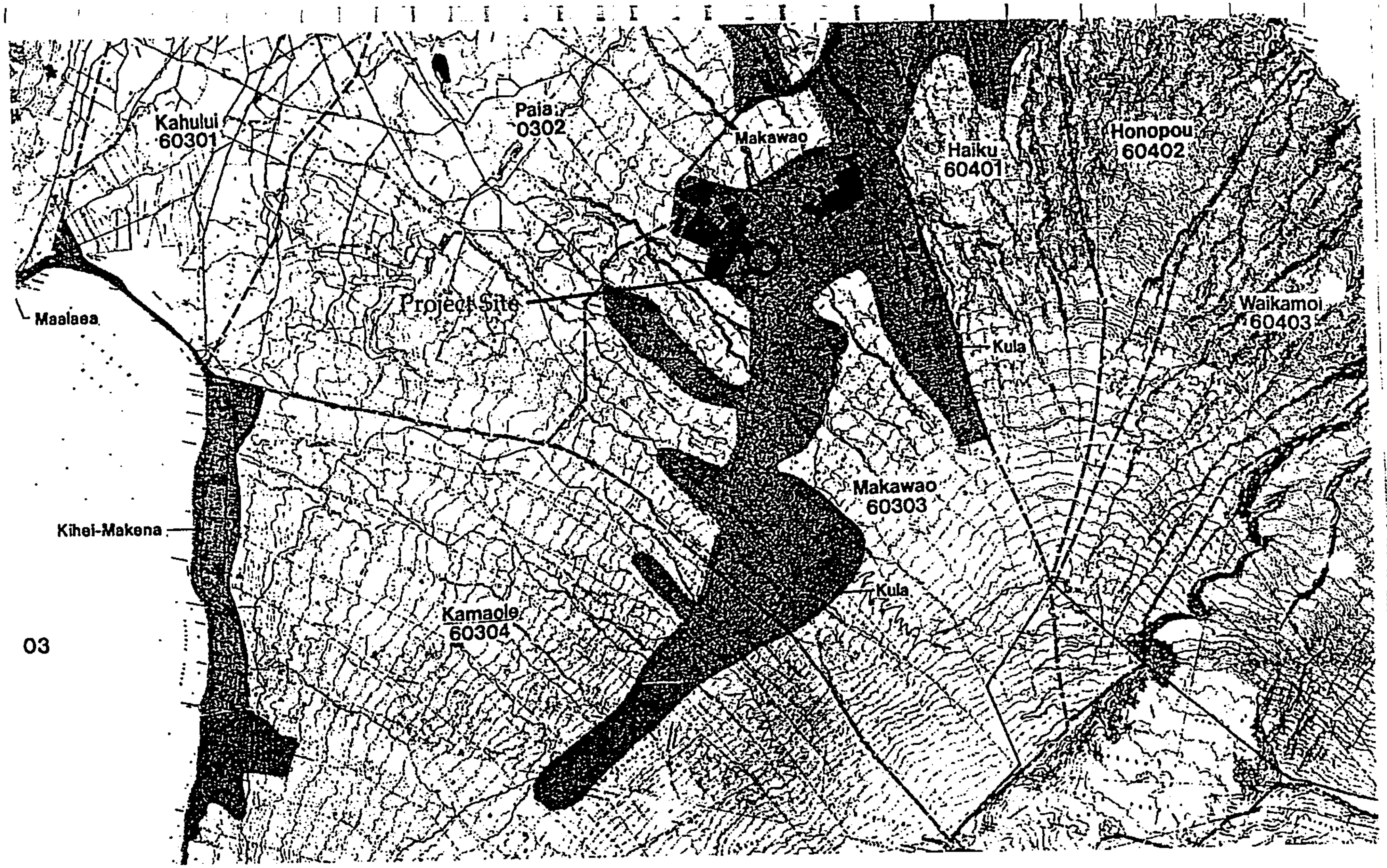
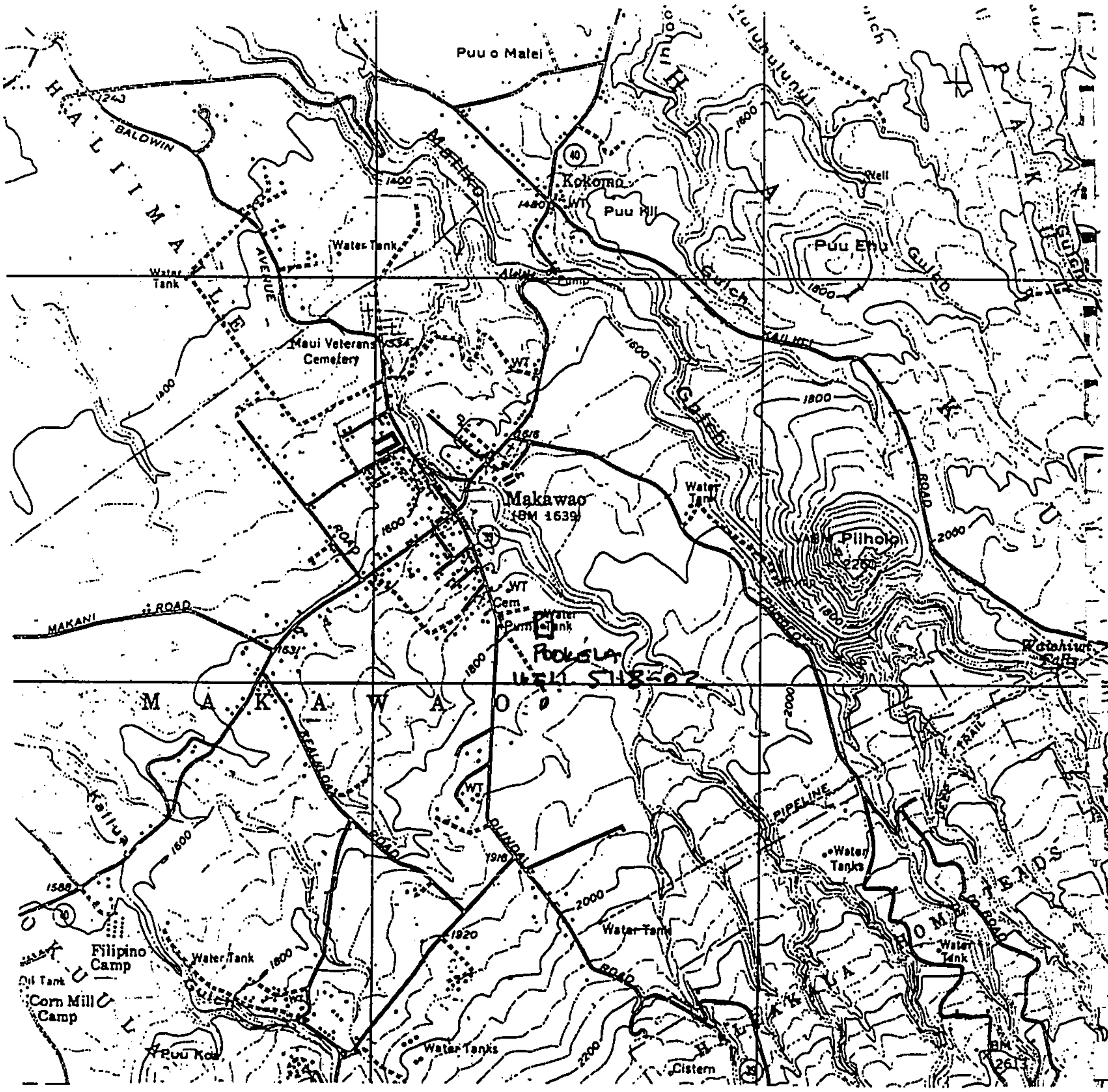


Location of the Proposed Development in Relation to Groundwater Occurrence in the Basel Aquifer



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Kokomo
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Gulch
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Cemetery
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(BM 1639)
Water Tank
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Pump
Water Tank
POOKELA
WELL 5418-02
MAKANI ROAD
MAKAWAO
ROAD
Kailua
Filipino Camp
Water Tank
Oil Tank
Corn Mill Camp
Puu Koa
Water Tanks
Cistern
PIPELINE
Water Tanks
Water Tank
Waiahiwi Falls
OLINDA
ROAD

Assessment of the Hydrologic Impact of Maui Land & Pineapple Company's Proposed Well at 1800-Foot Elevation Along Piiholo Road in the Makawao Aquifer System

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Honolulu, Hawaii 96813

Prepared for:

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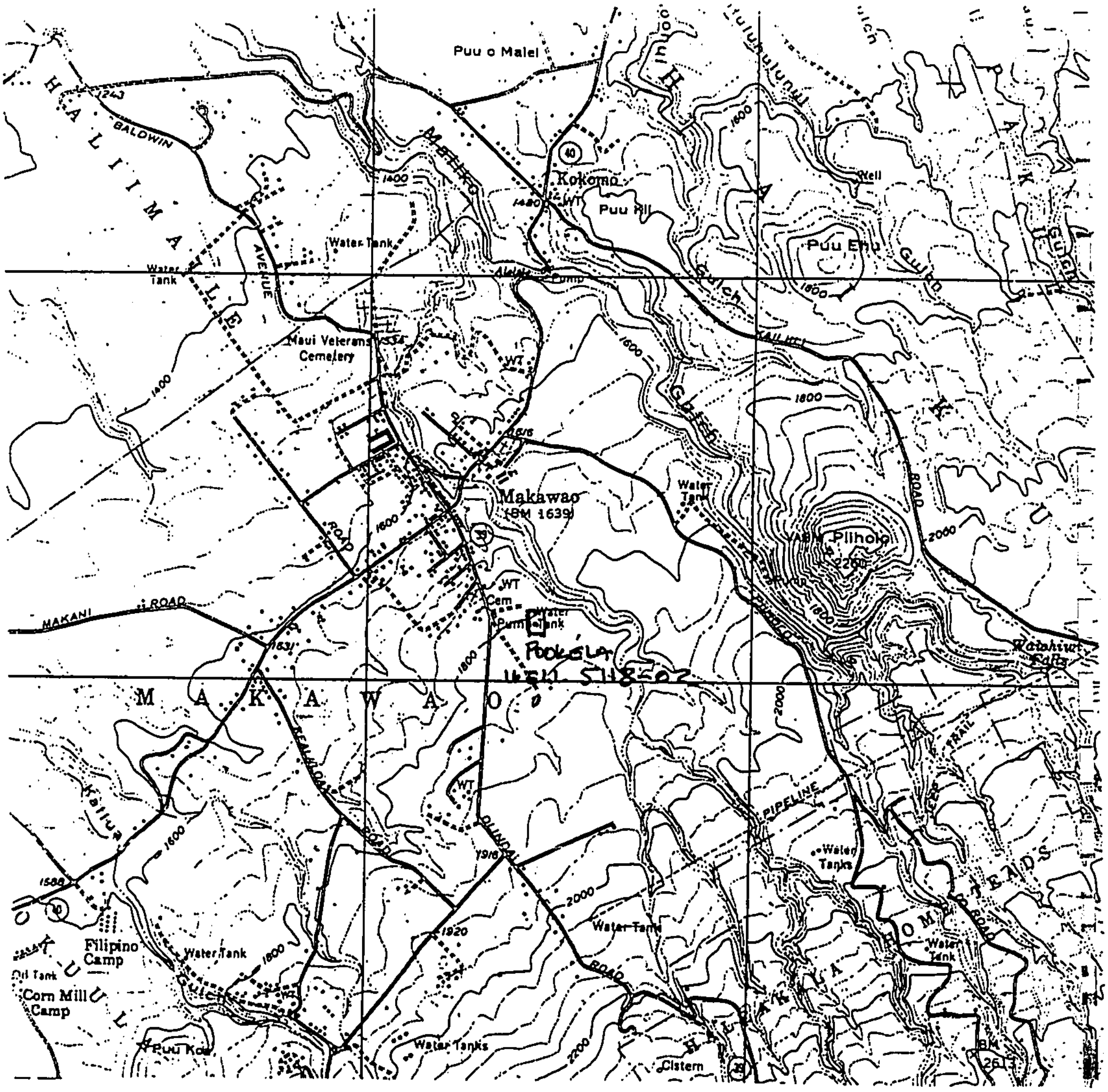
120 Kane Street
Kahului, Maui, Hawaii 96732

July 2003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Water Tanks
Waiahiwi Falls
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Corn Mill Camp
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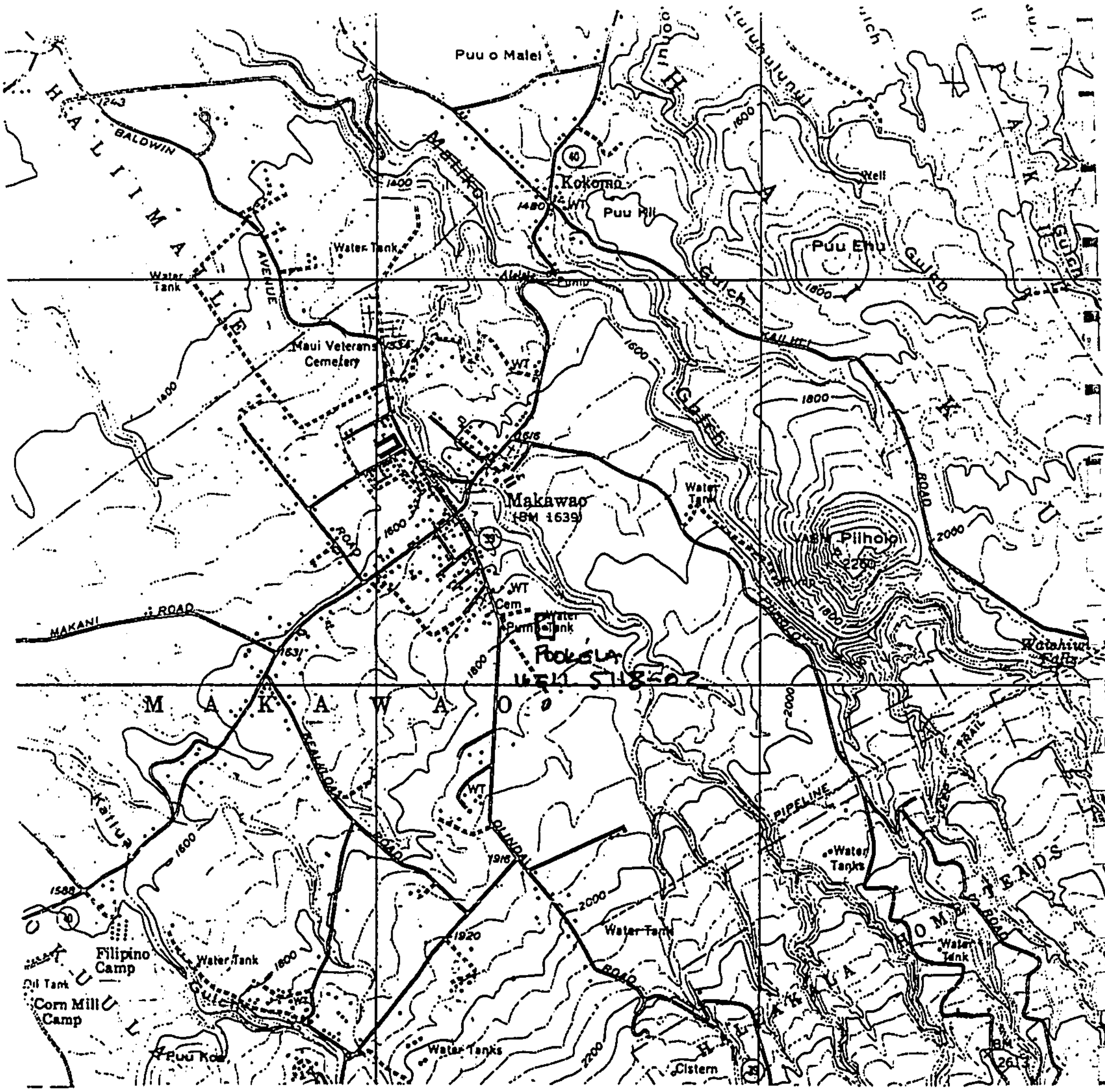
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Introduction

To provide drinking water for its proposed Upcountry Town Center, Maui Land & Pineapple Company, Inc. (ML&P) is proposing to construct a new well at about 1800-foot elevation along Piiholo Road above Makawao. The well would be constructed and outfitted in accordance with the design requirements of the Maui County Department of Water Supply (DWS) so that it can be dedicated to DWS and incorporated into DWS' water system.

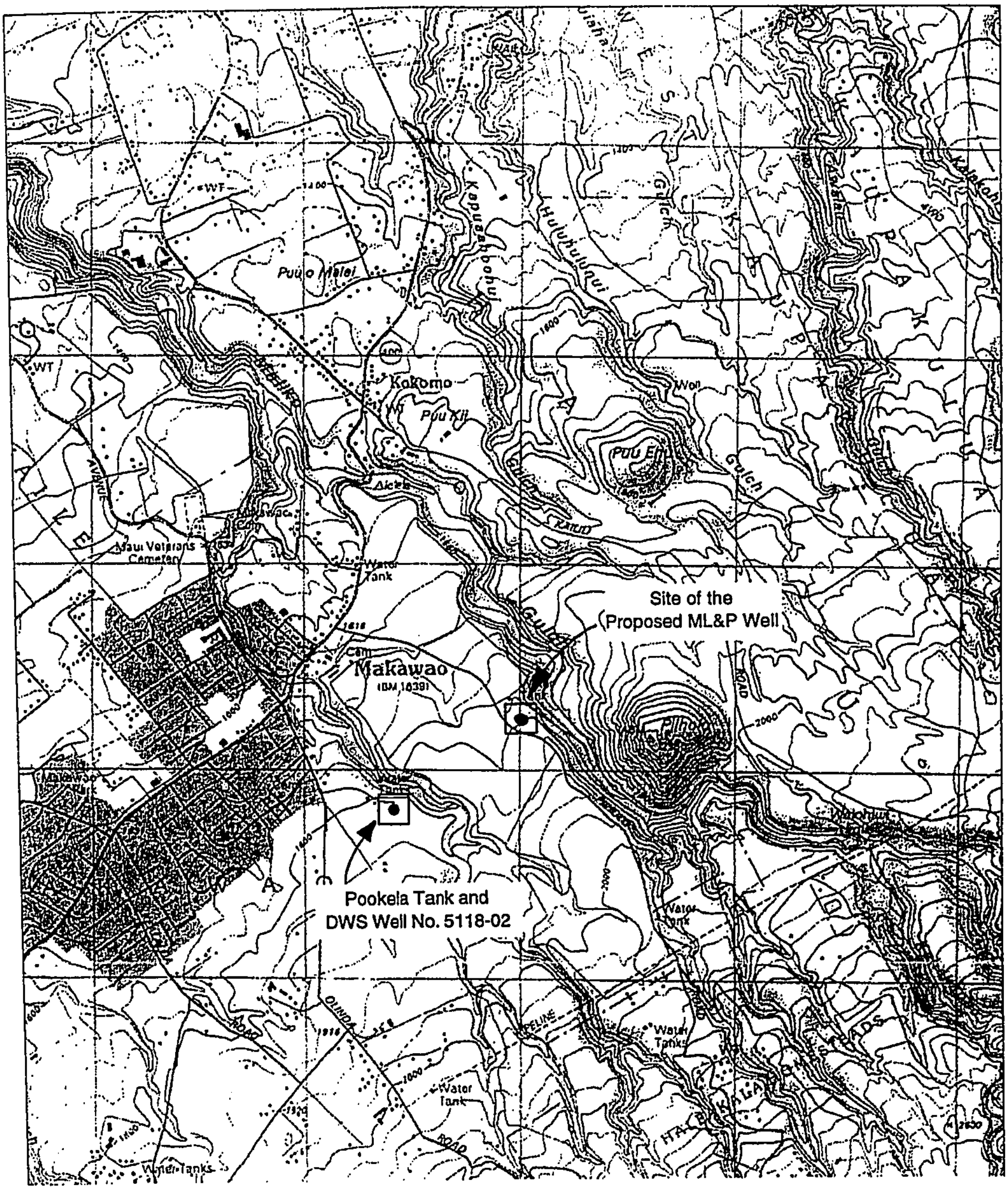
An EIS for the Upcountry Town Center project has been prepared by Group 70. This report has been prepared as a supplement to information in the EIS in response to requests by the Office of Environmental Quality Control (OEQC) and the Land Use Commission. It presents information and analyses of the hydrologic-related topics listed in OEQC's May 1998 "Guidelines for Assessing Water Well Development Projects". Other, non-hydrologic topics in the guidelines such as archaeological and cultural impacts and impacts of the project that the well would serve are discussed in the EIS prepared by Group 70.

Details of the Well Development Project

The proposed site for the well and its proximity to DWS' 2.0 MG Pookela Tank and its recently completed Well 5118-02 at the tank site are shown on Figure 1. Elements of the well development project, as best as they can be defined at this stage of planning, would consist of the following:

Site of the Well: TMK 2-4-12:06 owned by Maui Land & Pineapple, Inc.
Ground Elevation: 1800 Feet (Approx.)

Well Dimensions		
Total Depth	:	1925 Feet
Casing Diameter	:	18 Inches
Length of Solid Casing	:	1785
Length of Perforated Casing	:	150
Elevation at Bottom	:	-135 Feet (MSL)
Anticipated Static Water Level	:	11 to 12 Feet (MSL)
Installed Permanent Pump		
Rated Capacity	:	700 GPM at 1900 Feet TDH
Type	:	Submersible
Motor Horsepower	:	500
Connecting Pipeline:	:	12-Inch to Pookela Tank



Scale: 1"=2000'

Figure 1
Location of the Proposed ML&P Well at
1800 Feet Along Pilholo Road

In December 2002, DWS completed construction and pump testing of a new well next to its Pookela Tank (identified as State Well No. 5118-02). The well was pump tested continuously at 1400 GPM for six days. It produced excellent quality water (chlorides were constant and less than 10 MG/L) of relatively cool temperature (66° to 67° F.). There was only four feet of drawdown at the 1400 GPM pumping rate and this nominal drawdown was rapidly recovered when pumping ceased. These responses to pumping demonstrate that the well draws water from very permeable strata. The dimensions of ML&P's proposed well listed above are generally similar to those of DWS' Well 5118-02.

Based on calculations by R.T. Tanaka Engineers in Appendix I of the EIS, the Upcountry Town Center will require an average potable supply of 0.16 MGD at full build-out. According to DWS' standards, the well pumping capacity required for this must be equivalent to the maximum day demand in an operating time of 16 hours. This translates to a required capacity of 0.36 or 250 GPM for the Upcountry Town Center. The additional capacity that would be provided by the proposed 700 GPM pump could be used in several ways, including providing backup capacity to DWS' surface water sources serving the Upcountry area or supplying other projects in the service area.

Status of the Aquifer System in Which the Well Will Be Located

The proposed well would be located near the eastern boundary of the Makawao Aquifer System (State No. 60303). The geographic limits of this aquifer system and the adjacent Paia and Haiku aquifer systems are depicted on Figure 2. Available data on the wells in these three systems are compiled on Table 1. Areas, average rainfall, and sustainable yields of the three aquifer systems are tabulated below. The sustainable yield of 7 MGD for the Makawao aquifer system has been conservatively set for management purposes at less than 10 percent of the rainfall over its 53-square mile area.

Summary Statistics of the Makawao, Paia, and Haiku Aquifer Systems

Aquifer System		Area	Average Precipitation		Sustainable Yield	
Name	Number	(Sq. Miles)	In./Year	Equivalent MGD	MGD	% of Rainfall
Makawao	60303	52.9	38	96	7	7.3
Paia	60302	60.7	27	78	8	10.2
Haiku	60401	35.7	96	163	31	19.0

Note: Information from the State Water Resources Protection Plan, March 1992, Volume II, Page B-8.

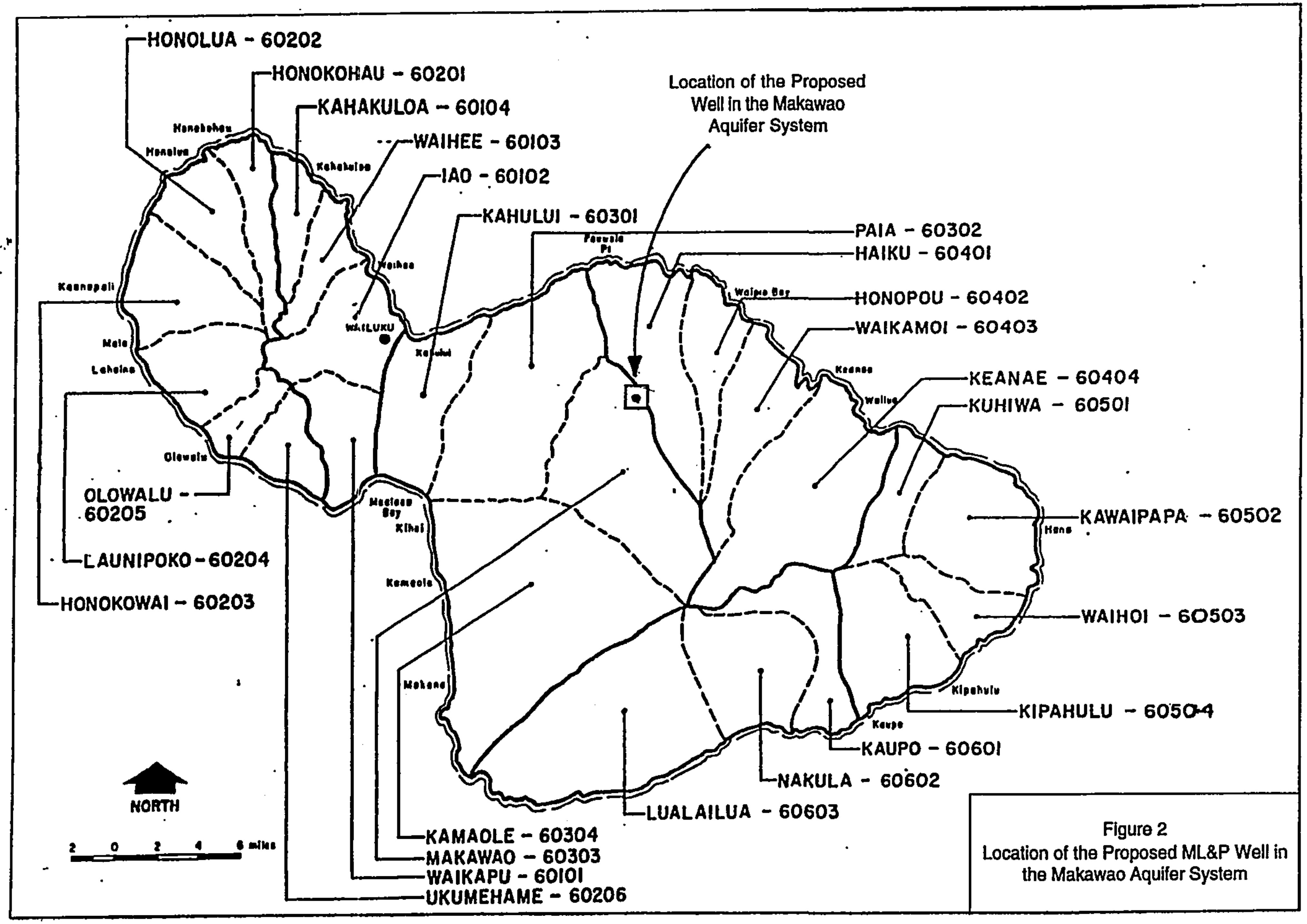


Figure 2
Location of the Proposed ML&P Well in the Makawao Aquifer System

Table 1. Data on Wells in the Makawao, Pala, and Haiku Aquifer Systems

Aquifer Name	Aquifer No.	State No.	Name / Owner	Year Constructed	Ground Elevation (Ft MSL)	Depth (Feet)	Elevation at Bottom (Ft MSL)	Casing Diameter (Inches)	Static Water Level (Ft MSL)	Chlorides (MG/L)	Temperature (° F.)
Makawao	60303	4821-01	Omaopio ESTY E	2000	1140	1200	-60	6	2.5	190-200	66.7 to 67
		5021-01	Pukalani Golf	1972	1078	1130	-52	16	3.5 to 8.9	400 to 490	
		5118-02	Pookela MBWS	2002	1810	1950	-140	18	11.1	10	
		5220-01	Hallimaile	2000	1101	1150	-49	16		42 to 65	
Pala	60302	4822-01	Kula Meadows	2000	1075	1135	-60	6	3.9	60	
		4824-01	Kihei Exploratory	1971	593	640	-47	12	2.8	55 to 69	73.9
		5320-01	Hamakuapoko 2	1993	780	812	-32	12	4.7	49	70.9
		5320-02	Maunaolu 1	2001	980	1005	-25	6	2.8(?)	75	67
		5420-01	Maui High School	1964	349	371	-22	8	3.4	82	72.0
		5420-02	Hamakuapoko 1	1992	702	765	-63	12	4.2	- -	72.0
		5422-01	Pala Mill Pump 13 [Shaft]	1923	155	50			5.2/3.8	166 to 450	
		5422-02	Pala Pump 17 [Shaft]	1932	295	- -			4.0	185 to 345	
		5423-01	Kailua Gulch [Shaft]	1899	18				4.0		
		5423-02	Lower Pala - Pump 16 [Shaft]	1899	25						
		5620-01	Maliko (HC&S)	- -	50	- -	- -	- -	- -		
		5620-02	Hokoana	1969	- -	36	- -	4	3.94	240	
		5620-03	Pauwela - Lewis 1	2001	190	210	-20	6	2.06	440	70
		5620-04	Pauwela - Lewis 2	2001	132	158	-26	6	3.64	260	
		5620-05	Maliko Moretti 1	2002	172	200	-18	6	3.55	260	
		5620-06	Maliko Moretti 2	2002	169	190	-21	6	4.00	590	
Haiku	60401	5317-01	Kulamalu	1998	1236	1362	-128	18	12.2	13	68.9
		5319-01	Silveno Spring								
		5418-01	EMWDP Monitor	2002	667	733	-66	14	4.68	50-60	
		5419-01	Haiku - DWS	1979	828	869	-41	12	2.3-4.3	58-96	68.0
		5517-01	JOACHIM	1997	531	570	-39	4		120	72
		5517-02	Manawai-Papanui	2001	534	558	-24	6	6.15	40	69
		5517-03	Summit Trade 2	2002	240	275	-25	6			
		5518-01	Mella Park	- -	400	320	+80	4			
		5518-02	Pauwela Can TH	1948	495	326	+169	1			
		5518-03	Pauwela Can TH	1948	495	535	-40	1			
		5518-04	Kulaha-Smith	2000	679	760	-81	6		40	68
		5519-01	Pauwela	1967	365	400	-35	8	3.4	68	
		5519-02	Haiku	1974	360	228	+132	4	210	68	
		5519-03	Haiku-Baldwin	1986	446	480	-34	8	5.0		

Owing to the depths of drilling and cost of pumping in the high elevation Makawao Aquifer System, only four wells have been completed to date and only three of these are currently in use. Data on their installed (or intended) pump capacities and present and possible ultimate rates of use are listed below. Present use amounts to 0.38 MGD, a small fraction of the aquifer's 7 MGD sustainable yield. Even with full use of the recently completed DWS well and the well proposed by ML&P for the Upcountry Town Center, total pumpage would be just 25 percent of the aquifer system's sustainable yield.

Pump Capacities and Rates of Use of Wells in the Makawao Aquifer System

Well		Pump Capacity (GPM)	Present Use (MGD)	Potential Future Use (MGD)
Owner / User	State No.			
Omaopio Esty E	4821-01	65	0.06	0.06
Pukalani Golf Course	5021-01	1000	0.28	0.28
Haliimaile-ML&P	5220-01	700	0.04	0.04
Pookela-DWS	5118-02	700	Not Yet In Use	0.67
Piiholo-ML&P	Not Assigned	700	Not Yet Constructed	0.67
Total		3165	0.38	1.72

<u>Notes</u>:
1. All data from the files of the Commission on Water Resource Management (CWRM).
2. No pumpage data for Well 4821-01 has been filed with the CWRM. The number above is an estimate based on the capacity of its installed pump.
3. Pumpage for Well 5021-01 at the Pukalani Golf Course is its average over the last four years.
4. ML&P's Haliimaile Well (No. 5220-01) was put in service in July 2000. The pumpage amount above is the average use from that time through May 2003.

Groundwater Occurrence at the Proposed Well Site

In characterizing groundwater conditions at the proposed well site, the boundary between the Makawao and Paia Aquifer Systems (it follows the east-to-west alignment of EMI's Wailoa-Hamakua Ditch) and between the Makawao and Haiku Aquifer Systems (it follows Maliko Gulch from 1100-foot elevation up past the proposed well site) are not particularly useful. The most important interpretive feature is the mountain's 2.7-mile wide northwest rift zone. The location of the traditionally mapped rift zone in relation to the proposed well is shown on Figure 3. Prior to geophysical surveys being conducted (Blackhawk Geometrics, 1998) and DWS' development of Well 5118-02, the west side of the rift zone was assumed to coincide with the linear alignment of three volcanic vents, Puu Piiholo, Kauhikoa, and Puu o Umi. Based on the new information now available, it is clear that both DWS Well 5118-02 and ML&P's proposed well site are within rather than outside the rift zone. Relative to the

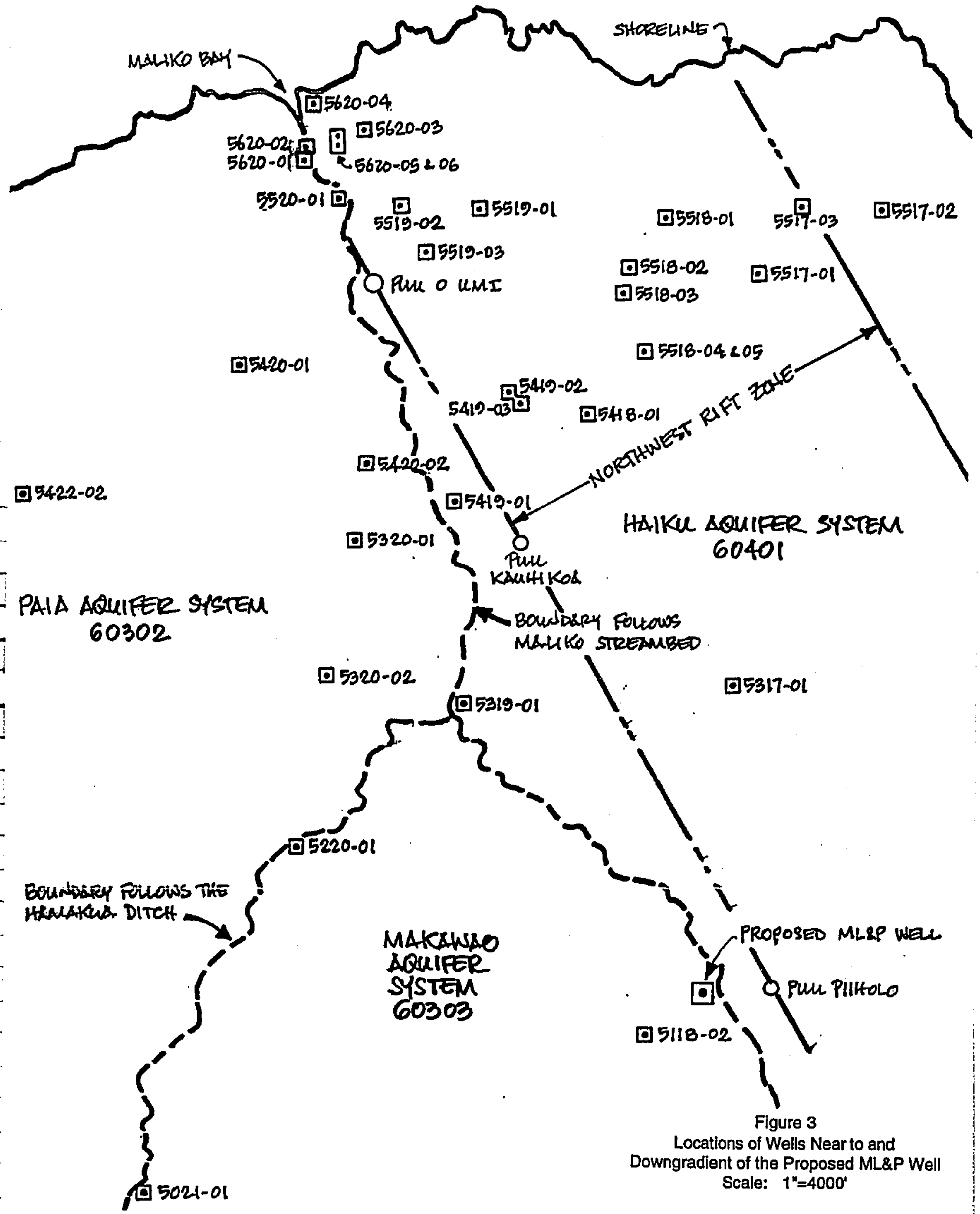


Figure 3
Locations of Wells Near to and Downgradient of the Proposed ML&P Well
Scale: 1"=4000'

water tapped by the nearest other wells in the Makawao Aquifer System (Nos. 5021-01 and 5220-01), groundwater from Well 5118-02 has the following distinguishing characteristics which support its location within the rift zone: It stands higher above sea level (11 to 12 versus 4 to 5 feet), suggesting the existence of a hydrologic discontinuity; it is significantly cooler (66° to 67° F. versus 72° F.); it has substantially lower chlorides (less than 10 versus 60 to 500 MG/L); and it exhibited no signs of salinity intrusion under a sustained pumping stress. With regard to these characteristics, groundwater conditions at Well 5118-02 are quite similar to those at Well 5317-01 which is in the adjacent Haiku Aquifer System and in the middle of Haleakala's northwest rift zone (its locations is also shown on Figure 3).

One other aspect of the groundwater environment that would be tapped by the proposed well should be noted. Although water would be drawn from the permeable Honomanu basalts at depth, drilling would first penetrate the overlying Kula lavas to reach the Honomanu formation. The Kula lavas are typically massive, poorly permeable, and interbedded with soil layers in places. Some of the wells further downslope and to the east in the Haiku Aquifer System have encountered perched water in limited quantities in the Kula formation during the process of drilling to the more permeable Honomanu formation below. However, no perched water was encountered in the Kula lavas at Well 5118-02 and this is expected to be the same situation at ML&P's proposed new well.

Contributing Watershed to ML&P's Proposed Well

There are insufficient data to accurately delineate the upgradient area that would contribute the water pumped by the proposed well (sometimes referred to as the wellhead protection area). However, this area can be conservatively circumscribed by what is known to date. The contributing area would be parabolic shaped, oriented with the trend of the mountain's northwest rift zone (30° west of north), and have a downstream stagnation point (ie. the bottom of the parabola) not more than 1500 feet from the well itself. The upgradient end of the parabola would asymptotically approach a width of 4000 feet or less and extend to the top of Haleakala. All of these dimensions are purposely chosen conservatively. The actual contributing area is likely to be significantly smaller. For example, calculations based on plausible assumptions of the ranges of various parameter values suggest that the stagnation point is probably less than 500 feet downstream of the well and the asymptotic width of the parabola upgradient from the well is probably less than 2500 feet.

From the downstream stagnation point up to elevation 3800 feet, Piiholo Road generally runs up the center of the potentially contributing area identified above. Present land uses in this area consist of the following:

- There are pineapple fields immediately downgradient of the well site on the east side of Piiholo Road. There is also a pineapple field on the west side of Piiholo Road which extends upslope to 2280-foot elevation.
- There are numerous residences along both sides of Piiholo Road all the way to its intersection with Olinda Road at 3800-foot elevation.
- There are several small farms, also located along Piiholo Road.
- There is substantial open space within and above the residential area. Below the alpine zone, the open space is primarily forest and grass land. Cattle grazing occurs on some of the grass lands. In the alpine zone further upslope, there is almost no vegetative cover.

Possible Hydrologic Impacts From the Development and Use of the Proposed Well

This section of the report deals with three potential hydrologic impacts resulting from the development and use of the proposed well: *impacts on streamflow; impacts on groundwater;* and groundwater contamination.

Potential Impacts on Streamflow. Although there are several shallow dry gulches which cross the Makawao Aquifer System, only Maliko Gulch, which has reaches of perennial flow, warrants consideration here. Maliko Gulch is the boundary between the Paia and Haiku Aquifer Systems from the shoreline up to 1100-foot elevation and between the Makawao and Haiku Aquifer Systems from that elevation to a point inland of the proposed well. The gulch is incised into Kula lavas at streambed elevations above about 1600 feet and into Kula and transitional lavas below that elevation. As with the Kula lavas, the transitional lavas are also massive and weathered and contain buried soil beds. Due to their limited permeability, they give rise to numerous contact springs in the east and west valley walls of the gulch. More than 20 such springs have been identified. Most of these are on the east valley wall. The few springs on the west valley wall (the side of the Makawao and Paia Aquifer Systems) have only modest discharge rates and flow only seasonally.

All of the springs in the east and west valley walls are several tens to more than 60 feet above the streambed itself. The larger of these are sufficient to create perennial flow in short reaches of the stream until the flow is lost to seepage into the streambed. As a result, the dry weather flow regime in Maliko Gulch consists of short sections of modest amounts of spring-fed perennial flow separated by longer reaches which are dry. The flowing section nearest to the proposed well extends from Waiohiwi Falls to the near vicinity of Puu Piiholo, a short distance upslope from the proposed well.

The potential impact on the perennial reaches of Maliko Gulch by pumping basal groundwater from wells located adjacent and within the gulch has been specifically investigated in detail. Nance (1998) analyzed the effects of pumping on streamflow by DWS' H'Poko Wells and HC&S' Shaft 32 in Maliko Gulch. In 1995, the USGS conducted a study of the effect of pumping DWS' Haiku well (data are in Lum, 1996). The data and analyses in these studies, as well as the information from DWS' recently completed Well No. 5118-02, indisputably establish that there is no possible way that use of ML&P's proposed well could affect streamflow in Maliko Gulch. The most pertinent reasons supporting this conclusion are as follows:

- The proposed well will draw water from the basal lens in the thin bedded Honomanu lavas at and below sea level.
- Based on the experience during construction of Well 5118-02, no perched groundwater in the Kula lavas is expected at the proposed well. However, the well's annular space will be sealed with cement grout to a minimum depth of 500 feet, far deeper than the thickness of potentially perching members of the Kula lavas. This will prevent any perched water, should it exist, from entering into the well.
- The reaches of perennial flow in Maliko Gulch are sustained exclusively by high elevation contact springs in the valley walls of the gulch. All of these are associated with water perched in the Kula formation and are well above the elevation of the streambed.
- The strata between these perched springs and basal groundwater near sea level is unsaturated. This means that pumping basal groundwater cannot influence the downward rate of seepage of springs because they are hydrologically disconnected and typically hundreds of feet higher in elevation than basal groundwater.
- Pump tests of DWS' Haiku well in 1995 and DWS' H'Poko wells in 1997 were specifically conducted to monitor impacts on streamflow. None were detected.
- Nance (1998) contains similar monitoring of the potential impact of pumping HC&S' Shaft 32 (State No. 5520-01) which is in Maliko Gulch and adjacent to a perennially flowing reach in the gulch. Whereas the draft of the DWS wells was relatively small (350 to 500 GPM from each well), the draft of the battery of wells linked to a common header in Shaft 32 was far greater (3500 GPM or 7 MGD). Despite this very high pumping rate and the immediate proximity of the shaft's wells to the stream, no impact to streamflow occurred.
- Data in Nance (1998) also demonstrate that the chemistry of water in the perennial reaches of streamflow in Maliko Gulch is essentially identical to that of the contact springs in the valley walls and distinctly different than the basal groundwater that the proposed well would tap.

Theoretically, drafts of basal groundwater at inland locations might conceivably affect streamflow where the streambed is low enough to intersect the basal lens. In Maliko Gulch, this occurs within about 1000 feet of the head of Maliko Bay. Streamflow is, in fact, perennial in that reach. Even in this case, however, data and analyses in Nance (1998) demonstrate that the flow in this reach is not basal groundwater. It is maintained by the discharge from Well 5620-01, a 130-foot long horizontal tunnel which is situated about 40 feet above the streambed in the west valley wall. Water chemistry conclusively demonstrate that the streamflow and the water drawn from a well in the streambed's alluvium (No. 5620-02) are sustained by the discharge from the horizontal tunnel above the streambed, not by basal groundwater.

Potential Impacts on Groundwater. A tabulation in an earlier section of this report showed that even at full use of DWS' recently completed well (No. 5118-02) and the well proposed by ML&P for the Upcountry Town Center, total pumpage in the Makawao Aquifer System would be less than 25 percent of the aquifer system's very conservatively set sustainable yield of 7 MGD. As such, an adverse impact on the few other wells in the aquifer system is highly unlikely.

The Paia Aquifer System is nominally downgradient from the Makawao Aquifer System and its basal groundwater is supplied, in part, by subsurface flow from the upgradient system. Use of the proposed well would reduce this subsurface supplement to the downstream aquifer system by an amount up to the actual pumpage by the well. Several aspects will mitigate this impact, however:

- The proposed well is 3.2 miles upgradient from the nearest well in the Paia Aquifer System (Well No. 5320-02).
- The 8 MGD sustainable yield set for the Paia Aquifer System is based exclusively on rainfall recharge within the geographic limits of the aquifer system itself. It does not include the obvious subsurface inflow from the upgradient aquifer system.
- The sustainable yield for the Paia Aquifer System also does not account for the considerable groundwater recharge which results from HC&S' irrigation return flow. This irrigation return originates from groundwater pumped at HC&S shafts and well batteries and from surface water brought across Maliko Gulch by EMI's Wailoa, Kauhikoa, and Lowrie Ditches.

In other words, the actual groundwater flux through the Paia Aquifer System is far greater than the component of direct rainfall-recharge which is the exclusive basis for its sustainable yield. From the perspective of the total flow through the aquifer, the loss of up to 0.67 MGD of upgradient subsurface inflow due to the ultimate full use of the proposed well would be relatively insignificant.

Potential Groundwater Contamination. The water quality from Well 5118-02 next to DWS' Pookela Tank is the best indication of the likely quality of water from ML&P's proposed well. DWS' well is close to the proposed well and its contributing, upslope watershed has similar land uses. Relative to the types of contamination which are issues for several lower elevation wells in the Paia and Haiku Aquifer Systems, the expectable quality of the proposed well is excellent in all respects:

Cooler Temperatures. The 66° to 67° F. temperature of Well 5118-02 is three to five degrees cooler than in most of the downgradient wells such as DWS' Haiku (No. 5419-01) and H'Poko Wells (Nos. 5420-02 and 5320-01). The lower temperature indicates that sources of recharge for a well at the proposed site are further upslope on the mountain than the recharge for lower elevation wells. This is significant because the potential sources of contamination are far less further upslope.

Salinity Intrusion. At lower elevations wells where basal heads are five feet or less, including two of the wells in the Makawao Aquifer System (Nos. 5021-01 and 5220-01), salinity increases due to continuous pumping stresses occur. This creates a problem in selecting the appropriate pump capacity and operating protocol so that the salinity will remain within an acceptable range for the intended use. For the two wells with basal heads greater than 10 feet, No. 5118-02 at the Pookela Tank and No. 5317-01 in the Haiku Aquifer System, the salinity is almost as low as rainwater (ie. chlorides were on the order of 10 MG/L) and was absolutely constant through extended pump tests at very high rates. Both wells were tested at 1400 GPM, twice the intended pumping rate of the proposed well.

Nitrate Levels as an Indication of Agricultural Return Flow or Other Human Activity. Nitrate, being a principle constituent of fertilizers and also found in high concentrations in domestic wastewater, is a useful indicator of the presence of agricultural irrigation return or domestic wastewater in groundwater pumped by a well. Normal "background" levels of nitrate-nitrogen in groundwater from pristine watersheds are typically less than 1.0 MG/L. The contributing watershed above the proposed well has some agricultural activity and all of the residences along Piiholo Road have individual wastewater disposal systems (cesspools or septic tanks with leachfield disposal). However, the nitrate-nitrogen in Well 5118-02 was just 0.51 MG/L. In downgradient wells such as the H'Poko Wells (Nos. 5420-02 and 5320-01), the levels are 5 to 6 MG/L, ten times the level in the upgradient well and demonstrating an obvious input by human activities on the intervening watershed.

Soil Fumigants EDB and DBCP. The presence of EDB and DBCP, soil fumigants previously used in pineapple cultivation, creates a problem if a well is to be used for human consumption. Treatment such as filtration with granular activated carbon is necessary. These contaminants have been detected in several wells downgradient in the Paia and Haiku Aquifer Systems (refer to Table 2 for a list of the affected wells). However, these contaminants were not detected in Well 5118-02 and are not expected to be found in the well proposed by ML&P. Both wells do have pineapple fields at the downstream end of their nominally contributing watershed areas. However, it appears that the character of the stratigraphy and the dip of these layers are such that irrigation return from these fields ultimately reaches basal groundwater further downslope than the contributing areas of these wells.

Alternative Sources for the Project's Drinking Water Supply

In all practicality, there are only two alternatives to the proposed well to supply the project: withdraw and treat more water from EMI's Wailoa Ditch at the Kamole Weir; and/or increase the yield of DWS' Lower Kula water system. Both of these are surface water sources which require treatment to make them acceptable for potable consumption. In terms of managing resources and minimizing hydrologic impacts, neither of these is preferable to the proposed well for the following reasons:

- In dry weather particularly, DWS' withdrawals from Wailoa Ditch reduce the irrigation supply available to HC&S. Increasing the rate of withdrawal would make this situation worse.
- Increasing the yield of DWS' Lower Kula water system would diminish streamflow on a 1:1 basis whereas pumping basal groundwater would have no impact on streamflow at all.

The yield of all surface water systems, including EMI's Wailoa Ditch and DWS' Lower Kula Water System, are subject to the variability of rainfall. Capacities of these systems are expressed in probabilities, not guaranteed amounts. The operating advantage to DWS to having the guaranteed amount of supply that wells provide at the elevation of the Pookela Tank during extended dry periods is significant.

Table 2

Presence of the Soil Fumigant Contaminants, EDB and DBCP, in Downgradient Paia and Haiku Aquifer System Wells

Aquifer System	Well		Sample Date	Ethylene Dibromide ("EDB")		Dibromochloropropane ("DBCP")	
	State No.	Name		Test Detection Limit (µg/l)	Result (µg/l)	Test Detection Limit (µg/l)	Result (µg/l)
Paia	5420-02	H'Poko 1	4-6-92	0.04	Not Detected	0.04	Not Detected
			8-4-97	0.02	Not Detected	0.01	0.04
			8-12-97	0.02	Not Detected	0.01	0.05
			8-18-97	0.02	Not Detected	0.01	0.046
	5320-01	H'Poko 2	12-1-92	0.02	0.21	0.01	0.23
			8-4-97	0.02	0.012	0.01	0.25
			8-12-97	0.02	0.16	0.01	0.32
			8-18-97	0.02	0.31	0.01	0.20
Haiku	5419-01	Haiku	5-18-03	0.02	Not Detected	0.01	0.05
			2-13-95	0.01	Not Detected	0.01	0.01
			2-22-95	0.01	Not Detected	0.01	Not Detected
			8-28-95	0.01	Not Detected	0.01	0.01

<u>Notes</u>:
1. Results of the two H'Poko wells from Table 4 of Nance (1998).
2. Results of the Haiku well from Lum (1996).
3. The State Department of Health regulatory limits are 0.04 µg/l for both EDB and DBCP.
4. Well 5420-01 in the Paia Aquifer System also reportedly had one or both of these contaminants, although specific dates and levels could not be found. The well was abandoned and sealed as a result.

References Cited or Otherwise Relied Upon

Blackhawk Geometrics. 1998. Geophysical Surveys for Assisting in Determining the Ground Water Resources Near the Pookela Water Tank, Island of Maui, Hawaii. Manuscript Report Prepared for the Malama Group.

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Appendix I

Preliminary Engineering Report for Upcountry Town Center, Pukalani, Maui

PRELIMINARY

ENGINEERING STUDY

FOR

UPCOUNTRY TOWN CENTER

AT

PUKALANI, MAUI, HAWAII

TAX MAP KEY: (2) 2-3-07:08

PREPARED FOR:

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JULY 16, 2001

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I. PURPOSE:

The purpose of this preliminary report is to investigate the infrastructural requirements of developing the proposed Upcountry Town Center on Parcel 8 of TMK: (2) 2-3-07 into a mixed use development with a town square atmosphere, including cottage industries, commercial and retail businesses, office and civic spaces, residences for seniors and open space.

This preliminary study will present a brief description of the existing infrastructure at the project area. It also provides contemplated improvements for the development required by the appropriate governmental agencies such as roadways, drainage, water and sewer systems.

II. SITE DESCRIPTION:

A. LOCATION:

This 40.6 acre site is bounded by the Pukalani Bypass Highway (F.A.P. No. 37C-01-92) to the east, old Haleakala Highway to the southwest and Makawao Avenue to the northwest at Pukalani, Maui, Hawaii. The site is situated just below the "five trees" intersection of Kula and Haleakala Highways.

Figure 1.1 shows the general location of the proposed project.

B. SOIL CONDITIONS:

The U.S. Department of Agriculture Soil Conservation Service's Soils Survey of the Island of Kauai, Oahu, Maui, Molokai and Lanai [2], classifies the soils within the project site as Haliimaile Silty Clay Loam, HgB (3 to 7 percent slopes) and HgC (7 to 15 percent slopes). Figure 1.2 shows the soil classification at the site.

Haliimaile Silty Clay Loam (HgB and HgC) belongs to Haliimaile Soil series that consists of well-drained soils on uplands of the island. Runoff is medium and erosion hazard is moderate. This soil series is also classified under Hydrologic Soil Group (HSG) "B".

C. FLOOD HAZARD CONDITIONS:

The Flood Insurance Rate Maps; Maui County designates the site within Flood Zone "C" (Figure 1.3).

Zone "C" is designated as areas of minimal flooding; therefore, the proposed project will not be subject to the requirements of Chapter 19.62, Flood Hazard Areas, of the Maui County Code.

D. TOPOGRAPHY:

The existing topography of the site is shown on Figure 1.4. About 80% of the lot is an abandoned pineapple field while the rest of the area, particularly the northern portion, contains several warehouse buildings.

The existing ground has elevations ranging from 1,610 feet to 1,720 feet above mean sea level. In general, the ground surface slopes downward in a northwesterly direction from Haleakala Highway (Pukalani Bypass) towards Makawao Avenue, at an average slope of about 7½ percent.

III. EXISTING INFRASTRUCTURE :

A. ACCESS:

The project site which is triangular in shape, is bordered by Makawao Avenue to the north; the Pukalani Bypass (new Haleakala Highway) to the east and the old Haleakala Highway to the west. At present, the site is accessed from Makawao Avenue. The existing roadway system in the area including discussions on lane configuration, signalization, posted speed limits, etc. is described in the "Traffic Impact Analysis Study" for the proposed development prepared by Parsons, Brinkerhoff, Quade and Douglas.

B. WATER:

Water for the area is currently provided by the 6" waterline along the mauka side of Makawao Avenue. The site is presently served by an existing 2" water meter. Wai Ulu Farms, which is located at the site is served by a ⅝" water meter. The existing water distribution and fire protection system at the site and in the vicinity are shown on Figure 2.1.

Briefly, the primary source of potable water in the project area is supplied by the Maui County Department of Water Supply from its Piiholo Water Treatment Facility, with some contribution from the Kamole Water Treatment Facility when the Department of Water Supply decides to pump water up from the Kamaole Facility.

Both treatment facilities utilize surface runoff as the source of raw water.

C. SEWER:

There is no existing County sewer system facilities at the site or in the vicinity of the site. Surrounding residences and businesses dispose of their wastewater by means of cesspools or individual wastewater systems that include septic tanks and leaching fields.

D. DRAINAGE:

The present onsite drainage condition is characterized due to surface waters sheet flowing across the project site in a northerly direction onto Makawao Avenue and flows into the existing drainage inlets "A" and "B" (Figure 2.2). The storm water is then carried across the road by the existing 30" and 24" drain lines under Makawao Avenue.

The runoff expected to be generated by the project site due to existing conditions is about 42 cfs and 53 cfs for 10-year and 50-year storms, respectively. The present 50-year 1-hr. runoff volume from the site is approximately 132,640 cubic feet (cf).

There currently exists a 54" drainage culvert crossing the Pukalani Bypass above the northeast quadrant of the project site. Storm water discharge from this culvert flows along the highway right-of-way line down to the northeast corner of the project site and is collected by the existing Drain Inlet "B". The runoff is then conveyed across Makawao Avenue by the existing 24" drain pipe. Any overflow fords Makawao Avenue into the downstream properties.

IV. PROPOSED INFRASTRUCTURAL IMPROVEMENTS:

A. GENERAL:

Proposed infrastructural improvements, such as roadways, water, sewer and drainage systems will be designed and constructed in accordance with the guidelines and requirements of appropriate governmental agencies that have jurisdiction over this type of development.

A conceptual site plan of the proposed land uses is shown on Figure 3.1.

B. ROADWAYS AND TRAFFIC:

The project will have access from Makawao Avenue, Old Haleakala Highway and new Haleakala Highway (Pukalani Bypass). Interior roadways will be 24-foot wide A.C. pavement. The major spine roads within the project will be designed to compliment the Country-Town setting and will include concrete curbs, curb and gutters and sidewalks.

Abutting roadways will be improved to the requirements of the County or State such as providing curb and gutter improvements along Makawao Avenue and constructing acceleration/deceleration lanes on the access to the new Haleakala Highway (Pukalani Bypass).

Traffic and roadway systems are further analyzed in the "Traffic Impact Analysis Report" for the proposed development by Parsons, Brinkerhoff, Quade and Douglas in their Traffic Impact Assessment Study dated July 2001.

C. <u>WATER SYSTEM</u>:

According to Department of Water Supply (DWS) standards, the estimated average daily demand for the proposed development is 159,300 gallons per day (gpd). Applying a demand factor of 1.5, the maximum daily demand will be about 238,950 gpd. The fire flow requirement, based on commercial usage, is 2,000 gallons per minute (gpm).

The proposed development will be serviced by a network of 8" and 12" pipes as shown on Figure 3.2. The new system will be connected to the existing 12" waterline at the junction of Haleakala and Kula Highways, to the existing 6" waterlines on Makawao Avenue and to the existing 4" waterline on the old Haleakala Highway via pressure reducing stations, if required.

Fire hydrants will be provided along the proposed roadways with spacings at no more than 250 feet.

For additional source development, Maui Land and Pineapple Company (MLP) is proposing development of offsite potable water wells on land owned by MLP in the upcountry area. This additional potable water would be added to the municipal upcountry water system to supplement the water from the Piiholo and Kamole Treatment Facilities in the upcountry water system.

D. <u>SEWER SYSTEM</u>:

The estimated average wastewater flow generated by the proposed development is 50,125 gallons per day (gpd) based on the Maui County Wastewater Reclamation Division's guidelines.

The conceptual sewer system is shown on Figure 3.3. The proposed system, consisting mainly of 8" and 12" PVC sewer pipes, will collect wastewater flows generated and transport it to a proposed onsite treatment facility. The treatment facility will be designed in accordance with the requirements of the State Department of Health and be able to produce the desired effluent quality appropriate for the type of disposal system to be used. The treated wastewater will then be pumped to the proposed disposal systems.

Leaching fields are proposed to dispose of the treated wastewater by employing absorption trenches with perforated PVC distribution pipes enveloped in filter rock. The absorption trenches will be 18" to 36" deep. The area of the subsurface disposal fields will be dependent upon the percolation rate of the existing ground. The quality of effluent for this type of disposal system is DOH Class R-3 effluent.

The onsite wastewater collection system will be designed and installed in accordance with the County of Maui Standards and the proposed treatment facilities and effluent disposal systems will be constructed in accordance with the State Department of Health requirements.

E. <u>DRAINAGE SYSTEM</u>:

The onsite drainage system concept is shown in Figure 3.4. Onsite runoff will be collected by catch basins or grated drop inlets and then conveyed to the proposed retention ponds by underground culverts. Referring to Figure 3.5, runoff from Drainage Area 1 will be conveyed to Drainage Basin 1; runoff from Drainage Area 2 will be discharged to Drainage Basin 2; and runoff from

Drainage Areas 3 and 4 will flow onto Makawao Avenue to be collected by the proposed roadway drainage system and eventually disposed of across the road by the existing culvert crossings.

A summary of the storm volumes and runoff rates are listed below.

1. Runoff Volumes (50-year):

Existing Conditions:

Area A:	Volume	= 115,325 cf
Area B:	Volume	= 17,315 cf
	Total	= 132,640 cf

The existing open ditch along Old Haleakala Highway will be replaced by an underground drainage system with drain inlets to pick up the roadway runoff.

Post Developed Conditions:

Area 1:	Volume	= 66,690 cf
Area 2:	Volume	= 107,767 cf
Area 3:	Volume	= 50,355 cf
Area 4:	Volume	= 1,307 cf
	Total	= 226,119 cf
		= 226,120 cf
Increase Due to Development		= 226,120 - 132,640
		= 93,480 cf

2. Runoff Rates:

10-Year Storm

Existing Conditions:	Q = 42 cfs	
Developed Conditions:	Q = 96 cfs	
Increase Due to Development		= 96 - 42
		= 54 cfs

50-Year Storm

Existing Conditions:	Q = 53 cfs	
Developed Conditions:	Q = 116 cfs	
Increase Due to Development		= 116 - 53
		= 63 cfs

These preliminary storm runoff volumes and rates are subject to change and adjustments due to final design considerations, but the conceptual nature of the proposed improvements will remain the same.

Storm runoff is composed of two factors, the volume of runoff and the rate of runoff. To assure that offsite flooding conditions do not result from the new development, the post development runoff from the property will not increase above the existing (non-developed) conditions.

The proposed retention basins will be sized to contain the projected runoff volume increase expected to be generated by the development, thus attaining a <u>zero runoff increase</u> (volume and rate) to adjacent and downstream properties.

Based on this preliminary drainage study, the proposed project when completed will not result in any additional adverse drainage effect on adjacent or downstream properties.

F. SOLID WASTE DISPOSAL:

Solid waste disposal from the proposed development will primarily be handled by private refuse collection and disposal companies for deposit in the Central Maui Sanitary Landfill operated by the County of Maui.

Construction waste will be recycled as practicable and the balance will be disposed in an approved construction waste landfill.

V. REFERENCES:

1. Rules for the Design of Storm Drainage Facilities in the County of Maui, Title MC-15, Department of Public Works and Waste Management, County of Maui, Chapter 4.

2. 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.

3. Erosion and Sediment Control Guide for Hawaii, prepared by U. S. Department of Agriculture, Soil Conservation Service, March 1981.

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

5. Flood Insurance Rate Maps for the County of Maui, June 1981.

6. Hawaii Administration Rules, Title 11, Hawaii State Department of Health, Subchapter 2 - Watewater Treatment Works

7. Proposal Guidelines for the Treatment and Reuse of Reclaimed Water, State Department of Health.

UPCOUNTRY TOWN CENTER

PRELIMINARY DOMESTIC WATER DEMAND CALCULATIONS

July 26, 2001

A. Reference: Tables 15, 16 and 17
Department of Water Supply System Standards, 1985

B. Preliminary Water Demands:

1. Upcountry Town Business (Commercial)

   Area = 15.6 Acs.

   Average Daily Demand = 15.6 x 6,000 gals./ac.

   = 93,600 gallons per day (gpd)

2. Light Industry

   Area = 3.4 Acs.

   Average Daily Demand = 3.4 x 6,000 gals./ac.

   = 20,400 gpd

3. Multi-Family Residential

   Area = 6.6 Acs.

   Average Daily Demand = 6.6 x 3,000 gals./ac.

   = 19,800 gpd

4. Open Space/Park /Roadways

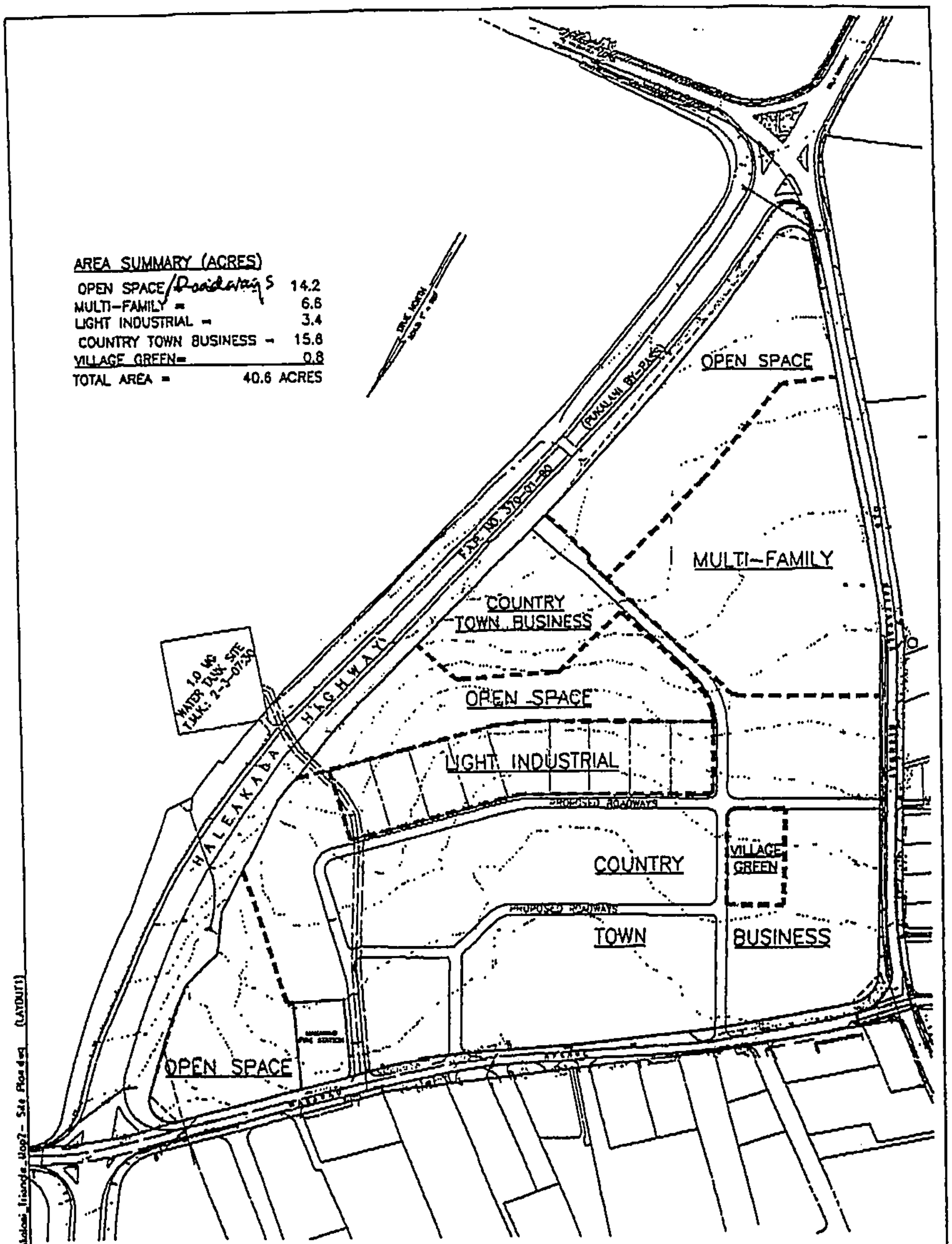
   Area = 15.0 Acs.

   Average Daily Demand = 15.0 x 1,700 gals./ac.

   = 25,500 gpd

5. Summation:

Total Average Daily Demand	= 159,300 gpd
Maximum Daily Demand	= 1.5 x Average Daily Demand
	= 1.5 x 159,300
	= 238,950 gpd
	= 0.239 MGD



CONCEPTUAL SITE PLAN

Tax Map Key: (2) 2-3-07:05

871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII 96793

R. T. TANAKA ENGINEERS, INC.
LAND SURVEYORS - CIVIL & STRUCTURAL ENGINEERS

JULY 26, 2001 JOB NO. 99-53

UPCOUNTRY TOWN CENTER

PRELIMINARY WASTEWATER FLOW CALCULATIONS

July 16, 2001

A. REFERENCES:

1. Wastewater Flow Standards, 9/28/93, Wastewater Reclamation Division, County of Maui

B. WASTEWATER FLOW CRITERIA:

1. Senior Citizen Housing Units:

   a. Ave. Flow = 100 gallons per capita per day (gpcd)

   b. Occupancy = 2 persons per unit

2. Industrial and Farm Buildings:

   a. Ave. Flow = 25 gpcd per employee

   b. Occupancy Load Factor = 500 s.f. per employee

3. Shopping Center (assumed retail only, no restaurant space considered), Retail Pads:

   a. Ave. Flow = 15 gpcd per employee

   b. Occupancy Load Factor = 200 s.f. per employee

4. Services, Office and Civic Pads:

   a. Ave. Flow = 20 gpcd per employee

   b. Occupancy Load Factor = 200 s.f. per employee

C. WASTEWATER FLOW:

1. Senior Citizen Housing Units:

No.of Units = 25 x 6 = 150 Units

No. of Persons/Unit = 2

Ave. Wastewater Flow = 2 x 150 x 100 gpd = 30,000 gpd

2. Light Industrial Lots:

9 Lots

Total Area = 141,700 s.f.

Assumed Building Site Coverage = 35%

Building Area = 49,595 s.f.

$$\text{No. of Employees} = \frac{49{,}595}{500 \text{ s.f.}} = 99.2 = 100$$

Ave. Wastewater Flow = 100 x 25 gpcd = 2,500 gpd

3. Waiulu Farm:

Area = 5,000 s.f. (Building Area)

$$\text{No. of Employees} = \frac{5{,}000}{500 \text{ s.f.}} = 10$$

Ave. Wastewater Flow = 10 x 25 gpcd = 250 gpd

4. Retail Center: (Assumed Retail only, no Restaurant space included)

Total Area = 121,000 s.f. (Building Area)

$$\text{No. of Employees} = \frac{121{,}000}{200\text{ s.f.}} = 605$$

Ave. Wastewater Flow = 605 x 15 gpcd = 9,075 gpd

5. Maui Fresh: (Two @ 0.5 Ac. each)

Area = 6,000 s.f. (Building Area)

$$\text{No. of Employees} = \frac{6{,}000}{500\text{ s.f.}} = 12$$

Ave. Wastewater Flow = 12 x 25 gpcd = 300 gpd

6. Offices & Civic Pads:

Total Area = 79,900 s.f. (Building Area)

$$\text{No. of Employees} = \frac{79{,}900}{200\text{ s.f.}} = 400$$

Ave. Wastewater Flow = 400 x 20 gpcd = 8,000 gpd

Total Ave. Wastewater Flow = 50,125 gpd

UPCOUNTRY TOWN CENTER

PRELIMINARY DRAINAGE CALCULATIONS

July 16, 2001

I. 10-YEAR RUNOFF RATE:

A. Reference: Rules for the Design of Strom Drainage Facilities in the County of Maui

1. Hydrologic Criteria: 10-year, 1-hour storm

2. Runoff Coefficient, C:

Existing, C = 0.30 (unimproved, Table 2)

Developed Conditions (Table 3, except as noted)

Open (Park, Grassed, etc.)	= 0.25 (Table 2)
Apartment Areas	= 0.70
Business/Industrial Areas	= 0.80

3. Methodology:

Rational Method, Q = CIA, in which:

Q = Flow rate in cubic feet per second

C = Runoff coefficient

I = Rainfall intensity in inches per hour for a duration equal to the time of concentration

A = Drainage area in acres

B. Refer to Figure 2.2 for existing drainage areas.

C. Hydrologic Calculations: (See attached Hydrology Chart)

PROJECT: Upcountry Town Center

DATE: ______

LOCATION: Pukalani, Maui, Hawaii

TMK: ______

HYDROLOGY
(DEVELOPED CONDITIONS - OVERALL)

Drainage Area Designation	Inlet Structure/ Designation	Area (Acres)	Length of Overland Flow (feet)	Average Slope, %	Character of Ground	T_c (min.)	C	TM (years)	1-Hour Rainfall (inches)	I (in./hr.)	Q=AIC (c.f.s.)	Remarks
10-Yr. Storm:												
	--	41.0	340	7.5	Ave. Grass	16	0.65	10	2.4	3.60	95.9	
						26						
			1750	7.5	Paved	10						
50-Yr. Storm:												
						26	0.65	50	2.9	4.35	115.9	

$$\text{Weighted C:} = \frac{10 \times 0.25 + 6.6 \times 0.70 + 24.4 \times 0.80}{41}$$

$$= \frac{26.64}{41}$$

$$= 0.65$$

JOB NO.: ______

R. T. TANAKA ENGINEERS, INC.
ENGINEERS - SURVEYORS

SHEET ____ of ____

PROJECT: Upcountry Town Center

DATE: June 19, '01

LOCATION: Pukalani, Maui, Hawaii

HYDROLOGY
(EXISTING CONDITIONS)

TMK:

Drainage Area Designation	Inlet Structure/ Designation	Area (Acres)	Length of Overland Flow (feet)	Average Slope, %	Character of Ground	T_c (min.)	C	TM (years)	1-Hour Rainfall (inches)	I (in./hr.)	Q=AIC (c.f.s.)	Remarks
10-Yr. Storm:												
A	Inlet "A"	35.3	1250	7.5	Ave. Grass	27	0.30	10	2.4	3.55	37.6	42.1 cfs
B	Inlet "B"	5.3	810	7.5	Ave. Grass	22	0.30	10	2.4	2.85	4.5	
50-Yr. Storm:												
A	Inlet "A"					27	0.30	50	2.9	4.30	45.5	52.8 cfs
B	Inlet "B"					22	0.30	50	2.9	4.60	7.3	

JOB NO.:

R. T. TANAKA ENGINEERS, INC.
ENGINEERS - SURVEYORS

SHEET ____ of ____

II. 50-YEAR STORM RUNOFF VOLUME:

A. Methodology: SCS Method

Ref.: Erosion & Sediment Control Guide for Hawaii, March, 1981, prepared by Soil Conservation Service, U.S. Department of Agriculture.

Given Data:

Type of Soil at Property = Haliimaile Series: Haliimaile Silty Clay Loam

Hydrologic Soil Group = B

Rainfall Amount, P (50-year, 1-hour) = 2.9"

Formulas:

Runoff depth:

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

$$\text{Where } S = \frac{1,000}{CN} - 10$$

B. Runoff Volume at Existing Condition:

(Refer to Figure 2.2 for Drainage Areas)
Existing Curve Number, CN = 75 (Pineapple, Partial Cover Cross-Sloped & Terraced)

$$S = \frac{1,000}{75} - 10$$

$$= 3.33$$

$$Q = \frac{(2.9 - 0.2 \times 3.33)^2}{2.9 + 0.8 \times 3.33} = 0.90''$$

1. Area A (35.3 Acs.):

$$V = \frac{0.90''}{12} \times 35.3 = 2.6475 \text{ acft}$$

$$= 115{,}325 \text{ cf (to Inlet "A")}$$

2. Area B (5.3 Acs.):

$$V = \frac{0.90''}{12} \times 5.3 = 0.3975 \text{ acft}$$

$$= 17{,}315 \text{ cf (to Inlet "B")}$$

3. Total Existing 50-year Runoff Volume:

$$115{,}325 + 17{,}315 = 132{,}640 \text{ cf}$$

C. <u>Runoff Volume at Developed Conditions</u>:
(Refer to Figure 3.5 for Drainage Areas)

1. <u>Determine CN</u>:

Area Designation	Land Use	Area Acres	CN	CN x Area
1	Business MF Open Space	2.9 6.6 6.9	92 92 61	267 607 421
	TOTAL	16.4	-	1,295
	$CN = \frac{1{,}295}{16.4}$ CN = 79			

Area Designation	Land Use	Area Acres	CN	CN x Area
2	Business Open Space	14.7 1.7	92 61	1352 104
	TOTAL	16.4	-	1456
	$CN = \frac{1.456}{16.4}$ $= 88.8$ Use CN = 89			
3	Business	6.7	92	616
	CN = 92			
4	Open	1.1	61	67
	CN = 61			

2. <u>Runoff Volumes</u>

Area 1: $S = \frac{1{,}000}{79} - 10$

$= 2.66$

$$Q = \frac{(2.9 - 0.2 \times 2.66)^2}{2.9 + 0.8 \times 2.66}$$

$= 1.12''$

$$V = \frac{1.12''}{12} \times 16.4$$

$= 1.531$ acft

$= 66{,}690$ cf (to Retention Basin #1)

Area 2: $$S = \frac{1{,}000}{89} - 10$$

$$= 1.24$$

$$Q = \frac{(2.9 - 0.2 \times 1.24)^2}{2.9 + 0.8 \times 1.24}$$

$$= 1.81''$$

$$V = \frac{1.81''}{12} \times 16.4$$

= 2.474 acft

= 107,767 cf (to Retention Basin #2)

Area 3: $$S = \frac{1{,}000}{92} - 10$$

$$= 0.87$$

$$Q = \frac{(2.9 - 0.2 \times 0.87)^2}{2.9 + 0.8 \times 0.87}$$

$$= 2.07''$$

$$V = \frac{2.07''}{12} \times 6.7$$

= 1.156 acft

= 50,355 cf (to Makawao Avenue Drainage System)

Area 4: $S = \dfrac{1,000}{61} - 10$

$= 6.39$

$Q = \dfrac{(2.9 - 0.2 \times 6.39)^2}{2.9 + 0.8 \times 6.39}$

$= 0.33''$

$V = \dfrac{0.33''}{12} \times 1.1$

= 0.030 acft

= 1,307 cf (to Makawao Avenue Drainage System)

Total 50-Year Runoff Volume = 66,690 + 107,767 + 50,355 + 1,307

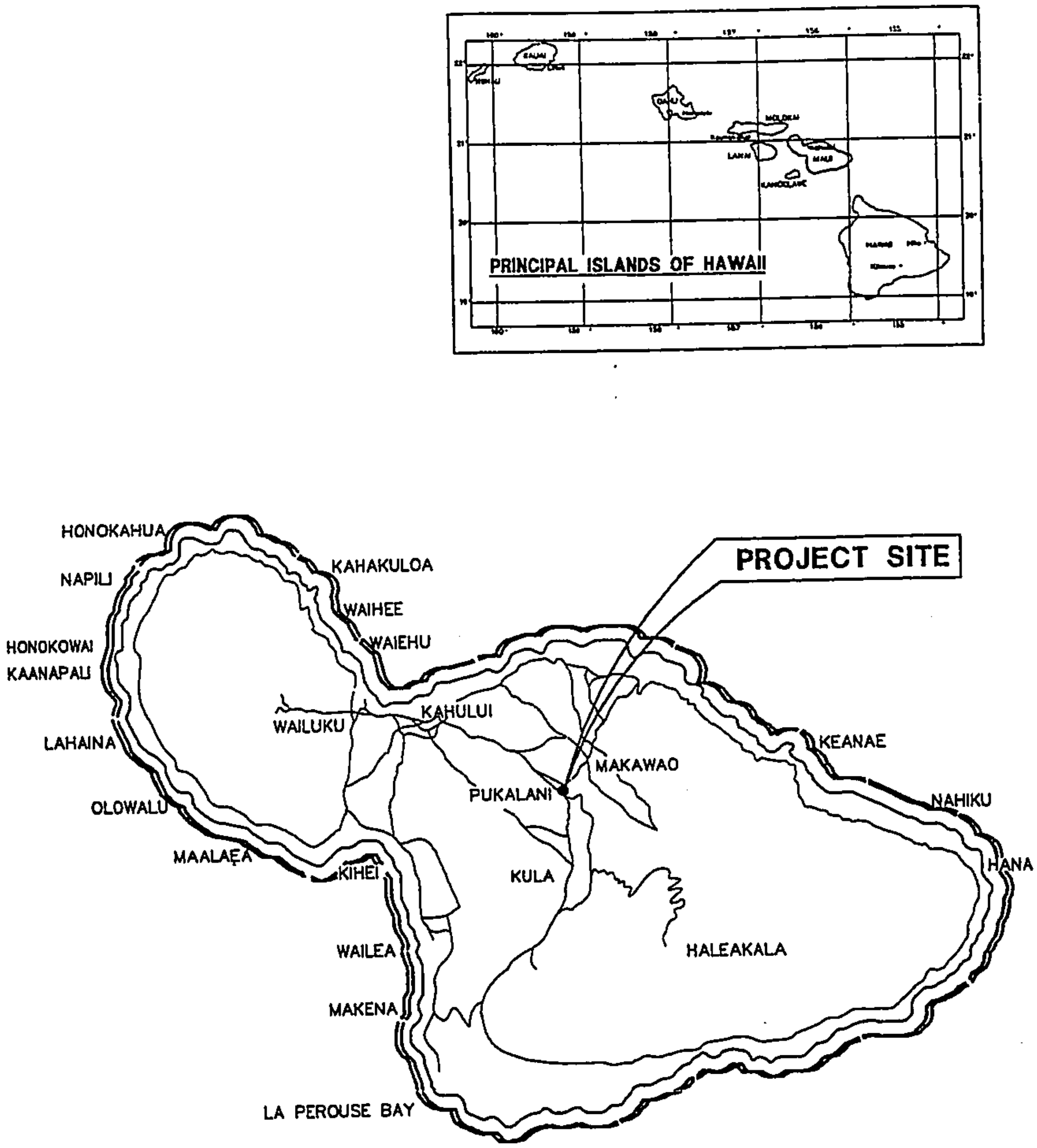
= 226,119 cf

= 226,120 cf

3. <u>Anticipated Increase of Storm Runoff Volume Due to Development</u>

Increase = 226,120 - 132,640

= 93,480 cf (minimum runoff volume to be retained onsite so that the proposed development will not cause any additional adverse effects to adjacent or downstream properties.)



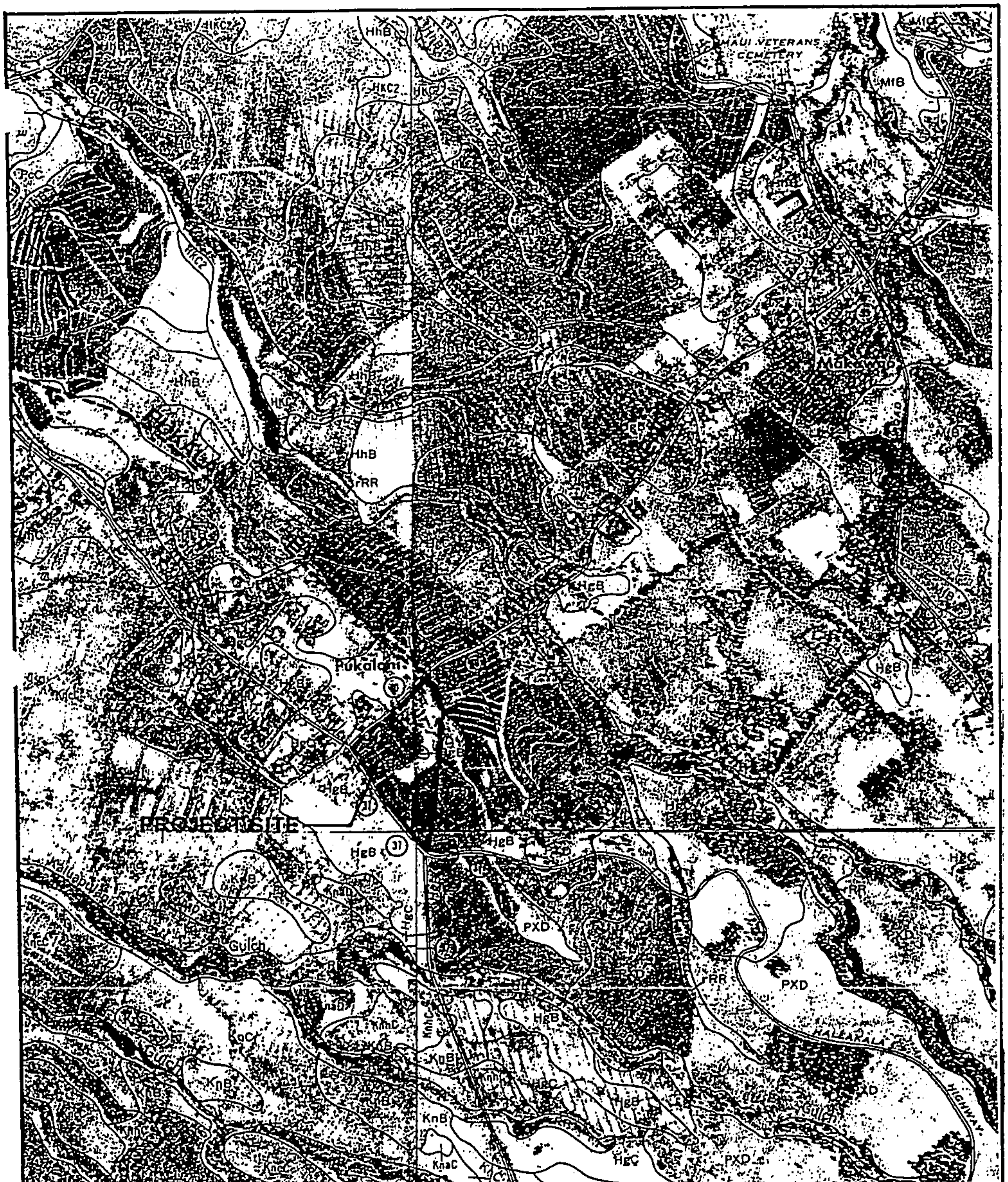
LOCATION MAP
NOT TO SCALE

FIGURE 1.1

1999\99-55\ISLAND OF MAUI EXHIBIT.dwg

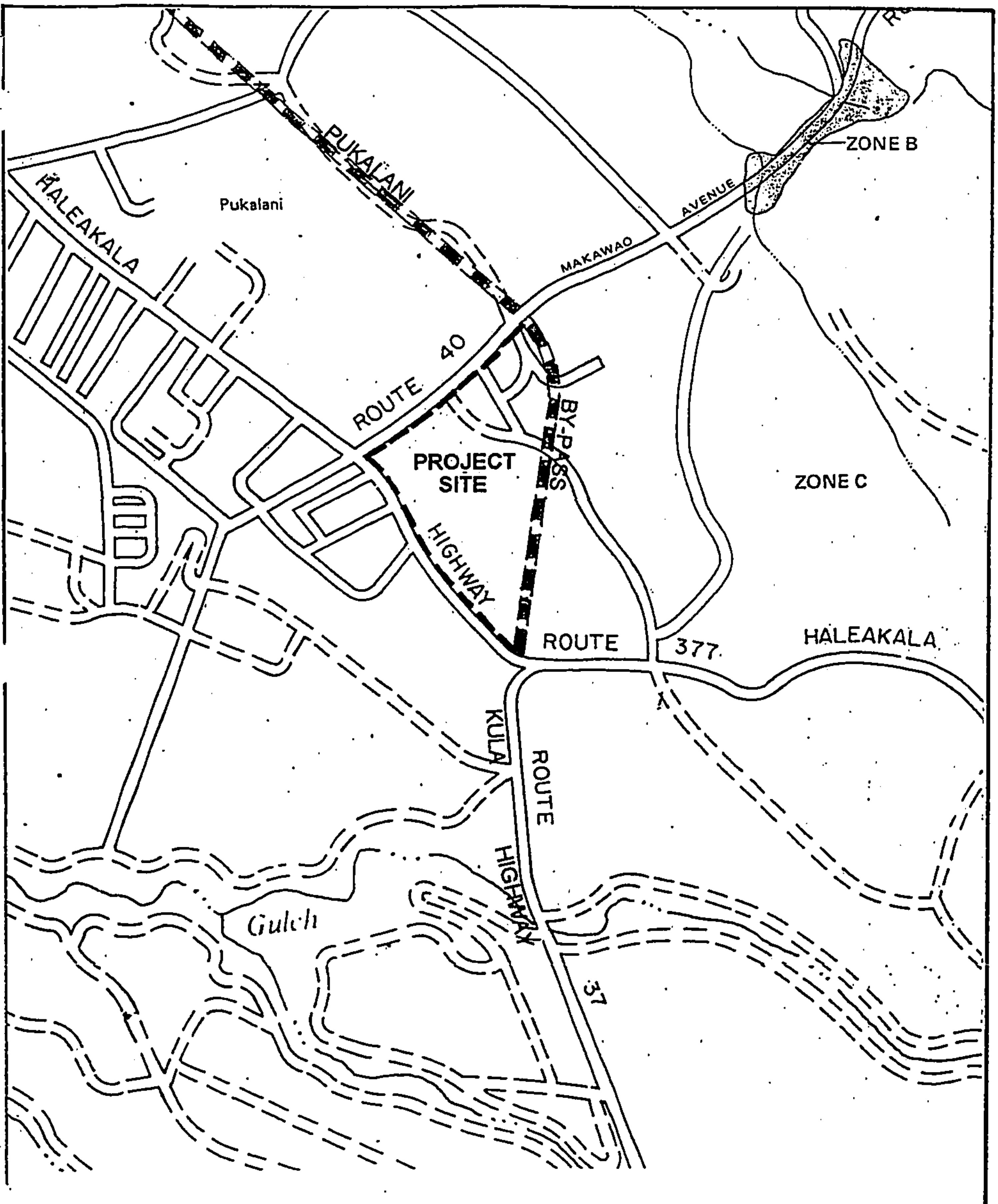
871 KOLU STREET, SUITE 201

R. T. TANAKA ENGINEERS, INC. JUNE 22, 2001 JOB NO. 99-55



SOILS MAP
Scale: 1" = 2,000'

FIGURE 1.2

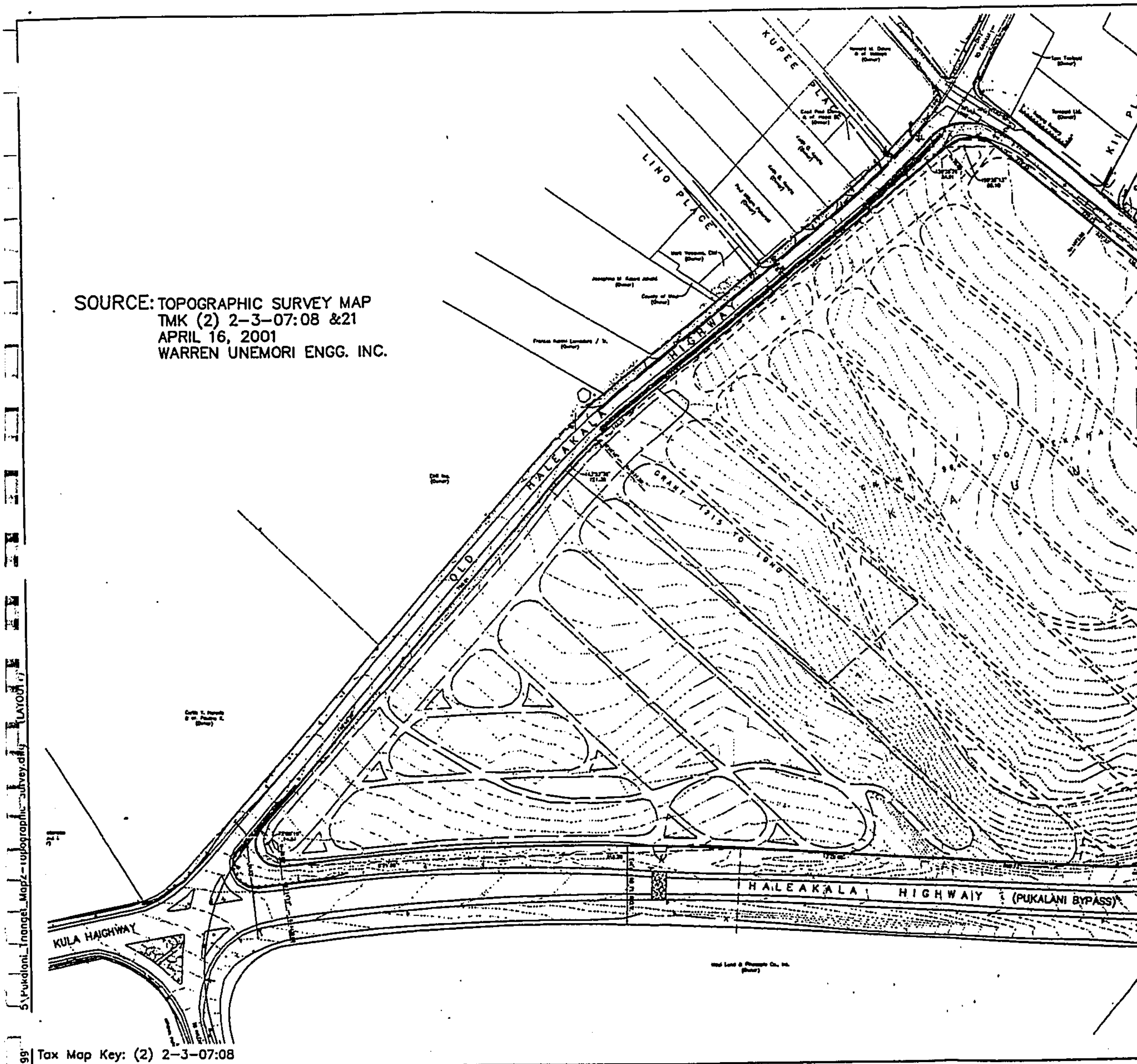


Ref: Flood Insurance Rate Map
County of Maui
Panel 260B
June 1, 1981

FLOOD MAP

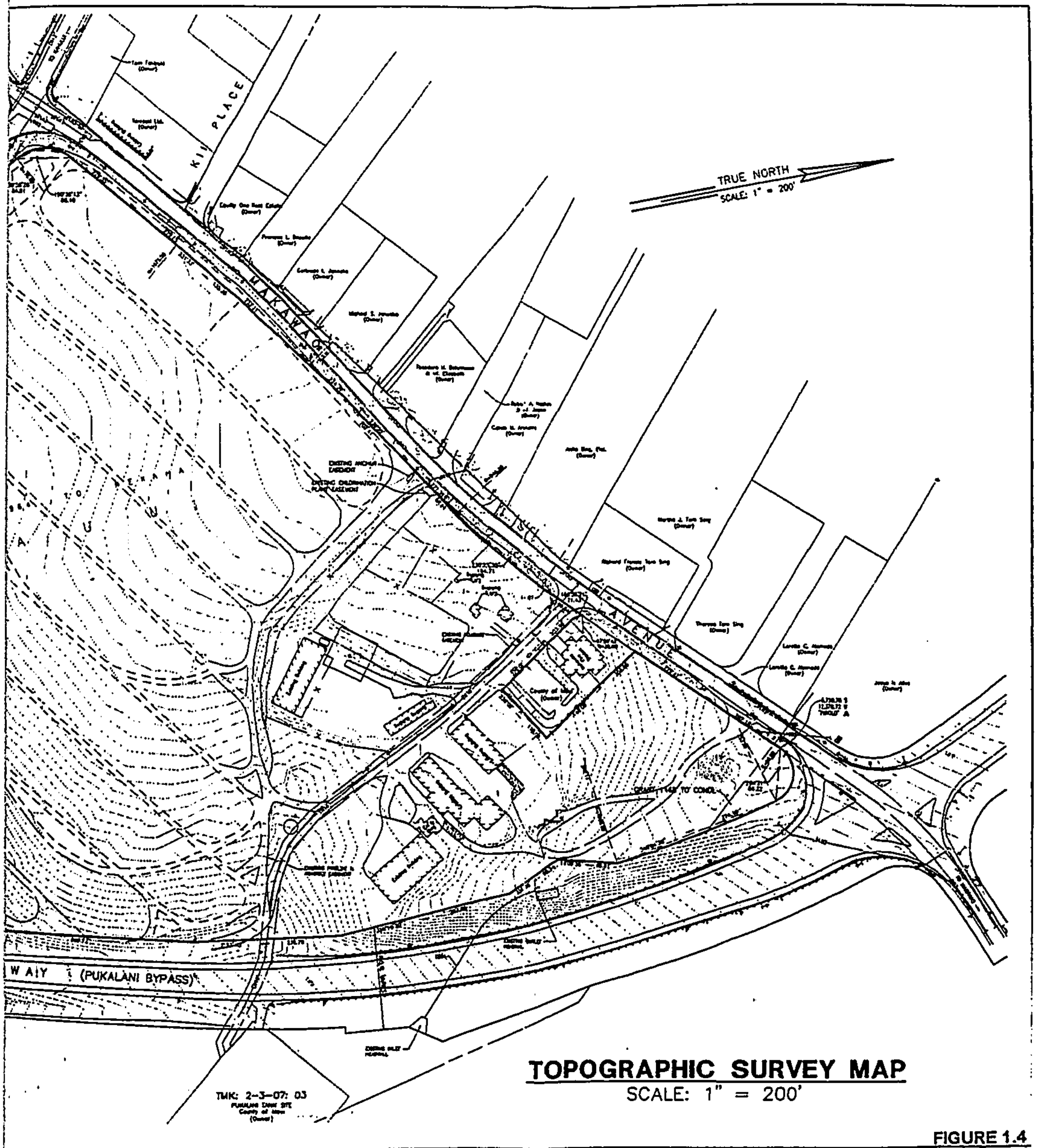
Scale: 1" = 1,000'

FIGURE 1.3



871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII 96793

R. T. TANAKA ENGINEERS, IN
LAND SURVEYORS – CIVIL & STRUCTURAL ENGINE



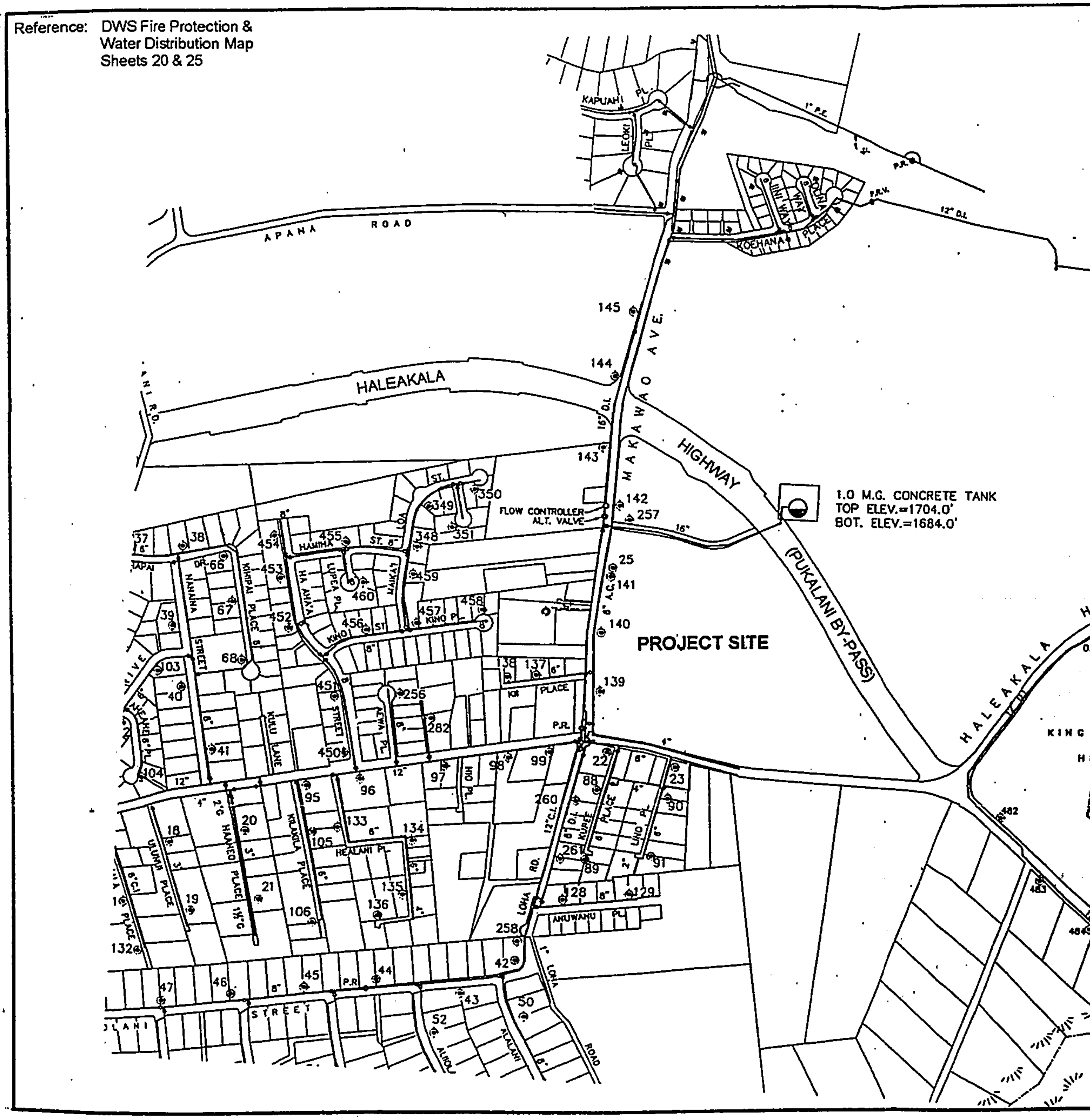
TOPOGRAPHIC SURVEY MAP
SCALE: 1" = 200'

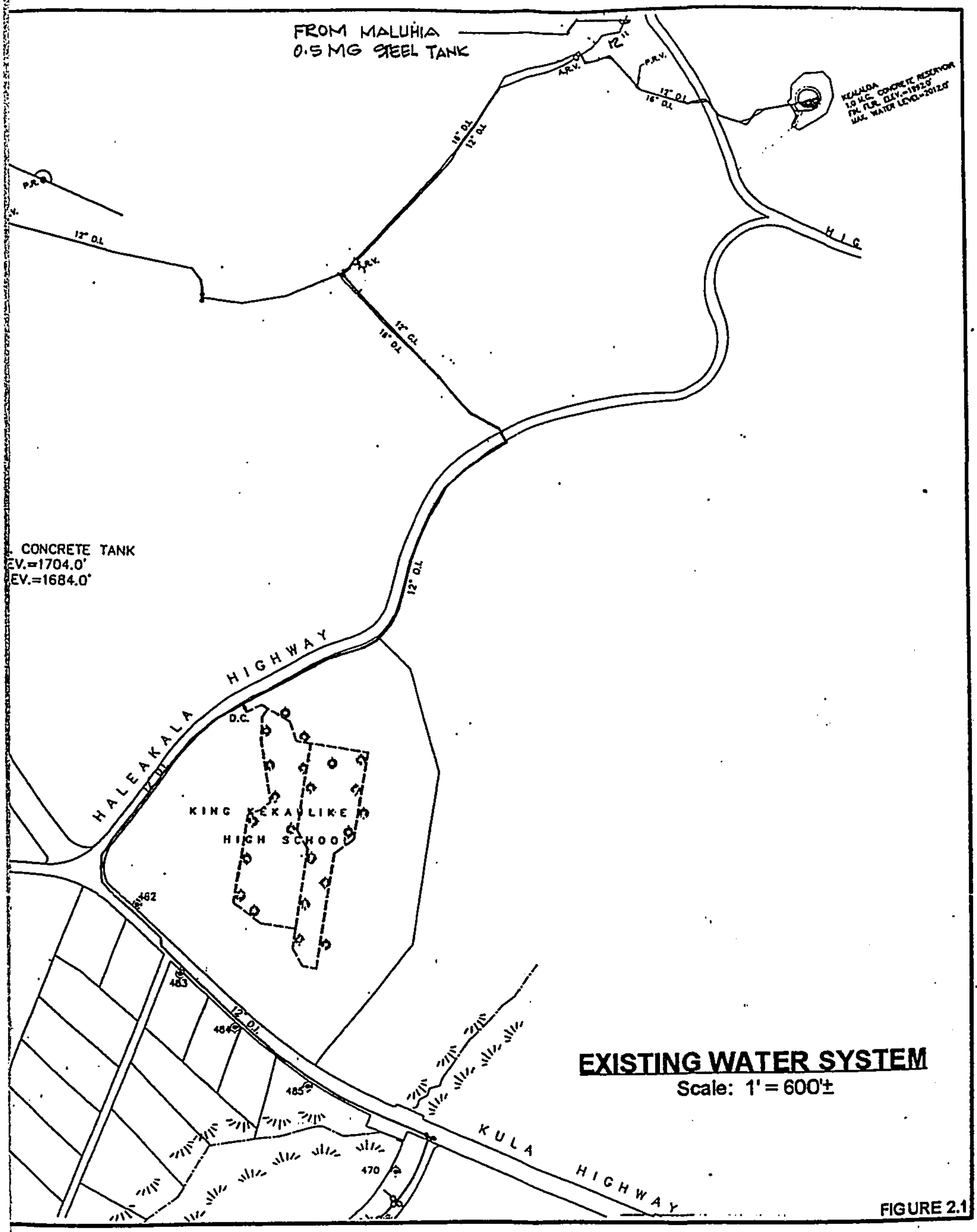
FIGURE 1.4

ENGINEERS, INC.
CIVIL & STRUCTURAL ENGINEERS

JUNE 20-2001 JOB NO. 99-55

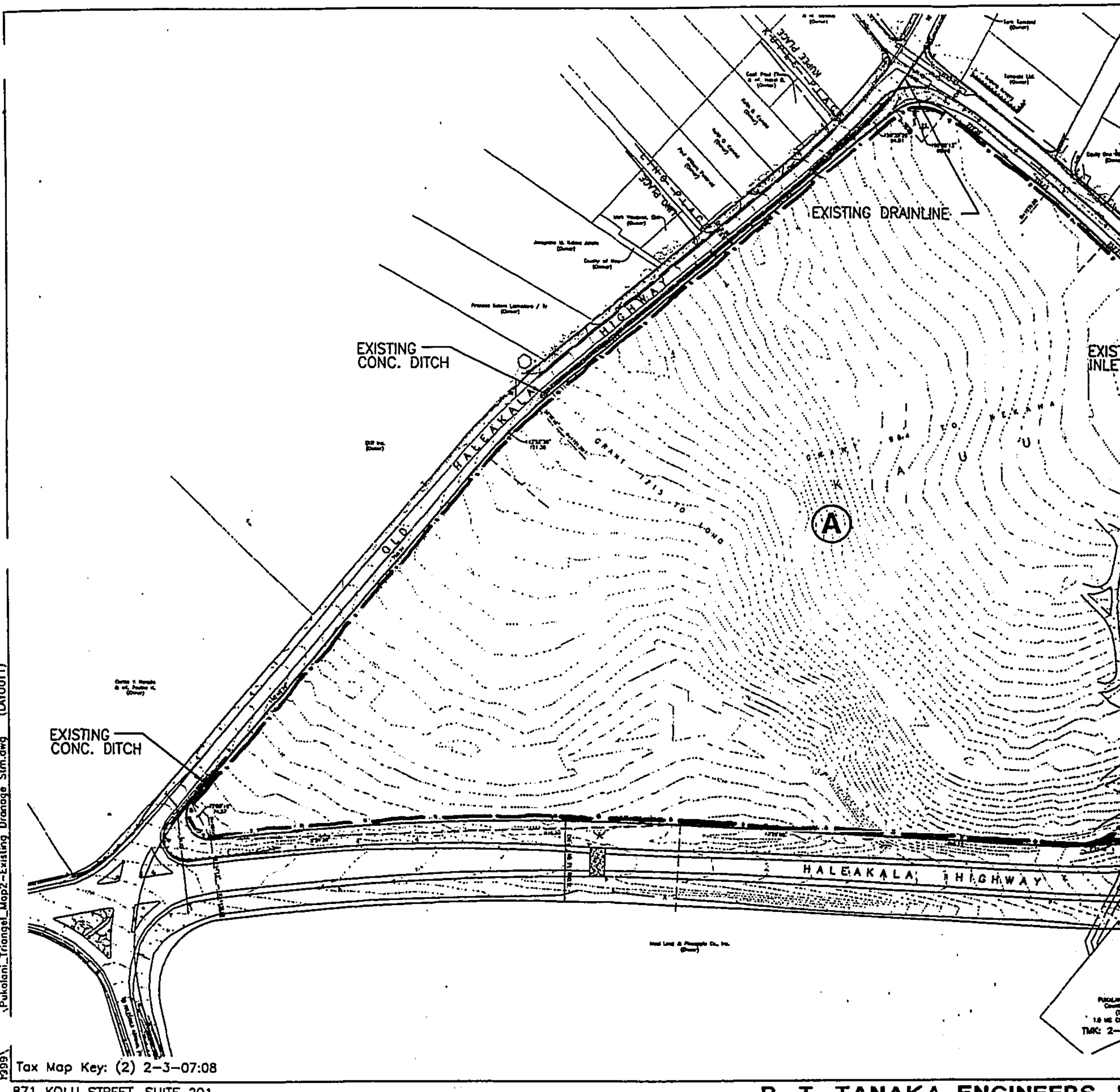
Reference: DWS Fire Protection & Water Distribution Map Sheets 20 & 25





EXISTING WATER SYSTEM
Scale: 1' = 600'±

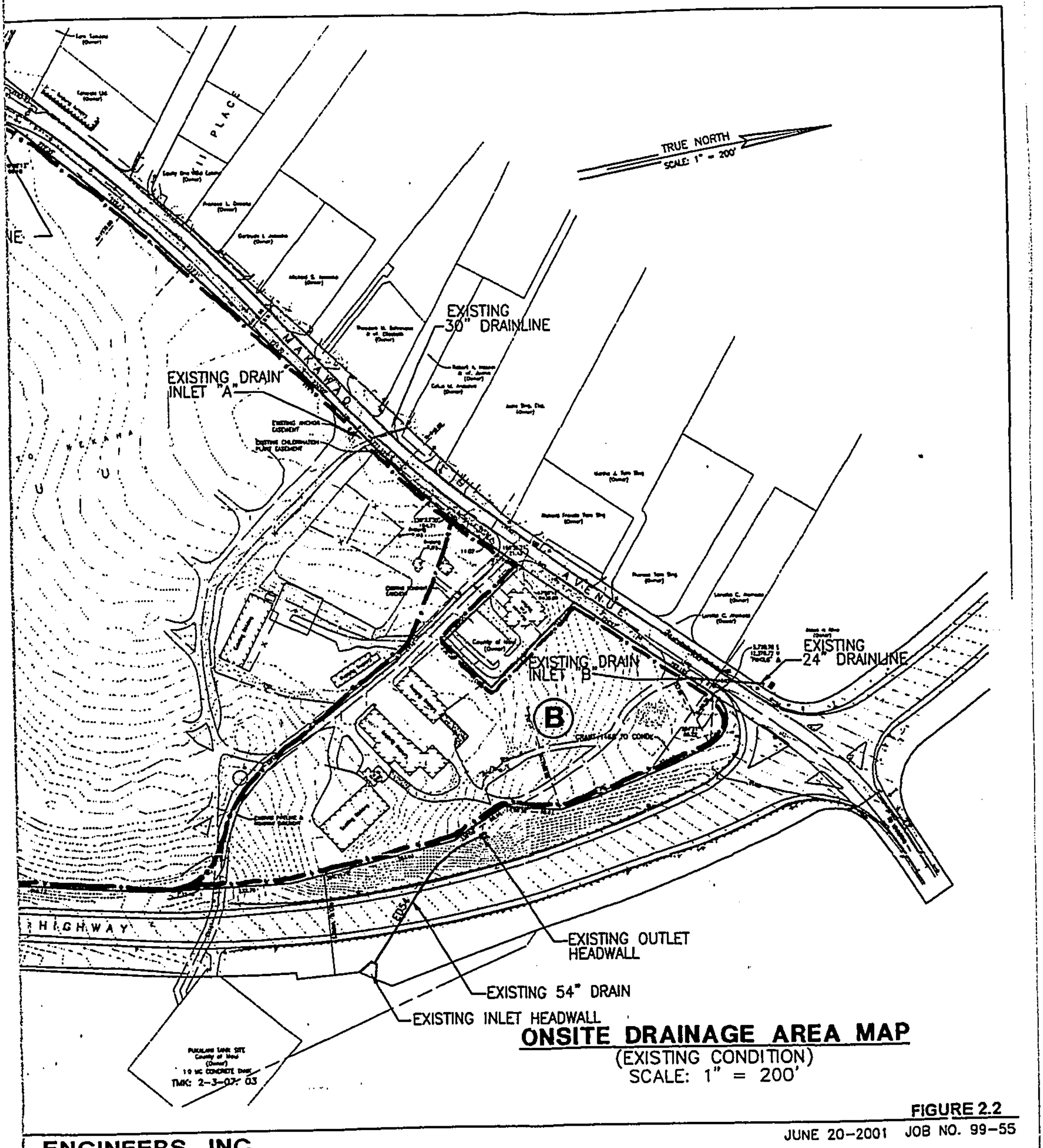
FIGURE 2.1



Tax Map Key: (2) 2-3-07:08

871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII 96793

R. T. TANAKA ENGINEERS, I
LAND SURVEYORS - CIVIL & STRUCTURAL ENG

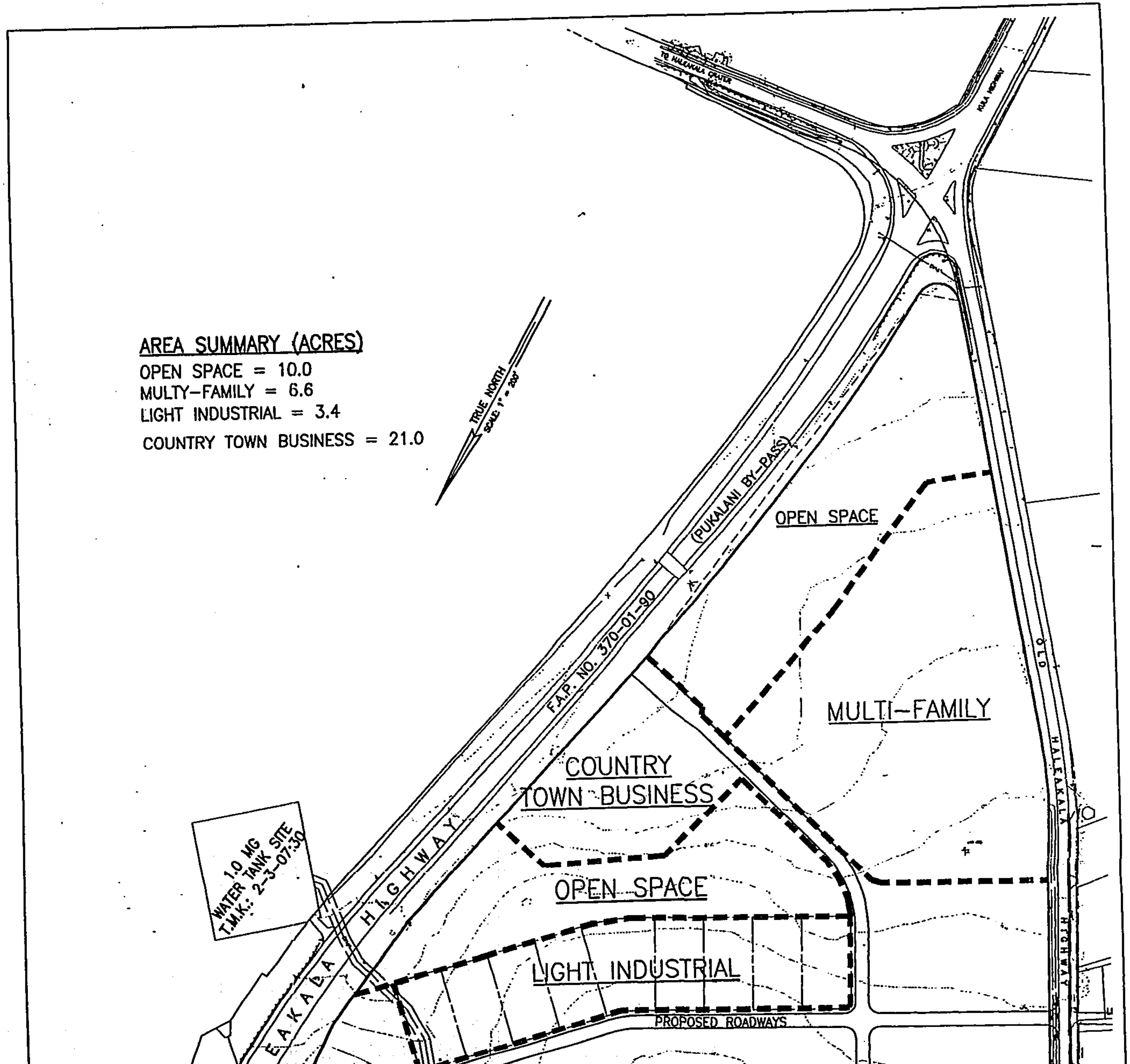


ONSITE DRAINAGE AREA MAP
(EXISTING CONDITION)
SCALE: 1" = 200'

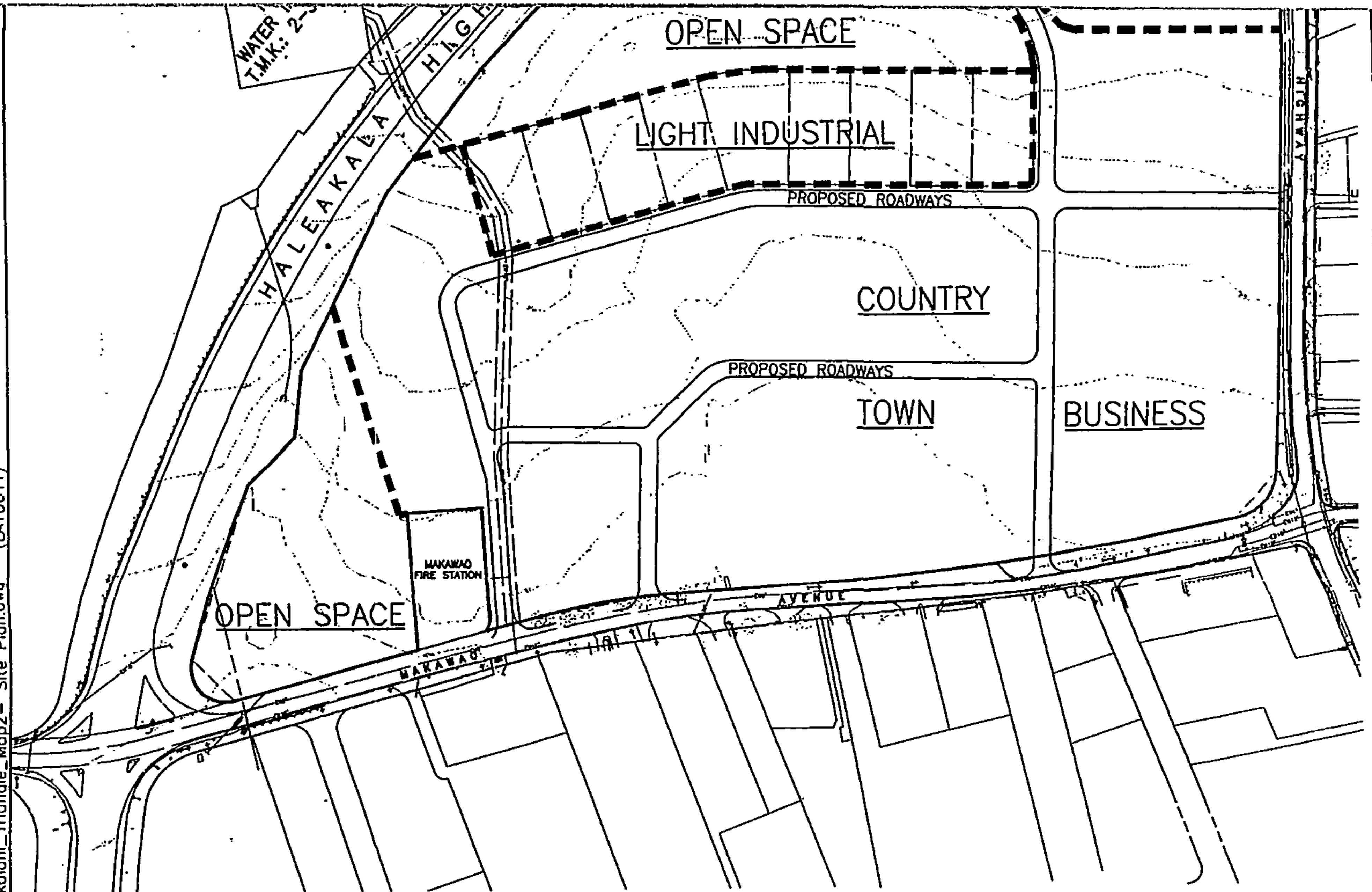
FIGURE 2.2

JUNE 20-2001 JOB NO. 99-55

ENGINEERS, INC.
CIVIL & STRUCTURAL ENGINEERS



AREA SUMMARY (ACRES)
OPEN SPACE = 10.0
MULTY–FAMILY = 6.6
LIGHT INDUSTRIAL = 3.4
COUNTRY TOWN BUSINESS = 21.0
TRUE NORTH
SCALE: 1" = 200'
(PUKALANI BY–PASS)
F.A.P. NO. 370–01–90
HALEAKALA HIGHWAY
OLD HALEAKALA HIGHWAY
KULA HIGHWAY
TO HALEAKALA CRATER
OPEN SPACE
MULTI–FAMILY
COUNTRY TOWN BUSINESS
OPEN SPACE
LIGHT INDUSTRIAL
PROPOSED ROADWAYS
1.0 MG WATER TANK SITE T.M.K.: 2–3–07:30



CONCEPTUAL SITE PLAN

SCALE: 1" = 200'

Tax Map Key: (2) 2-3-07:08

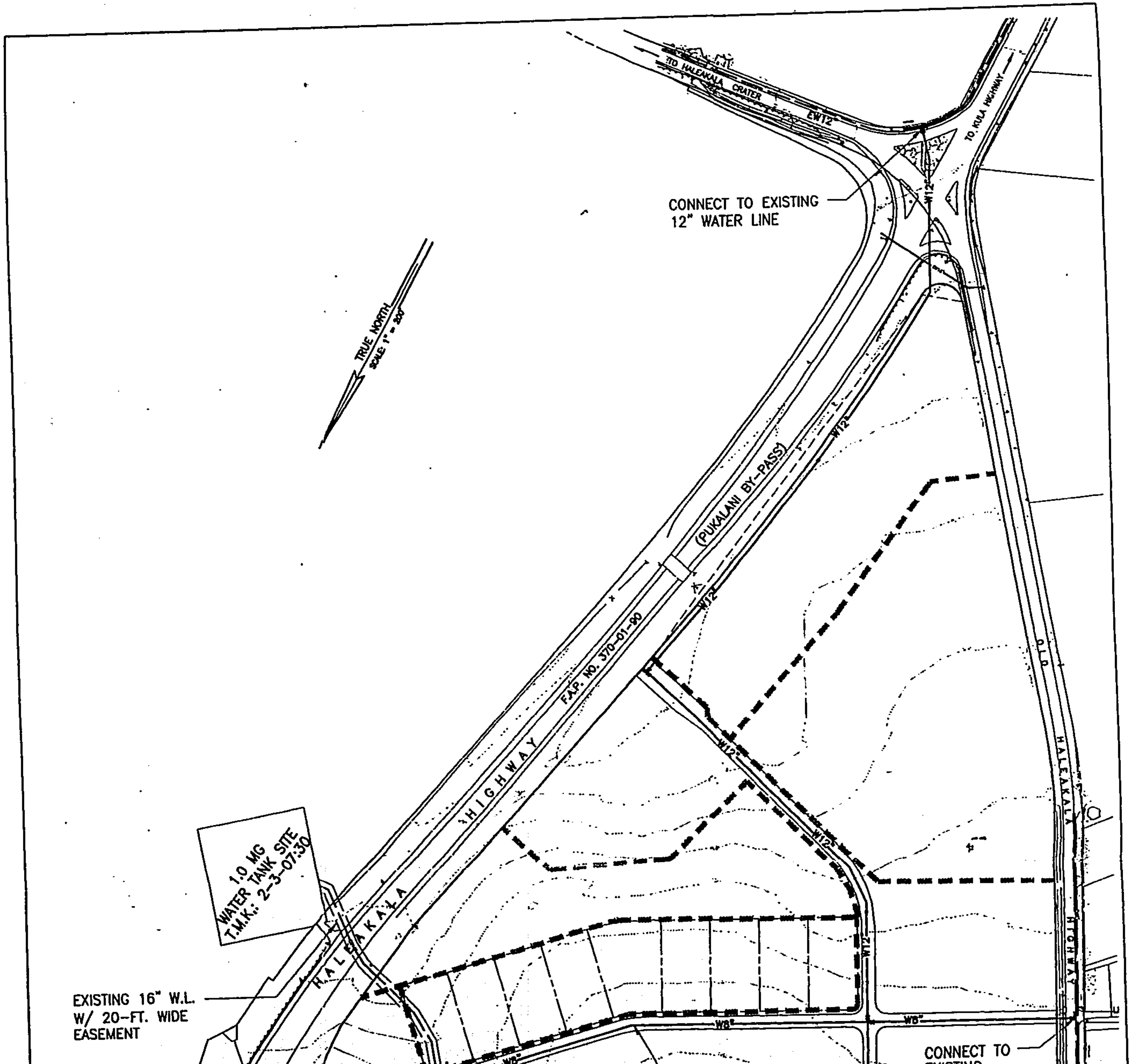
FIGURE 3.1

871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII 96793

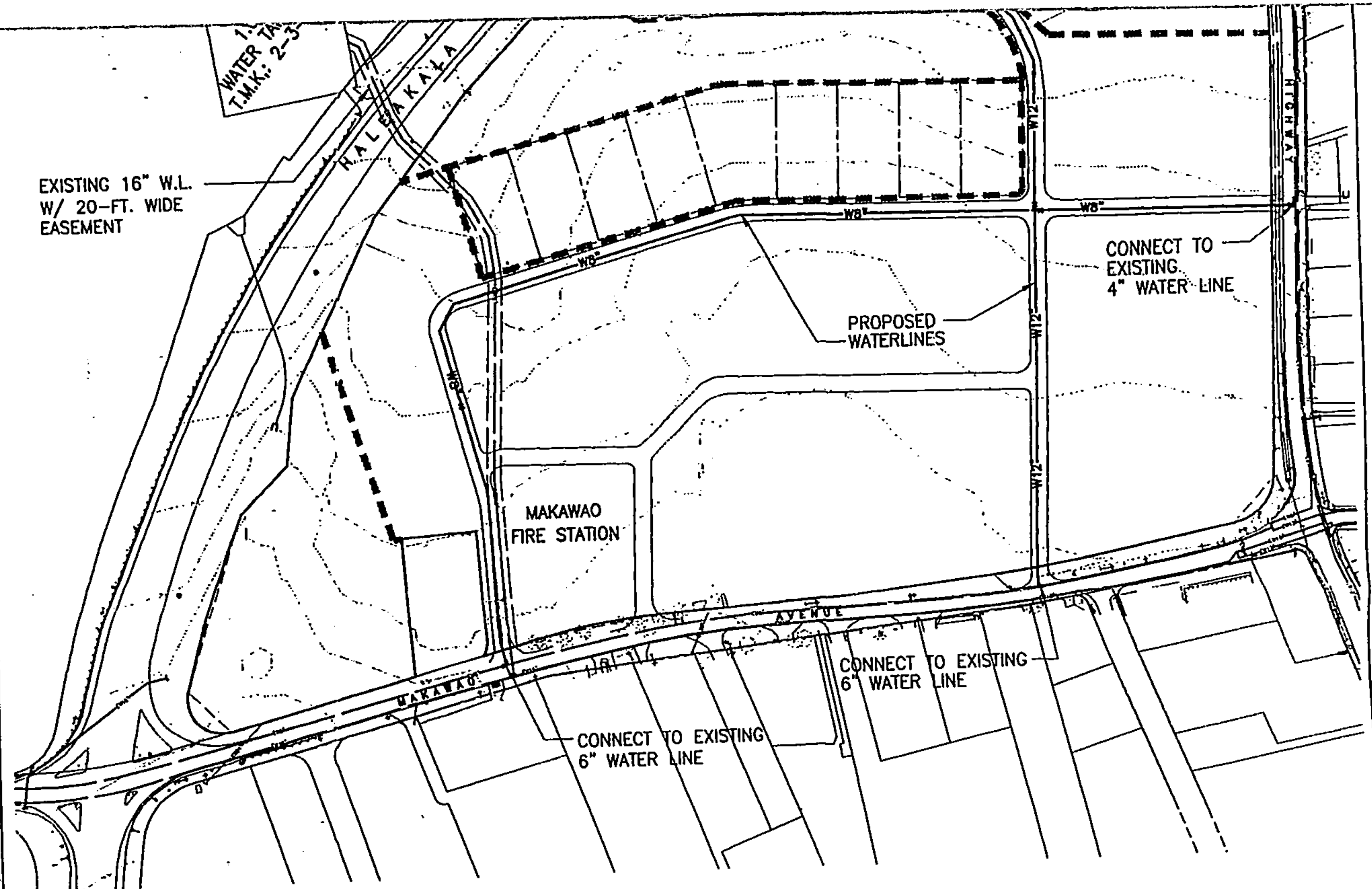
R. T. TANAKA ENGINEERS, INC.
LAND SURVEYORS - CIVIL & STRUCTURAL ENGINEERS

JUNE 22, 2001 JOB NO. 99-55

1999\99-55\Pukalani_Triangle_Map2- Site Plan.dwg (LAYOUT1)



TO HALEAKALA CRATER
TO KULA HIGHWAY
EW12"
W12"
CONNECT TO EXISTING
12" WATER LINE
TRUE NORTH
SCALE 1" = 200'
(PUKALANI BY-PASS)
F.A.P. NO. 370-01-90
HALEAKALA HIGHWAY
OLD HALEAKALA HIGHWAY
1.0 MG
WATER TANK SITE
T.M.K.: 2-3-07:30
EXISTING 16" W.L.
W/ 20-FT. WIDE
EASEMENT
W8"
CONNECT TO



CONCEPTUAL WATER SYSTEM

SCALE: 1" = 200'

FIGURE 3.2

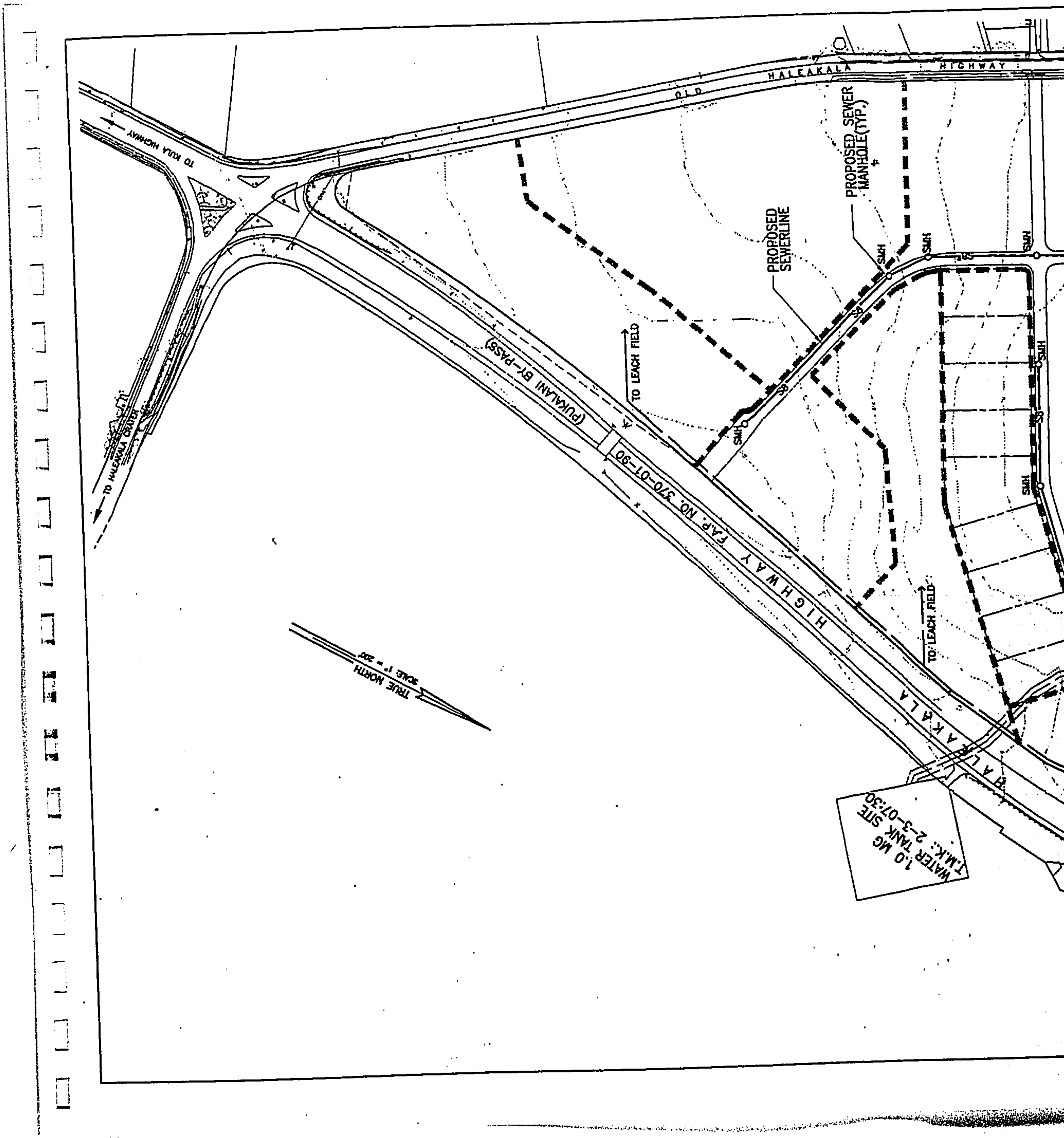
Tax Map Key: (2) 2-3-07:08

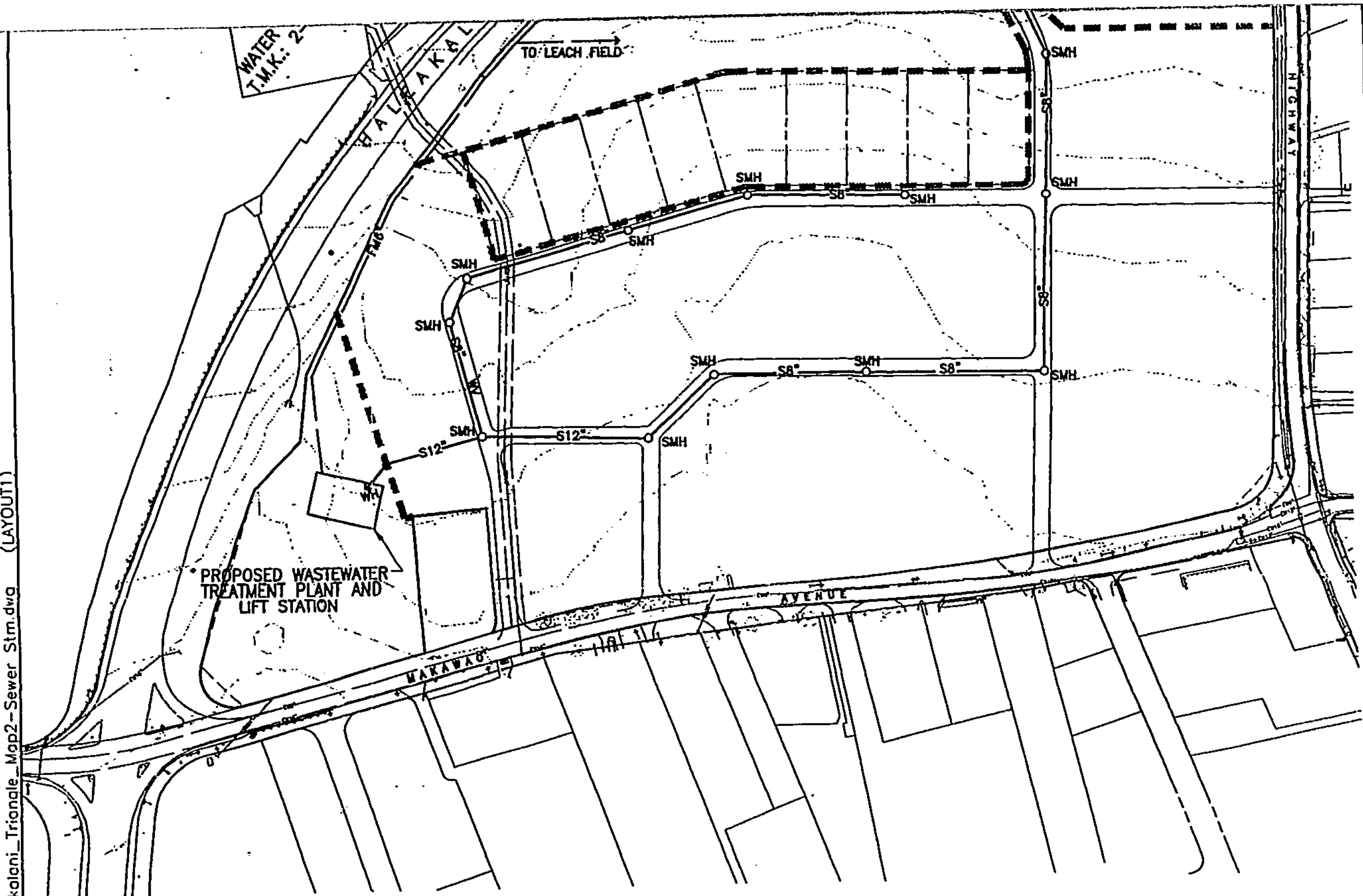
JUNE 22, 2001 JOB NO. 99-55

R. T. TANAKA ENGINEERS, INC.

871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII 96793

1999\99-55\Pukalani_Trianale_Map2 Water System.dwg (LAYOUT1)


OLD HALEAKALA HIGHWAY
PROPOSED SEWER MANHOLE (TYP.)
PROPOSED SEWERLINE
SMH
TO LEACH FIELD
TO LEACH FIELD
HALEAKALA HIGHWAY F.A.P. NO. 370-01-90
(PUKALANI BY-PASS)
TO KULA HIGHWAY
TO HALEAKALA CRATER
TRUE NORTH
SCALE 1" = 200'
1.0 MG WATER TANK SITE
T.M.K.: 2-3-07:30



CONCEPTUAL SEWER SYSTEM

SCALE: 1" = 200'

FIGURE 3.3

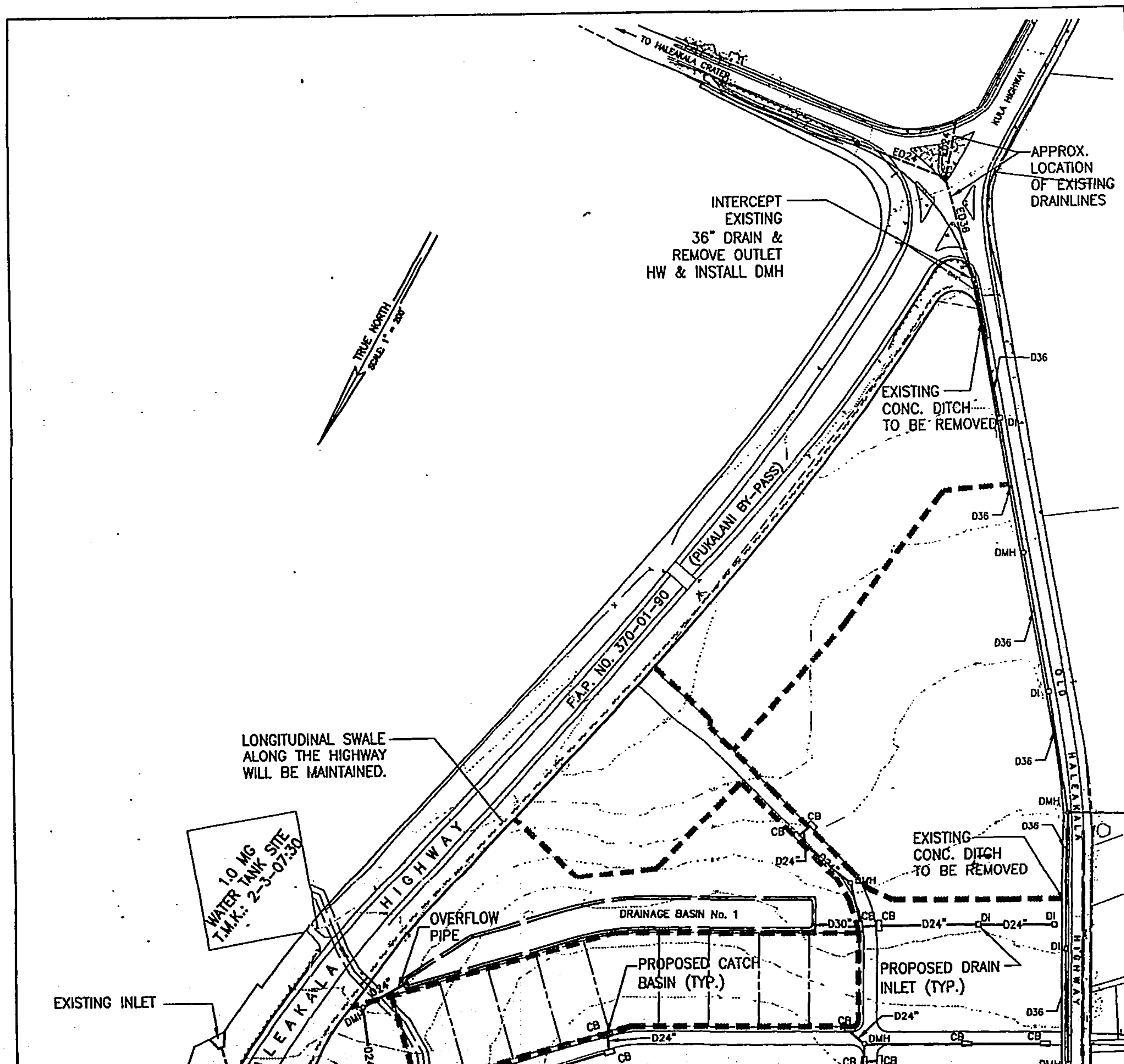
Tax Map Key: (2)-2-3-07:08

JUNE 22, 2001 JOB NO. 99-55

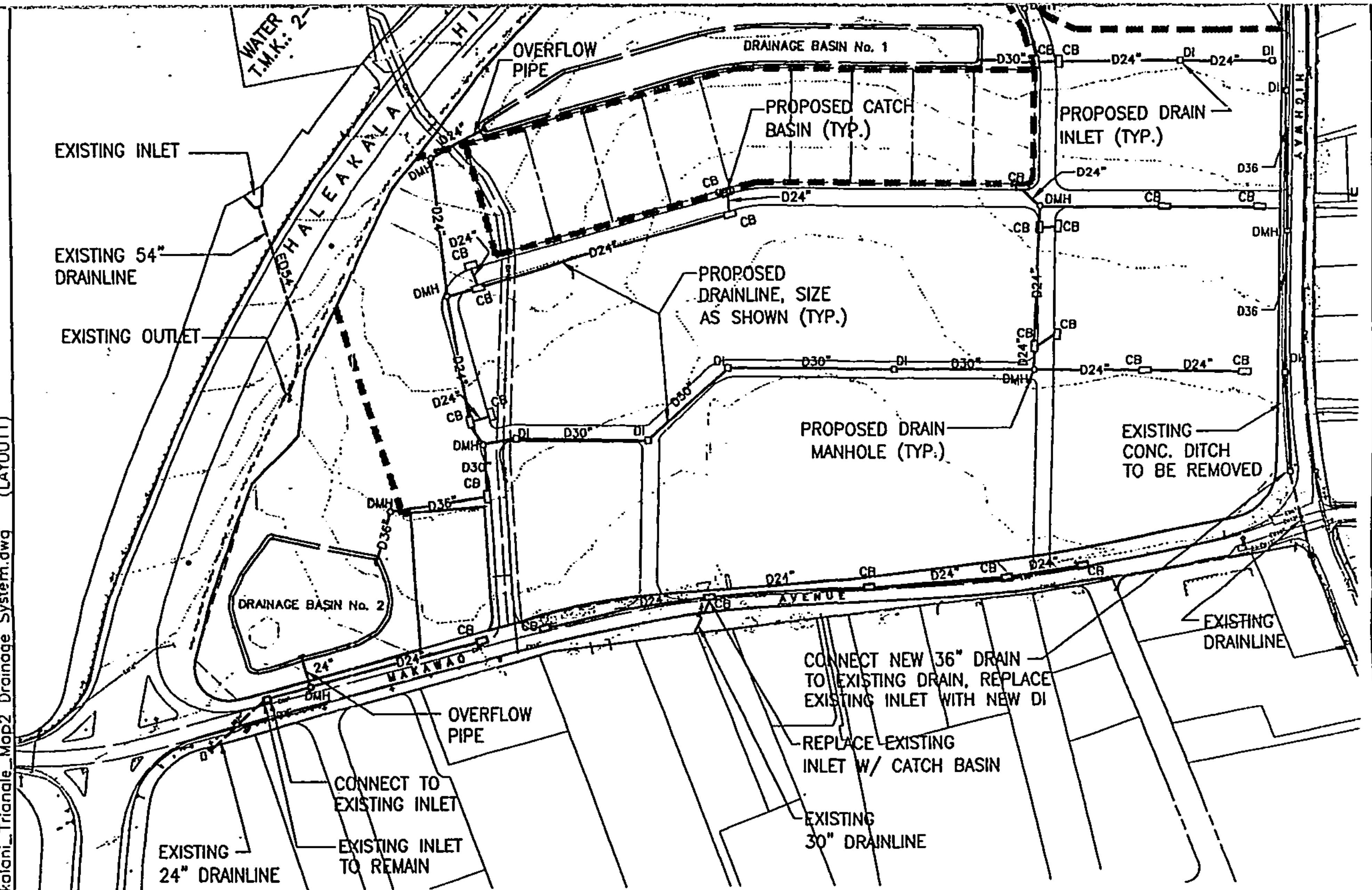
871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII 96793

R. T. TANAKA ENGINEERS, INC.
LAND SURVEYORS - CIVIL & STRUCTURAL ENGINEERS

1999\99-55\Pukalani_Trianale_Map2-Sewer Stm.dwg (LAYOUT1)



TO HALEAKALA CRATER
KULA HIGHWAY
APPROX. LOCATION OF EXISTING DRAINLINES
ED24
ED38
INTERCEPT EXISTING 36" DRAIN & REMOVE OUTLET HW & INSTALL DMH
TRUE NORTH
SCALE 1" = 200'
(PUKALANI BY-PASS)
F.A.P. NO. 370-01-90
EXISTING CONC. DITCH TO BE REMOVED
D36
DMH
DI
OLD HALEAKALA HIGHWAY
LONGITUDINAL SWALE ALONG THE HIGHWAY WILL BE MAINTAINED.
1.0 MG WATER TANK SITE T.M.K.: 2-3-07:30
HIGHWAY
HALEAKALA
OVERFLOW PIPE
DRAINAGE BASIN No. 1
D30"
D24"
CB
PROPOSED CATCH BASIN (TYP.)
PROPOSED DRAIN INLET (TYP.)
EXISTING CONC. DITCH TO BE REMOVED
EXISTING INLET



CONCEPTUAL DRAINAGE SYSTEM

SCALE: 1" = 200'

Tax Map Key: (2) 2-3-07:08

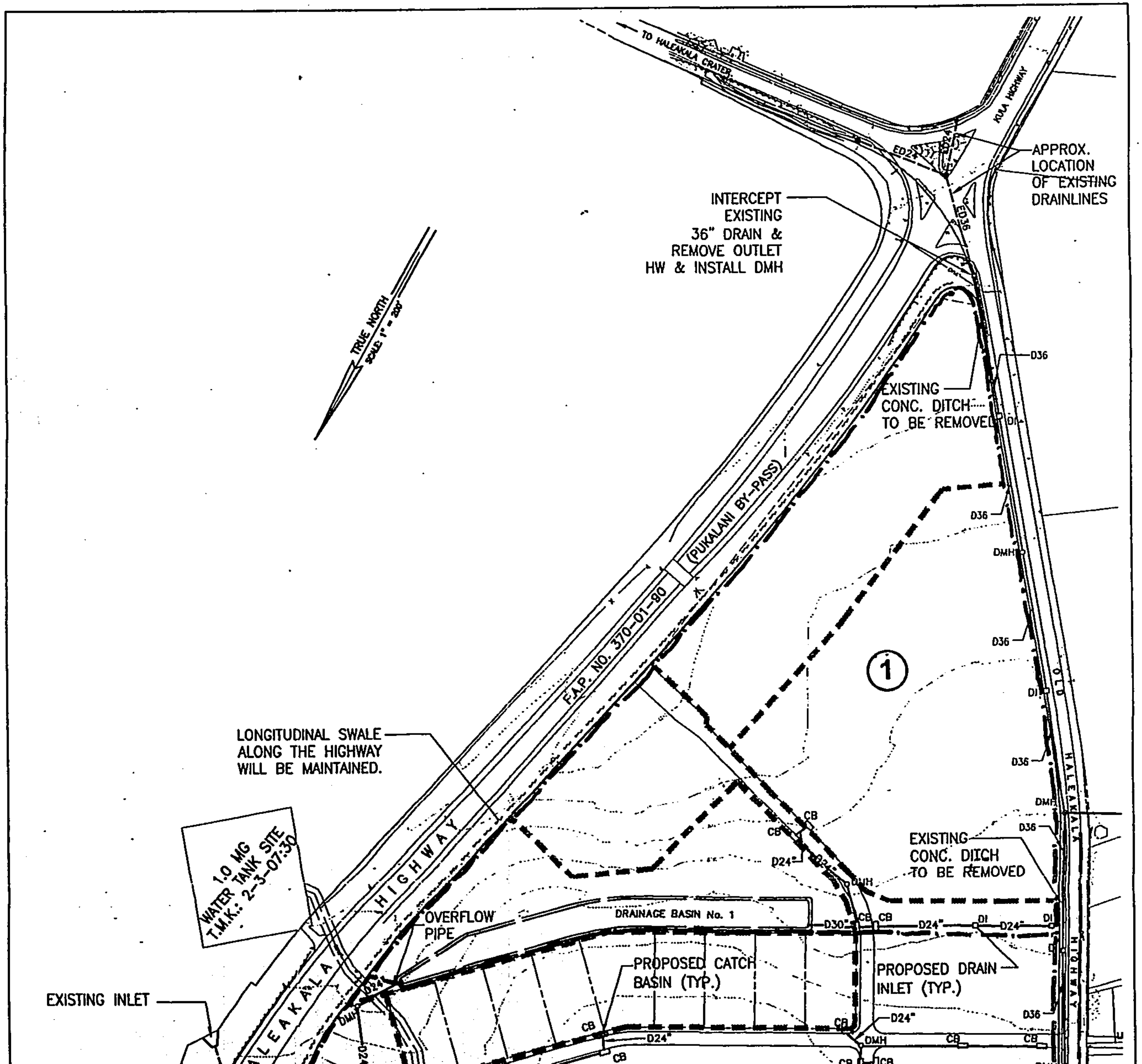
FIGURE 3.4

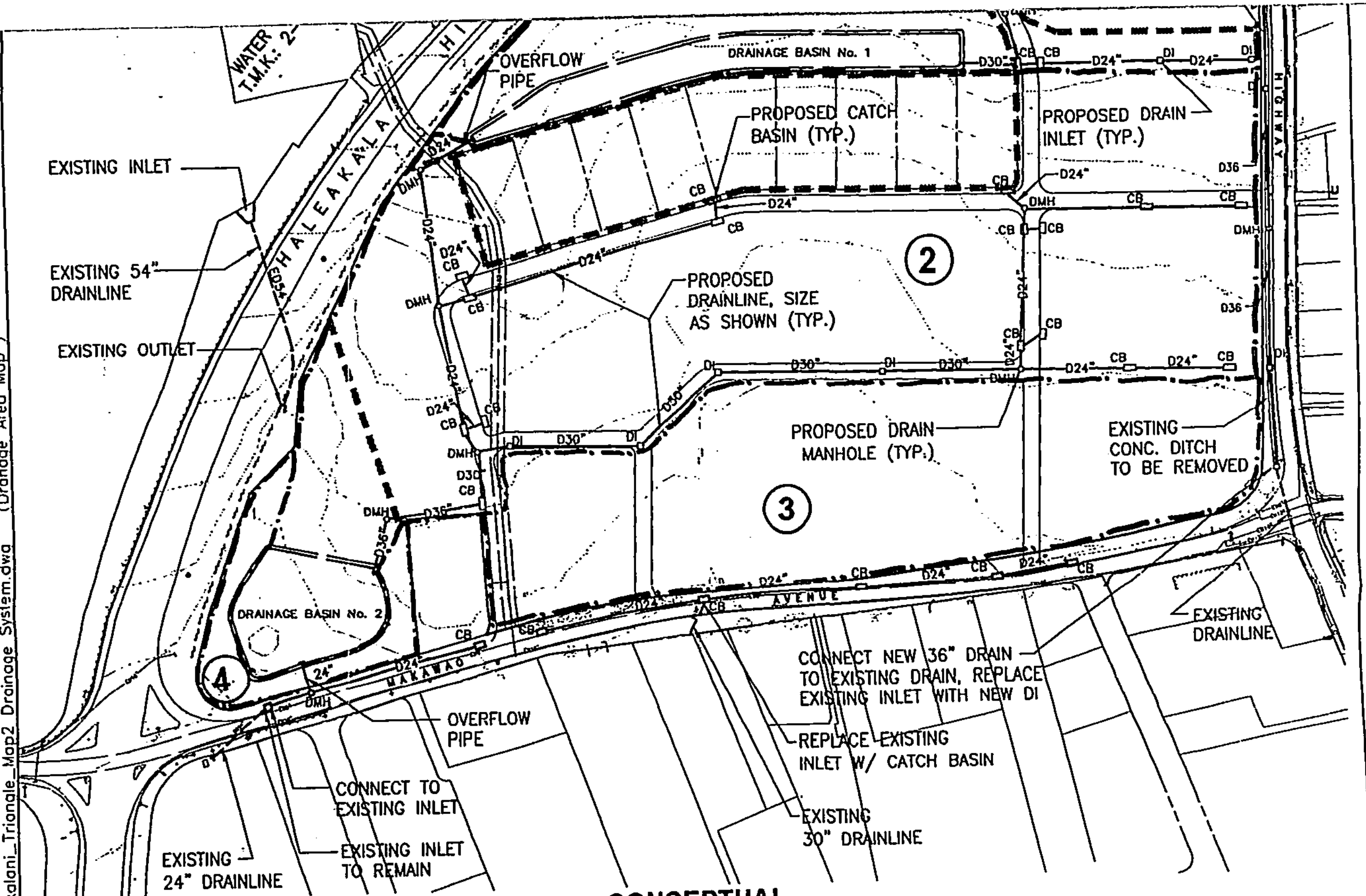
871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII 96793

R. T. TANAKA ENGINEERS, INC.
LAND SURVEYORS - CIVIL & STRUCTURAL ENGINEERS

JUNE 22, 2001 JOB NO. 99-55

1999\99-55\Pukalani_Triangle_Map2 Drainage System.dwg (LAYOUT1)


TO HALEAKALA CRATER
KULA HIGHWAY
APPROX. LOCATION OF EXISTING DRAINLINES
INTERCEPT EXISTING 36" DRAIN & REMOVE OUTLET HW & INSTALL DMH
ED24
ED36
TRUE NORTH
SCALE 1" = 200'
D36
EXISTING CONC. DITCH TO BE REMOVED
DI
DMH
(PUKALANI BY-PASS)
F.A.P. NO. 370-01-90
OLD HALEAKALA HIGHWAY
1
LONGITUDINAL SWALE ALONG THE HIGHWAY WILL BE MAINTAINED.
CB
D24"
1.0 MG WATER TANK SITE T.M.K.: 2-3-07:30
EXISTING CONC. DITCH TO BE REMOVED
DRAINAGE BASIN No. 1
OVERFLOW PIPE
D30"
HALEAKALA HIGHWAY
PROPOSED CATCH BASIN (TYP.)
PROPOSED DRAIN INLET (TYP.)
EXISTING INLET



CONCEPTUAL
ONSITE DRAINAGE AREA MAP

(NEW CONDITIONS)
SCALE: 1" = 200'

FIGURE 3.5

Tax Map Key: (2) 2-3-07:08

JUNE 22, 2001 JOB NO. 99-55

R. T. TANAKA ENGINEERS, INC.
LAND SURVEYORS - CIVIL & STRUCTURAL ENGINEERS

871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII 96793

1999\99-55\Pukalani_Trianale_Map2 Drainage System.dwg (Dranage Area Map)

Appendix J

MLP Upcountry Maui Project Electrical Assessment

MORIKAWA & ASSOCIATES, LLC
ELECTRICAL ENGINEERING SERVICES
P.O. BOX 880280
PUKALANI, MAUI, HAWAII 96788
431 AULII DRIVE
PUKALANI, MAUI, HAWAII 96768
ALASKA • CALIFORNIA • HAWAII • IDAHO
NEVADA • OREGON • WASHINGTON
TEL: (808) 572-1745
FAX: (808) 572-6323
E-MAIL: mori@maui.net
www.msengineers.com

July 25, 2001

Group 70 International, Inc.
925 Bethel Street, Fifth Floor
Honolulu, HI 96813-4307

Attention: Mr. Jeff Overton, AIA

Subject: MLP Upcountry Maui Project Electrical Assessment

Dear Jeff,

The following is report on the projected electrical demand load and computations for the MLP Upcountry Maui Project as well as the project impact on electrical, telephone, and CATV facilities.

The methodology used was to 1) determine the type of occupancy allocated to each of the defined areas of the project, 2) apply a known estimate for lighting, general power, air conditioning, and miscellaneous usage, 3) apply a diversity factor to the total estimated load, to 4) determine a net kilowatt demand. A differentiation was made for night parking lot and roadway lighting load, which could fall into the common area.

The total estimated demand load for this project is 3,721 KVA at 12.47 KV.

This load would be served by Maui Electric Company Substation No. 17, located along the lower Kula Highway, across from King Kekaulike High School. This station was recently upgraded with a 69 KV to 12.47 KV, 10,000 KVA transformer to handle the anticipated load of the Kula Malu Subdivision and the new Kamehameha School Campus.

Additional feeder capacity at 12.47 KV were installed to provide power to and backup of Makawao, the Pukalani Terrace Subdivision, and various subdivision projects in the area. Essential to this project, from a utility standpoint, is the ability to provide reliable power through the ability to switch to backup circuits.

In conversation with Maui Electric Company, sufficient lead time to analyze, implement, and construction the primary and backup circuits are necessary. Preliminary planning of two or more years was requested.

This project would likely be fed from the overhead lines along Makawao Avenue or the Old Haleakala Highway.

The impact of the project on the electrical power system for the area appear to be minimal with sufficient advanced notice. Also for consideration is the lead-time to procure utility padmounted transformers, which could take upward of eight months.

In conversation with Verizon, the telephone company, high speed access (DSL) is available at the project site from their switching station in Makawao. The circuits are installed along Makawao Avenue.

With sufficient advanced notice, a minimum of 18 months, the required telephone circuits for the project would be available.

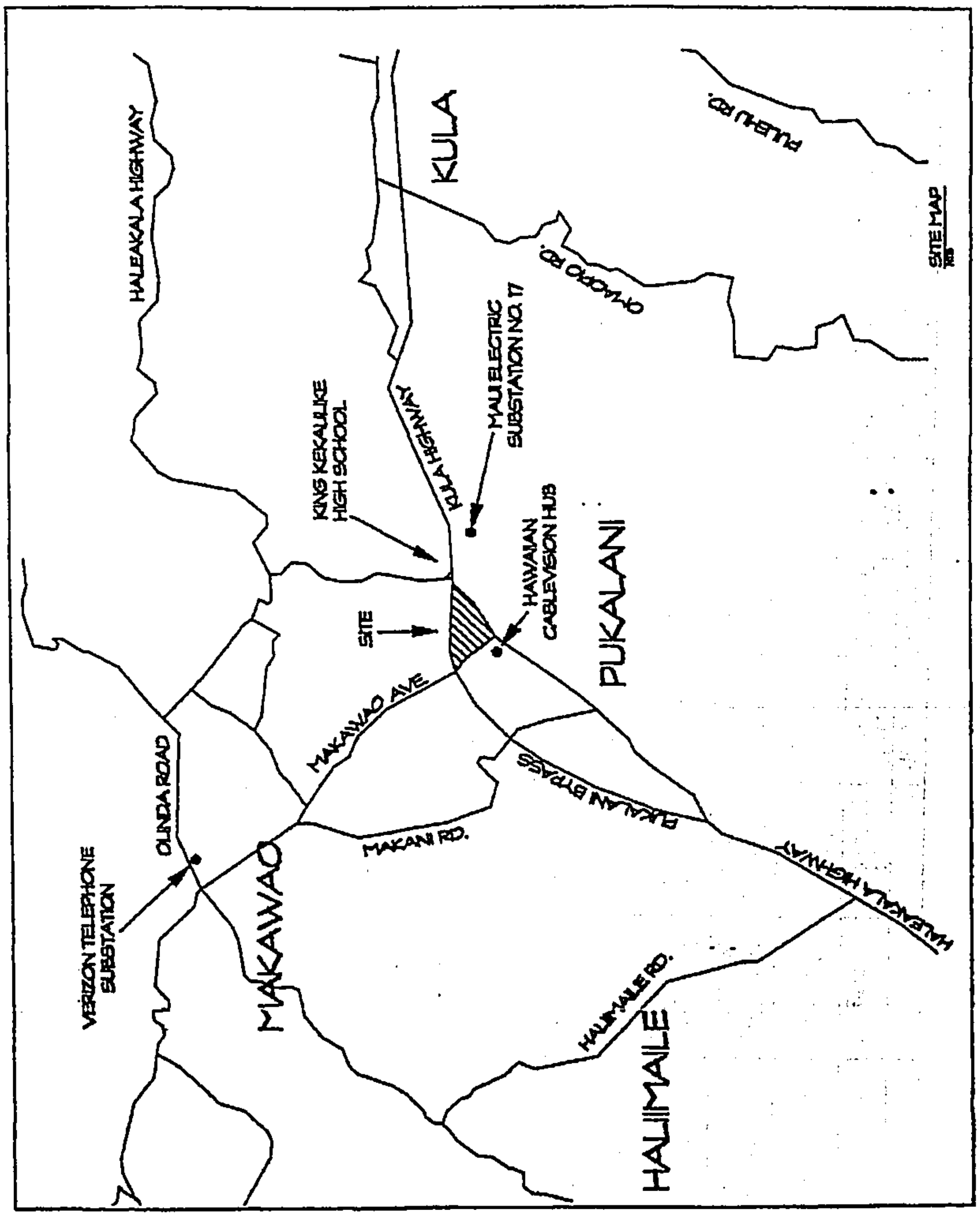
Our conversation with Hawaiian Cablevision, one of their major hubs is located in the vicinity of Pukalani Superette. High speed internet access will be available shortly in this area. No impact on the cable system is anticipated with minimal notice required, relative to the other utility requirements.

Attached to this letter is a map showing the relative location of the various utility substations or hubs. Also attached is a spreadsheet of the electrical computations in determining the electrical demand load.

Please contact me if there are any questions.

Sincerely,

Lyman M. Morikawa, PE


HALEAKALA HIGHWAY
KULA
PULEHU RD.
OMAOPIO RD.
SITE MAP
MAUI ELECTRIC SUBSTATION NO. 17
KING KEKAULIKE HIGH SCHOOL
KULA HIGHWAY
HAWAIIAN CABLEVISION HUB
SITE
PUKALANI
MAKAWAO AVE.
PUKALANI BYPASS
OLINDA ROAD
VERIZON TELEPHONE SUBSTATION
MAKANI RD.
HALEAKALA HIGHWAY
MAKAWAO
HALIIMAILE RD.
HALIIMAILE

MLP Upcountry — Morikawa & Associates — Date: 7/20/01 — Prepared By: MH

Component	Size	Net Basic Area	Occupancy Type	Lighting	General Power	A/C	Misc.	Gross Total	Diversity Factor	Projected Load (Day)	Projected Load (Night)
	Ft. X Ft.	$Ft.^2$		KVA	KVA	KVA	KVA	KVA		KVA	KVA
Retail Center Program											
Shopping Area - Building 1	50 X 60	3000	Ret.	9	15	30	0	54	0.7	38	
Shopping Area - Building 2	50 X 300	15,000	Ret.	45	75	150	0	270	0.7	189	
Shopping Area - Building 3	50 X 300	15,000	Ret.	45	75	150	0	270	0.7	189	
Ofc./Ret. at Makawao Ave.	50 X 200	10,000	Ret.	30	50	100	0	180	0.7	126	
Shopping Area - Building 4	50 X 60	3000	Ret.	9	15	30	0	54	0.7	38	
Anchor - Building 1	140 X 180	25,200	Ret.	76	126	252	0	454	0.7	318	
Anchor - Building 2	135 X 150	20,250	Ret.	61	101	203	0	365	0.7	256	
	Total Area:	91,450				Total KVA:		1647	Total Load:	1,154	
Retail Buildings											
Retail Buildings A	50 X 100	5,000	Ret.	15	25	50	0	90	0.7	63	
Retail Buildings B	50 X 100	5,000	Ret.	15	25	50	0	90	0.7	63	
	Total Area:	10,000				Total KVA:		180	Total Load:	126	
Parking											
Parking Area 1	250 X 250	62,500	Pkg.	16				16	1		16
Parking Area 2	350 X 250	87,500	Pkg.	22				22	1		22
Parking Area 3	125 X 225	28,125	Pkg.	7				7	1		7
Parking Area 4	175 X 50	8,750	Pkg.	2				2	1		2
Parking Area 5	150 X 75	11,250	Pkg.	3				3	1		3
Parking Area 6	150 X 50	7500	Pkg.	2				2	1		2
Parking Area 7	150 X 50	7500	Pkg.	2				2	1		2
Parking Area 8	100 X 50	5000	Pkg.	1				1	1		1
Parking Area 9	125 X 150	18750	Pkg.	5				5	1		5
Parking Area 10	125 X 125	15625	Pkg.	4				4	1		4
Parking Area 11	75 X 200	15,000	Pkg.	4				4	1		4
Parking Area 12	100 X 50	5000	Pkg.	1				1	1		1
Parking Area 13	75 X 125	9375	Pkg.	2				2	1		2
	Total Area:	281,875				Total KVA:		71		Total Load:	71

	Size	Net Basic Area	Occupancy Type	Lighting	General Power	A/C	Misc.	Gross Total	Diversity Factor	Projected Load (Day)	Projected Load (Night)
<u>Office/Civic Program</u>											
Office/Civic Pad A - 2 Story	70 X 160	22,400	Ofc.	67	112	224	0	403	0.6	242	
Office/Civic Pad B - 2 Story	100 X 120	24,000	Ofc.	72	120	240	0	432	0.6	259	
Office/Civic Pad C - 2 Story	100 X 100	20,000	Ofc.	60	100	200	0	360	0.6	216	
Office/Civic Pad D - 2 Story	70 X 140	19,600	Ofc.	59	98	196	0	353	0.6	212	
Office/Civic Pad E - 2 Story	70 X 140	19,600	Ofc.	59	98	196	0	353	0.6	212	
	Total Area:	105,600				Total KVA:		1,901	Total Load:	1,141	
<u>Cottage Industrial Lots</u>											
Lot 1		4,000	Lt. Ind.	12	40	40	0	92	0.7	64.4	
Lot 2		4,000	Lt. Ind.	12	40	40	0	92	0.7	64.4	
Lot 3		4,000	Lt. Ind.	12	40	40	0	92	0.7	64.4	
Lot 4		4,000	Lt. Ind.	12	40	40	0	92	0.7	64.4	
Lot 5		4,000	Lt. Ind.	12	40	40	0	92	0.7	64.4	
Lot 6		4,000	Lt. Ind.	12	40	40	0	92	0.7	64.4	
Lot 7		4,000	Lt. Ind.	12	40	40	0	92	0.7	64.4	
Lot 8		4,000	Lt. Ind.	12	40	40	0	92	0.7	64.4	
	Total Area:	32,000				Total KVA:		736	Total Load:	515	
<u>Residential Enclave Option</u>											
Complex 1	125 X 65	8125	Res.	24	24	82	0	130	0.5	65	
Complex 2	125 X 65	8125	Res.	24	24	82	0	130	0.5	65	
Complex 3	125 X 65	8125	Res.	24	24	82	0	130	0.5	65	
Complex 4	125 X 65	8125	Res.	24	24	82	0	130	0.5	65	
Complex 5 - Angled	225 X 65	14625	Res.	44	44	146	0	234	0.5	117	
Main Facility	125 X 65	8125	Res.	24	24	82	0	130	0.5	65	
Attached Facility	50 X 50	2500	Res.	8	8	24	0	40	0.5	20	
	Total Area:	57,750				Total KVA:		924	Total Load:	462	
Residential Parking											
Parking Lot 1	200 X 65	13,000	Pkg.	3				3	1		3
Parking Lot 2	150 X 65	9,750	Pkg.	2				2	1		2
Parking Lot 3	100 X 65	6500	Pkg.	2				2	1		2
Parking Lot 4	100 X 65	6500	Pkg.	2				2	1		2
	Total Area:	35,750				Total KVA:		9		Total Load:	9

	Size	Net Basic Area	Occupancy Type	Lighting	General Power	A/C	Misc.	Gross Total	Diversity Factor	Projected Load (Day)	Projected Load (Night)
ice Building - P-2		22,000	Ofc.	66	110	220	0	396	0.6	238	
ul Fresh Venue	30 X 100	3,000	Whse.	6	9	30	0	45	0.7	32	
alulu Farms Venue		5,000	Whse.	10	15	50	0	75	0.7	53	
					GROSS KVA:			5,975			
d Basis					TOTAL DEMAND (DAY):					3,721	
					TOTAL DEMAND (NIGHT):						80
	Est. Lighting	Est. Power	Est. A/C								
il	3 VA/Sq. Ft.	5 VA/Sq. Ft.	10 VA/Sq. Ft.								
ehouse	2 VA/Sq. Ft.	3 VA/Sq. Ft.	10 VA/Sq. Ft.								
r Industrial	3 VA/Sq. Ft.	10 VA/Sq. Ft.	10 VA/Sq. Ft.								
taurant	3 VA/Sq. Ft.	10 VA/Sq. Ft.	12 VA/Sq. Ft.								
il Rest. (Kiosk)	3 VA/Sq. Ft.	15 VA/Sq. Ft.	12 VA/Sq. Ft.								
dence	3 VA/Sq. Ft.	3 VA/Sq. Ft.	10 VA/Sq. Ft.								
ce	3 VA/Sq. Ft.	5 VA/Sq. Ft.	10 VA/Sq. Ft.								
ding	0.25 VA/Sq. Ft.										

Appendix K

Meeting Notes from Community/ Organization/Individual Meetings

KULA COMMUNITY ASSOCIATION
P.O. Box 417, Kula, Hawaii 96790
http://kulamaui.com

General Meeting Minutes
23 August, 2001

Call to Order
The meeting was called to order by President Elliott Krash at 7:00 p.m. in the Kula Community Center.

Attendees
Approximately 200 people were present.

Secretary's Report
The minutes of the April 19, 2001 General Meeting were approved as submitted.

Treasurer's report
John Wilson read the Treasurer's Report. The current balance is $2,121.73. As there were no additions or corrections, the report was approved pending audit.

Announcements
All announcements listed on the agenda were made.

Committee Reports
Beautification - Arbor Day: Dave Jenkins reported that a tree planting project is planned. Rice Park has been suggested. Dave said that he would be looking to the community for support of this project.
Lighting - Outdoor Lighting Ordinance: Steve Sutrov and Mike Mayberry set up a lighting display at the side of the room. Steve said that a draft lighting ordinance would be circulating to community groups for review and comments and would be forwarded to the County Council for consideration. The draft is also on-line and constantly changing at this point. Mike gave an overview of the light pollution problems in today's world.
fety - Readdressing: Marjorie Hill and Jimmy Aarona updated the group on the readdressing project and reminded folks to call 411 ..d report their new address when they receive it.

Program: What's Happening To Upcountry Maui?
Introduction: Dick Mayer explained that the purpose of this discussion is to take a longer perspective on Upcountry planning and to consider a vision for Upcountry.

Sumner Erdman, President, Ulupalakua Ranch discussed ranching in the 21st century:
It is important for Maui people to purchase Maui agricultural products and it is the job of the ranchers and farmers to make that feasible. Most markets for the Maui agricultural products are not in Hawaii. Ranchers need to diversify. Ulupalakua Ranch has tried many types of diversification over the years. They are currently looking at defensive development as an option. This involves selling portions of the ranch to buyers who want a remote site and ranch environment and are willing to allow Ulupalakua Ranch to continue to operate as a ranch and avoid further development. Erdman stressed they are not developers and many of the recent rumors are not true, such as the rumor that Ulupalakua Ranch plans to develop a golf course and resort on the ranch. Maui is in the 4th year of a drought and it takes a rancher 5 years to return to normal after a drought. Wailea 670 approached Ulupalakua Ranch and offered to develop water on specific area of the ranch and allocate 20% of the water developed to Ulupalakua Ranch at no cost to the ranch. Ulupalakua Ranch entered into this arrangement last October and if water is found on this area of the ranch, the ranch will get 20% of the water and Wailea 670 would get the balance of the water. They would not sell water to others. This water agreement has the potential of reducing the Ulupalakua water usage from the County system, which could release water for use by others in the area. Sumner stated that he and his family are dedicated to agriculture and ranching, the preservation of open space and the preservation of the Upcountry lifestyle.

Darrell Yagodich, Planner for DHHL updated the group on the Hawaiian Home Lands Projects in Kula:
Waihuli – There are 318 lots ranging in area from ½ to 1 acre and located below Polipoli Rd. There are 6,000 acres in total. The offsite water modifications are now being inspected and once approved will be turned over to the County. They hope to get their tax map key numbers in October and then people can start to occupy the land. The Native Hawaiian Self Determination Act (NAHSDA) taargeted to those with 80% or below median family income will be used to help families in Waihuli.
'eokea – There are 71 agriculture subdivision lots ranging from 2-3 acres each. Plans are to start construction in mid 2002. This will ..clude a dual water system with the potable water from improvements to the County system and irrigation water from the Upper Kula line. Further agriculture developments are planned. There are another 25 lots to be developed within 7 years below the 71 lots. An exploratory well is being drilled on the Keokea property at the 1400-ft. elevation to look at the aquifer. This work will be completed in 2 months.

Ans. No response.
6. Charlie Maxwell updated the group on the 5 acre parcel donated by Dowling to the Hawaiian community. Maxwell said it would be the only example in the state with indigenous architecture for teaching and learning. It may be possible to partner with Kamehameha Schools.
Cliff Ostrover asked how traffic for the Upcountry Town Center would be handled. He is concerned as traffic around the school is very busy at certain times of the day.
Ans. Maui Land & Pine has a traffic study underway to assess the situation and make recommendations. Also planned is a safer pedestrian walkway along Old Haleakala Hwy. Dick Mayer suggested that the Department of Education be lobbied for better busing allowing students living with-in one mile of the school to be picked up by bus instead of having to walk along side the road.
8. Aric Nakashima responded to the earlier question asking why two business places were needed in Pukalani. He feels that Kulamalu is not a shopping center but rather a business zoned area. That is why the Pukalani Community Association voted for the concept for the Upcountry Town Center. They thought it would be nice to have a nearby store that stocked blue jeans or shoes.
9. Rob Parsons reviewed the changes in the Kulamalu project during and after the zoning process. The Public/Quasi-Public area in Kulamalu was originally scheduled to be a church or day care facility and it is now the Keiki Zoo. The Park area was to be soccer fields and a multi use trail. It looks very different today. Also the average height of the buildings were to be 40 ft. below the Kula Hwy. and today the land is built up above the highway.
Ans. Everett Dowling responded that he has not changed any of his commitments and that the set back is the same as promised and that the buildings will be 40 feet below the highway, as promised.
10. Christina Hemming asked Maui Land & Pineapple Company to discuss their plans for water for the Upcountry Town Center.
Ans.: Maui Land & Pineapple Company would develop another water source.

Announcement
Elliott Krash asked the group to review the announcements on the back of the agenda. She announced a Special Meeting on September 6, 2001 for Rev. Finberg to present the sign proposal for Upcountry Christian Fellowship Church.

Adjournment
The meeting adjourned at 9:20 p.m.

MAUI LAND & PINEAPPLE COMPANY, INC.

DATE: February 28, 2001

TO: Team Members

FROM: Donna Clayton

SUBJECT: "Upcountry Village" Presentation Before PTZ - 2/27/01

Meeting notes:

Team Participants:

ML&P:
Warren Suzuki (WS)
Donna Clayton (DC)
Group 70:
Norman Hong (NH)
Jeff Overton (JO)

Aric Nakashima, President of the Pukalani Community Association and member of the Planning, Traffic and Zoning (PTZ) Committee, called the meeting to order.

Present from the PTZ Committee were:

Rudy Balinbin, Co-Chair
Patrick Constantino, Co-Chair (arrived midway through the ML&P presentation)
Aric Nakashima
Lois Nishikawa, Secretary
Kathy Hall

Approximately 25 people attended the meeting.

Aric briefly reviewed from memory the last meeting of this committee, including the update that Mr. Arisumi had pulled his application for a development in the 3 remaining lots of the Upcountry Highlands subdivision across from McDonalds. Aric also mentioned that Dan Evert may be willing to serve as parliamentarian for the General Membership meetings in the future. Also, in the future, all Pukalani Community Association members will be sent a notice of the agenda to insure proper notice is given on any upcoming issues to be voted on.

Rudy Balinbin then conducted the PTZ meeting per the agenda.

1. Reverend Robert Fineberg from Upcountry Christian Fellowship reviewed his sign approval process to date and asked for the PTZ Committee to recommend approval of his sign plan and bring it up for a vote at the next

General Membership Meeting. The PTZ Committee agreed to put the sign issue on the agenda for a vote at the next General Membership Meeting without a recommendation from the PTZ Committee.

2. Michelle Chouteau of Chouteau Consulting introduced her clients Hillary and Bill Palmer. They would like to obtain a Conditional Use Permit to allow a desktop publishing business to operate in a home owned by the Palmers at 3276 Old Haleakala Hwy. After discussion about the concern of adding additional businesses along Old Haleakala Hwy. and the noise and traffic this brings to the area, the PTZ Committee recommended that this item be sent to the General Membership Meeting for consideration without a recommendation from the PTZ Committee.

3. ML&P presentation on the Upcountry Village:
   a. Norman Hong discussed the three exhibits for this project. The first showed the location of the site in the hub of Upcountry. The second showed the existing site and the third showed the very preliminary planning to date indicated by a bubble diagram of the approximate location of the proposed business-commercial area, public quasi-public area, senior housing, civic, Maui Fresh store and open space areas. He shared the concept that Pukalani needs a town center to give it an identity. Norman asked for questions from those present.

      1) Harold Gouveia asked who owns the land along the Old Haleakala Hwy. across from the proposed senior housing. Warren Suzuki informed him that the land is owned by Hawaiian Electric and zoned for ½ acre lots on the community plan.
      2) Lois Nishikawa asked if ML&P had given any thought to giving a large portion of the site for ballpark as more ballparks are needed Upcountry. Harold Gouveia pointed out that the terrain was not appropriate for a ballpark. Warren indicated the large portion of the site plan shown as open space and told Lois that ML&P would look into a park area.
      3) Harold Gouveia asked which side of the Bypass Hwy. would the widening of the highway affect as that might affect this project. Warren will look into that.
      4) Kathy Hall asked how many site accesses were planned. Norman Hong said it was too early to know at this time. Kathy requested that a couple accesses be provided along Makawao Ave. Norman Hong said that it was also ML&P's understanding that a right turn in and right turn out only would be allowed along the Bypass Hwy.

5) Debbie Anthony asked if any entrance was planned along the Old Haleakala Hwy. Norman said not at this time. Debbie suggested that a right turn in and right turn out only from the Old Haleakala Hwy. might relieve traffic.
6) Kathy Hall stated that if Upcountry business owners had a place to locate their business, they might not request turning homes into businesses along Old Haleakala Hwy.
7) Kathy Hall stated the concept of senior housing in the project was a good idea.
8) Kathy Hall liked the location of the project; "not in anyone's back yard."

b. The PTZ Committee recommended that this item be sent to the General Membership Meeting for consideration without a recommendation from the PTZ Committee.

4. Rory Frampton and Ed Fujinaka discussed their proposed Napa store and two 2-story buildings with offices upstairs and commercial downstairs to be located on the Old Haleakala Hwy.
   a. Traffic issues were to be alleviated through their updated plan; however additional traffic concerns were raised.
   b. Kathy Hall asked if Napa could go into the Pukalani Triangle site. Ed said that they are paying $80,000 now at Pukalani Center for 3,200 sf and he believes the Pukalani Triangle site will be expensive too.
   c. Ed was asked to consider closing by 7 pm with no business after 7 pm and to find some solution to security alarms ringing for a long period of time.
   d. Ed was asked to find some way to secure the parking lot at the close of business to prevent kids hanging out and skateboarding there.
   e. When asked what commercial businesses he thought would be interested in his buildings, Ed mentioned a pet shop. Doctors, lawyers and professional consultants are thought to be likely second floor tenants.
   f. Debbie Anthony of The Nature Conservancy stated that the County minimum parking requirements met by this project design might not be enough parking. She works in the Pukalani Square, which met the minimum parking requirements, and there is not enough parking there.

The PTZ Committee recommended that this item be sent to the General Membership Meeting for consideration without a recommendation from the PTZ Committee.

MAUI LAND & PINEAPPLE COMPANY, INC.

The next General Membership Meeting is scheduled for Thursday, March 22, 2001 at 6:30 pm at the Pukalani Elementary School Cafeteria.

PUKALANI
COMMUNITY
ASSOCIATION 151 Aulii Drive, Pukalani Maui, Hawaii 96768/Ph. (808)572-1674/FX(808)573-5312
"GOOD NEIGHBORS, GREAT COMMUNITY"

PUKALANI COMMUNITY ASSOCIATION
GENERAL MEMBERSHIP MEETING
March 15, 2001 – Pukalani Elementary School Cafeteria
~A G E N D A~

I. Welcome and Introductions ....Aric
II. Minutes ....Lois
III. Treasurer's Report..Cora
IV. Committee Reports
V. Old Business
  A. Speed Bumps in front of Pukalani Elementary School – an item under old business for a while, now that they have been installed, discussion?
  B. 15 Healani Pl. – NAPA Auto Parts, owner Ed Fujinaka – Rory Frampton of Chris Hart & Partners, consultants. Zoning change from residential R-2? to Business Country Town. Chair requests: Clarification of Zoning terms to the membership before discussion.
  C. Sign renovation, Haleakala Hwy. – UpCountry Christian Fellowship Church, Pastor Robert Finneberg. Presently, an old wooden sign recessed into a blue rock base, illuminated at night by external ground flood lighting, Would like to renovate sign by enlarging sign face, to be backlit by internal lights, blue rock base to be lowered slightly, the larger sign face is needed to include announcements of church activities, besides identifying location and occupant. Presently non-conforming. Presently an item, County Board of Variance and Appeals.
VI. New Business
  A. Mr. & Mrs. Palmer – Michele Chouteau of Chouteau Consulting. Zoning change by way of County Special Use Permit. Presently a Residential property on Old Haleakala Hwy., located between Aina Maui Properties Office and Haaheo Pl.. Would like to operate a home based computer business, with 3-4 employees, with daily deliveries (no more deliveries than other businesses).
  B. Maui Land and Pine Development – owner, Maui Land and Pine - Norman Hong and Jeff Overton of Group 70, consultants. Location of development is in upper Pukalani bordered by Pukalani Bypass, Old Haleakala Hwy., and Makawao Ave.. Presentation of development.

VII. Announcements
  A. Next Board Meeting and Committees Meeting Night
  B. Next General Membership Meeting

*Note: Chair requests clarification of Land Use terms at introduction of presentation or whenever terms are used. (ie., R-2, R-3, Conditonal, or BCT, etc,...)

MAUI LAND & PINEAPPLE COMPANY, INC.

DATE: March 20, 2001

TO: Team Members

FROM: Donna Clayton Donna

SUBJECT: Pukalani Community Association General Membership - 3/15/01

Team Participants:

ML&P:
- Warren Suzuki (WS)
- Donna Clayton (DC)

Group 70:
- Norman Hong (NH)
- Jeff Overton (JO)

Aric Nakashima, President of the Pukalani Community Association, called the meeting to order and briefly covered the minutes, treasurer's report and committee reports. He called for a brief break in order to accommodate those signing up for membership.

New memberships were accepted and ballots given out to all members. Aric clarified that each person who intends to vote must have paid his or her $5 membership dues or be on the existing membership list. People who own property in Pukalani, and do not live in Pukalani, are also eligible for membership.

Approximately 65 people attended the meeting.

1. NAPA Auto Parts owner Ed Fujinaka was represented by Rory Frampton and a traffic consultant. They explained their updated plans for the project and their plans to mitigate traffic impacts, which included offering speed tables on the Old Haleakala Hwy.

   Questions/Comments from the membership:

   A. Why not take your business to where the other business is going to be?
   B. Speed tables don't slow traffic down that much.
   C. People are worried about kids crossing the highway to and from the school bus with the additional traffic.
   D. Are you widening the entire Healani Pl? Ans. No, only the length of the project.

E. Much of the opposition to the project is about the entrance off of Old Haleakala Hwy.
F. Ken Hoffman said Old Haleakala Hwy. should be a historic highway – quit building. When there are problems on the bypass highway, traffic is sent down Old Haleakala Hwy. Hoffman said he is a member of the safety committee and that speed bumps don't work. We don't want another Makawao Town in Pukalani. Ken was formerly with the Circle K grocery chain on the mainland and likes to be called "Kenjo" according to Aric Nakashima.
G. "I have lived on Healani Pl. 50 years. This will make us suffer."
H. Colleen Fernandez presented a petition signed by 24 people who live on Healani Pl. and don't want NAPA there.
I. Mrs. Amoral complained that she is on water restrictions and does not want to share water with this development.
J. Traffic is terrible no matter what plans you have. People park on Healani Pl. and relieve themselves. (Colleen Fernandez)
K. Colleen Fernandez said she cannot make a left turn off of Healani Pl. at this time to take her grandchildren to Pukalani School. More traffic would just make matters worse.
L. Relocate your project to Pukalani Triangle.
M. A Healani Pl. resident said traffic has been bad since McDonalds came in. More development more traffic. Set precedent now for no business mixed with residential.
N. Nothing against NAPA but the location is not right. Slowing down things is another way to create congestion.
O. Mrs. Fernandez prefers 2 beautiful houses than NAPA. Older people always get blamed for accidents but others drive like maniacs.
P. Mickey Neal, Healani Pl. resident of 15 years, moved there from Lanai looking for quiet. His is the youngest family in the neighborhood and the older folks have trouble driving. Opposes NAPA.
Q. Randy Burguess reminded the group that this development will also be presented to the Planning Commission and that is a good place to express your ideas.
R. Colleen Fernandez asked the traffic consultant when the traffic counts were taken and if he had counted the children. Ans. Counts were taken 6:30 am to 8:30 am and 4:00 pm to 6:00 pm. There was also a 24 hours counter slightly above the site. No children were counted.
S. Eric Fernandez, grandson of Mrs. Fernandez, said the issues are traffic and kids.
T. Dan Evert clarified that a "No" vote on the ballot means it will not be counted for or against. Ans. Yes.

Vote taken on the NAPA request. (Result: 6 for, 59 against, 1 blank)

MAUI LAND & PINEAPPLE COMPANY, INC.

2. Upcountry Christian Fellowship sign – request for support. As no one was present from the church and all present understood the issue, a vote was taken on the sign request. (Result: 42 for, 21 against, 1 no vote)

3. Albert Rodrigues of 3157 Iolani St. is concerned with the speed along Iolani St. He is circulating a petition for speed tables and sidewalks and asked for support from the membership. Aric Nakashima referred Albert to the Planning, Traffic and Safety Committee.

4. Michelle Chouteau of Chouteau Consulting discussed her clients, Hillary and Bill Palmer's, interest in obtaining a Conditional Use Permit to allow a desktop publishing business to operate in a home owned by the Palmers at 3276 Old Haleakala Hwy.

   Questions/Comments from the membership:

   A. Harold Gouveia asked if the entrance is off of the Old Haleakala Hwy. Ans. Yes.
   B. How much traffic does the business generate? Ans. No clients come to the business. There are several employees.
   C. Mrs. Andrade asked if they have already been running their business at this location for several years without a permit. Ans. Yes, they are trying to get a permit.
   D. Are they paying their business taxes?
   E. Dan Evert suggested rather than applying for a special use permit, they should relocate to an existing business zoned property. He knows of some.

5. ML&P presentation of development:

   Norman Hong discussed the three exhibits for this project. The first showed the location of the site in the hub of Upcountry. The second showed the existing site and the third showed the very preliminary planning to date indicated by a bubble diagram of the approximate location of the proposed business-commercial area, public quasi-public area, senior housing, civic, Maui Fresh store and open space areas. Norman asked for questions from those present.

   Questions/Comments from the membership:

   A. Eric Fernandez asked what is the urgency to turn Upcountry into Kihei? Why not a subdivision of homes?
   B. Frances Ashdown asked why does it have to be developed on such a gorgeous spot. It will ruin the setting of Upcountry. Ans. This site is now difficult to farm due to being cut off from the larger

parcel by the highway. Also, Upcountry residents should have amenities and services closer to their homes.

C. Frances Ashdown asked how many years would it be before the development would be built. Ans. 2-3 years for the entitlements.

D. A lady who lives across the Old Haleakala Hwy. from the site said the dust and dirt from the farming operations is terrible. Business would be better and light industrial is needed too, as long as they keep a country style.

E. "Can you sell a lot to NAPA?"

F. Mrs. Fernandez likes the idea of taking business away from her house that she has lived in 54 years. But how do we get the water? We are asked to conserve. Ans. ML&P would have to provide additional water.

G. Barbara Luke asked what brainstorming has taken place on where water can be obtained? Ans. We are in the very preliminary stages now, but a new water source would be needed.

H. Kathe Hall stated that a shopping center would not use as much water as a housing development on the site would use.

I. How many residential units are planned? Ans. We are in the very preliminary stages now but 120-150 senior living units have been discussed. The water estimates for this proposed site plan indicate the water usage would be the same as is now used for the existing pineapple field.

J. Barbara Luke said this plan seems like it is too similar to Dowling's. Can you get Dowling's rezoned to ag? Luke said Mr. Dowling said the same thing about senior housing and there is no senior housing there.

K. Ken Hoffman asked are you speaking on behalf of senior people? Would they want to live in a cluster like that? Ans. There are waiting lists for the Hale Mahaolu cluster housing units.

L. Debbie Anthony said she liked the idea of a little of everything but does not want an Upcountry industrial park with Upcountry architecture, similar to the Wailuku Industrial Park. How many actual buildings would there be? Ans. We are not planning warehouse buildings; more like barns. No specific number yet.

M. Barbara Luke asked how many entrances and exits are planned? Are you going to honor the no access off of the bypass as called for in the Upcountry community plan? Ans. Nothing specific yet, but at the PTZ meeting we discussed two accesses off of Makawao Ave. and a right turn in and right turn out only off of the bypass highway, similar to the one in place now for the Jesus Is Alive Church. An entrance off of the Old Haleakala Hwy. was discussed, but we are trying to determine what the community thinks about that.

N. Debbie Anthony said that we need more entrances than just off of Makawao Ave. to prevent congestion.

MAUI LAND & PINEAPPLE COMPANY, INC.

Norman Hong asked if the association was ready to give a preliminary vote of support for this project. Ans. Not at this time.

Meeting adjourned. The next meeting was not announced.

MAUI LAND & PINEAPPLE COMPANY, INC.

DATE: April 24, 2001

TO: Team Members

FROM: Donna Clayton

SUBJECT: "Upcountry Town Center" Presentation Before PZT - 4/19/01

Meeting notes:

Team Participants:

ML&P:
- Warren Suzuki (WS)
- Bob McNatt (BM)
- Donna Clayton (DC)

Group 70:
- Norman Hong (NH)
- Jeff Overton (JO)

Aric Nakashima, President of the Pukalani Community Association and member of the Planning, Zoning & Traffic (PZT) Committee, called the meeting to order at 6:15 pm.

Present from the PTZ Committee were:

Rudy Balinbin, Co-Chair
Patrick Constantino, Co-Chair
Aric Nakashima
Lois Nishikawa, Secretary
Kathe Hall
Barbara Luke
Wesley Goodin
Edith Don

Aric Nakashima made a motion to dispense with the reading of the minutes. Motion approved.

Rudy Balinbin then conducted the PZT meeting per the agenda:

Old Business:

A. Upcountry Christian Fellowship
   Item deferred.

B. Palmer Computer Publishing Old Haleakala Hwy.
Item deferred.

C. ML&P Triangle Development
NH reviewed the bubble diagram shown at the March PZT meeting and then presented the new artistic renderings showing the project from various viewpoints.

Questions/Comments:

1. Barbara Luke - who would be the second anchor?
   Ans. Unknown at this time.
2. Barbara Luke – how large is the Village Green?
   Ans. 1 ½ acres approximately
3. Barbara Luke – any idea what the cottage industry would be?
   Ans. Perhaps a vet, furniture crafter, self storage, Napa – low impact businesses
4. Barbara Luke – Aric would you move in there?
   Ans. Yes, if the situation is right.
5. Barbara Luke – would ML&P lease the property or sell the lots?
   Ans. We would develop most of it, perhaps sell some lots.
6. Barbara Luke – would you have rules so that there would not be toxic fumes, etc.?
   Ans. Government regs control and enforce those sorts of concerns.
7. Barbara Luke – how many feet back from Makawao Ave. is the sidewalk?
   Ans. 20-30 feet
8. Barbara Luke – do you think MECo would want to put up the big steel poles and if they did, would you suggest underground utilities?
   Ans. Our first preference is to maintain the old wooden poles, but we would look into underground utilities
9. Barbara Luke – there are a lot of high school kids that would be in this area but at least they would not be isolated.
10. Kathe Hall – currently the kids go to Kahului.
11. Aric Nakashima – your rendering of the office building looks like the Pioneer Inn.
    Ans. Similar but the office building would be on a much smaller scale.
12. Kathe Hall – asked if anyone had eaten at the Olive Garden Restaurant – might be a good choice for this site.
13. Rudy Balinbin – is there a lot of interest in the second anchor?
    Ans. Longs is one alternative, some interest
14. Kathe Hall – this site plan could make it so that kids don't need to go down the hill.

MAUI LAND & PINEAPPLE COMPANY, INC.

15. Barbara Luke – it is the pleasantness of the area that you shop in that makes you want to shop – she loves Pukalani Superette for that reason.
16. Aric Nakashima – is there going to be a McDonalds?
    Ans. If there were something like that, it would not be a drive thru.
17. Warren Suzuki – ML&P plans to do a marketing survey in the community to see what the community would like to have.
18. Kathe Hall – suggested the marketing survey be handled through the schools in the area (Makawao, Pukalani, King Kekaulike, etc.). The kids can have the forms filled out at home and turn them into the school for extra credit. It is done all the time.
19. Kathe Hall – likes the idea of a survey to get the right tenants so that people don't drive down country so much.
20. Warren Suzuki – ML&P is looking into a medical clinic also.
21. Kathe Hall – Kaiser would be great or expanding the existing site office of Maui Medical.
22. Aric Nakashima – perhaps a satellite city hall or an ambulance would be good.
23. Warren Suzuki – a post office might also work at this site.
24. Barbara Luke – Kula Community Association is looking for an emergency ambulance Upcountry.
25. Barbara Luke – how much are you duplicating what Everett Dowling is doing?
    Ans. His plans have changed and he is now selling light industrial lots.
26. Kathe Hall is concerned that if we don't proceed with this project, Bishop Estate will do the shopping center.
27. Lois Nishikawa said there are no plans for any shopping center on the part of Bishop Estate, just schools.
28. Barbara Luke said this triangle concept is great for the area.
29. Kathe Hall agreed, as it is not in anyone's back yard.
30. Rudy Balinbin feels this concept fits the area.
31. Kathe Hall – senior housing is so needed; the one in Kihei is packed.
32. Barbara Luke – how long will it take to build this?
    Ans. 2-3 years
33. Aric Nakashima – other community associations will get involved and we need to be clear that to put this center any other place would be weird.
34. Kathe Hall – this is the hub of Upcountry.
35. Kathe Hall – when should we invite Kula?
    Ans. Best to take care of Pukalani first.
36. Barbara Luke – Kula will not care unless it is in their back yard.

Rudy Balinbin called for a motion to allow ML&P to present their updated plans at the next General Membership meeting. Motion approved unanimously.

MAUI LAND & PINEAPPLE COMPANY, INC.

The General Membership meeting was set for Wednesday, May 2, 2001 at 6:30 pm at the Pukalani School Cafeteria if the cafeteria is available. (Note: The date was later changed to May 3, 2001.)

ML&P left the meeting.

PŪKALANI
COMMUNITY
ASSOCIATION 151 Aulii Dr., Pukalani, Maui, Hawaii 96768/Ph. (808) 572-1674, FX (808) 573-5312
"GOOD NEIGHBORS, GREAT COMMUNITY"

PUKALANI COMMUNITY ASSOCIATION
GENERAL MEMBERSHIP MEETING
Thursday, May 3, 2001 – Pukalani Elementary School Cafeteria

~MINUTES~

I. Welcome and Introductions
Aric Nakashima called the meeting to order at 6:48 pm.
Dick Mayer, Steve Sutro and Elliot Krash were introduced as guests representing the Kula and MAUCA community associations.

II. Minutes
Aric Nakashima dispensed with the reading of the minutes of the last meeting. A copy is available for those interested.

III. Treasurer's Report
Aric Nakashima dispensed with the treasurer's report as there is no change in the balance from the last meeting.

IV. Committee Reports
None. Aric Nakashima reminded the group that chairs are needed for several committees.

V. Old Business
A. Sign renovation, Haleakala Hwy. – UpCountry Christian Fellowship Church. It was brought to the attention of the Board that the previous vote taken was based on old information. This sign issue is still pending before the Board of Variance & Appeals. The sign is basically the same; however there may be a change in the church name. The Board of Variance & Appeals deferred the issue to the Urban Design Review Board for an opinion. This opinion from the Urban Design Review Board is expected in May or June and then the issue will be put on the agenda for the Board of Variance & Appeals. This previous action on this agenda item was cancelled and the item deferred until the review by the Board of Variance & Appeals is completed.

B. Daystar Lunchwagon Corp. – Michael Sniffen explained his proposal to modify a container as a commissary kitchen. Michael and his wife Sandy run a foster girls home at 3170 Iolani St. and they would like to incorporate this lunchwagon business into their foster care program. The container would be located between the existing house and cottage on the property. There is plenty of parking on the site and little traffic would be generated. Mr. Sniffen has notified the neighbors within the 500 ft. radius and is waiting to hear back from them. There is a County Council hearing on the project on May 22, 2001.

Discussion: Members questioned the hours of operation and were told the plan is to begin work at 5:00 am and deliver the meals at 10:30 am. It was moved and seconded to de. this item until the response is in from neighbors. Motion carried.

C. Maui Land & Pineapple Company, Inc. proposed development. Norman Hong of Group 70, International and Warren Suzuki of Maui Pine showed a PowerPoint presentation on the renderings of the planned development from different viewplanes.

Discussion: Questions from those present included street lighting concerns, the possibility of a Maui Pine outdoor museum on the property, the need for an Upcountry hospital and whether this site might be appropriate, explanation of assisted care senior housing, clarification on where the water for this development would come from, question on if a woodworking shop be suitable for the cottage industry lots, question on whether tourists would be attracted to the site, statement that this development is survival for Pukalani Superette, the benefit this would provide by relieving the need for people to work out of their homes or open businesses near existing homes, and questions on what is planned at the Dowling development.

Earl Lamadora asked if there was a motion. The group worked on the following motion:

"The Pukalani Community Association approves the concept of the Maui Land & Pine development as presented subject to the issues raised by the community with the expectation that they would work with the community towards the final plans."

At Kathe Hall's suggestion, the members signed the motion (see attached). The proxy ballots were counted and included in the total. Motion carried.

VI. Adjournment

The meeting adjourned at 8:45 pm.

Respectfully,

Secretary, pro tem

The Pukalani Community Association ~~vo.~~ approves the concept of the Maui Land & Pine developments as presented subject to the issues raised by the community with the expectation that they would work with the community towards the final plan

[illegible signature]	572-8240
Pauline [illegible]	572-8240
[illegible]	
Paul J. Meyer	572-6677
Donna Clayton	572-9866
Debbie Anthony	
[illegible signature]	573-0388
[illegible signature]	572-6874
[illegible signature]	572-1266
[illegible signature]	572-6126
[illegible signature]	573-5102
Michael Smiffery	572-9589
[illegible signature]	572-8291
[illegible signature]	572-9444
Beverley Foster	572-0484
[illegible signature]	572-0484
[illegible signature]	572-7341
Doug Schenk	572-4596
Re[illegible] [illegible signature]	572-1670

#5

Proxy

Joyce Hoyd	no vote
Mildred Andrade	not support
Erik Friedericksen	not support
Evelyn Fernandez	support
Gretchen Ladley	neutral
Adele Sumida	Support
Harvey & Colleen Mora	Support
Yvette Kaaude	Support
Karolyn Alford	Support
Clay Couture	not support

File

Wailuku Main Street Association, Inc.
Tri-Isle Main Street Resource Center
A Non-Profit Organization
2035 Main Street, Ste. 1 • Wailuku, Maui, HI 96793
Tel (808) 244-3888 • Fax (808) 242-2710

Date: July 24, 2001

Total Number of Pages 6 (including cover)

TO: Donna Clayton
Maui Land & Pine

Fax No.: 877-3826

FROM: Jocelyn Perreira, Executive Director/Tri-Isle Main Street Coordinator

Wailuku Main Street Association, Inc./Tri-Isle Main Street Resource Center

Telephone: (808) 244-3888 Fax: (808) 242-2710

MESSAGE: Hard Copy to Follow ☐ Yes ☑ No

As promised, please let me know if you received info.
Attendance at mtg 38. This includes BoD that rec'd info & not in attendance.

Please call (808) 244-3888 if you do not receive this FAX complete, or need further clarification of information transmitted.

For ML+P
Donna Clayton
877-3826

MAKAWAO MAIN STREET ASSOCIATION

Board of Directors
2000/2001

______	• Madelyn "Benni" D'Enbeau, Vice Chair	270-8018/575-2398
______	• Calvin Shibuya, Treasurer	572-7261/572-6141
______	• Benjamin "Bully" Joaquin, Secretary	572-0027
______	• Abel Abreu	Unlisted
______	• Cielo Molina	984-8500/572-9388
______	• Myles Nakashima	572-7616/572-1830
______	• Herman Nascimento	242-6891/572-8963
______	• Stacey Purdy	575-9490/244-3888
______	• Lahela Roback	572-9476
______	• Claude Sarsona	572-2943/344-0395 (cell)
______	• Hugh Starr	573-0081/572-8682
______	• Phillip Swatek	572-1535
______	• Linda Wojcieski	572-6915/871-4335
______	• Jocelyn A. Perreira, Tri-Isle Main Street Coordinator	244-3888/242-2710

Makawao Main Street Association
Minutes of Town Meeting
Monday, May 23, 2001 6:30 p.m.

Location: Makawao School, Cafeteria, Makawao, Hawaii.

Present: The Board of Directors and attached list of those in attendance that signed in prior to leaving the meeting. Note: Not all signed in. (35) Also in attendance was Councilman Mike Molina.

Call to Order: Chairperson Madelyn D'Enbeau called the meeting to order at 6:40 p.m. The order of the meeting agenda was rearranged to accommodate those who needed to leave early.

The Following Agenda Items were discussed in the order presented.

Bike Tour Impacts: Chairperson D'Enbeau noted that the Item is in the Public Works Committee. Councilman Molina expressed concern that many smaller companies are now also operating business and may not be adhering to industry guidelines or safety standards. Discussion ensued.

- Can Maui via its Corporation Counsel regulate the industry or is it a state function? Councilman Molina will look into the question.
- It was noted that Brian Kramer is the only responsible Bike Company owner that has sat with the community to attempt to resolve some issues.
- Charlie Levy said safety dictates that you just take your 2 foot lane. It is the car's responsibility to pass.
- Michelle Chateau provided a handful of suggestions for the organization.
  - Establish a County bike Tour Operator Permit.
  - Institute a Driver Awareness and Education Program
    (It's not an issue of time, its an issue of safety)
  - What is the carrying capacity of our roads?
  - Develop Bike Tour Regulations
- Tim Kramer noted they were working on some pull out along Baldwin Avenue.
- Celeste King reported dangerous situation is occurring on Kokomo Road.

The Makawao Main Street Association informed Councilman Molina that they are still in support of a Regulated Industry. To separate the responsible tour operator from the irresponsible.

4-Way Stop:

- The consensus of the community is that they like the 4-way stop. The dribble through effect keeps the traffic moving.
- It was noted that no one had received any calls in opposition.

• It was noted that no one had received any calls in opposition.

• We don't ever want to see a traffic light at the crossroads.

• It is much safer to have it as it is now.

• Councilman Molina noted that he has not received many complaints.

• Observers have noted that two cars move out at one time from each stop.

• A recommendation to place a STOP AHEAD sign before the 4-way stop was well received.

Sign age & Restrooms:

• A recommendation of proposing a paniolo type sign near the municipal lot that says Park and Walk.

• Councilman Molina said he took $80,000 from Eddie Tam improvements to design the restrooms. The group notified the Councilman that they want the restrooms located in the municipal lot and not in the proposed paniolo museum.

Raised Crosswalks in Town thoroughfare:

• The group present were split on raised sidewalks. Chateau expressed that she was not in favor of a raised crosswalk. While Celeste King noted that she would love a raised crosswalk which is noted for being a traffic calming devise. Clear examples of the divided opinions. However, after discussion brought out various points of view it was felt that crosswalks would be most beneficial further down Baldwin Avenue and at the Makawao School.

ML&P Triangle Development Project: The Up Country Town Center project was represented by Norman Hong and Jeff Overton of Group 70. The Honolulu planners represent the interest of the property owners, Maui Land & Pine represented by Bob McNatt and Donna Clayton. It was noted that tonite's meeting was informational.

The following comments were noted.

• The project intent is to provide much needed goods and services, limiting the need for people to go into central maui and thus reducing traffic impacts.

• Aric Nakashima of the Pukalani Community Association reported that their group accepted the concept and requested that they be informed of any changes that would occur during construction phase.

• It was noted that the Dowling project isn't even finished, yet how does that fit in with Pukalani. It was further expressed that the Dowling project turned out differently from what had been proposed.

• Concern was expressed about cars reversing into traffic.

• Group 70's Hong presented the following picture by saying they did not intend another Shopping Center to create a rural country town. They intend to have open space along the perimeter, narrow curved streets, smaller scale buildings only two stories in height. Also planned for are public gathering spaces, mixed uses and a residential component. Landscaping is symbolic of the region. There is a significant amount of space on the edge of the By-Pass. Passive park, equestrian trails and bike paths throughout. MAUI FRESH 5,000-6,000 s. f. Plantation Ranch Headquarters is ML&P store for visitors to get fresh drinks etc..

Responding to questions he further elaborated on the following.
The Senior housing component intended for independent living provides for between 120-150 units.

The retail is along Makawao Avenue. Parking off of Makawao Avenue is angled parking with a parking area hidden in back of the two story buildings. There is a mixture of office and civic uses. A medical clinic and other professional offices. In the center is a village green. They will encourage the store owner to have the ability to live on the second floor in the cottage industry area.

The tree selected to represent Pukalani is the Jacaranda which is synonymous with Kula and the region. It was recommended that the developer research the Pukalani history and try to determine a Pukalani tree. That could be incorporated into to plans and would have a nice touch, since the Jacaranda which will also be used is usually equated with Kula.

They will do pasture fencing to promote the rural atmosphere, avoid typical curb gutter sidewalks. Retain existing power poles. They'll cover an open ditch where drainage will be taken underground. A sidewalk will meet the street with a 15 -20' set back.

Store design would emulate Pukalani Superette style of the original Tanizaki Store with umbrella seating outside. 1/2 acre or 20,000 s.f. of village green. They will be using low level lighting to control light pollution.

Retail parking is 5 per 1,000 s.f. approximately 500 stalls for parking along with parking along the streets angled or parallel.

There are 5 entrances and exits

Other concerns stated were

- The need to develop another water source. Concern expressed for developer stating that they are just digging a well
- What's to keep the project from changing zoning and going to butler buildings?
  It was noted that details are not all worked out yet.
- Madelyn stated that "We don't have a mechanism in the County for keeping plans as presented.
- Phil asked about a build out schedule?
  Ans. 2-3 years before ground breaking. Project Plan amendment, community plan amendment and district zoning. State Land Use redesignation from Ag to Urban.
- Group stated a need for more office space than retail

- It was stated that cottage industry lots will be sold off.
- Concerns expressed about the By-Pass remaining a By-Pass without cut off into the development. Chateau said that State Highway has specific language in the community plan.

The Chairperson D'Enbeau conveyed the sentiments of the group. That in as much as it is a walking development. We like the concept, but the devil is in the details. So having the concurrence of the group the Makawao Main Street Association is in support of the proposed project, but would like to be informed of any proposed changes during the course of the development.

The date of the next regular meeting is set for Monday, June 25, 2001 at 5:00 p.m. at the KalamaSchool Cafeteria.

Hearing no announcements, the meeting was adjourned at 8:01 p.m.

Respectfully Submitted for
Benjamin "Bully" Joaquin, Board Secretary

KULA COMMUNITY ASSOCIATION

P.O. Box 417 - Kula, HI 96790 - *http://kulamaui.com*

The vision of the Kula Community Association is to preserve open space, support agriculture, maintain a rural residential atmosphere, and to work together as a community.

The specific purpose of this association is to improve the quality of life for the residents of Kula, to promote civic welfare and generally to benefit the community of Kula.

Board Meeting Agenda - 5 July 2001

Revised 7/2/01

Call to Order: 5:30 p.m. at Kula Elementary School

Introductions: Maui Land & Pine Representatives

Excused: Erwin DePonte, Gina Flammer, Dave Jenkins, Terry McBamet, Karolyn Mossman, Mitch Silver

Communications

From KCA to:

Mike Molina, Councilmember: Letter stating KCA concerns about Kula street lighting
Bob Siarot, DoT, and David Goode, DPWWM: Copy of Molina letter on street lighting
BWS Budget Hearing: Testimony on BWS Operating and CIP budgets reiterating KCA policy and position statements
David Goode, Dir PW&WMgmt: Letter offering comments on code amendments for sidewalks reiterating Upc Plan
Urban DesignReview Board: Testimony on Upcountry Church sign reiterating KCA position (deferred til 7/17)
Maui News: Letter thanking legislators, councilmembers, paramedics, DoH, citizens for support on ambulance

To KCA from:

EMI/HC&S: Note thanking KCA for testimony to BL&NR to keep water flowing from watershed (on mo to mo basis)
Julia Tsumoto, DoT: Letter thanking KCA for particip and announcing July 24 mtng of State/Co Interim Trans Plan cttee
Rene Yamafuji, Principal, KES: Telephone call explaining reduced room rental rate for 2001-2
Donna Clayton, AsstLandMgr, ML&P: Copy of EIS Prep Notice for ML&P Pukalani Triangle project
Mike Maberry, AsstDir, UofH Inst for Astronomy: Copy of letter to DoT stating concerns about Kula street lighting
Gov Cayetano: Letter thanking KCA for comments on MYFS funds, explaining DoH position, giving status on project
Gov Cayetano: Letter thanking KCA for letter on funds Haleakala Obsrv Site Mstr Pln and announcing release of funds

Treasurer's Report: John Wilson

Secretary's Report: Gina Flammer

Committee Reports
Health/Safety: Ambulance status - Elliott
Roads/Highways & LandUse/Planning: Street lighting - Steve; Signs - Steve, Hari

Unfinished Business
Program for August KCA/MAUCA Meeting

New Business
BWS Vacancy
Kulamalu Project Status

Presentation
ML&P Briefing on Pukalani Triangle Project

Announcements

Board Meetings (1st Thursday monthly, 5:30 pm, Kula Elementary School Library)
2 AugustAgenda: August GenMtng plans; Nominating Committee
General Meetings (Usually third Thursday, middle month each quarter, 7 pm, Kula Community Center)
23 August Program: "What's Happening in Kula" (K'malu, HHL, GrowthData, PlanProc, Ranch, Park); Business: TBD
15 November Program: TBD (LegisRpt, Hway, Wtr, Charter ???); Business: Election of KCA Directors and Officers

Adjourn: 7:00

Other Business/Future Meetings
KCA Web Policy (Mitchell) Co. Charter (Karolyn) Recycling Center (John)
Beautification (Dave)

PUKALANI COMMUNITY ASSOCIATION
GENERAL MEMBERSHIP MEETING
MINUTES
December 4, 2001

President Aric Nakashima called the meeting to order at approximately 6:35 pm.

Minutes & Treasurer's Report:

The minutes and the treasurer's report were dispensed with. Aric informed the group that there was approximately $670.00 in the bank account.

Old Business:

1. The Executive Board met last week. The Church of the Nazarene made a presentation at that meeting as did Harvey Makii of MECo.
2. Update on the Upcountry Christian Fellowship signage issue: The matter is now before the Urban Design Review Committee.
3. No new information on the request for a container kitchen on Iolani Street.
4. Both the Arizumi development in Pukalani Highlands and the Napa development mauka of McDonalds have dropped their requests.
5. Maui Land & Pineapple Company is still in the process of preparing the Draft Environmental Impact Statement submittal for their proposed Upcountry Town Center project.
6. Dowling's Kulamalu development is proceeding. Ainalani Road is an issue.

New Business:

1. Safety Committee – no report.
2. Membership Committee: Donna Clayton reminded members that dues are due in January. Membership lists will be updated.
3. Youth and Recreation Committee – no report.
4. Planning, Zoning, and Traffic Committee:
    a. Presentation by Sterling Kim and Pastor Dale Kreps:
        1) Proposed new Church of the Nazarene on Hiwalani Loop next to the Makawao Hongwanji Preschool.
        2) The Planning Commission is the next step in the process to get the zoning changed and three lots consolidated into one lot.
        3) Plan calls for a combination gym and worship center of approximately 10,000 sf.
        4) This would allow the church to continue to serve the youth in the area.
        5). Concerns from the community in the immediate vicinity of the church included:

1. Existing noise from youth group is loud and might get worse after church is built.
2. Car racing on Hiwalani Loop is very bad now and might get worse after church is built.
3. The community would like speed bumps on Hiwalani Loop.
4. Traffic on Hiwalani Loop is a big issue. The group requested that the church do all they can to get the entrance moved to the Old Haleakala Hwy.
5. The church will work to resolve the above issues and come back to a future general membership meeting to discuss the project again.

b. Harvey Makii from MECo gave a presentation explaining the MECo plan to work with the various companies that need antenna sites by allowing them to use existing MECo poles for their antennas.

The meeting adjourned at 8:45 pm.

Respectfully submitted,

Dennis J. Clayton

Secretary, Pro tem

PUKALANI COMMUNITY ASSOCIATION
GENERAL MEMBERSHIP MEETING

Pukalani Elementary School Cafeteria, 6:30pm
December 4, 2001

A G E N D A

i. introduction
ii. minutes
iii. treasurer's report
iv. old business
safety committee

membership committee

youth and recreation committee

planning, zoning, and traffic committee
. upcountry Christian fellowship – signage

. container kitchen on iolani st. – land use

. arisumi development

. napa development

. maui land and pine development

. kulamanu development

v. new business
safety committee
membership committee

youth and recreation committee

planning, zoning, and traffic committee
. church of the Nazarene – Sterling Kim

. meco – Harvey Makii

vi. announcements
vii. meeting adjourned

Appendix L (Addition to the Final EIS)

Limited Phase II Surface Investigation &
Draft Risk Evaluation, Worker Inhalation
Former Corn Mill Camp
Pukalani, Maui, Hawaii

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Clayton
GROUP SERVICES

Limited Phase II Surface Investigation

Former Corn Mill Camp
Pukalani, Maui, Hawaii

Clayton Project No. 85-01221.00
June 14, 2001

Prepared for:
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Clayton Group Services

EXECUTIVE SUMMARY

Carlsmith Ball, LLP, retained Clayton Group Services, Inc. ("Clayton") to perform a limited Phase II surface investigation at the Maui Land & Pineapple Company, Inc. property formerly known as the Corn Mill Camp (the "subject property") and located at the Junction of Makawao Avenue and Pukalani Bypass Road in Pukalani, Maui, Hawaii.

The purpose of this project was to (1) review historical areas at the site and identify areas of concern, (2) collect and analyze approximately 10 soil samples at the subject property for chemical constituents in connection with to previous agricultural chemical storage, (3) assess whether the levels of chemical constituents are above or below the State of Hawaii Department of Health ("DOH") Tier 1 Action Levels and/or Environmental Protection Agency ("EPA") preliminary remediation goals ("PRG"), and (4) use the results of the data to identify areas that may impact planned development of the subject property.

Background

In September of 1996, Levine Fricke Recon performed an Environmental Compliance Audit of the Haliimaile Section of Maui Pineapple Company, that included the subject property. The draft audit report identified historical uses of two Corn Mill Camp buildings that included the mixing and storing of agricultural chemicals. According to the report, the subject property was used in the 1940s and 1950s for storing pentachlorophenol phenate, DDT, and disodium methanearsenate.

The subject property was acquired by Maui Land & Pineapple Company, Inc. in the early 1960s at which time the two buildings were cleaned of residual dust by washing the floors and walls with water. The water was allowed to escape through floorboards and infiltrate into the ground beneath the two buildings. In addition, Maui Pineapple Company personnel familiar with the subject property informed Clayton that the buildings may have been used for storage and mixing of chemicals known to have been used by Haleakala Pineapple Company. Those chemicals included Lindane, Chlordane, DBCP, PCP, DDT, and arsenic compounds.

At least two mixing tanks with capacities of less than 1,000 gallons were known to have been located at one of the buildings and used to mix chemical pesticides and herbicides prior to crop application. According to Maui Pineapple Company personnel, the subject property was used for offices, equipment storage, and agricultural chemical storage and mixing until the mid-1960's. Thereafter the subject property was used only for storage purposes.

Field Activities

On April 18, 2001, Clayton collected soil samples at 13 locations within the subject property. The sample locations were selected in the immediate areas of the two buildings used to store chemicals and areas likely to be impacted by releases of the stored materials. The soil samples were collected from depths of two to six inches below ground surface. Samples were collected using hand-operated sampling devices, such as trowels, augers and spatulas constructed of stainless steel. Eleven of the samples were selected for analysis. The samples were sent under standard chain-of-custody procedure to Columbia Analytical Services, Inc. ("CAS"), Canoga Park, California, for analysis. CAS sent a subsample of each sample to West Coast Analytical Services, Inc., Santa Fe Springs, California, for analysis.

Laboratory Results

The samples were analyzed for (1) organochlorine pesticides using EPA Method 8081A, (2) organophosphorus pesticides using EPA Method 8141, (3) chlorinated herbicides using EPA Method 8151A, (4) volatile organic compounds ("VOCs") using EPA Method 8260B, (5) phenols using EPA Method 8270C, (6) arsenic using EPA Method 7060A, and (7) chromium and copper using EPA Method 6010B.

Organochlorine pesticides (4,4-DDE and 4,4-DDT) were detected above the State of Hawaii DOH Tier 1 Soil Action Level ("SAL") in ten of the eleven samples analyzed. Phenols analysis revealed concentrations of pentachlorophenol above the PRG in one sample. Arsenic was detected in soil samples at concentrations ranging from 6.0 to 150 milligrams per kilogram (mg/kg). Two samples exceeded the SAL of 22 mg/kg. Organophosphorus pesticides and chlorinated herbicides were not detected in any of the samples above the Method Reporting Limits ("MRL"). Laboratory analytical results indicated VOCs were not detected at or above the MRLs.

Conclusions and Recommendations

Results of the laboratory analyses of eleven soil samples indicate the presence of pesticides at two locations resulting in impacts to surface soils at levels of up to three orders of magnitude above the SAL. The horizontal and vertical extent of pesticide contamination at the subject property could not be delineated by this limited investigation.

Therefore, based on the results of our investigation, Clayton recommends the following:

- Prepare a work plan to (1) delineate the horizontal and vertical extent of soil impacted by organochlorine pesticides, pentachlorophenol, and arsenic, and (2) assess the presence of dioxin, which may be associated with pentachlorophenol. The work plan should be prepared in accordance with the Technical Guidance Manual for Implementation of the Hawaii State Contingency Plan. Activities presented in the work plan will involve, among other things, drilling of boreholes, collecting samples, and laboratory analysis.
- Following the delineation of impacted soil; an analysis of preliminary remedial alternatives should be performed to identify the most appropriate remedial options for the subject property.

1.0 INTRODUCTION

Carlsmith Ball, LLP retained Clayton Group Services, Inc. ("Clayton") to perform a limited Phase II surface investigation at the Maui Land & Pineapple Company, Inc. property formerly known as the Corn Mill Camp (the "subject property") and located at the Junction of Makawao Avenue and Haleakala Highway in Pukalani, Maui, Hawaii.

1.1. BACKGROUND

In September of 1996 Levine Fricke Recon performed an Environmental Compliance Audit of the Haliimaile Section of Maui Pineapple Company, that included the subject property. The draft audit report identified historical uses of two Corn Mill Camp buildings that included the mixing and storage of agricultural chemicals. According to the report, the subject property was used in the 1940s and 1950s for storage of pentachlorophenol phenate, DDT, and disodium methanearsenate (Levine Fricke, 1997).

Maui Land & Pineapple Company, Inc. acquired the subject property in the early 1960s at which time the two buildings were cleaned of residual dust by washing the floors and walls with water. The water was allowed to escape through floorboards and infiltrate into the ground beneath the two buildings. According to Mr. Doug MacCluer, of Maui Pineapple Company, the subject property may have been used for storage and mixing of agricultural chemicals historically used by Haleakala Pineapple Company. Those chemicals included Lindane, Chlordane, DBCP, PCP, DDT, and arsenic compounds. Mr. MacCluer stated that at least two mixing tanks with capacities of less than 1,000 gallons were known to have been located at one of the buildings and used to mix chemical pesticides and herbicides prior to crop application. The subject property has historically been used for offices, pesticide application vehicle and equipment storage, and agricultural chemical storage and mixing until the mid-1960's. Thereafter the subject property was used only for storage purposes.

1.2. PURPOSE

The purpose of this project was to (1) review historical areas at the subject property and identify areas of concern, (2) collect and analyze approximately 10 soil samples at the subject property for chemical constituents in connection with previous agricultural chemical storage, (3) assess whether the levels of chemical constituents are above or below the State of Hawaii Department of Health ("DOH") Tier 1 Action Levels or Environmental Protection Agency ("EPA") preliminary remediation goals ("PRG"), and (4) use the results of the data to identify areas that may impact planned development of the property.

2.0 SCOPE OF WORK

Clayton performed the following tasks:

- Reviewed historical operations and identified areas that were suspect and warrant sampling and analysis.
- Collected 13 surface soil samples at select locations and depths on the subject property.
- Analyzed 11 of the 13 surface soil samples for:

  (1) Organochlorine pesticides using EPA Method 8081A,
  (2) Organophosphorus pesticides using EPA Method 8141,
  (3) Phenols using EPA Method 8270C,
  (4) Chlorinated herbicides using EPA Method 8151A,
  (5) Volatile organic compounds ("VOC") using EPA Method 8260B,
  (6) Arsenic, chromium and copper using EPA Method 6010B, and
  (7) Arsenic using EPA Method 7060A.

- Reviewed analytical results and compared them to EPA Region IX PRGs and DOH Tier 1 Action Levels.
- Used the data to identify areas of concern that may impact planned development at the property and require special attention.
- Prepared this report presenting the results of the investigation, laboratory analyses, conclusions and recommendations.

3.0 PROPERTY DESCRIPTION

The subject property consists of approximately 40-acres of mountainside land located along Makawao Avenue, on the western flank of the Haleakala Volcano (Figures 1 and 2, Figures Tab).

The subject property is improved with warehouse buildings and offices in a commercial and light industrial setting. Adjacent properties are used for agricultural and residential purposes. The subject property fronts the Haleakala Highway to the northeast and Makawao Avenue to the northwest. A paved access road connects the subject property to Makawao Avenue.

4.0 PHYSICAL SETTING

According to the U.S. Geological Survey, Haiku, Maui, Hawaii, 7.5-minute topographic quadrangle map, the subject property is located in the town of Pukalani in the Makawao District of the Island of Maui, Hawaii. The area is characterized by a moderate to steep grade in a northwesterly direction (Figure 1). Elevations at and around the subject property range from approximately 1,630 to 1,650 feet above mean sea level (amsl) (USGS 1997).

4.1 SOIL CONDITIONS

According to the U.S. Department of Agriculture Soil Conservation Service, the ground beneath the subject property is listed *as Haliimaile silty clay loam,* on 7 to 15 percent slopes (mapping unit *HgC*). The *Haliimaile* series consists of well-drained soils on uplands on the island of Maui. These soils developed in material weathered from basic igneous rock.

In a representative profile, the surface layer is dark reddish-brown, silty clay about 15 inches thick. The subsurface soil, more than 60 inches thick, is a dark reddish-brown silty clay and very dark, grayish-brown clay that has a subangular blocky and angular blocky structure. The substratum is soft, weathered basic igneous rock. The soil is strongly acid in the surface layer and strongly to medium acid in the subsurface. Permeability is moderately rapid, runoff is medium, and the erosion hazard is moderate.

4.2 GROUNDWATER CONDITIONS

Regional groundwater at the subject property is derived from the Makawao aquifer system of the Central sector on the island of Maui, as stated in the Aquifer Identification and Classification for the island of Maui: Groundwater Protection Strategy for Hawaii, Technical Report No. 185, published by the Water Resources Research Center at the University of Hawaii. The aquifer system below the subject property consists of an upper and lower aquifer.

Based on the technical report, the upper aquifer is an unconfined high level aquifer, perched in volcanic lithology. Its status is described as a currently used, replaceable, fresh drinking water supply (salinity <250 milligrams per liter [mg/L] Chloride). This aquifer has a high vulnerability to contamination, according to the technical report.

Based on the technical report, the lower aquifer is an unconfined basal aquifer occurring in a flank type (horizontally extensive lavas) volcanic lithology. Its status is described as potentially useful, irreplaceable, fresh drinking water supply (salinity <250 mg/L Chloride). This aquifer has a moderate vulnerability to contamination, according to the technical report.

The estimated depth to first groundwater near the subject property vicinity is greater than 100 feet below ground surface (bgs), and the basal aquifer is over 1,000 feet bgs. The inferred groundwater flow direction is expected to be northwest towards the Pacific Ocean. The local gradient and flow direction under the subject property for both the upper an lower aquifers may be influenced naturally by zones of higher or lower permeability, or by nearby pumping or recharge, and may deviate from the regional trend.

According to the DLNR, there are no wells on the subject property and no drinking water or injection wells within ½ mile. There is one irrigation supply well located approximately one mile west of the subject property at an elevation of 1,086 feet amsl. The well was drilled a total depth of 1,130 feet bgs and had a static water level of 8 feet amsl (DLNR, 2001).

5.0 FIELD ACTIVITIES

5.1 SAMPLING STRATEGY

On April 5, 2001, sampling locations were selected at the subject property, based on information provided by Maui Land & Pineapple Company, Inc. regarding storage and wash down areas, and aboveground storage tanks ("AST") used to store and mix liquid pesticide and herbicide solutions. The sample locations were selected in the unpaved areas around the two central buildings most likely to be impacted by releases of the stored chemicals.

5.2 SOIL SAMPLING ACTIVITIES

On April 18, 2001, Clayton hand-augered a total of thirteen boreholes (SS-1 through SS-13) at the locations and collected a total of thirteen soil samples, one from each borehole. The soil samples were collected from depths of two to six inches below ground surface. Samples were collected using hand-operated sampling devices, such as trowels, augers and spatulas constructed of stainless steel.

The soil samples were collected in pre-cleaned 8-oz. glass jars with Teflon™ lined caps. The samples were labeled and stored with frozen gel-ice in a portable ice chest. The samples were delivered to Columbia Analytical Services ("CAS") for analysis following standard chain-of-custody procedures.

Soil samples SS-1 to SS-8 were collected in the central portion of the subject property at the northeast end of the former warehouse, payroll office and shower room (Figure2). Samples SS-1 and SS-2 were collected proximal to the location of the former ASTs. Sample SS-2 was collected from slightly moist soil at the outlet of the building floor drain. Sample SS-3 was collected just outside of the former shower room. Sample SS-4 was collected from the northeast side of the central warehouse. Samples SS-5 and SS-6 were collected from bare soil beneath the margins of the same structure. Samples SS-7 and SS-8 were collected from the unpaved area northeast of the central warehouse. Soil sample SS-9 and SS-10 were collected from bare soil beneath the small stand-alone structure, a former pesticide storage building, located between two warehouse facilities of the subject property. Soil sample SS-11 was collected from a densely vegetated area northeast of and adjacent to the same structure. Samples SS-12 and SS-13 were collected from outlying areas more than 100 feet from the nearest sample location. Samples SS-12 and SS-13 were not analyzed.

During collection of the soil samples, no odor or discoloration was detected, with the exception of SS-4, which had a slight paint-like odor and tan discoloration. The soils generally appeared very homogenous, had a very soft to stiff consistency, and were dry to slightly moist.

The soil encountered in the boreholes was predominately dark brown to dark reddish brown silty clay with some gravel. The boreholes were backfilled with surface soil from the surrounding area.

5.3 DECONTAMINATION PROCEDURES

The sampling equipment was cleaned between each sample location. The cleaning process involved brushing or scraping off excess soil particles, rinsing with water, washing and scrubbing the equipment in a non-phosphate detergent solution, rinsing in a bucket of tap water and triple rinsing with distilled water, followed by air-drying.

6.0 STATE AND FEDERAL SOIL ACTION LEVELS

The subject property is located above the State of Hawaii Underground Injection Control (UIC) Line; therefore, groundwater at the subject property is considered to be a source of potable water. The State of Hawaii DOH Tier 1 Action Levels for soil and groundwater (rainfall ≤200 centimeters/year) for sites where a drinking water source is threatened are applicable to this site.

In June of 1996, the State of Hawaii Department of Health (DOH) established soil and groundwater action levels in their guidance document titled "Risk-Based Corrective Action and Decision Making at Sites with Contaminated Soil." The guidance document uses the Aquifer Identification and Classification Technical Report No. 185, published by the Water Resources Research Center at the University of Hawaii, to assist in determining drinking water and non-drinking water aquifers. According to this report, the aquifer below the subject property is a drinking water aquifer.

The DOH established the Tier 1 Action Levels based on (1) potential adverse impact on groundwater due to leaching of residual contamination from impacted soil, (2) potential adverse impact on groundwater due to remobilization of product in impacted soil, and (3) potential threats to human health due to direct exposure to impacted soil.

The EPA Region IX, which includes Hawaii, established preliminary remediation goals (PRGs) for contaminants based on a risk-based analysis.

The applicable State of Hawaii DOH Tier 1 Soil Action Level ("SAL") and EPA PRGs are shown on Tables 1 through 6 in Appendix A.

7.0 LABORATORY RESULTS

Soil samples SS-1 through SS-11 were analyzed for (1) organochlorine pesticides using EPA Method 8081A, (2) organophosphorus pesticides using EPA Method 8141, (3) chlorinated herbicides using EPA Method 8151A, (4) volatile organic compounds (VOCs) using EPA Method 8260B, (5) phenols using EPA Method 8270C, (6) arsenic using EPA Method 7060A, and (7) chromium and copper using EPA Method 6010B. Samples SS-12 and SS-13 were not analyzed.

The laboratory analytical results are summarized in Tables 1 through 6 included behind the Tables Tab. The laboratory analytical reports and chain-of-custody forms are included in Appendix A.

Organochlorine pesticides were detected in all of the samples analyzed. 4,4-DDE and 4,4-DDT were detected above the SAL in ten of the eleven samples analyzed. The highest concentrations of organochlorine pesticides were detected in samples SS-1 and SS-2. Sample SS-1 exhibited a concentration of 4,4-DDE at 99 milligrams per kilogram (mg/kg) and 4,4-DDT at 940 mg/kg. Sample SS-2 exhibited a concentration of 4,4-DDE at 96 mg/kg and 4,4-DDT at 900 mg/kg. Laboratory analytical results for seven other organochlorine pesticides produced Method Reporting Limits (MRLs) above the PRGs. The elevated MRL is due to matrix interference and sample dilution. Sample dilution is often required for highly contaminated samples.

Phenols analysis revealed concentrations of pentachlorophenol above the PRG in one sample (SS-1) and an elevated MRL (greater than the PRG) in six other samples. CAS repeated pentachlorophenol analysis for SS-1 after results for 8151A analytes revealed a concentration of pentachlorophenol of 0.1 mg/kg in the same sample. The result for the additional analyses indicated pentachlorophenol at 12 and 18 mg/kg; however, these results were obtained 18 days after the standard method holding time.

Organophosphorus pesticides and chlorinated herbicides were not detected in any of the samples above the MRLs.

Arsenic was detected in soil samples at concentrations ranging from 6.0 to 150 mg/kg. Two samples (SS-2 and SS-11) exceeded the PRG of 22 mg/kg.

Laboratory analytical results indicated VOCs were not detected at or above the MRLs. However, the MRL was not low enough to confirm concentrations of four specific VOCs were not above their respective SAL or PRG. It is Clayton's opinion, based on the non-detect concentrations of 62 other constituents, that it is unlikely that the detection limit presents a concern.

8.0 CONCLUSIONS AND RECOMMENDATIONS

On April 18, 2001, Clayton advanced a total of thirteen boreholes (SS-1 through SS-13) at select locations and collected a total of thirteen soil samples, one from each borehole. The boreholes were augered to depths of 2 to 6 inches. Eleven samples (SS-1 through SS-11) were selected for analysis.

Based on laboratory analytical results, two areas exhibited concentrations of 4,4-DDE and 4,4-DDT up to three orders of magnitude above the SAL. Laboratory analytical results for seven other organochlorine pesticides produced Method Reporting Limits above the EPA PRGs.

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Phenols analysis revealed concentrations of pentachlorophenol above the PRG in one sample and an elevated MRL (greater than the PRG) in six of the samples. Arsenic was detected in soil samples at concentrations ranging from 6.0 to 150 milligrams per kilogram (mg/kg). Two samples exceeded the PRG of 22 mg/kg.

Laboratory analytical results indicated VOCs were not detected at or above the MRLs. However, the MRLs were not low enough to confirm concentrations of four specific VOCs were not above their respective SAL or PRG. It is Clayton's opinion, based on the non-detect concentrations of 62 other constituents, that it is unlikely that the detection limit presents a concern.

Results of the laboratory analyses of eleven soil samples indicate the presence of releases of pesticides at two locations resulting in impacts to surface soils at elevated levels. The horizontal and vertical extent of pesticide contamination at the subject property could not be delineated by this limited investigation.

Based on the results of our investigation, Clayton recommends the following:

- Prepare a work plan (1) delineate the horizontal and vertical extent of soil impacted by organochlorine pesticides, pentachlorophenol, and arsenic, and (2) assess the presence of dioxin, which may be associated with pentachlorophenol. The work plan should be prepared in accordance with the Technical Guidance Manual for Implementation of the Hawaii State Contingency Plan. Activities presented in the work plan will involve among other things drilling of boreholes, collecting samples, and laboratory analysis.

- Following the delineation of impacted soil; an analysis of preliminary remedial alternatives should be performed to identify the most appropriate remedial options for the subject property.

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TABLES

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Table 1 (Page 1 of 2)
Laboratory Analytical Results
(EPA Method 8260B)
Soil Samples
Date Sampled: April 18, 2001
Clayton Project No.: 85-01221.00

EPA Method 8260B Volatile Organic Compounds	SS-1 (ug/kg)	SS-2 (ug/kg)	SS-3 (ug/kg)	SS-4 (ug/kg)	SS-5 (ug/kg)	SS-6 (ug/kg)	SS-7 (ug/kg)	SS-8 (ug/kg)	SS-9 (ug/kg)	SS-10 (ug/kg)	SS-11 (ug/kg)	Method Blank (ug/kg)	Method Blank (ug/kg)	PRG/(SAL) (ug/kg)
Dichlorodifluoromethane (CFC 12)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	310,000
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,700
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	830
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13,000
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6,500
Trichlorofluoromethane (CFC 11)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,000
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	(5,800)
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,200,000
Methylene Chloride	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	(3)
trans1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,100,000
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Chloroform	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	(1)
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
1,1,1-Trichloroethane (TCA)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,400,000
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	(150)
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	760
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,500
Trichloroethylene (TCE)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6,100
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	770
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,400
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	520,000
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,900
4-Methyl-2-pentanone (MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Tetrachloroethene (PCE)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	19,000
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,700
1,2-Dibromoethane (EDB)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	48
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	(80)
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,000

ug/kg: Micrograms per kilogram (~parts per billion)
ND: Not Detected at the Method Reporting Limit (MRL)
NS: No Standard
PRG: Preliminary Remediation Goals, EPA
SAL: Soil Action Level, HDOH

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Table 1 (Page 2 of 2)
Laboratory Analytical Results
(EPA Method 8260B)
Soil Samples
Date Sampled: April 18, 2001
Clayton Project No.: 85-01221.00

EPA Method 8260B Volatile Organic Compounds	SS-1 (ug/kg)	SS-2 (ug/kg)	SS-3 (ug/kg)	SS-4 (ug/kg)	SS-5 (ug/kg)	SS-6 (ug/kg)	SS-7 (ug/kg)	SS-8 (ug/kg)	SS;9 (ug/kg)	SS-10 (ug/kg)	SS-11 (ug/kg)	Method Blank (ug/kg)	Method Blank (ug/kg)	PRG/(SAL) (ug/kg)
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	230,000
Total Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,700,000
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	310,000
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	900
1,2,3-Trichloropropane	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	ND<5.0	3
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	92,000
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	240,000
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	70,000
tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	390,000
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	170,000
sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	220,000
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	52,000
4-Isopropyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8,100
n-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	240,000
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
1,2-Dibromo-3-chloropropane (DBCP)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,000
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,000,000
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	(41,000)
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	32,000
Methyl *tert*-Butyl Ether	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	(5)
1,1,2-Trichlorotrifluoroethane (Freon113)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Vinyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,400,000

Note: Shaded values equal or exceed the PRG or SAL, whichever is lower, due to a MRL that is higher than the PRG/SAL.

ug/kg: Micrograms per kilogram (~parts per billion)
ND: Not Detected at the Method Reporting Limit (MRL)
NS: No Standard
PRG: Preliminary Remediation Goals, EPA
SAL: Soil Action Level, HDOH

Clayton

CLIENT CONFIDENTIAL

Table 2
Laboratory Analytical Results
(EPA Method 8081A)
Soil Samples
Date Sampled: April 18, 2001
Clayton Project No.: 85-01221.00

EPA Method 8081A Organochlorine Pesticides	SS-1 (mg/kg)	SS-2 (mg/kg)	SS-3 (mg/kg)	SS-4 (mg/kg)	SS-5 (mg/kg)	SS-6 (mg/kg)	SS-7 (mg/kg)	SS-8 (mg/kg)	SS-9 (mg/kg)	SS-10 (mg/kg)	SS-11 (mg/kg)	Method Blank (mg/kg)	PRG/(SAL) (mg/kg)
alpha-BHC	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	NS
gamma-BHC (Lindane)	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	NS
beta-BHC	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	NS
Heptachlor	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	0.55
delta-BHC	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	NS
Aldrin	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	0.15
Heptachlor Epoxide	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	0.27
Endosulfan I	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	NS
4,4-DDE	99	96	<6	<0.3	0.052	0.82	9.8	2.1	4	8	4.8	ND	(1.3)
Dieldrin	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	0.15
Endrin	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	260
4,4-DDD	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	(1.8)
Endosulfan II	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	NS
4,4-DDT	940	900	88	2	0.076	3.3	10	4.3	56	70	41	ND	(0.82)
Endrin Aldehyde	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	NS
Endosulfan Sulfate	<75	<75	<6	<0.3	<0.006	<0.3	<0.6	<0.75	<3	<6	<3	ND	NS
Methoxychlor	<175	<175	<14	<0.7	<0.014	<0.7	<1.4	<1.75	<7	<14	<7	ND	4400
Toxaphene	<2500	<2500	<200	<10	<0.2	<10	<20	<25	<100	<200	<100	ND	2.20
Chlordane	<2500	<2500	<200	<10	<0.2	<10	<20	<25	<100	<200	<100	ND	(0.38)

Note: Shaded values equal or exceed the PRG/SAL.

mg/kg: Milligrams per kilogram (~parts per million)
ND: Not Detected at the Method Reporting Limit (MRL)
NS: No Standard
PRG: Preliminary Remediation Goal, EPA
SAL: Soil Action Level, HDOH

Clayton Group Services

Table 3
Laboratory Analytical Results
(EPA Method 8270C)
Soil Samples
Date Sampled: April 18, 2001
Clayton Project No.: 85-01221.00

EPA Method 8270C (Phenols)	SS-1 (mg/Kg)	SS-2 (mg/Kg)	SS-3 (mg/Kg)	SS-4 (mg/kg)	SS-5 (mg/kg)	SS-6 (mg/kg)	SS-7 (mg/kg)	SS-8 (mg/kg)	SS-9 (mg/kg)	SS-10 (mg/kg)	SS-11 (mg/kg)	Method Blank (mg/kg)	PRG (mg/kg)
Phenol	<15	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	100,000
2-Chlorophenol	<15	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	240
2-Methylphenol	<15	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	44,000
3-and 4-Methlphenol Coelution	<15	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	NS
2-Nitrophenol	<15	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	NS
2,4-Dimethylphenol	<15	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	18,000
2,4-Dichlorophenol	<15	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	2,600
4-Chloro-3-methylphenol	<15	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	NS
2,4,6-Trichlorophenol	<15	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	220
2,4,5-Trichlorophenol	<15	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	88,000
2,4-Dinitrophenol	<15	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	1,800
4-Nitrophenol	<15	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	7,000
2-Methyl-4,6-dinitrophenol	<15	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	NS
Pentachlorophenol	40	<30	<30	<30	ND<0.3	<0.6	<15	<30	<0.6	<15	<6	ND	11

mg/kg: Milligrams per kilogram (~parts per million)
ND: Not Detected at the Method Reporting Limit
NS: Not Standard
PRG: Preliminary Remediation Goal, EPA

Clayton Group Services

Table 4
Laboratory Analytical Results
(EPA Methods 6010 and 7060)
Soil Samples
Sampled: April 18, 2001
Clayton Project No.: 85-01221.00

EPA Methods 7060A and 6010B	SS-1 (mg/kg)	SS-2 (mg/kg)	SS-3 (mg/kg)	SS-4 (mg/kg)	SS-5 (mg/kg)	SS-6 (mg/kg)	SS-7 (mg/kg)	SS-8 (mg/kg)	SS-9 (mg/kg)	SS-10 (mg/kg)	SS-11 (mg/kg)	Method Blank (mg/kg)	PRG/(SAL) (mg/kg)
Arsenic, Total (7060A)	9	38	10	ND<5	ND<5	ND<5	6	ND<5	ND<5	7	150	ND	(22)
Chromium, Total (6010B)	110	49	140	36	54	37	29	18	43	36	39	ND	450
Copper, Total (6010B)	44	140	39	38	9	34	30	18	19	25	16	ND	NS

Note: Shaded values equal or exceed SAL.

ug/kg: Micrograms per kilogram (~parts per billion)
mg/kg: Milligrams per kilogram (~parts per million)
ND: Non-detectable
NA: Not Applicable
PRG: Preliminary Remediation Goals

Clayton Group Services

Table 6
Laboratory Analytical Results
(EPA Method 8141)
Soil Samples
Date Sampled: April 18, 2001
Clayton Project No.: 85-01221.00

EPA Method 8141 Organophosphorus Pesticides	MRL (ug/kg)	SS-1 (ug/kg)	SS-2 (ug/kg)	SS-3 (ug/kg)	SS-4 (ug/kg)	SS-5 (ug/kg)	SS-6 (ug/kg)	SS-7 (ug/kg)	SS-8 (ug/kg)	SS-9 (ug/kg)	SS-10 (ug/kg)	SS-11 (ug/kg)	Method Blank (ug/kg)	PRG (ug/kg)
Abate	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Bolstar	40	ND	ND<400*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Chlorpyrifos	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,600,000
Coumaphos	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Demeton	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	35,000
Diazinon	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	790,000
Dichlorvos	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8,500
Dimethoate	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	180,000
Disulfoton	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	35,000
EPN	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Ethoprop	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Fensulfothion	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Fenthion	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Guthion	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Malathion	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18,000,000
Merphos	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	26,000
Methyl parathion	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Mevinphos	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Monocrotophos	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Naled	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,800,000
Parathion	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,300,000
Phorate	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	180,000
Prothiofos	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Ronnel	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	44,000,000
Stirophos	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Sulfotep	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
TEPP	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Trichloronate	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS

*MRL raised due to matrix interference.

ug/kg: Micrograms per kilogram (~parts per billion)
ND: Not Detected at the Method Reporting Limit (MRL).
NS: No Standard
PRG: Preliminary Remediation Goal, EPA

Clayton GROUP SERVICES

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Table 6
Laboratory Analytical Results
(EPA Method 8151A)
Soil Samples
Date Sampled: April 18, 2001
Clayton Project No.: 85-01221.00

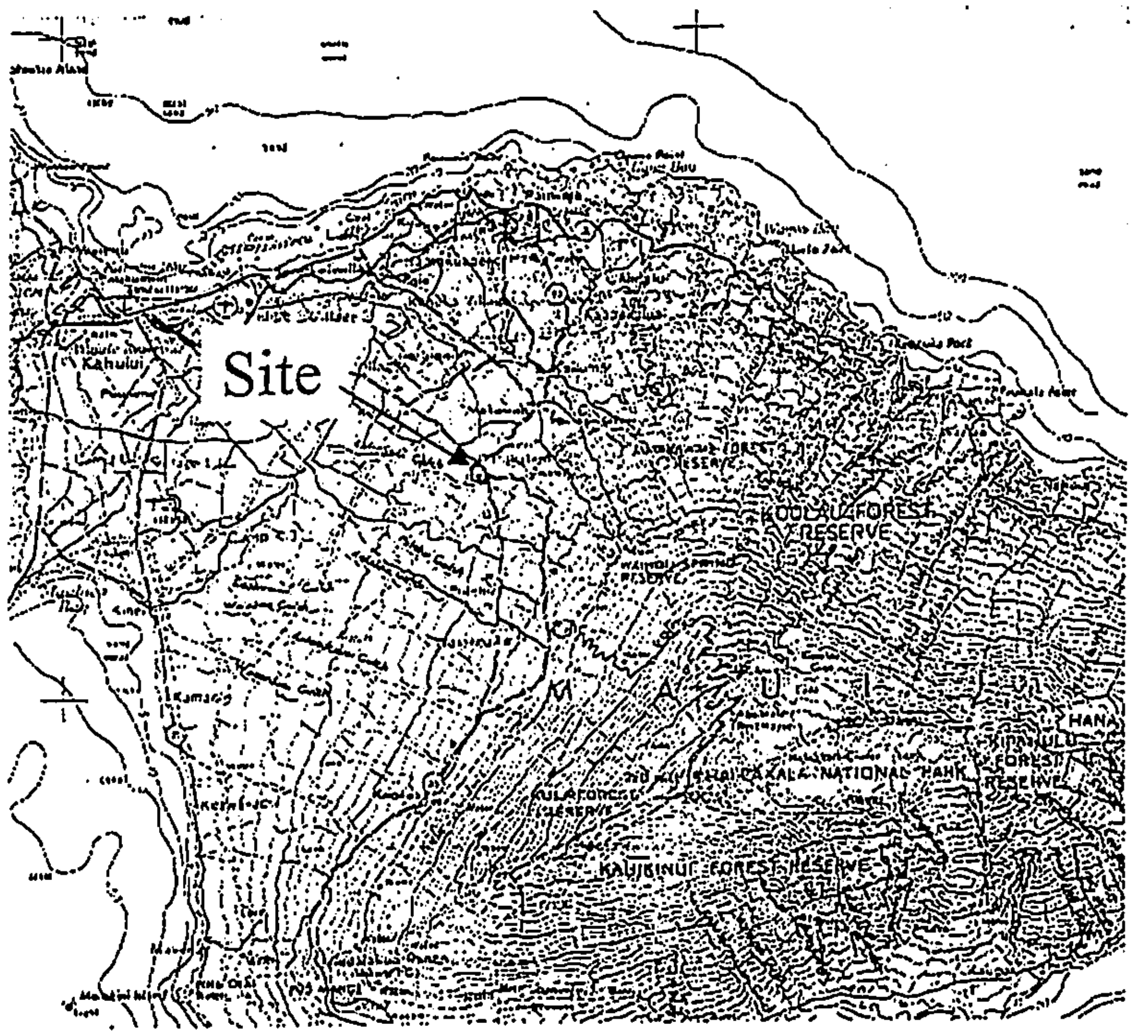
EPA Method 8151A Chlorinated Herbicides	MRL (ug/kg)	SS-1 (ug/kg)	SS-2 (ug/kg)	SS-3 (ug/kg)	SS-4 (ug/kg)	SS-5 (ug/kg)	SS-6 (ug/kg)	SS-7 (ug/kg)	SS-8 (ug/kg)	SS-9 (ug/kg)	SS-10 (ug/kg)	SS-11 (ug/kg)	Method Blank (ug/kg)	PRG (ug/kg)
2,4-D	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12,000,000
2,4-DB	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,000,000
Dicamba	30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	26,000,000
Dichlorprop	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Dinoseb	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	880,000
MCPA	5000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	440,000
MCPP	5000	ND<10000*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Pentachlorophenol	20	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11,000
Silvex	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
2,4,5-T	30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8,800,000

*MRL raised due to matrix interference.

ug/kg: Micrograms per kilogram (~parts per billion
NS: No Standard
ND: Not Detected at the Method Reporting Limit (MRL).
PRG: Preliminary Remediation Goal, EPA

Clayton Group Services

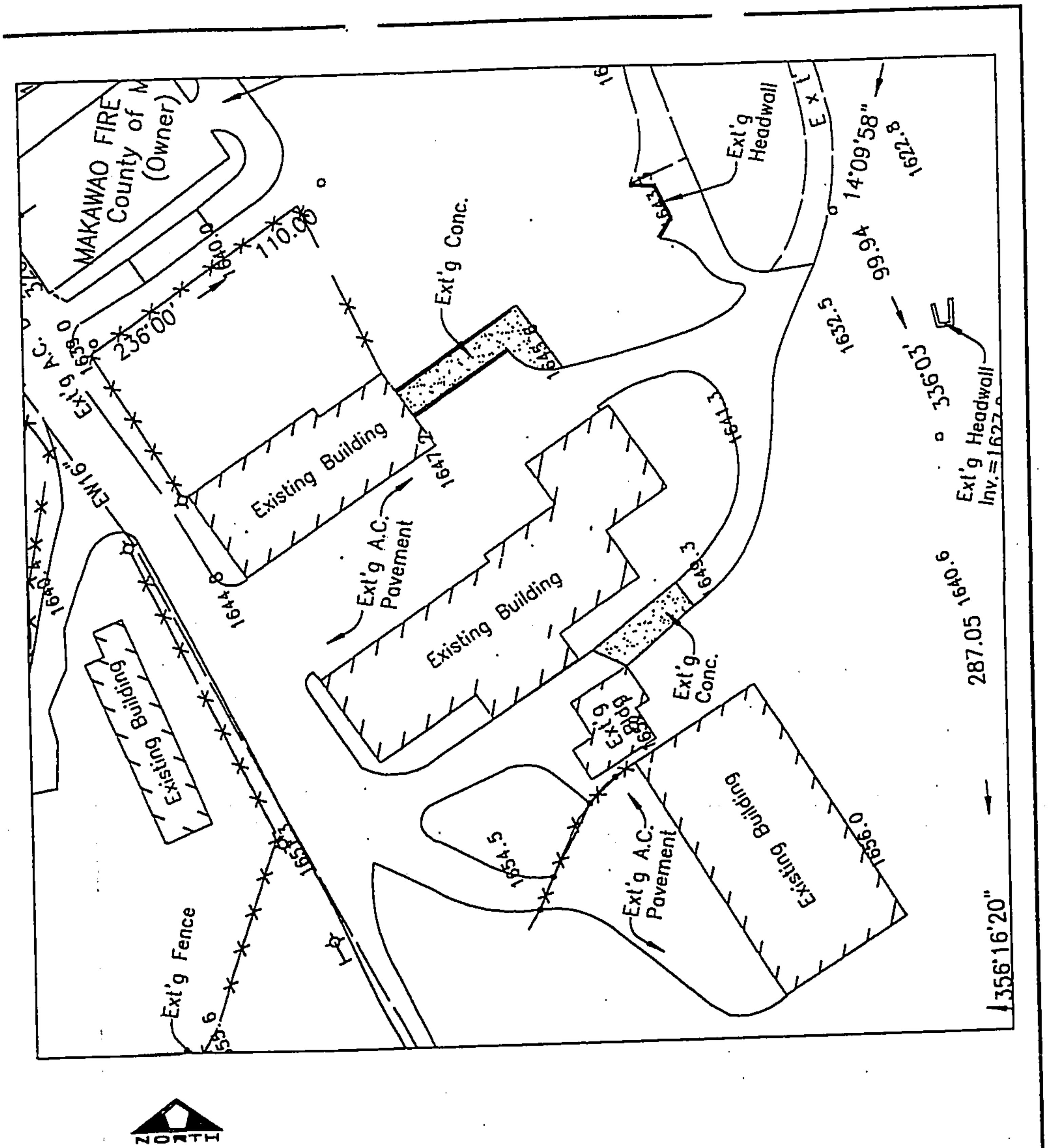
FIGURES



Compiled from US Quadrangles 1:24,000 and 1:62,500
United States Department of the Interior
Geological Survey
Hawaiian Islands, NF 4–16 Maui, Hawaii 1974

NORTH

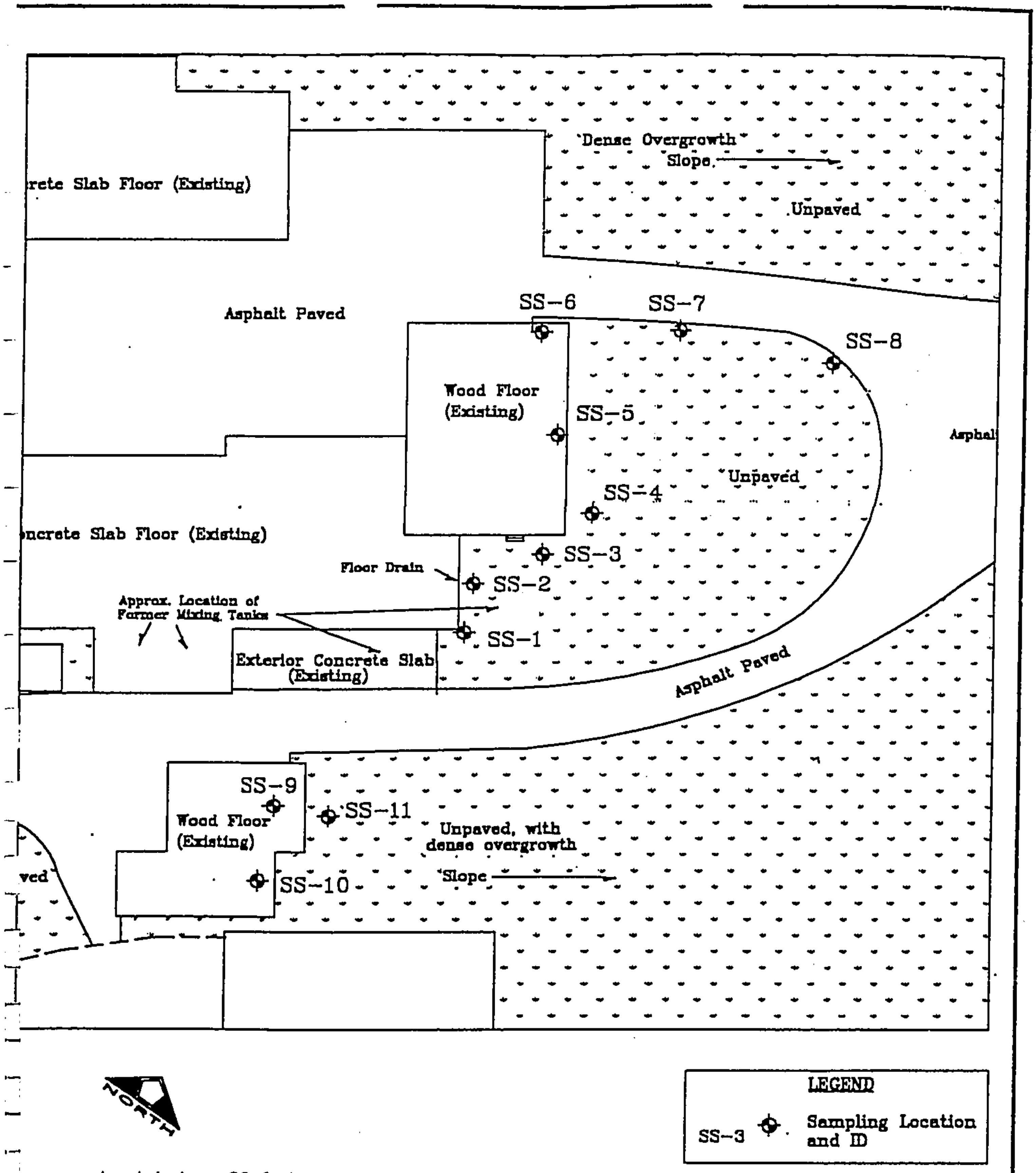
Clayton GROUP SERVICES	Project No.: 85–01221.00	Title: SITE LOCATION MAP	FIGURE 1
	Date: 5/29/01	Location: Former Corn Mill Camp Pukalani, Maui, Hawaii	
	Revised By: SS		
	Checked By: DPF	Client: Carlsmith Ball, LLP	



No Scale

Source: Group 70

Clayton GROUP SERVICES	Project No.: 85-01221.00	Title: SITE PLAN VIEW MAP	FIGURE 2
	Date: 05/10/01	Location: Former Maui Pine Cornmill Camp Pukalani, Maui, Hawaii	
	Revised By: RLF		
	Checked By: DPF	Client: Carlsmith Ball LLP	

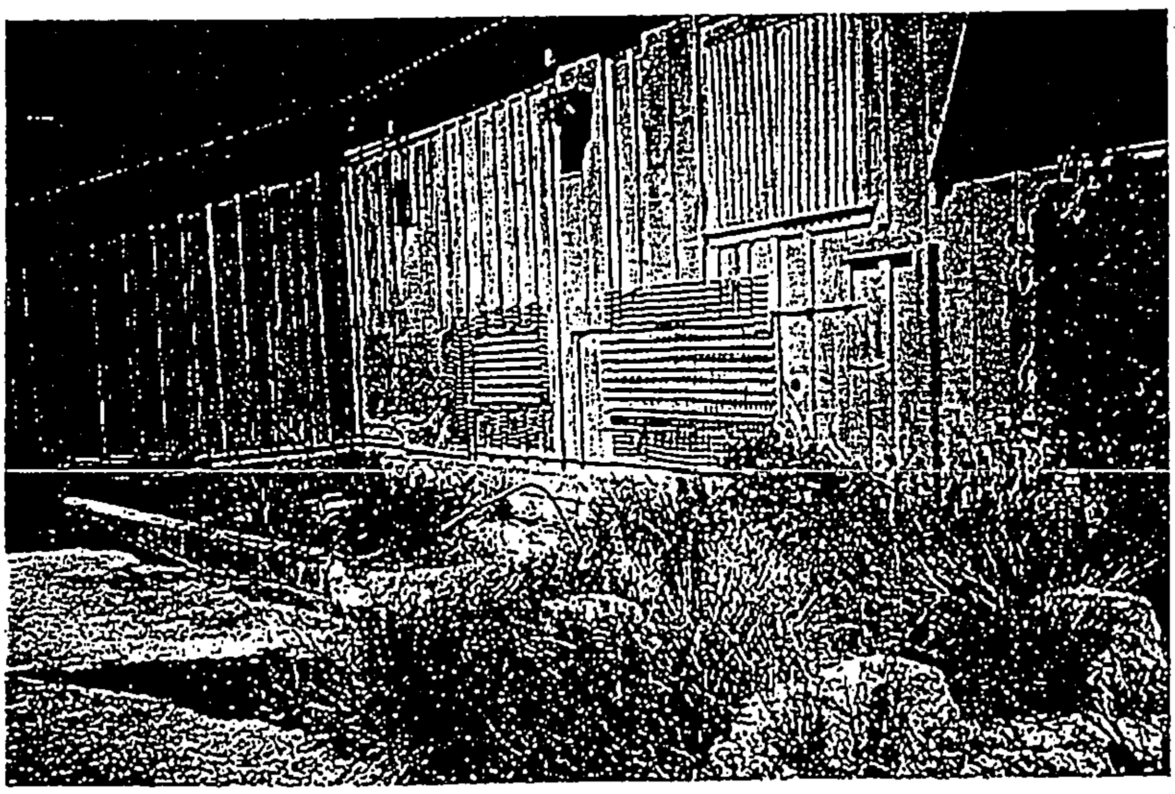


rox. scale: 1 inch = 20 feet.

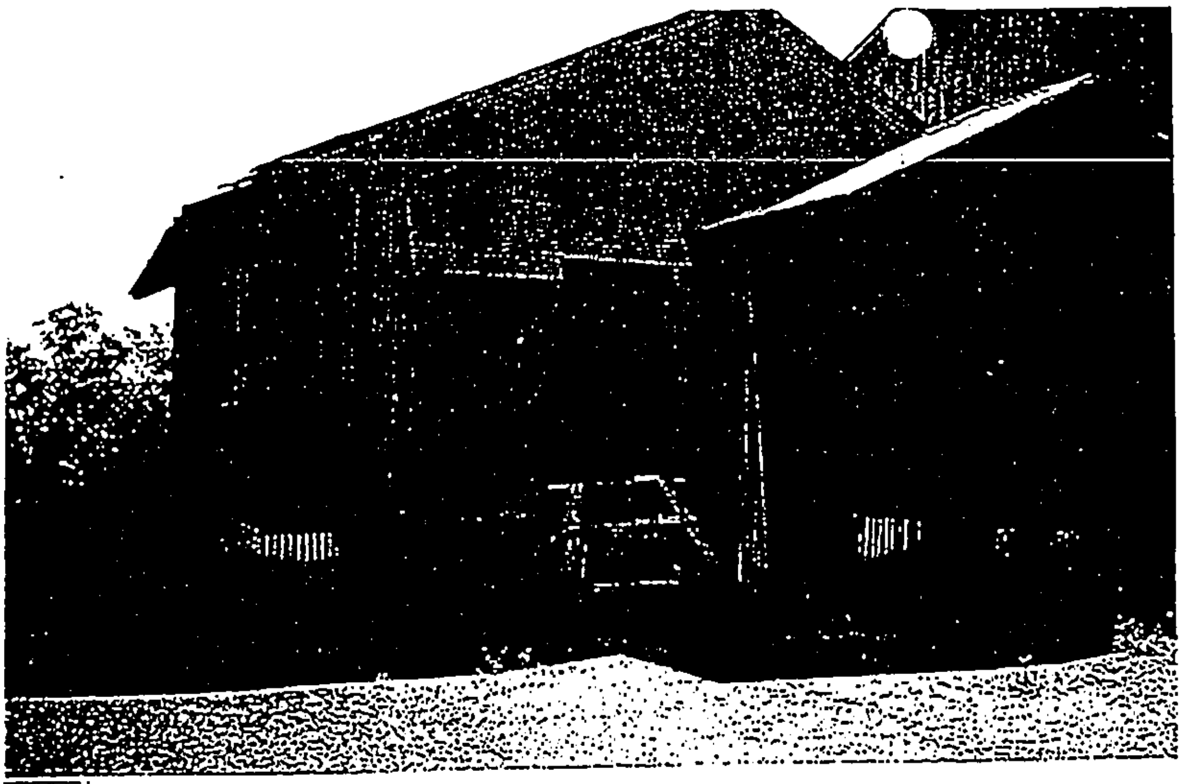
Clayton GROUP SERVICES	Project No.: 85-01221.00	Title: SOIL SAMPLING LOCATIONS MAP	FIGURE 3
	Date: 05/10/01	Location: Former Maui Pine Cornmill Camp Pukalani, Maui, Hawaii	
	Drawn By: RLF		
	Checked By: DPF	Client: Carlsmith Ball LLP	

PHOTOGRAPHS

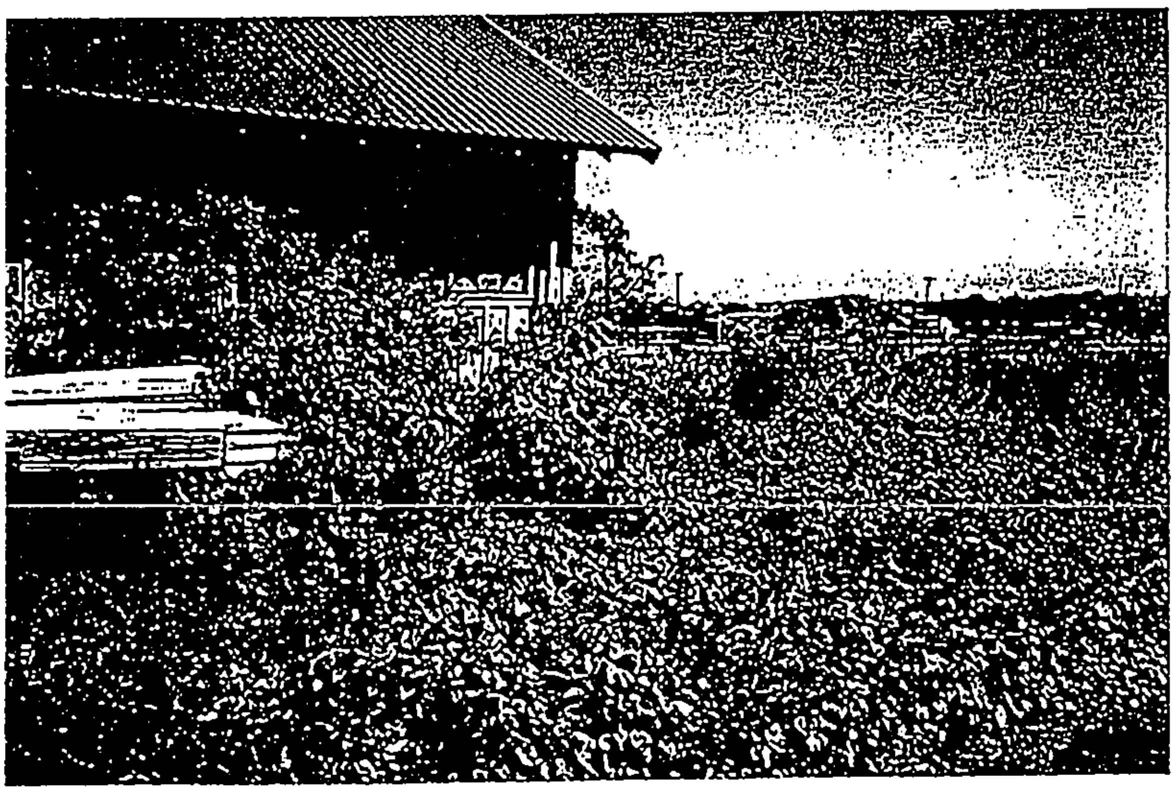
Clayton Project No.	Description	View, looking north, of the central warehouse on the subject property.	Photo 1
	Site Name	Pukalani Triangle, Pukalani, Maui, Hawaii	Photo Date
85-01221.00	Client	Carlsmith Ball LLP	4/18/01



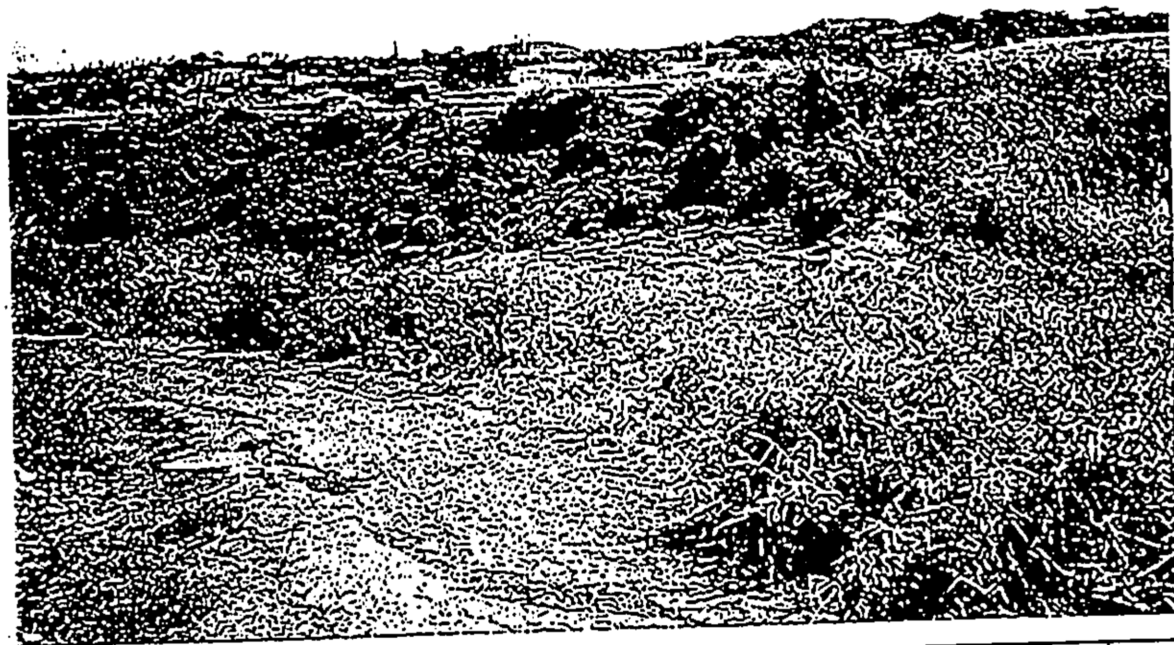
Clayton Project No.	Description	Location of the former ASTs shown.	Photo 2
	Site Name	Pukalani Triangle, Pukalani, Maui, Hawaii	Photo Date
85-01221.00	Client	Carlsmith Ball LLP	4/18/01



Clayton Project No.	Description	Two former pesticide storage areas shown between the warehouses.	Photo 3
	Site Name	Pukalani Triangle, Pukalani, Maui, Hawaii	Photo Date
35-01221.00	Client	Carlsmith Ball LLP	4/18/01



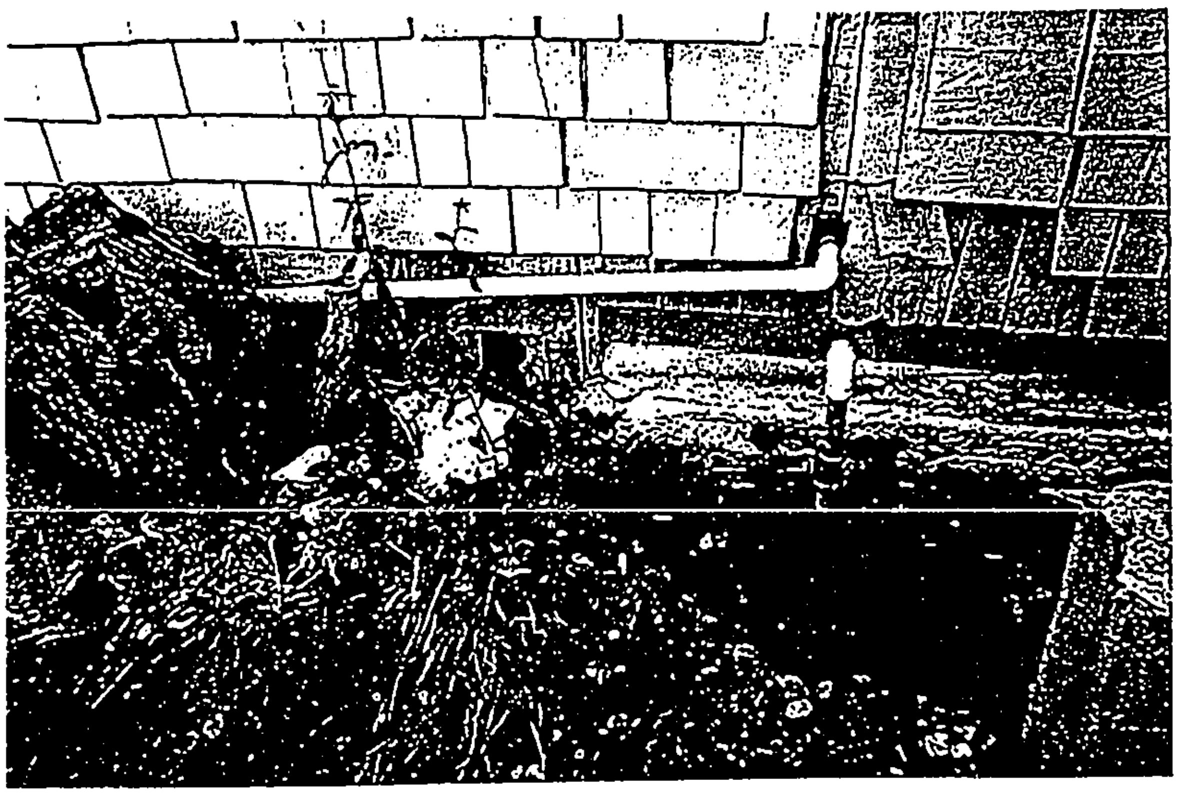
Clayton Project No.	Description	View, looking north, of the unpaved area at the end of the payroll office.	Photo 4
	Site Name	Pukalani Triangle, Pukalani, Maui, Hawaii	Photo Date
35-01133.00	Client	Carlsmith Ball LLP	4/18/01



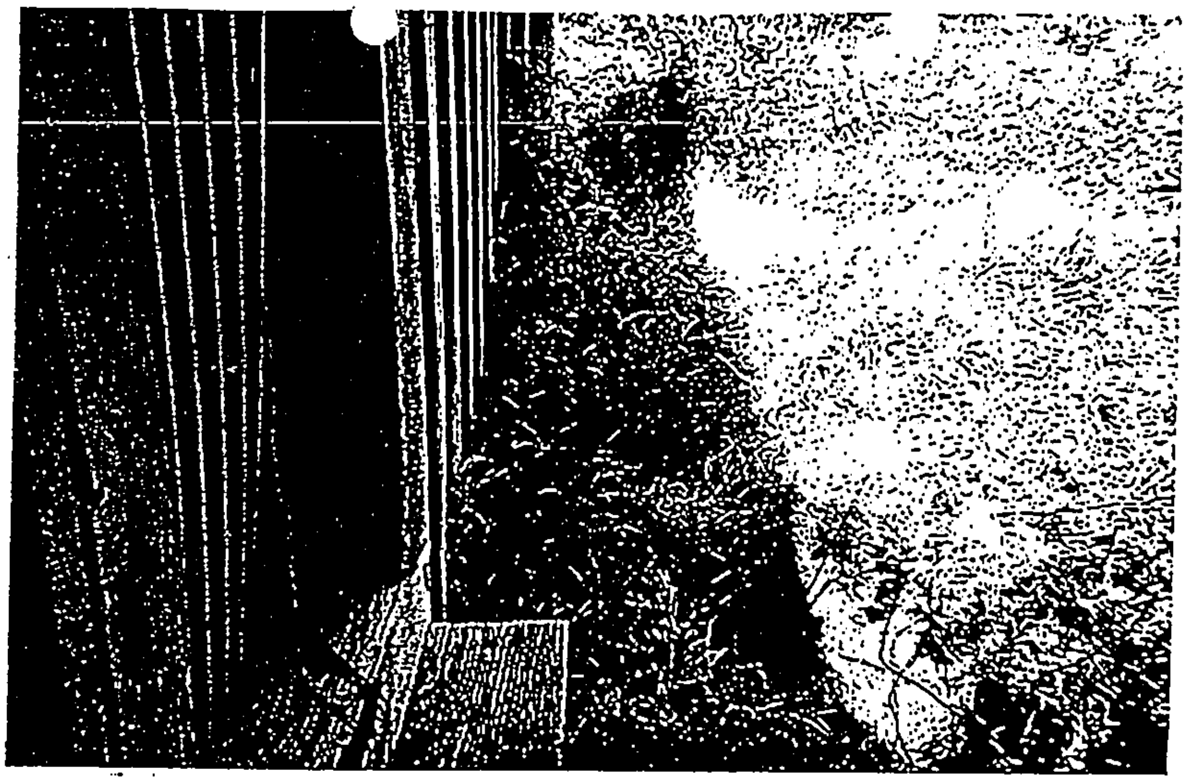
Clayton Project No.	Description	View looking northeast from the same vantage point of Photo 4.	Photo 5
	Site Name	Pukalani Triangle, Pukalani, Maui, Hawaii	Photo Date
85-01221.00	Client	Carlsmith Ball LLP	4/18/01

Clayton Project No.	Description	View looking north -northeast from the same vantage point of Photo 4.	Photo 6
	Site Name	Pukalani Triangle, Pukalani, Maui, Hawaii	Photo Date
85-01221.00	Client	Carlsmith Ball LLP	4/18/01

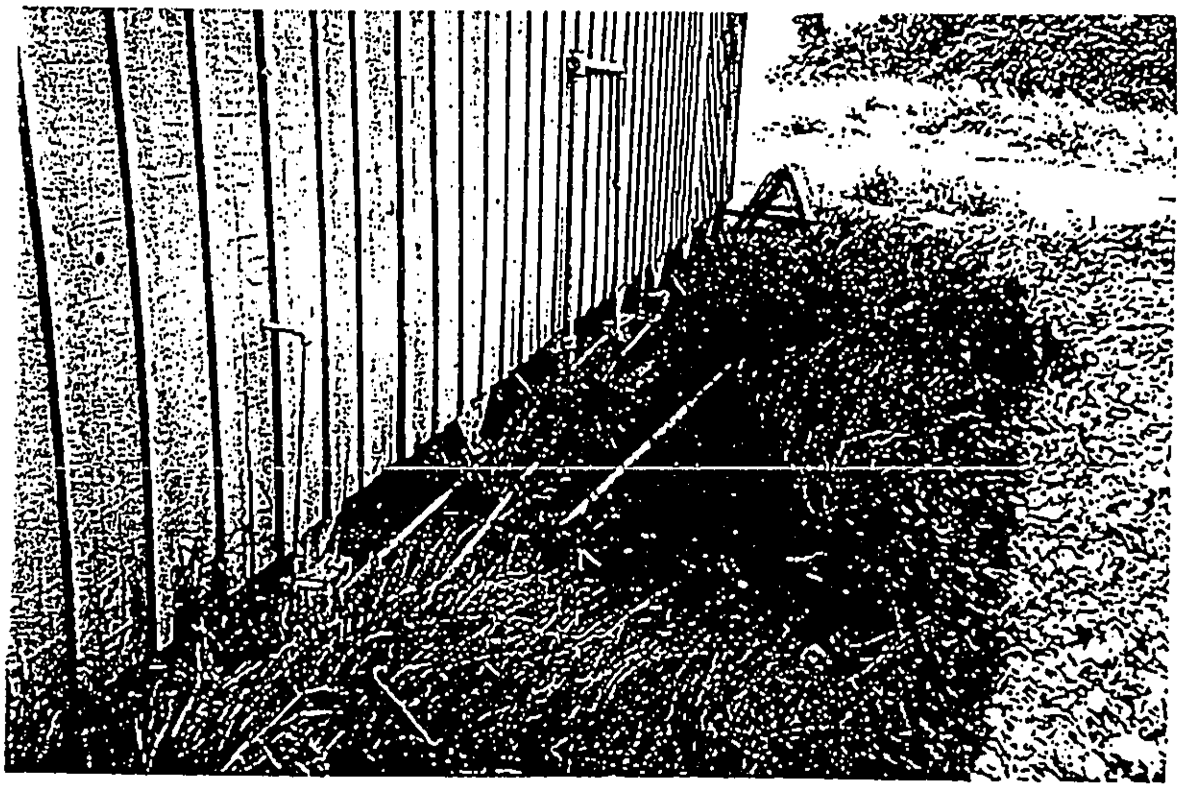
Clayton Project No.	Description	Location of sample SS-1 shown at the corner of the warehouse building.	Photo 7
	Site Name	Pukalani Triangle, Pukalani, Maui, Hawaii	Photo Date
85-01221.00	Client	Carlsmith Ball LLP	4/18/01



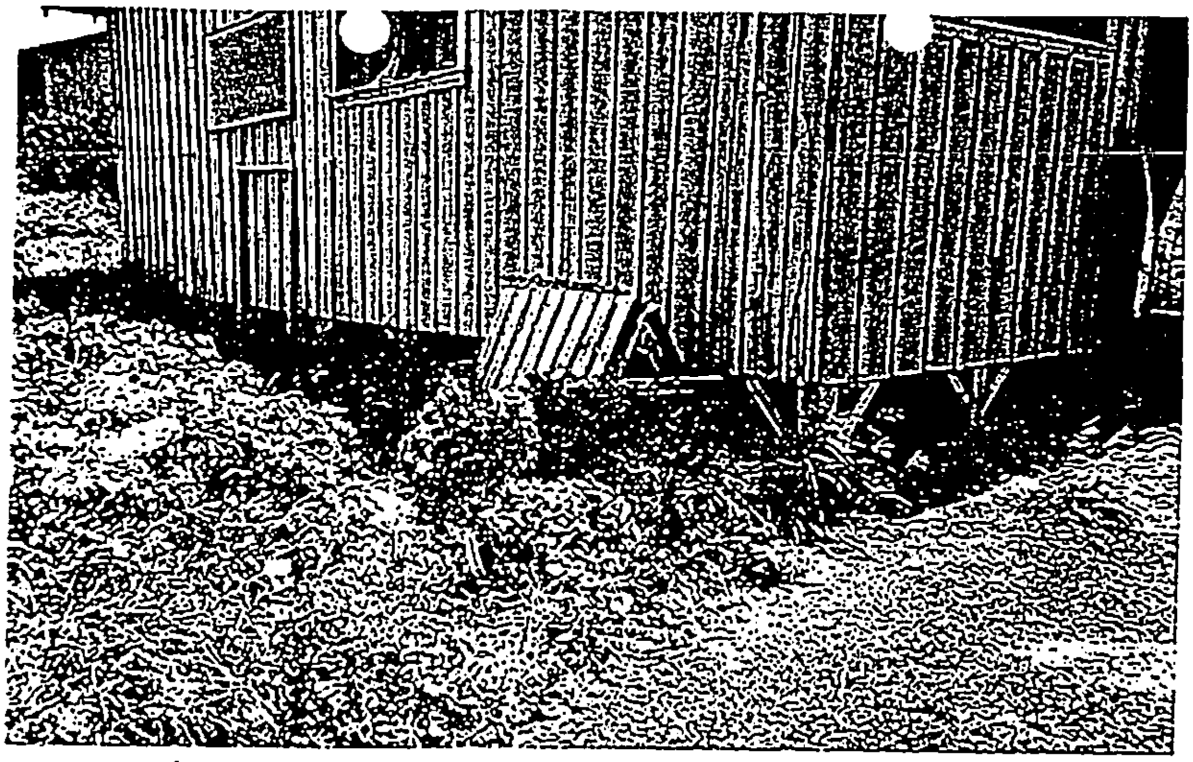
Clayton Project No.	Description	Location of sample SS-2 shown at the floor drain outlet.	Photo 8
	Site Name	Pukalani Triangle, Pukalani, Maui, Hawaii	Photo Date
35-01221.00	Client	Carlsmith Ball LLP	4/18/01



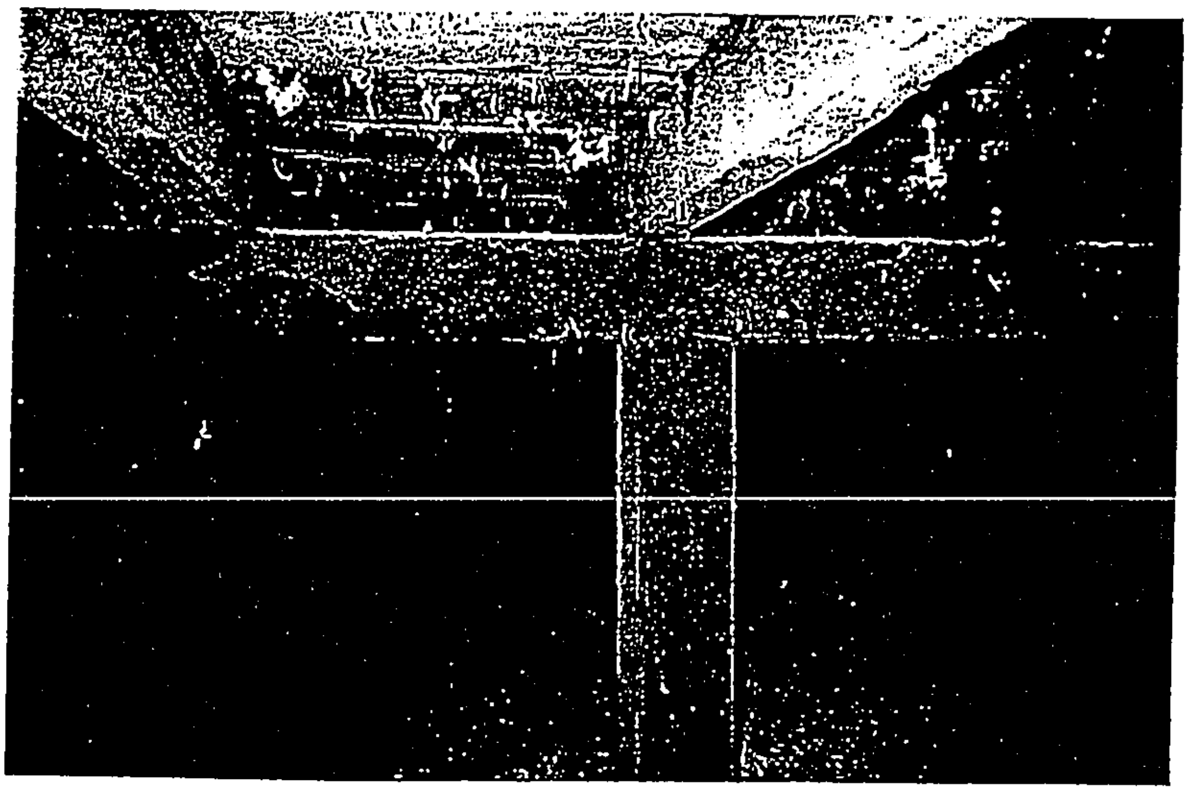
Clayton Project No.	Description	Location of sample SS-3 shown just outside the former shower room.	Photo 9
	Site Name	Pukalani Triangle, Pukalani, Maui, Hawaii	Photo Date
85-01221.00	Client	Carlsmith Ball LLP	4/18/01



Clayton Project No.	Description	Northeast side of the central warehouse shown (SS-4 in forground).	Photo 10
	Site Name	Pukalani Triangle, Pukalani, Maui, Hawaii	Photo Date
85-01221.00	Client	Carlsmith Ball LLP	4/18/01



Clayton Project No.	Description	Location of samples SS-4 thru 7 shown at the end of warehouse building.	Photo 11
	Site Name	Pukalani Triangle, Pukalani, Maui, Hawaii	Photo Date
85-01221.00	Client	Carlsmith Ball LLP	4/18/01



Clayton Project No.	Description	Approximate location of samples SS-9 and SS-10 shown, left of frame.	Photo 12
	Site Name	Pukalani Triangle, Pukalani, Maui, Hawaii	Photo Date
5-01221.00	Client	Carlsmith Ball LLP	4/5/01

Clayton Project No.	Description	Location of sample SS-11 shown.	Photo 13
	Site Name	Pukalani Triangle, Pukalani, Maui, Hawaii	Photo Date
85-01221.00	Client	Carlsmith Ball LLP	4/18/01

APPENDIX

LABORATORY ANALYTICAL REPORT
AND
CHAIN-OF-CUSTODY FORM

Appendix of this document is available upon request to Group 70 International, Inc.

Screening Risk Evaluation, Worker Inhalation
DRAFT

Former Corn Mill Camp
Pukalani, Maui, Hawaii

Clayton Project No. 85-01221.00
July 6, 2001

Prepared for:
CARLSMITH BALL, LLP
Honolulu, Hawaii

Prepared by:

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1.0 BACKGROUND

Soil sampling was conducted at the site (Figure 1) to characterize potential chemicals releases to soil associated with pesticide/herbicide mixing and storage. Eleven surface soil samples (from 2 to 6 inches in depth) were collected and analyzed by the following broad suite analyses:

- EPA Method 8260B
- EPA Method 8270C
- EPA Method 8180A
- EPA Method 8141
- EPA Method 8151.

Additionally, arsenic, copper and chromium were analyzed by EPA Methods 6010 and 7060.

2.0 OBJECTIVE / METHODOLOGY FOR SCREENING RISK EVALUATION

A screening risk evaluation (SRE) was conducted to identify the potential for risks to onsite workers via inhalation of particulates. The SRE was conducted in accordance with USEPA (1989, 1996) risk assessment guidance. The specific steps of the SRE were:

1) Data review/selection of chemicals of potential concern;
2) Toxicity assessment;
3) Exposure assessment;
4) Risk characterization; and
5) Conclusions regarding worker safety.

The SRE steps are detailed in the remainder of this technical memorandum.

3.0 DATA REVIEW/SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Samples SS-1 and SS-2 exhibited significantly elevated reporting limits for EPA Method 8081A. Accordingly, the maximum reporting limit was employed as the basis for the exposure point concentration (EPC) for these analytes. The EPA Method 8260B method detection limit for 1,2,3, trichloropropane (5 ug/kg) exceeds the risk benchmark of 3 ug/kg (USEPA, 2000). Accordingly, the reporting limit (5 ug/kg) was employed as the basis for the EPC for this analyte. Soil data, when conservatively applied as discussed, were deemed of adequate quality for application in the SRE.

Chemicals of potential concern (COPCs) were identified as all chemicals positively detected and those chemicals that were reported as nondetect with a significantly elevated reporting limit. For chemicals positively detected, the maximum reported concentration was used in the SRE as the basis for the exposure point concentration (EPC). For chemicals having a significantly elevated reported limit or a reporting limit that exceeds a risk benchmark level, the full value of the reporting limit was used as the basis for the EPC.

4.0 TOXICITY ASSESSMENT

Cancer slope factors (USEPA, 2000) and noncancer reference doses (USEPA, 2000) are summarized in Table 1A.

5.0 EXPOSURE ASSESSMENT

The relevant exposure scenario is long-term exposure of workers to airborne particulates originating from surface soil. Workers at the site do not directly contact the soil. Accordingly, soil ingestion (e.g., from hand-to-mouth activities) and dermal contact with soil were not identified as complete exposure pathways. Exposure parameter values used were taken from current USEPA guidance (USEPA, 1997), included here as Table 1B.

EPCs in air were conservatively estimated using the USEPA particulate emission factor (PEF) (USEPA, 1996), which is based on a soil concentration input term and USEPA air dispersion data (USEPA, 1996). The default PEF is 1.32 E +9 m^3/kg (USEPA, 1996). As previously discussed, the air EPC was based on the maximum reported soil concentration. In cases where the reporting limit significantly exceeded a risk benchmark level, the reporting limit was used as the basis for the EPC.

6.0 RISK CHARACTERIZATION

The screening cancer risk estimate is 6 x 10-7 (Table 2). This value is below the USEPA acceptable cancer risk range of 10-6 to 10-4 (USEPA, 1991). The screening cancer risk estimate is likely to be overestimated due to the conservative methods applied in the SRE.

The screening hazard index estimate is 0.003. This value is below the USEPA acceptable hazard index of 1 (USEPA, 1991). The screening hazard index estimate is likely to be overestimated due to the conservative methods applied in the SRE.

7.0 CONCLUSIONS REGARDING WORKER SAFETY

As discussed above, the screening cancer risk and screening hazard index are acceptable based on USEPA risk management criteria (USEPA, 1991). Accordingly, in accordance with USEPA criteria, there are no significant health risks or health hazards associated with onsite worker exposure to surface soils via inhalation of particulates on site.

This report prepared by:

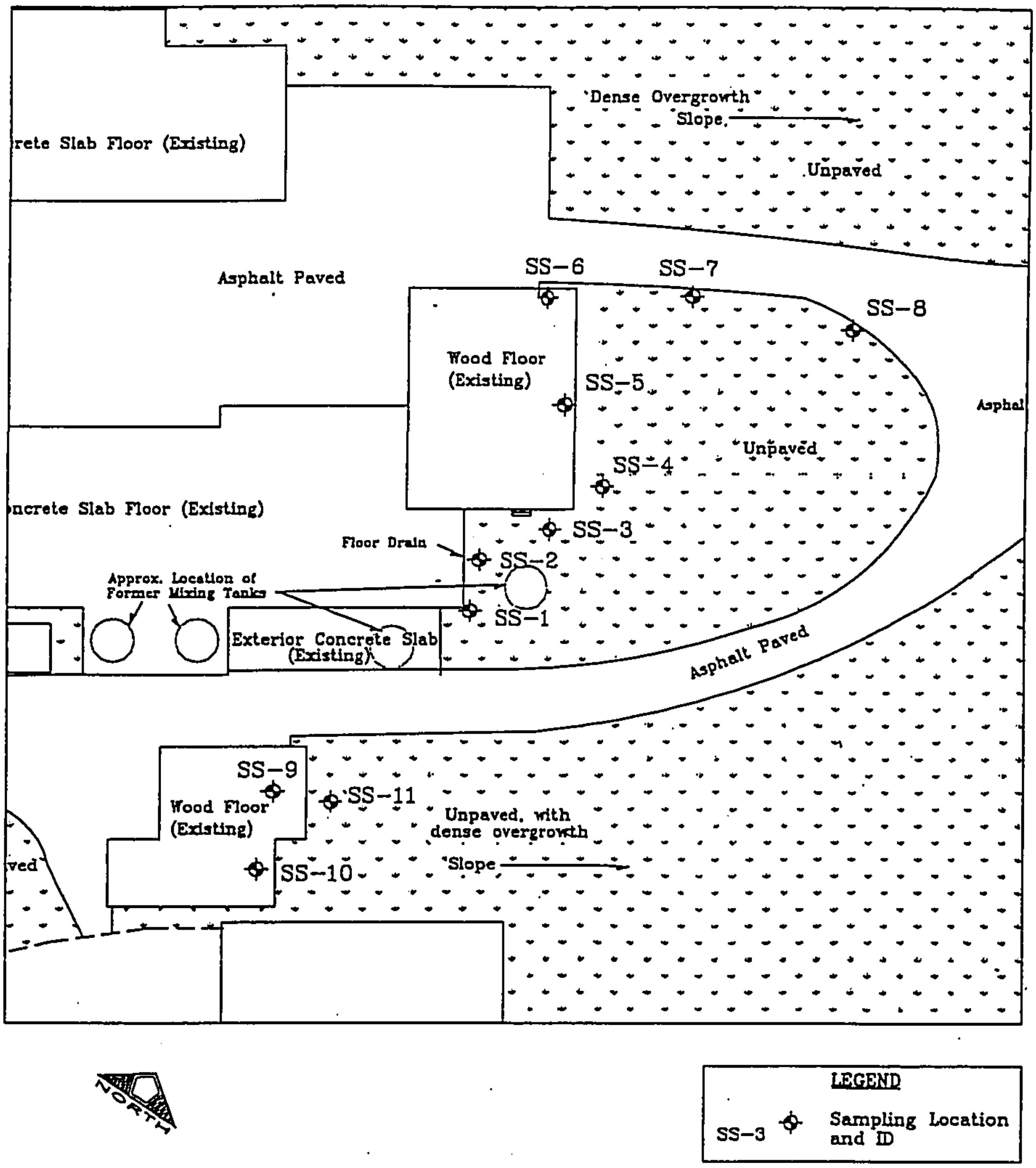
Teri L. Copeland, D.A.B.T.
Consulting Toxicologist

This report reviewed by:

Daniel P. Ford, R.G.
Director
Honolulu Regional Office

8.0 REFERENCES

- United States Environmental Protection Agency (USEPA), 1989. Risk Assessment Guidance for Superfund, Vol. I, Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response, December.
- USEPA, 1991. Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions. Memorandum from D.R. Clay, Assistant Administrator, USEPA. OSWER Directive 9355.0-30, April
- USEPA, 1996. Soil Screening Guidance: Technical Background Document. Office of Solid Waste and Emergency Response, May.
- USEPA, 1997. Exposure Factors Handbook, Update to Exposure Factors Handbook, May, 1989. Office of Research and Development, August.
- USEPA, 2000. Region 9 Preliminary Remediation Goals (PRGs).



Approx. scale: 1 inch = 20 feet.

Clayton GROUP SERVICES	Project No: 85-01221.00	Title: SITE MAP		FIGURE 2
	Date: 05/10/01	Location: Former Maui Pine Cornmill Camp Pukalani, Maui, Hawaii		
	Drawn By: RLF			
	Checked By: DPF	Client: Carlsmith Ball LLP		

TABLES

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CLIENT CONFIDENTIAL

TABLE 1A
BASIS FOR EXPOSURE POINT CONCENTRATION
AND TOXICITY CRITERIA

INHALATION OF PARTICULATES

Chemical	EPC (mg/kg)	Basis	Tox Criterion SFi	RfDi	Surrogate
Aldrin	75	*	#	#	
a BHC	75	*	#	#	
b BHC	75	*	#	#	
d BHC	75	*	#	#	
g BHC	75	*	#	#	
Chlordane	2500	*	#	#	
Dieldrin	75	*	#	#	
DDD	75	*	#	S	DDT
DDE	99	**	#	S	DDT
DDT	940	**	#	#	
Endrin	75	*	NA	#	
Endrin Ald	75	*	NA	S	Endrin
Endosulf I	75	*	NA	#	
EndosulfII	75	*	NA	S	Endosulfan
Endosulf S	75	*	NA	S	Endosulfan
Heptachlor	75	*	#	#	
HepEpox	75	*	#	S	Heptachlor
Methoxycl	175	*	NA	#	
Toxaphene	2500	*	#	none	No RfD
1,2,3 TCP	2.5	*	#	#	(oral)
PCP	40	**	#	#	
Arsenic	150	***	#	#	(oral)
Chromium	110	**	NA	#	(oral)

Notes:

* One half elevated reporting limit for Sample SS-1

** Maximum result in Sample SS-1

\# - Chemical-specific (See Tables 2 and 3)

NA - No cancer endpoint

TABLE 1A
BASIS FOR EXPOSURE POINT CONCENTRATION
AND TOXICITY CRITERIA

*** Maximum result in Sample SS-11

(oral) - route extrapolation

Table 1B

Exposure Assessment Parameters for Onsite Worker

Parameter	Reasonable Maximum Exposure (RME)	
Body Weight (BW)	Value:	70 kg
	Rationale:	Average body weight, USEPA, 1997
Exposure Frequency (EF)	Value:	0.684 (250/365 days/year)
	Rationale:	USEPA, 1997
Exposure Duration (ED)	Value:	25 years
	Rationale:	95th percentile value, USEPA, 1997
Averaging Time (AT)	Value:	
	Cancer:	70 years (25,550 days)
	Noncancer:	AT = Exposure duration = 25 years (9,125 days)
	Rationale:	USEPA, 1997
Particulate Emission Factor (PEF)	Value:	1.32×10^{9} m^{3}/kg
	Rationale:	Default RME value, USEPA, 1996
Inhalation Rate (IR)	Value:	20 m^{3}/day
	Rationale:	USEPA, 1997
Absorption (ABS)	Value:	1 (assumes 100% of particulates inhaled are absorbed systemically)
	Rationale:	Default (maximumabsorption)

DRAFT

TABLE 2
SCREEN CANCER RISK

INHALATION OF PARTICULATES

Chemical	Cs (mg/kg)	PEF (m^3/kg)	IR (m^3/d)	EF (u)	ED (yrs)	ABS (u)	BW (kg)	AT (yrs)	LADD (mg/kg-d)	SFi $(mg/kg\text{-}d)^{-1}$	Cancer Risl (u)	% Total
Aldrin	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	17	6.7E-08	11.6%
a BHC	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	6.3	2.5E-08	4.3%
b BHC	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	1.8	7.1E-09	1.2%
d BHC	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	6.3	2.5E-08	4.3%
g BHC	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	1.3	5.2E-09	0.9%
Chlordane	2500	1.32E+09	20	0.684	25	1	70	70	1.32E-07	0.35	4.6E-08	8.0%
Dieldrin	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	16	6.3E-08	11.0%
DDD	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	0.24	9.5E-10	0.2%
DDE	99	1.32E+09	20	0.684	25	1	70	70	5.23E-09	0.34	1.8E-09	0.3%
DDT	940	1.32E+09	20	0.684	25	1	70	70	4.97E-08	0.34	1.7E-08	2.9%
Endrin	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	0	0.0E+00	0.0%
Endrin Ald	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	0	0.0E+00	0.0%
Endosulf I	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	0	0.0E+00	0.0%
EndosulfII	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	0	0.0E+00	0.0%
Endosulf S	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	0	0.0E+00	0.0%
Heptachlo	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	4.6	1.8E-08	3.2%
HepEpox	75	1.32E+09	20	0.684	25	1	70	70	3.97E-09	9.1	3.6E-08	6.2%
Methoxyc	175	1.32E+09	20	0.684	25	1	70	70	9.25E-09	0	0.0E+00	0.0%
Toxaphene	2500	1.32E+09	20	0.684	25	1	70	70	1.32E-07	1.1	1.5E-07	25.1%
1,2,3 TCP	2.5	1.32E+09	20	0.684	25	1	70	70	1.32E-10	7.0	9.3E-10	0.2%
PCP	40	1.32E+09	20	0.684	25	1	70	70	2.12E-09	0.12	2.5E-10	0.0%
Arsenic	150	1.32E+09	20	0.684	25	1	70	70	7.93E-09	15	1.2E-07	20.6%
Chromium	110	1.32E+09	20	0.684	25	1	70	70	5.82E-09	0	0.0E+00	0.0%
									Total Risk		5.8E-07	

Appendix M

Corn Mill Camp Warehouse Buildings – Structural Engineering Review (Walter Vorfeld & Associates, February 2003)

CORN MILL CAMP WAREHOUSE BUILDINGS
STRUCTURAL ENGINEERING REVIEW

The purpose of this report is to present facts observed and opinions formed regarding the structural condition of the four buildings and wooden water tank at the remnant of the old Maui Land & Pine base yard known as Corn Mill Camp, in order to aid its owners in deciding whether any of the buildings can feasibly be renovated for future use.

The building structures were examined on two occasions, during which the exterior walls and roof surfaces were inspected, as well as the interior of each building, including the roof framing.

The Corn Mill Camp buildings are situated on the northeastern corner of a large triangular piece of property bounded on the north by Makawao Ave., on the northeast by Pukalani Bypass, and on the west by Old Haleakala Hwy. The mauka corner of the over-all property is at "Five Trees", just below Kekaulike High School.

Two of the four buildings are timber-framed utility/warehouse structures with slab-on-grade floors. The third is also a utility building with a steel primary frame supporting timber roof and wall framing. It also has a slab-on-grade floor. The fourth building is a small, wood-framed structure, with a wood floor supported by posts and piers. The water tank is wooden with a concrete foundation. For purposes of this report, the buildings will be labeled Buildings A, B, C and D. Building A is the structure nearest Makawao. Building C is the uppermost on the property, with Building D adjacent to and just below it. Building B is located between Buildings A and Buildings C and D. The water tank is positioned just above and to the west of Building C. An overall plan indicating approximate size of each building and their relative locations is included for reference.

Each of the five structures is reviewed separately, with discussion of general structural condition and specific conditions that might require remediation or repair, or otherwise affect their continued use. Where obvious structural inadequacy(s) relative to current building code structural requirements are believed to exist, especially those related to roof loading and/or resistance of high level wind forces, general recommendations for reinforcement are presented. The current Maui County Code has adopted the 1997 edition of the Uniform Building Code (UBC)

BUILDING A (Photos A1-A13)

General Structural Conditions: Building A measures approximately 3500 sq. ft in area and is 90 ft long by 40 ft wide at one end and 32 ft wide at the other. Its length is divided into five 12 ft wide bays at the west end and two 15 ft bays at the east. It has a slab-on-grade floor and currently provides storage area for old automobiles and auto parts. The building length is divided between the last 12 ft and the first 15 ft bay by a stud-framed, plywood-sheathed wall. The primary roof structure is metal roofing applied over older wood shingles on skip sheathing over 2x4 rafters at 36" O.C. The rafters are supported by 2x6 purlins spaced at about 5'-0" O.C., which are in turn supported by timber-framed trusses, dividing the building into its eight bays. The trusses are supported at each end by 6x6 timber posts that bear on the slab-on-grade at the front of the building and on the bottom plate of the exterior walls along the two ends and the rear. Other than nails, no anchorage hardware for any structural member, even at post-to-foundation conditions, was observed.

The exterior walls on the ends and rear of the building are single wall construction of 1x12 vertical boards, applied over a 2x6 horizontal wall girt system. On the rear or north wall, the siding has 1x2 battens applied over the joints between the 1x12 boards. Shingles cover the 1x12 boards on each end of the building. The front wall (south side) faces into a concrete driveway/parking area and is walled entirely with side-rolling doors between the posts supporting the roof trusses. Without the rolling doors, this side of the building would be fully open to the paved area, an arrangement which would allow truck parking and repair, similar to the structures at Hali'imaile. The rolling doors are sheathed with plywood. Roof eave height along the driveway is about 10 ft.

The east end of the building is adjacent to a loading dock, which backs up to a large double sliding door. The top of the loading dock is even with the floor level of the building.

Condition of the Structure: With the exception of the termite damage to roof framing members and exterior wall sheathing, the materials of Building A are in reasonably sound condition. The metal roofing appears to have been replaced recently and is in good condition. The skip sheathing shows effects of termites. Termite damage was also observed in many roof purlins and rafters; little damage was observed in the roof trusses. The 1x12 siding covering the exterior walls exhibits signs of extensive termite damage. Day light shines through holes in the boards at many locations. In addition, the posts supporting the roof trusses along the south wall have termite damage at their bases at several locations. At one post location, the damage is extensive enough to have resulted in the post settling by 4-6 inches, as evidenced by a pronounced sag in the roof eave.

Analysis indicates that several aspects of the building's structure do not comply with minimum Building Code standards for roof loading due to gravity forces, as well as horizontal and vertical forces due to high wind.

The rafters and purlins appear adequate to support the roof and framing self-weight and the code-specified design live load of 16 psf, where no significant reduction of cross section has occurred due to termite damage. Termite damage was observed in several of these members. Where termite damage has diminished the structural cross section by 5% or more, members should be replaced, as their load capacity would not be adequate. It does not appear that the main roof trusses have adequate connection of individual members to one another to support the same loading as the purlins and rafters. Significant reinforcement would be required to make them compliant with even the minimum code loads. Neither the roof purlins nor the main trusses have capacity to support any additional loading that might be required by installation of ceilings, air conditioning, insulation, etc.

Of greater concern is the building's general lack of capacity to resist forces due to high wind. Current building code and building codes as far back as 1978 require that structures on Maui be designed to resist vertical, lateral and overturning forces that might result from a minimum basic wind speed of 80 mph. Depending on the physical surroundings of a building, the basic wind speed forces must be modified based on code-specified exposure/gust factors. The openness of the area surrounding Corn Mill Camp would require that the building be designed for EXPOSURE C, as defined by the UBC.

Several similarly framed buildings failed and collapsed on Kaua'i during Hurricane Iniki in 1992. Construction methods employed at the time Building A was built involved little, if any, engineering analysis, but were instead based on economically effective use of hard-to-come-by materials and the experience of plantation carpenters.

As discussed earlier, there is little evidence of anchorage capable of resisting wind uplift forces. The posts supporting the roof trusses are not anchored to the foundations, nor are the trusses anchored to the posts or purlins and rafters anchored to the trusses.

The lack of shear walls across the building makes it very likely that, if the roof structure does not lift off in a hurricane, horizontal wind pressures will cause the walls and posts to fall over due to wracking of the building.

In order to adequately reinforce the building to resist forces due to high wind, both ends and a large portion of each side would need to be reframed with stud wall construction sheathed with plywood to provide exterior shear walls. In addition, several interior shear walls would be required across the length of the building to provide adequate resistance to wind shears transverse to the building.

Transverse walls would need to be close enough together to limit the roof diaphragm shears to relatively low values, unless all roofing material was removed, including old shingles, and structural plywood sheathing applied to the rafters to provide reinforcement. In addition, all structural framing would require anchorage to supporting members (roofing to rafters, rafters to purlins, purlins to trusses, trusses to posts, posts to foundation, etc) to provide a continuous load path to resist uplift wind forces. This amounts to approximately 500 separate connections, not counting fastening of the metal roofing.

BUIILDING B (Photos B1-B27)

General Structural Conditions: Building B measures approximately 6500 sq. ft. in area and is 132 ft long by 40 ft wide for most of its length, with a 40x40 ft addition tacked onto the northeast corner. A slab-on-grade makes up the floor of the 132 feet of length, with the floor of the addition being wood-framed and supported by post-and-pier construction. The length of the main rectangle is divided into eleven 12 ft wide bays, similar to Building A. The 40x40 addition was constructed against the north of the main rectangle and wraps around the northeast corner for a distance of 10 ft along the north side. A plywood-sheathed wall divides the first four bays on the south end from the last seven occupied by The Nature Conservancy on the north. The primary structure and roofing is identical to that of Building A, except that, along the south side of the main building, a short concrete masonry (CMU) wall occurs, separating the higher exterior grade on the mauka side from the slab-on-grade at the interior. As in Building A, no anchorage hardware for any structural member was observed, other than nails.

All exterior walls, except the north side of the main area, are single wall construction of board and batten, identical to Building A. Shingles cover the east end of the main area where the addition is attached. The north side of the main rectangle faces into the concrete driveway/parking area between buildings A and B and is similar to the opposing wall of Building A, in that each bay opens with a plywood-sheathed sliding door. The top of the door and wall section above is open, with picket framing to allow for ventilation. Eave height of the main area along the driveway is about 12-14 ft.

Condition of the Structure: The main area of Building B is identical to Building A in its structural condition. All items requiring replacement, repair, or reinforcement in Building A occur in Building B, except it is eleven bays long instead of seven, and 6500 sq. ft. instead of 3500 sq. ft. In addition, the 1400 sq. ft. addition at the east end has a timber-framed floor on post-and-pier construction that will require considerable replacement of structural components due to termite damage.

BUILDING C (Photos C1-C21)

General Structural Conditions: Building C measures approximately 8800 sq. ft. in area and is 155 ft long by 57 ft wide. The floor is a rough slab-on-grade. The length of the building is divided into seven bays, approximately 22 ft in width, by structural steel frames, which span the width of the structure.

The frames are constructed of double, cold-rolled structural steel channel members, welded together in a back-to-back configuration. Each structural steel frame consists of a roof truss supported at each side of the structure by steel columns on concrete piers. The steel columns are secured to each concrete pier by four anchor bolts. Diagonal bracing occurs at each frame line from the bottom of each truss to the base of each column at the sides of the building. Steel roof trusses also divide each 22-ft bay into three 7-ft sub bays. The secondary trusses are supported at each end by a steel spandrel beam, in turn supported by the primary frame columns. Corrugated metal roofing is supported by 2x4 purlins at about 4'-0" O.C. spanning the 7 ft between the steel trusses.

Similarly to Buildings A and B, the end and rear walls of the building are sheathed with boards and battens over horizontal 2x wood framing attached to the steel frame. The west-facing side wall has several large pivoting doors, which open outward into an asphalt-paved area. The entire west wall is sheathed with corrugated metal material and is open.

A gully occurs along the east side of the property and results in exterior grade being lower along the rear and mauka end of the building than the interior floor elevation. This also occurs along the north end as well, due to the mauka-to-makai slope. The difference between interior and exterior grade is supported by a CMU retaining wall about 3-4 ft tall. The retaining wall is highest along the makai or north end and east side (retaining about 4 ft).

Condition of the Structure: The timber roof framing and wall framing and sheathing of Building C appear to be more deteriorated due to termites and weather than that of either Buildings A or B. The metal roofing is much older and probably needs to be replaced or at least coated to seal leaks. The primary steel roof frames and trusses, however, appear to be in sound condition, with little sign of deterioration due to rust.

The capacity of Building C to resist UBC minimum wind loading is far greater than either of the two warehouse structures, owing to the fact that it is welded steel and has had diagonal bracing provided at each of the 22-ft wide bays, as well as along the front and rear sides. The remedial measures necessary to bring this structure into compliance with current UBC requirements will be much less than for Buildings A or B. These measures include reinforcement and/or replacement of roof purlins and removal and reframing of the exterior walls with wood or metal studs. If Buildings A and B are not renovated and are demolished, it may be possible to reclaim sufficient undamaged siding to re-sheath the building with the original material, provided it is treated for termites. If original siding is not used, then rough-sawn 5/8" thick T1-11 plywood panel siding with battens applied will replicate the original board and batten condition while providing considerable structural reinforcement. Metal roofing from the other two buildings might also be salvaged for use on Building C.

Although it is not possible state what reinforcement might be required to make Building C UBC-compliant relative to high wind loading, engineering experience with similar structures indicates it could be done relatively simply, by adding to the in-place, sound, primary structural steel frame.

BUILDING D (Photos D1-D7)

General Structural Conditions: Building D measures approximately 700 sq. ft. in area and is approximately 26x26 ft square. The floor is timber-framed over beams, posts and piers, and is raised about 30" above grade. The building is divided into two spaces of equal width, accessed from the west side by way of two sets of concrete stairs.

Lightly framed timber trusses and 2x single wall framing are both sheathed with corrugated metal roofing. No wood siding was observed.

Condition of the Structure: The roof and wall framing showed signs of extensive damage by termites, and the roofing metal was coming loose in several locations. Although the crawl space beneath the building was not accessible, it is suspected that extensive termite damage occurs there as well, given the observations made of the posts and piers beneath the addition to the east end of Building B.

The building, as currently constructed, will not satisfy the structural requirements of the building code, and repairing the deterioration and reinforcing it to sustain code-specified forces would be more costly than completely rebuilding it

---

WATER TANK (Photos WT1&2)

General Structural Conditions: Measuring approximately 25 ft in diameter and 16 ft in height, the 50,000 gallon water tank is constructed of 3x6 wood staves, surrounded by ¾" diameter galvanized tension rods spaced between 4" and 8" O.C. for the height of the tank. A twelve-sided conical shaped roof covers the tank. Heavy timber purlins support the tank floor and walls and are in turn supported by concrete foundation walls spaced at about 3'-0" O.C.

Condition of the Structure: The water tank appears to have been reasonably well maintained over its life and should continue to provide useful service if proper maintenance is continued. The tank should be kept nearly full of water to keep the staves from drying out and shrinking.

If the tank is to be relocated and must be emptied, transverse bracing should be installed inside the tank at the bottom, mid-height and top to maintain an outward pressure against the staves and tension rings and prevent it from collapsing inward during transport. If empty, the tank, tank floor and roof probably weigh between 10,000 and 15,000 lbs. A crane lifting the tank with slings beneath the floor purlins can probably load it onto the back of flat bed truck for transport to another location. Foundations, similar to those currently in-place, should be properly designed and constructed to support the tank.

Conclusions and Recommendations:

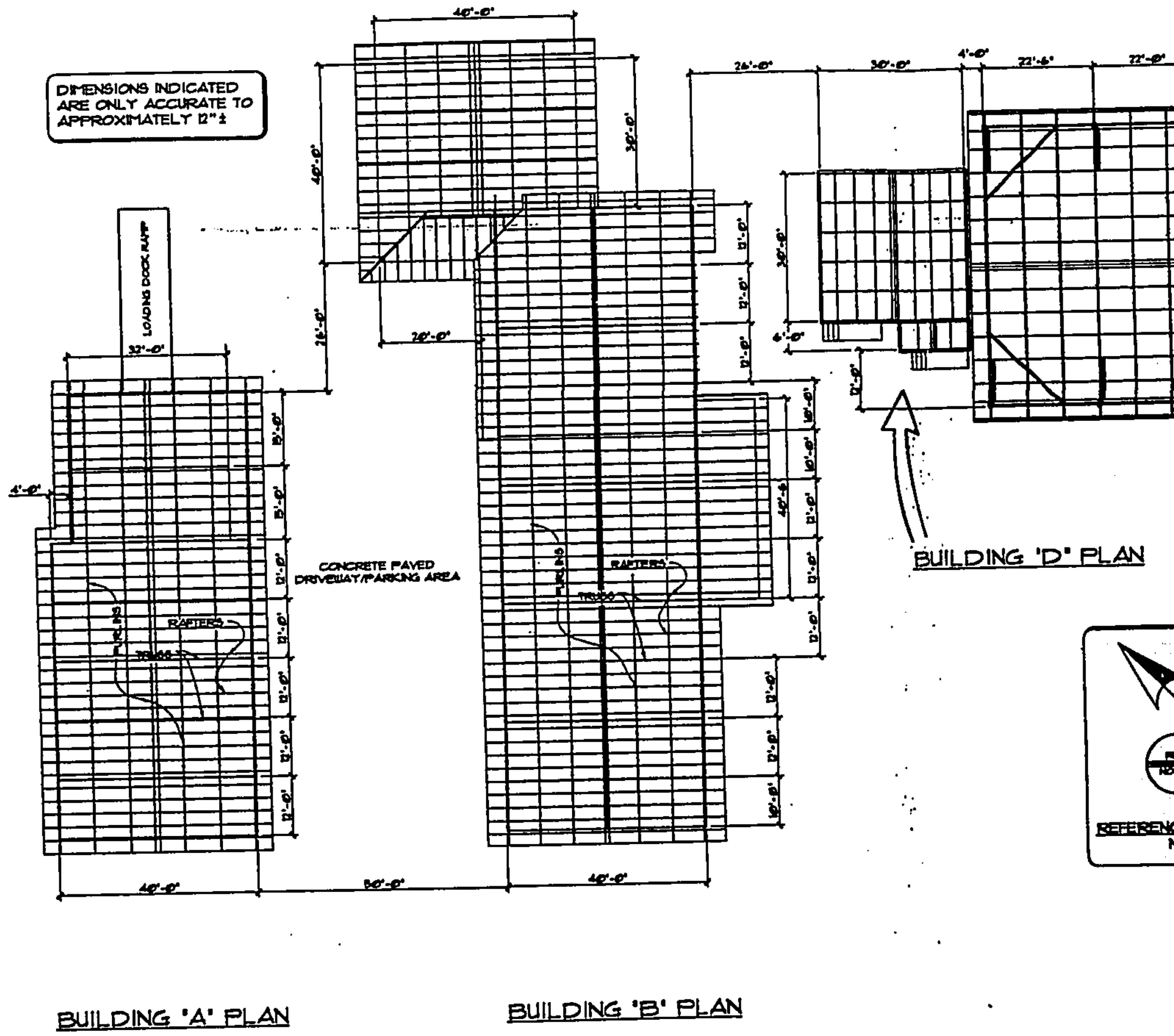
As stated above the water tank is in sound condition and can continue to be used in its present location as is or at an alternate location provide proper measures are taken to keep it from collapsing during relocation, while the tank is empty.

Bldg. D is too small and in too advanced a state of structural deterioration to merit any effort to renovate it. The cost of reconstructing a new building of similar size and configuration would be less than the costs to renovate the building and make it compliant current code standards.

In assessing the feasibility of future use of the three main buildings (A, B, & C) at Corn Mill Camp several factors need be considered, not the least important of which is their structural capacity. It appears that at least two of the three warehouse/service buildings (A & B) were constructed prior to Maui County enforcing any form of building code with minimum requirements for resistance of forces resulting from high wind. In addition the roof framing of all three building, with the exception of the main steel trusses of Bldg. C, are marginal at best, when compared to the current Building Code requirements for superimposed live load. When the extent of termite damage observed is considered the purlins and rafters of all three structures appear to be considerably sub-standard and would require appreciable removal and reframing to remedy. Retro-fitting each of the two wood framed structures to be fully compliant with minimum standards of current UBC load requirements would likely prove more expensive than construction of new building of similar size and material. The fact that Bldg. C has a reasonably constructed primary frame of structural steel with diagonal steel bracing providing resistance to high wind loads makes structural renovation considerably more feasible.

If future use involves architectural renovation of each building to make them more weather proof, marketable to tenants with electrical, plumbing and mechanical improvements, as well as accessibility compliant, the likelihood of new construction being more cost effective is far greater if not a for gone conclusion. Replication of the architectural style of each building can be accomplished effectively with new timber framed systems that, if pressure treated, will provide a more durable structure, with a far greater useable life than would result from renovation of the current termite damaged wood framed construction.

Walter Vorfeld & Associates
CONSULTING STRUCTURAL ENGINEERS
10 Ulana Street
Makawao, Maui, Hi 96768
(808) 572-3535
Fax (808) 572-3616



LAYOUT OF CORN MILL CAMP BUI

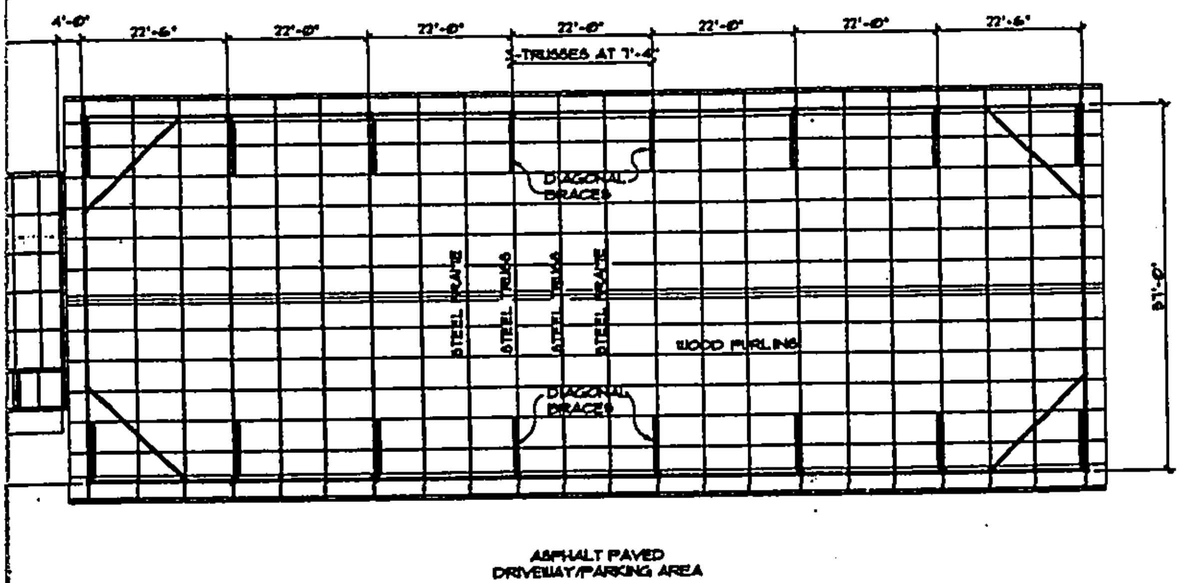
SCALE: 1" - 30'-0"

JOB NO. WV4A 22028

BY: WTV

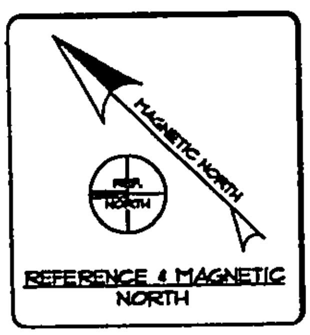
DATE: 12-09-2002

SHEET NO. 1 OF 1



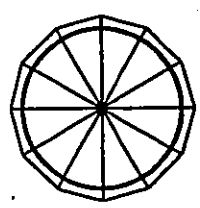
UILDING 'D' PLAN

BUILDING 'C' PLAN

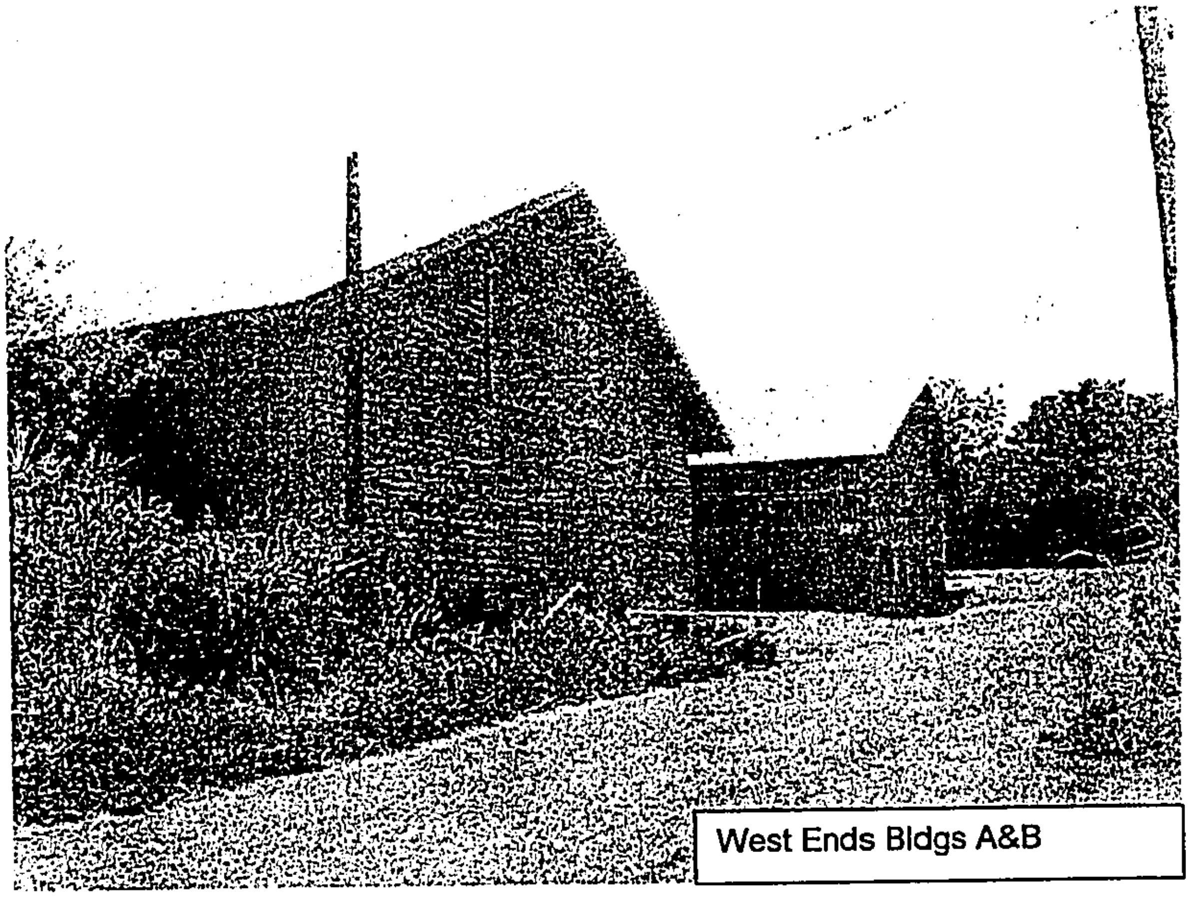


REFERENCE & MAGNETIC NORTH

CAMP BUILDINGS

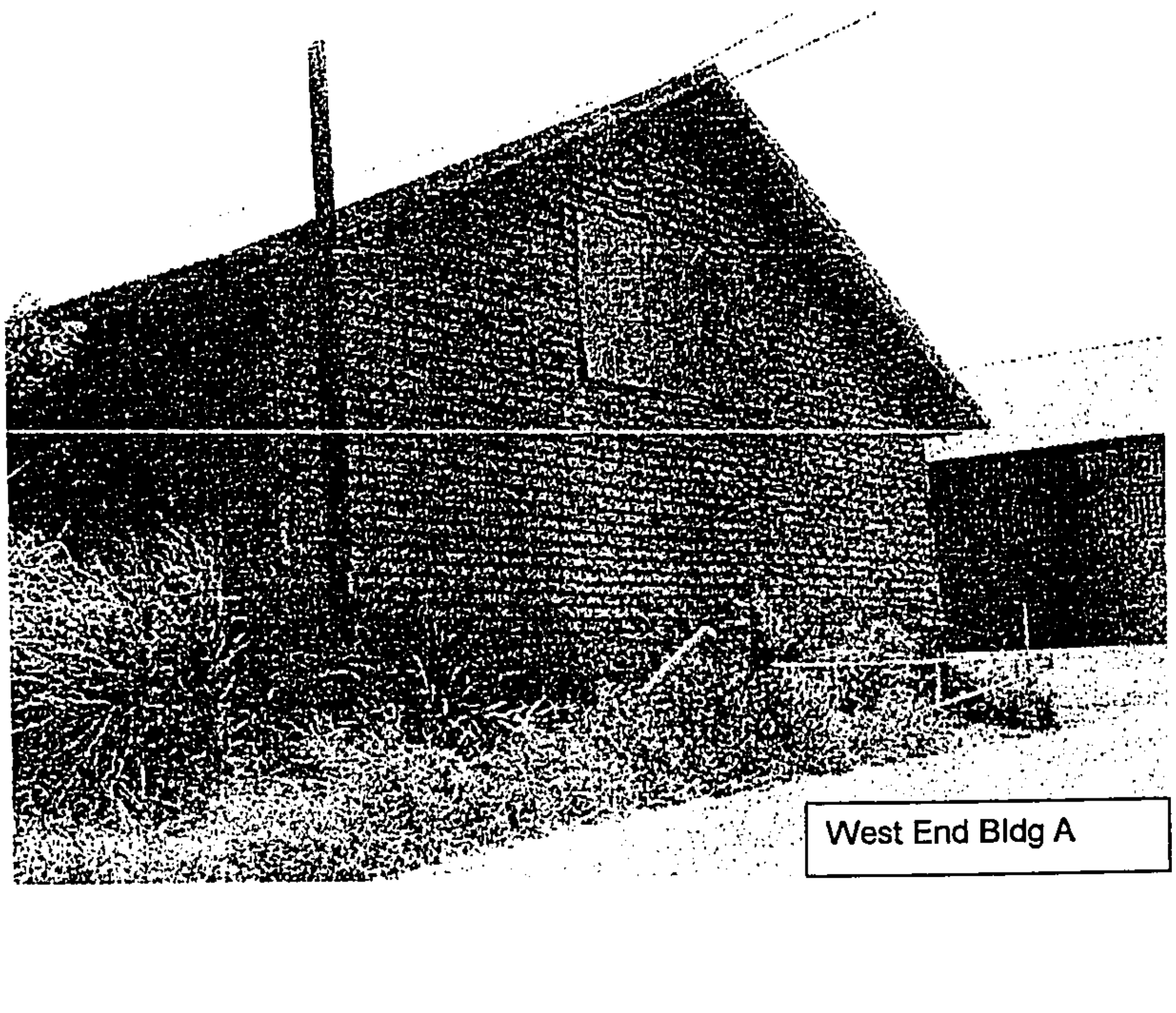


WATER TANK PLAN



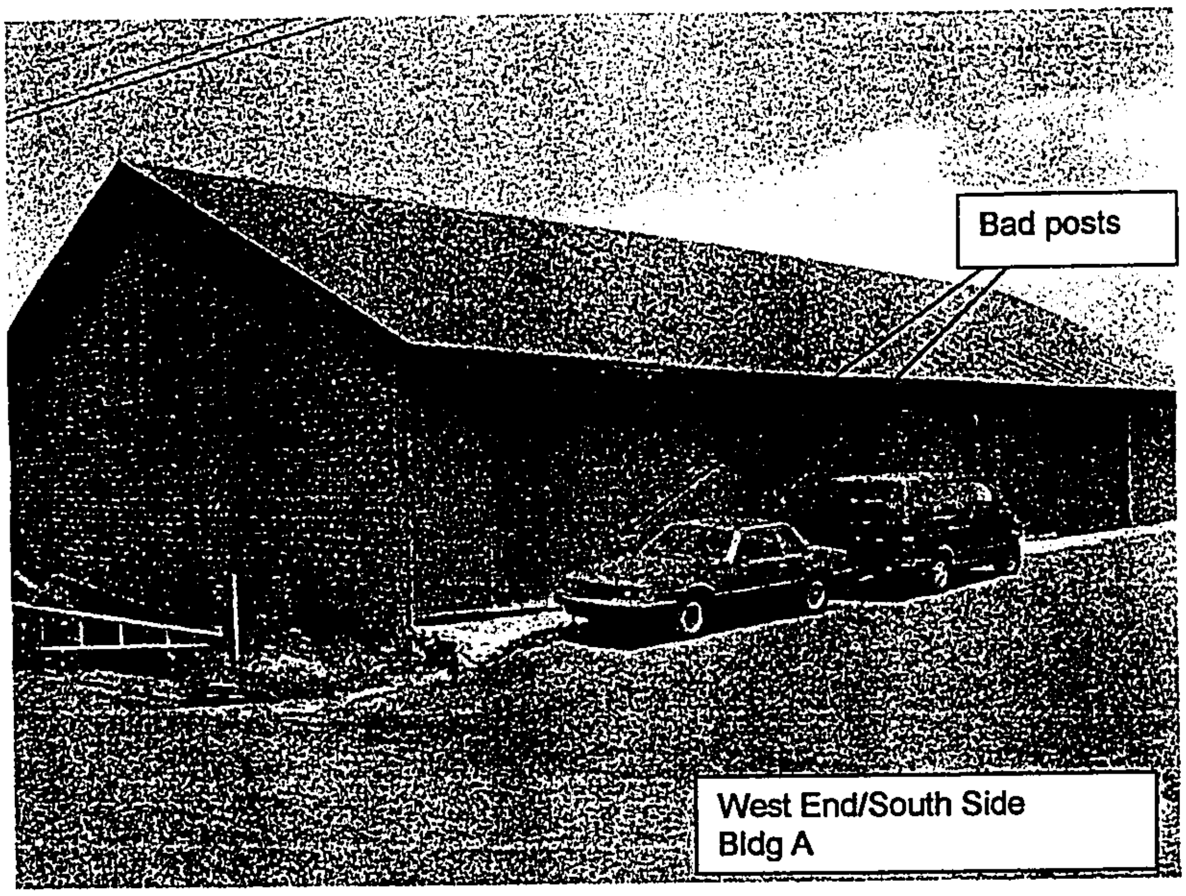
West Ends Bldgs A&B

A1



West End Bldg A

A2



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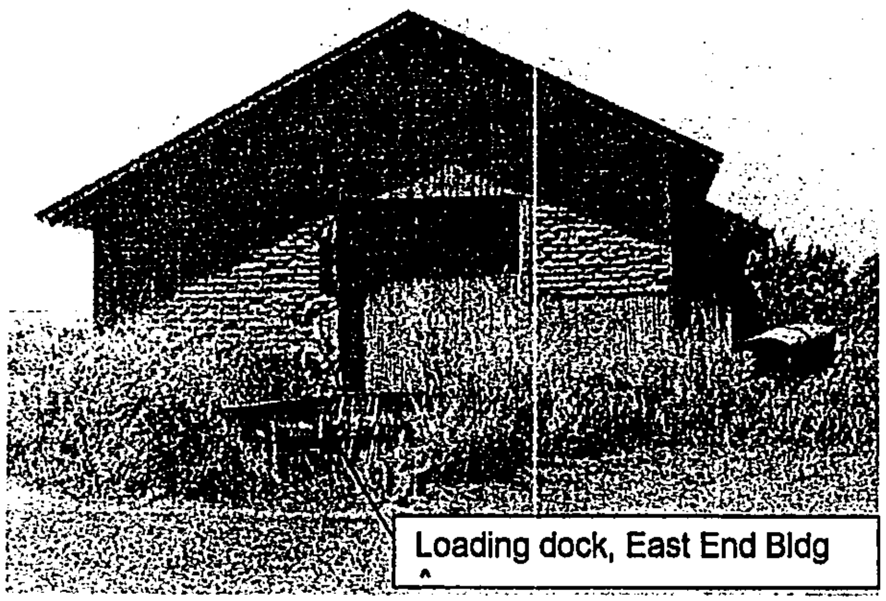

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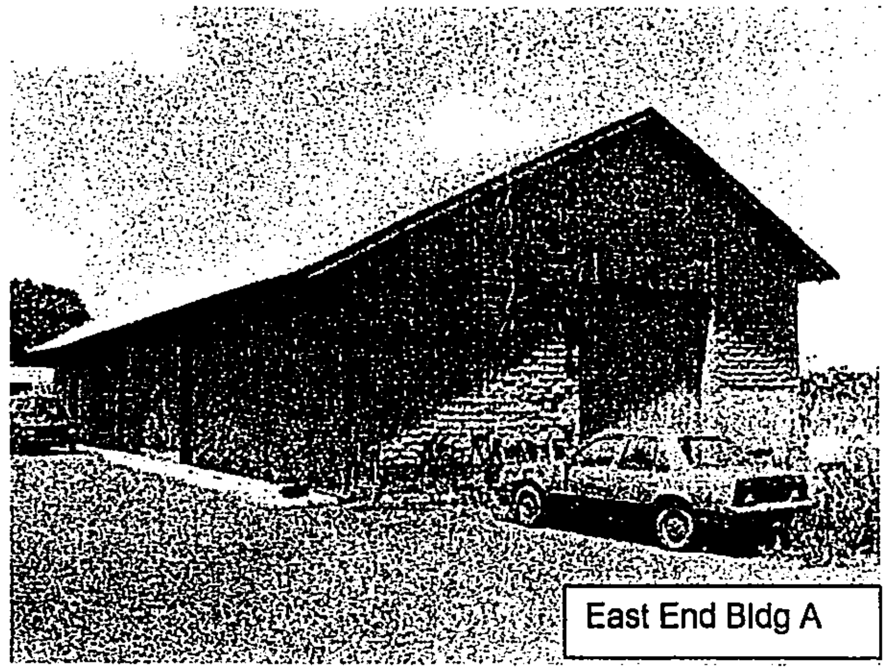

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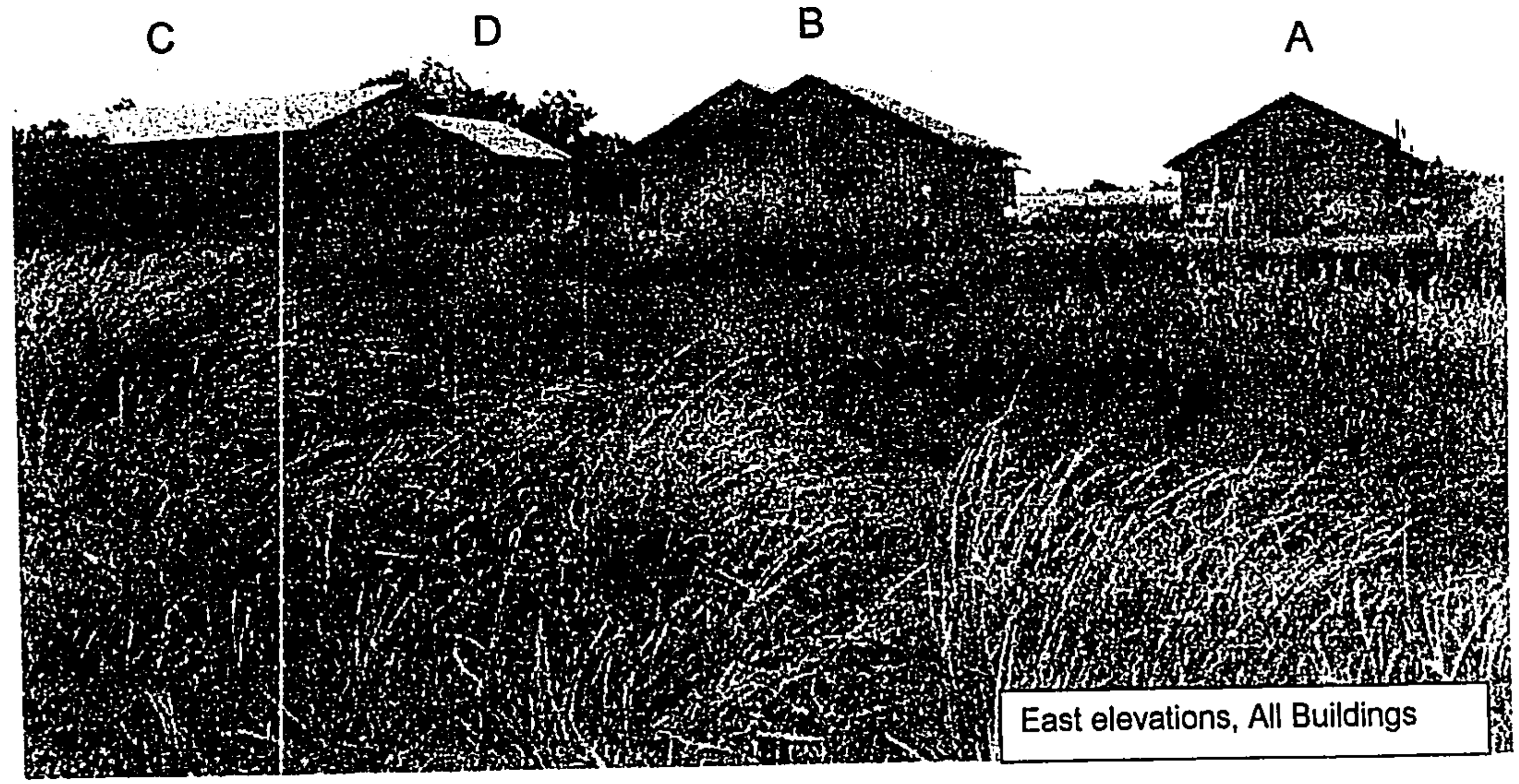
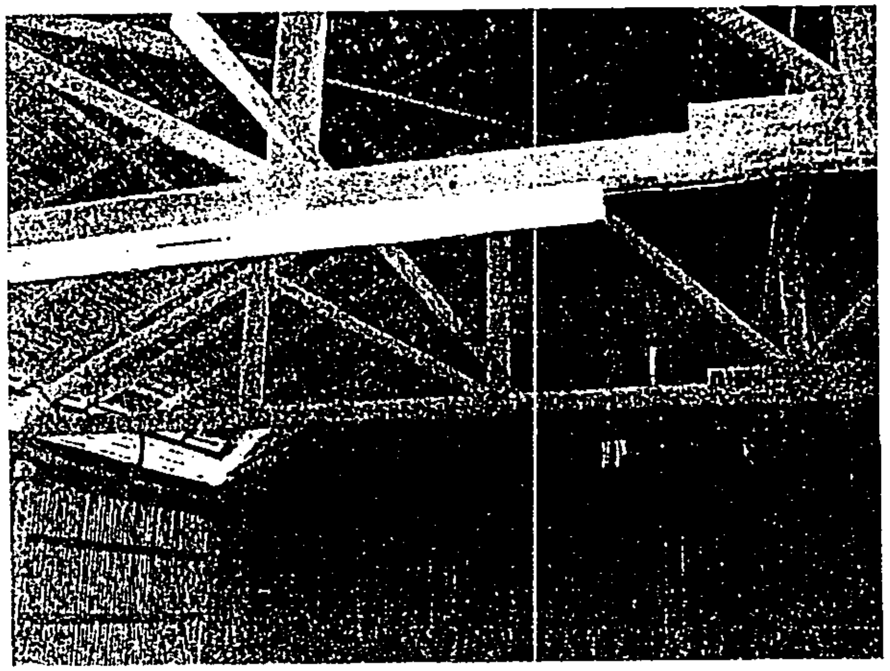

C
D
B
A
East elevations, All Buildings



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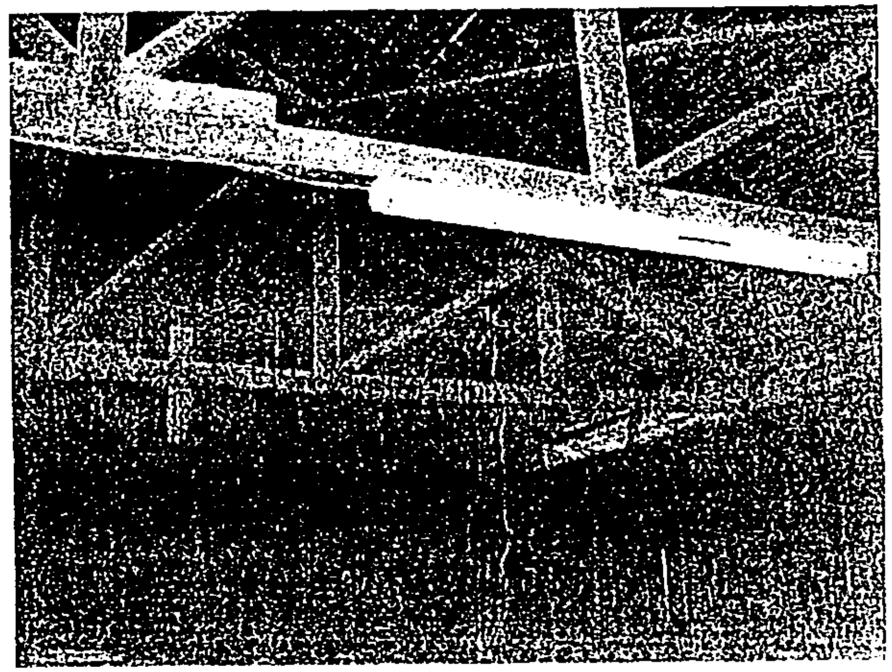
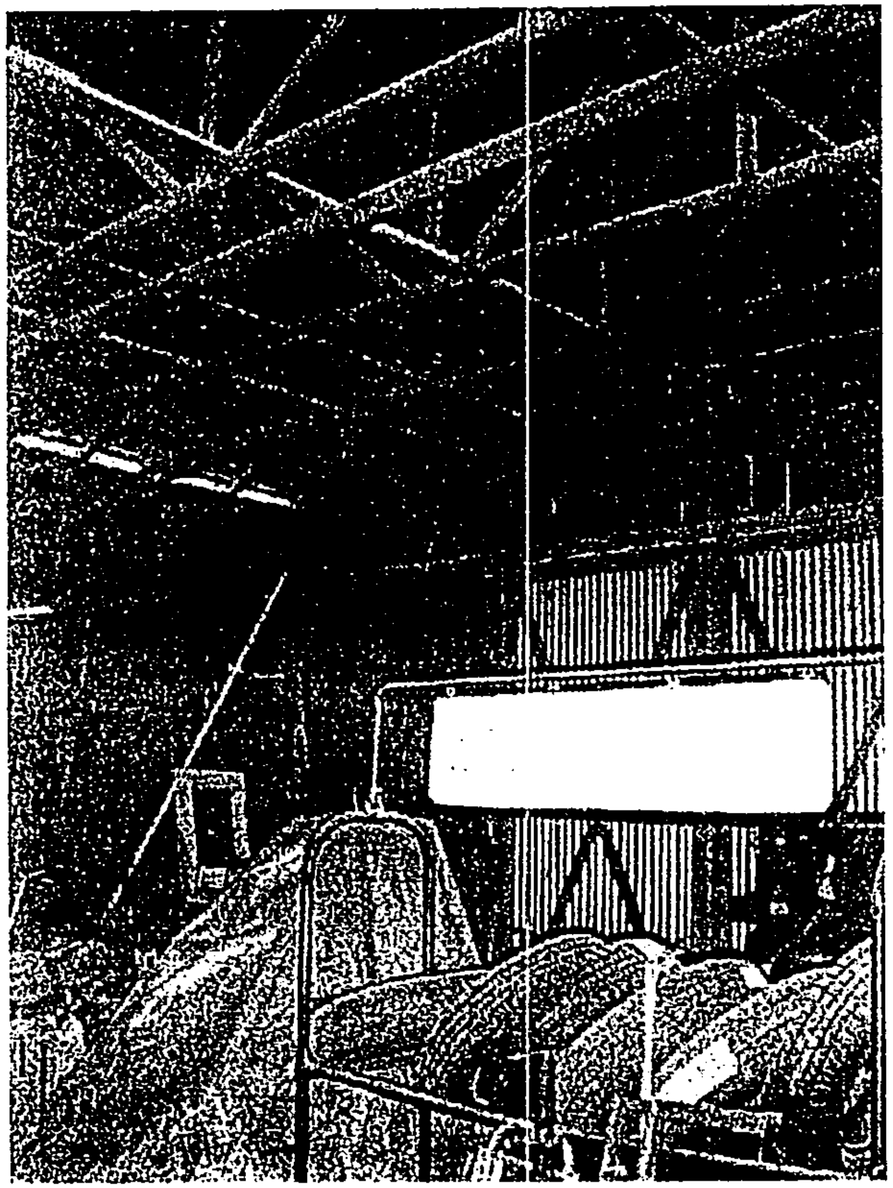


A8

A9

Roof trusses and
framing @ Bldg A



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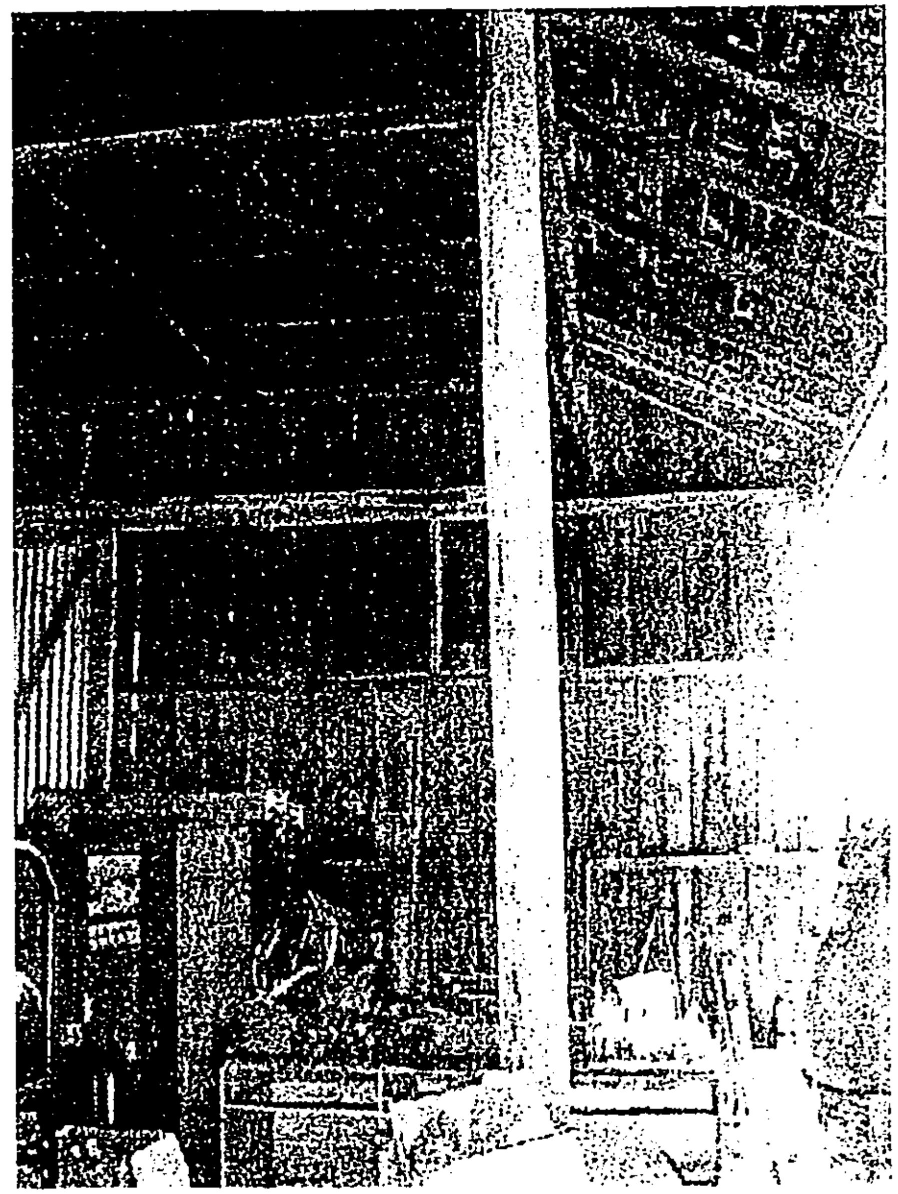
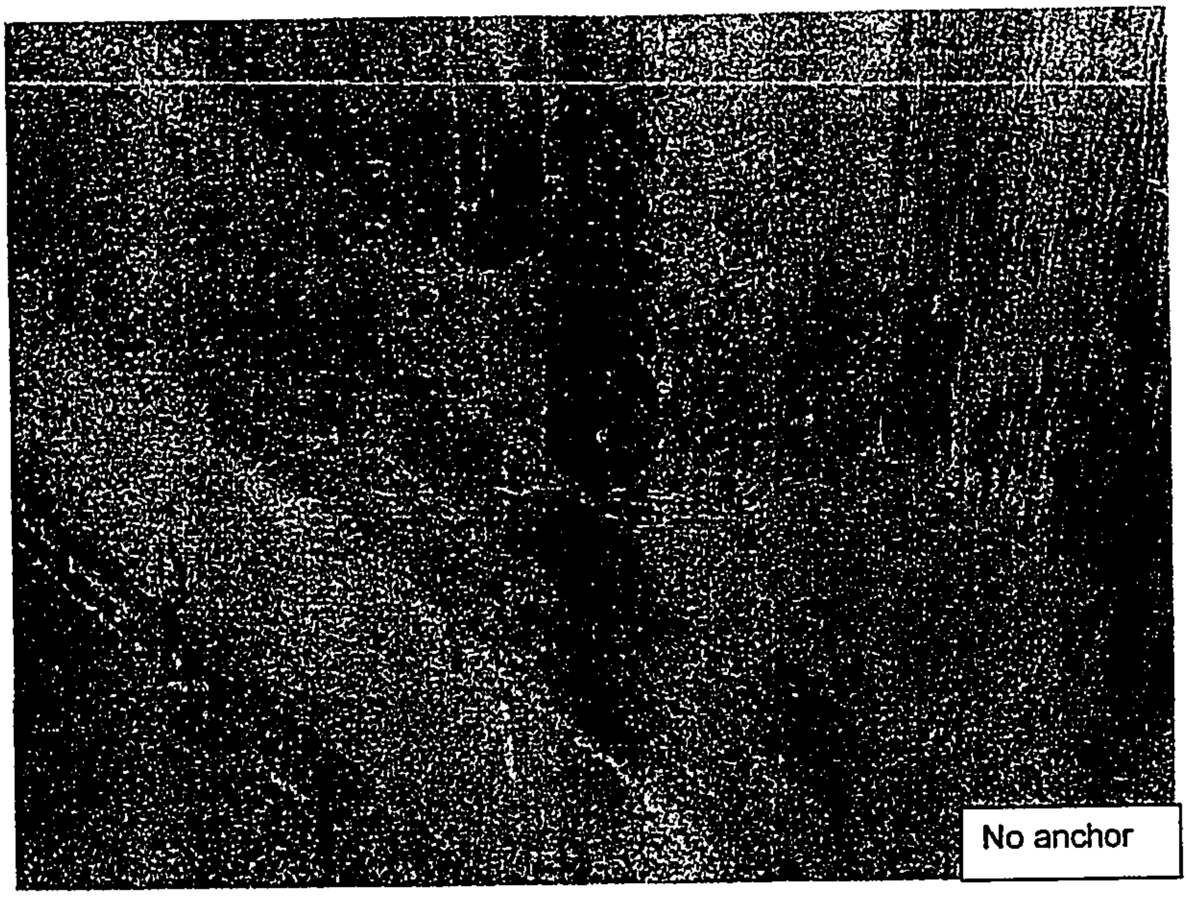


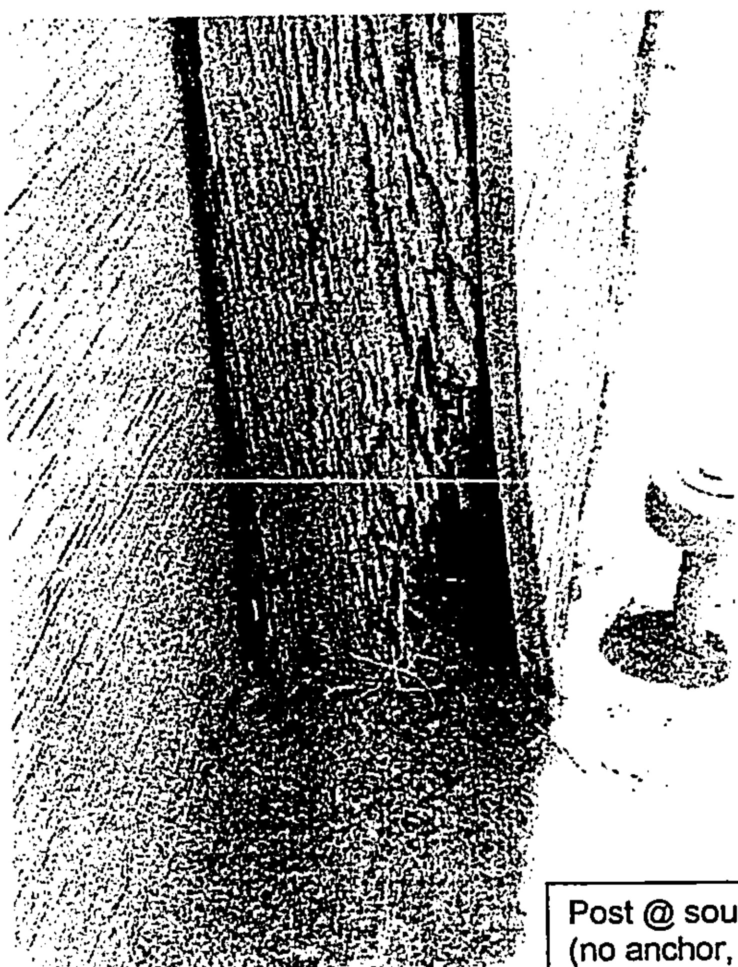
A11

Roof trusses & framing
@ Bldg A



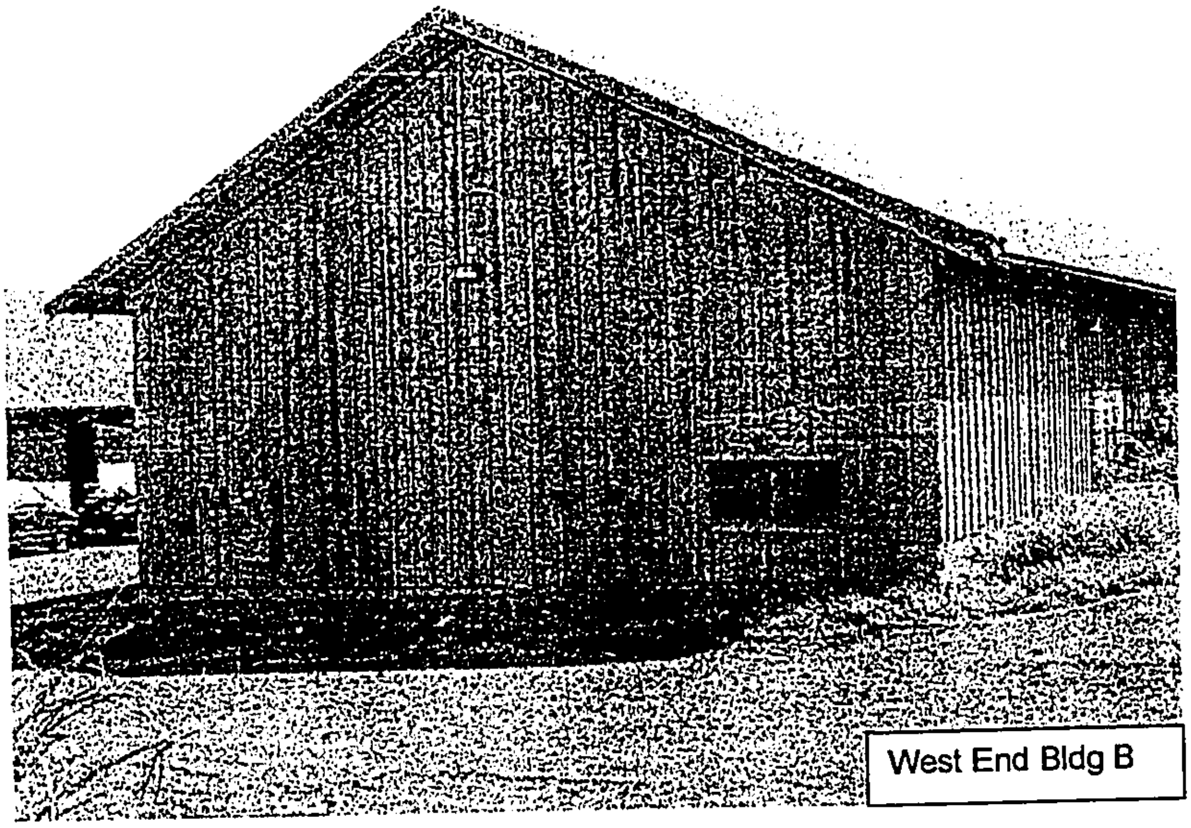
No anchor

A12



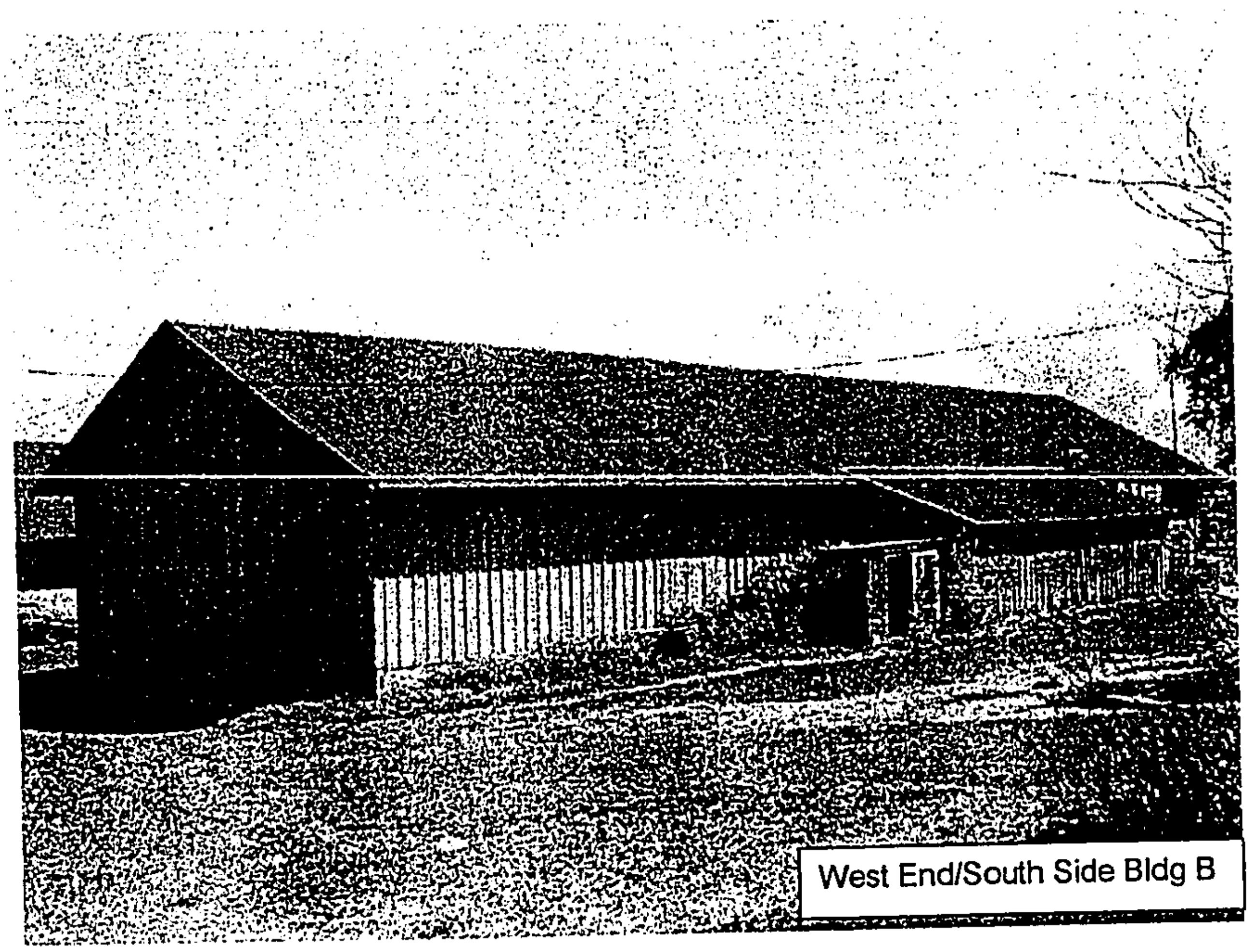
Post @ south wall (no anchor, termite damage)

A13



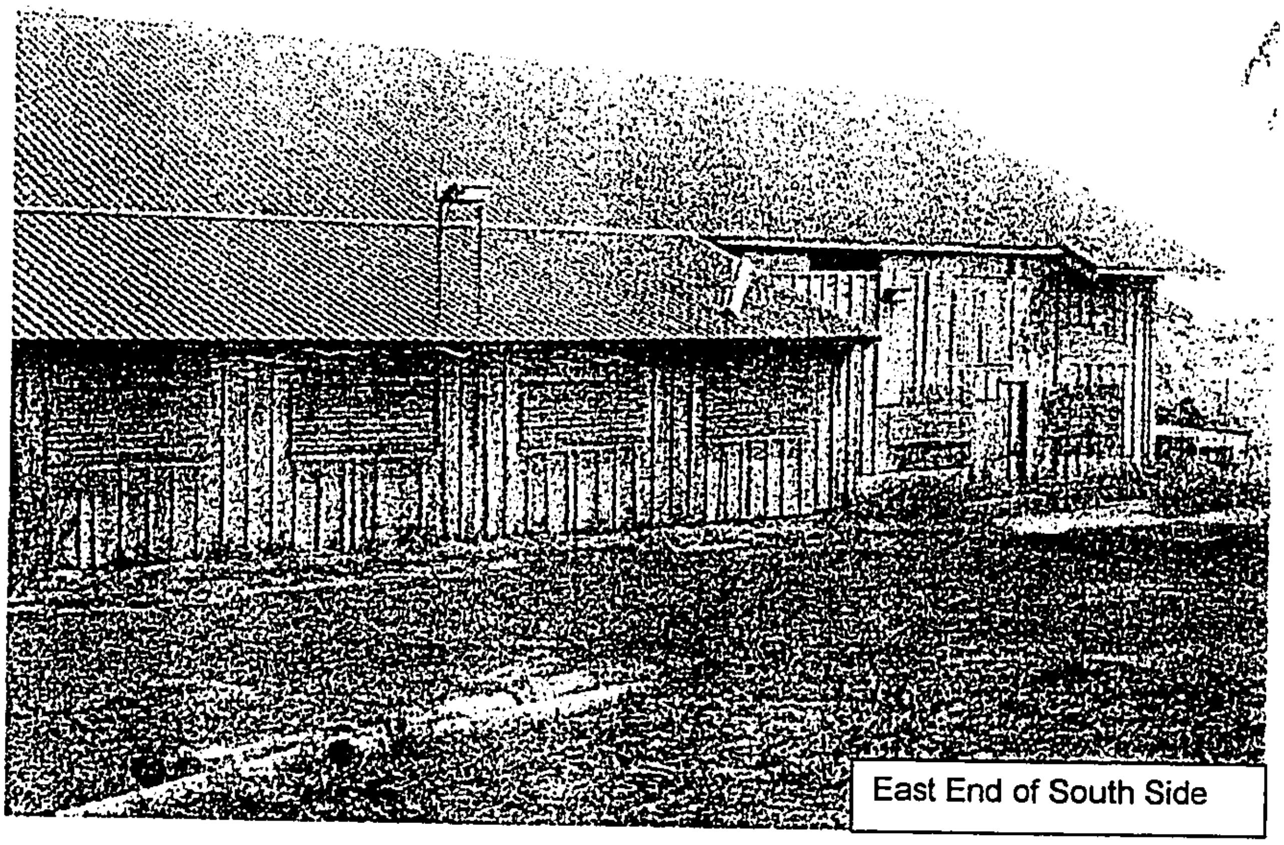
West End Bldg B

B1



West End/South Side Bldg B

B2



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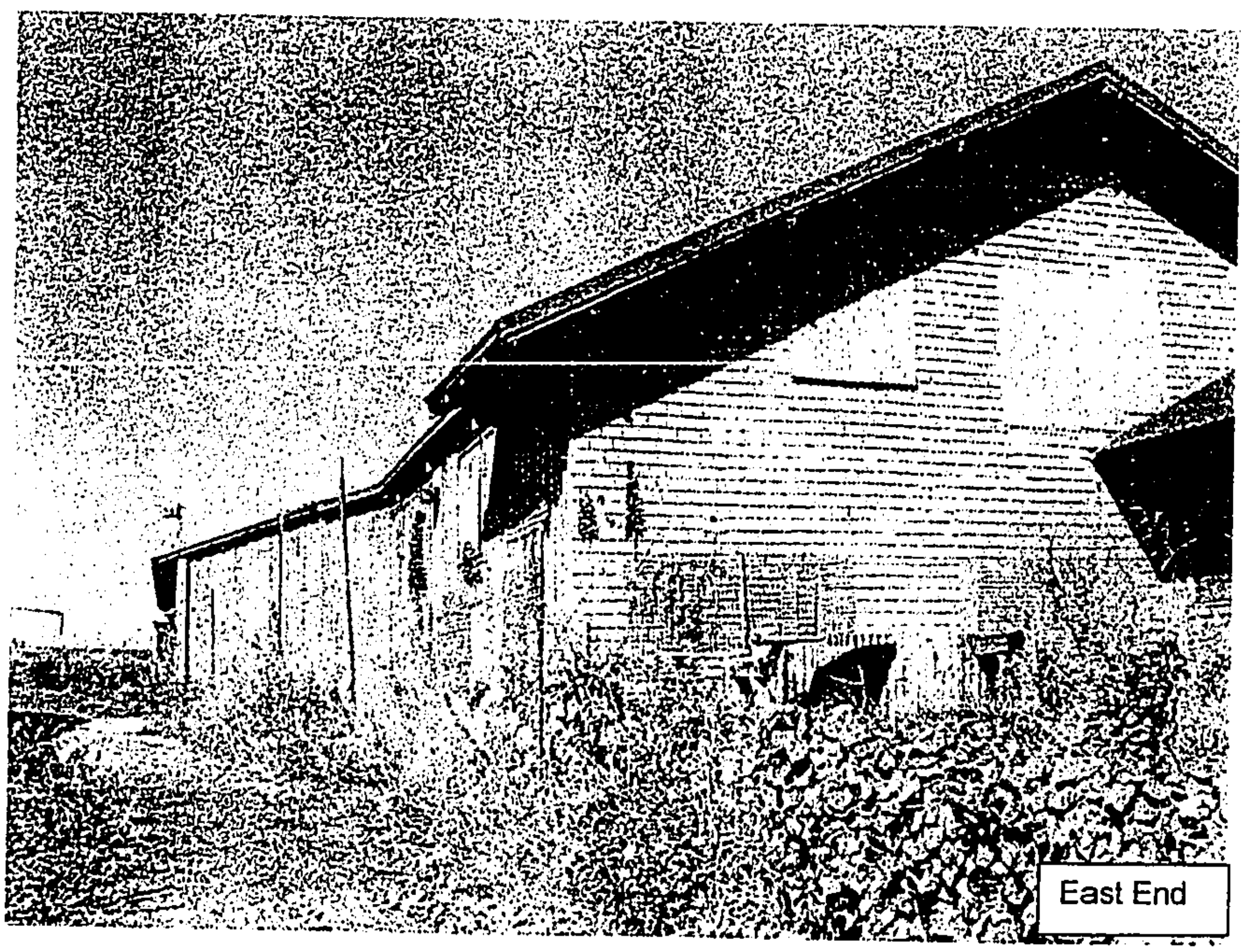

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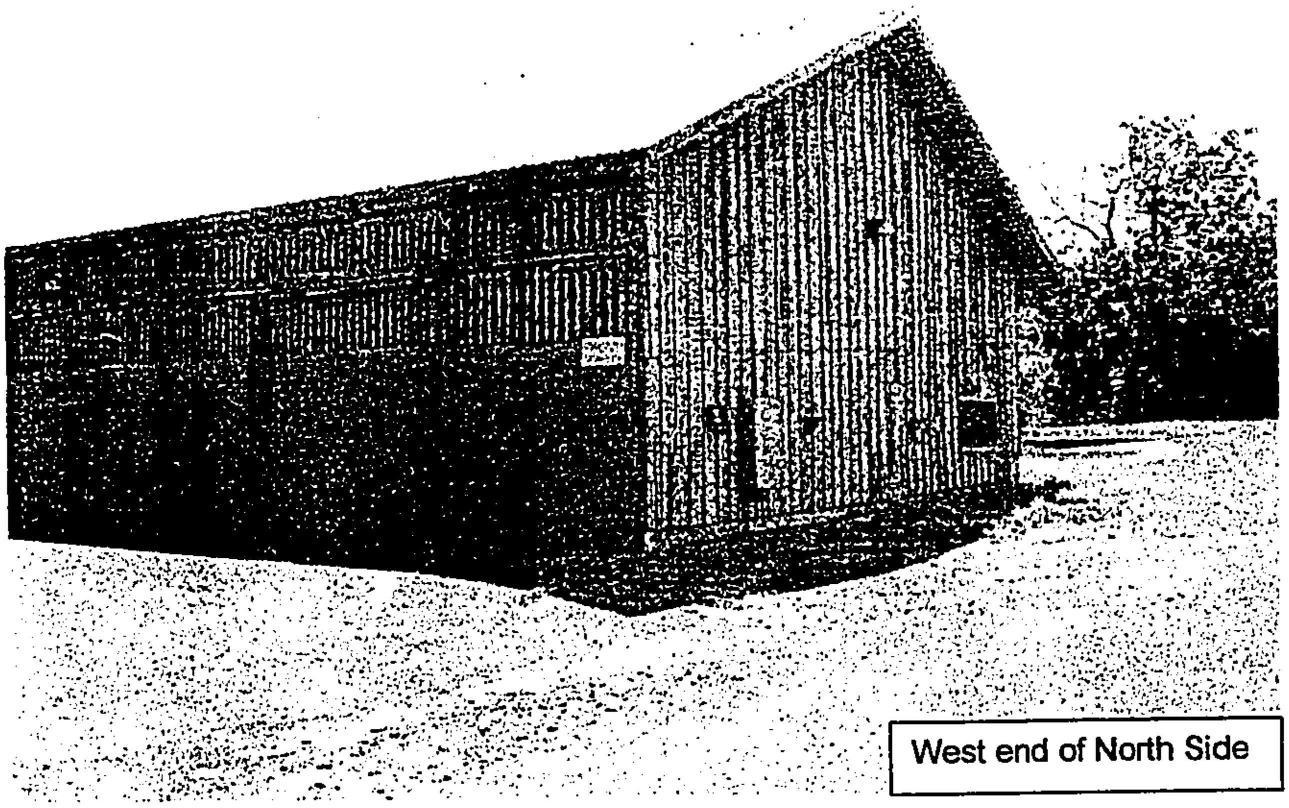
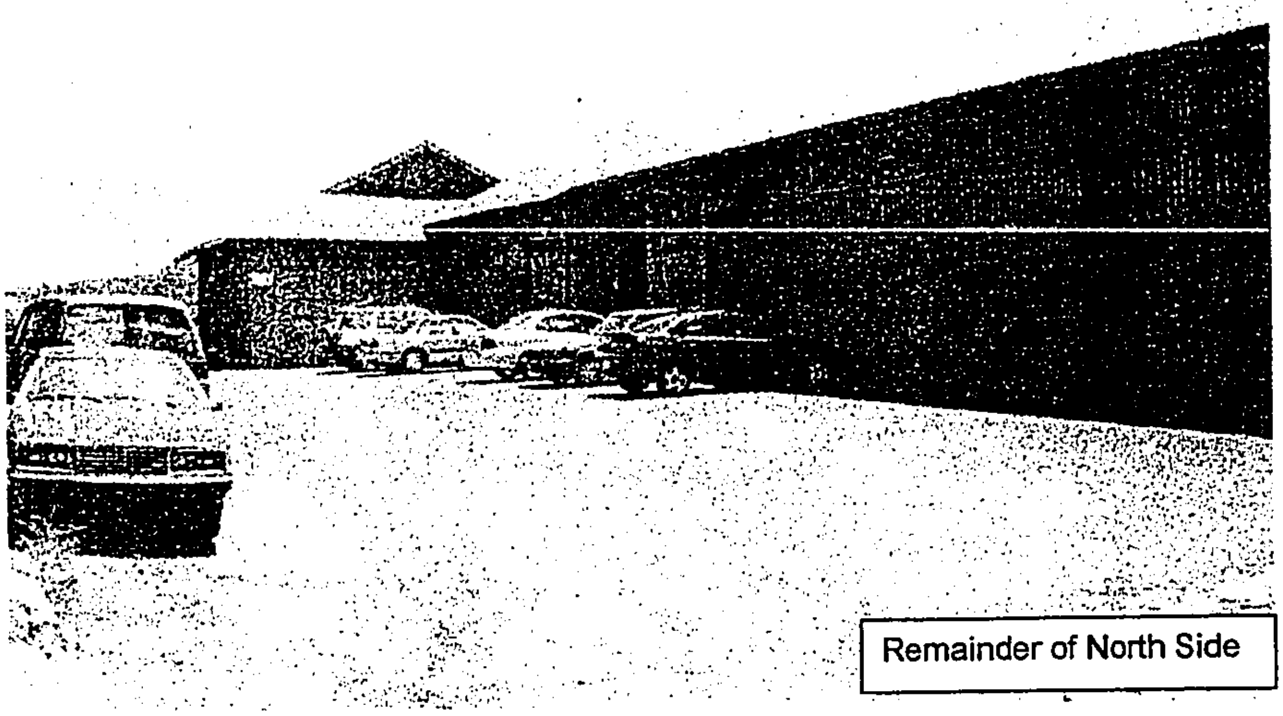


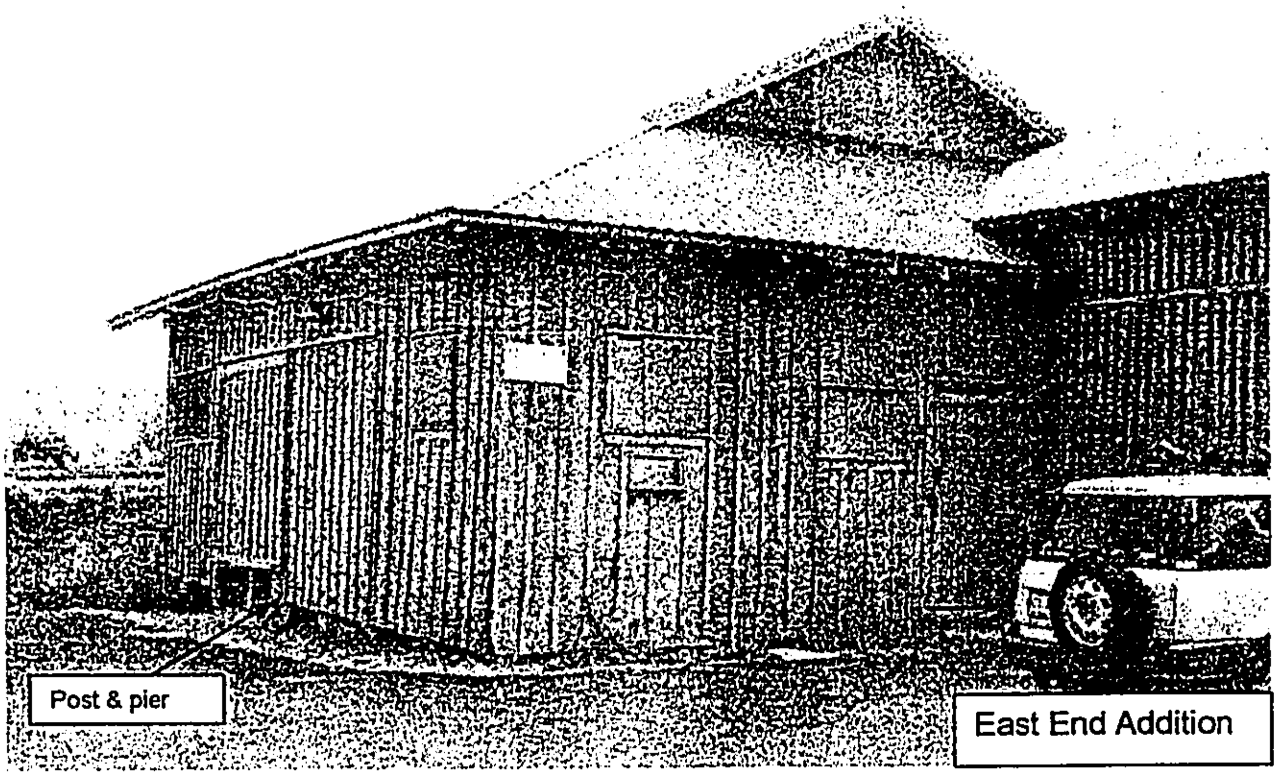
West end of North Side

B5

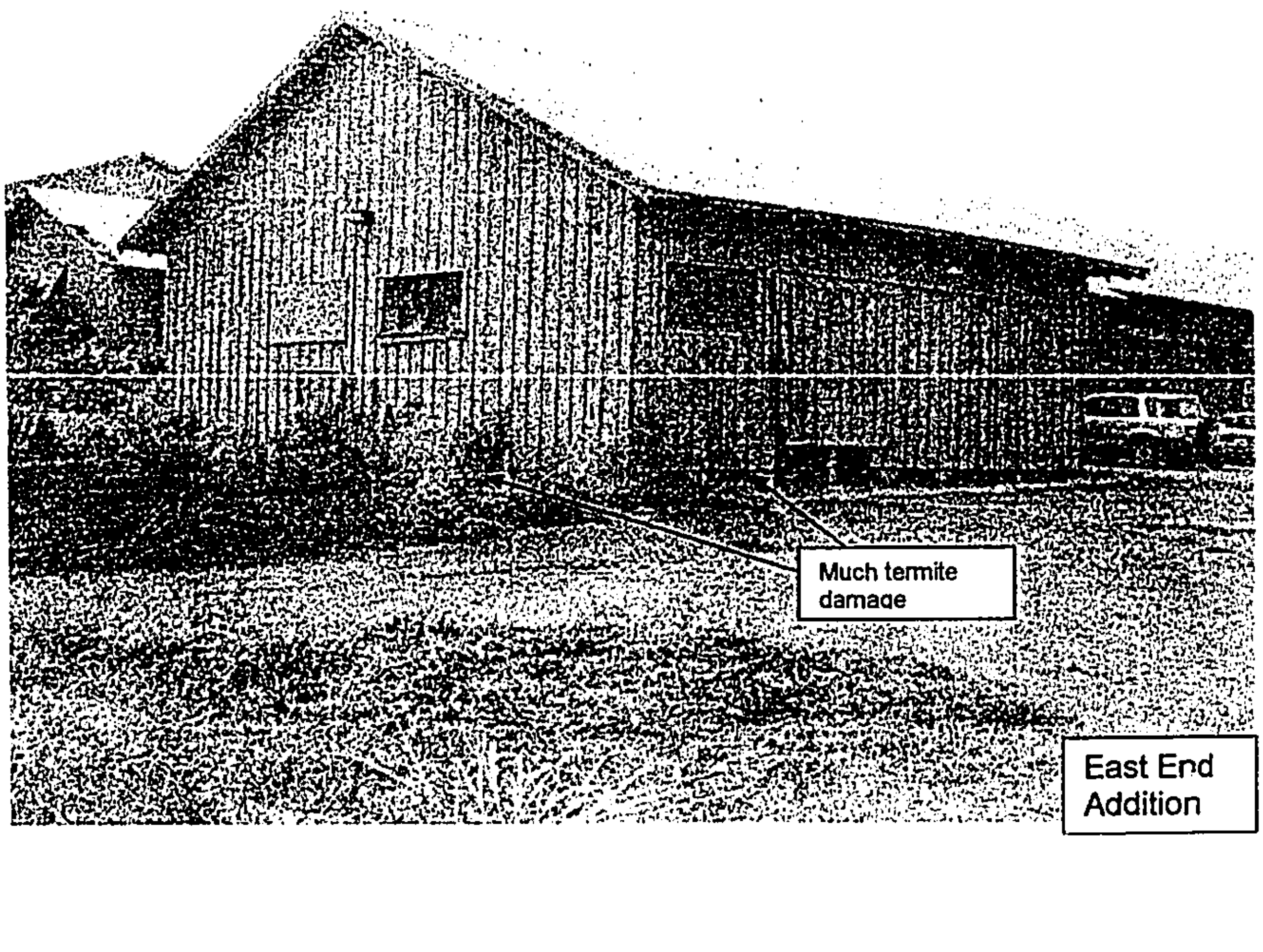


Remainder of North Side

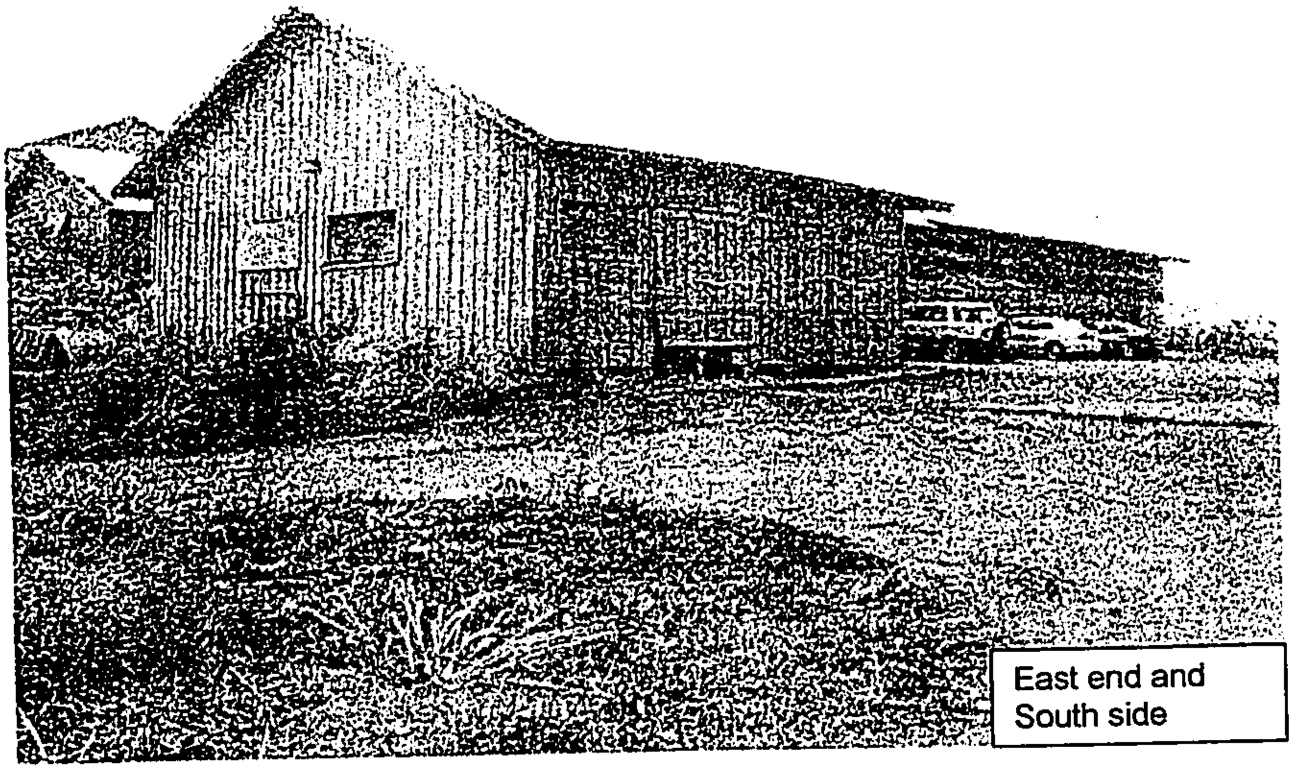
B6


Post & pier
East End Addition

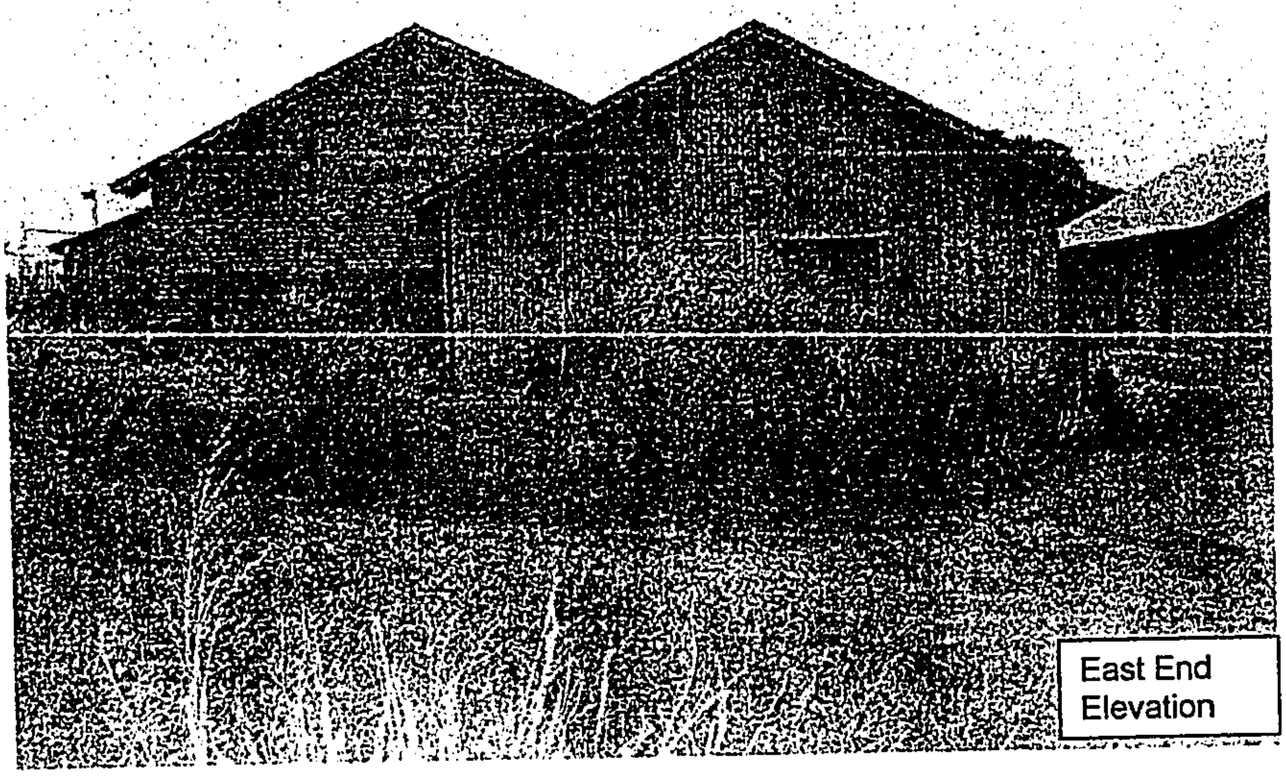
B7


Much termite damage
East End Addition

B8



B9



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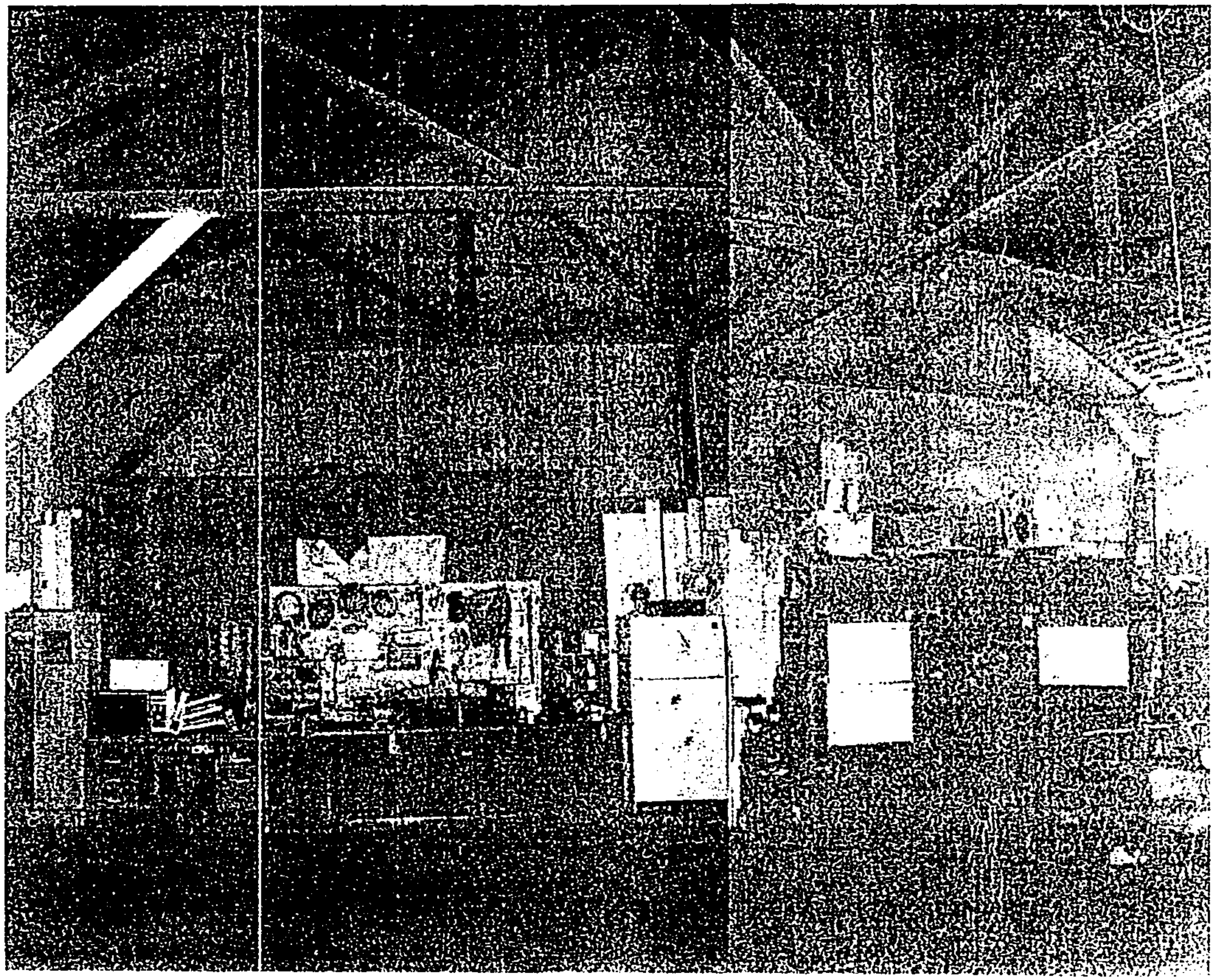
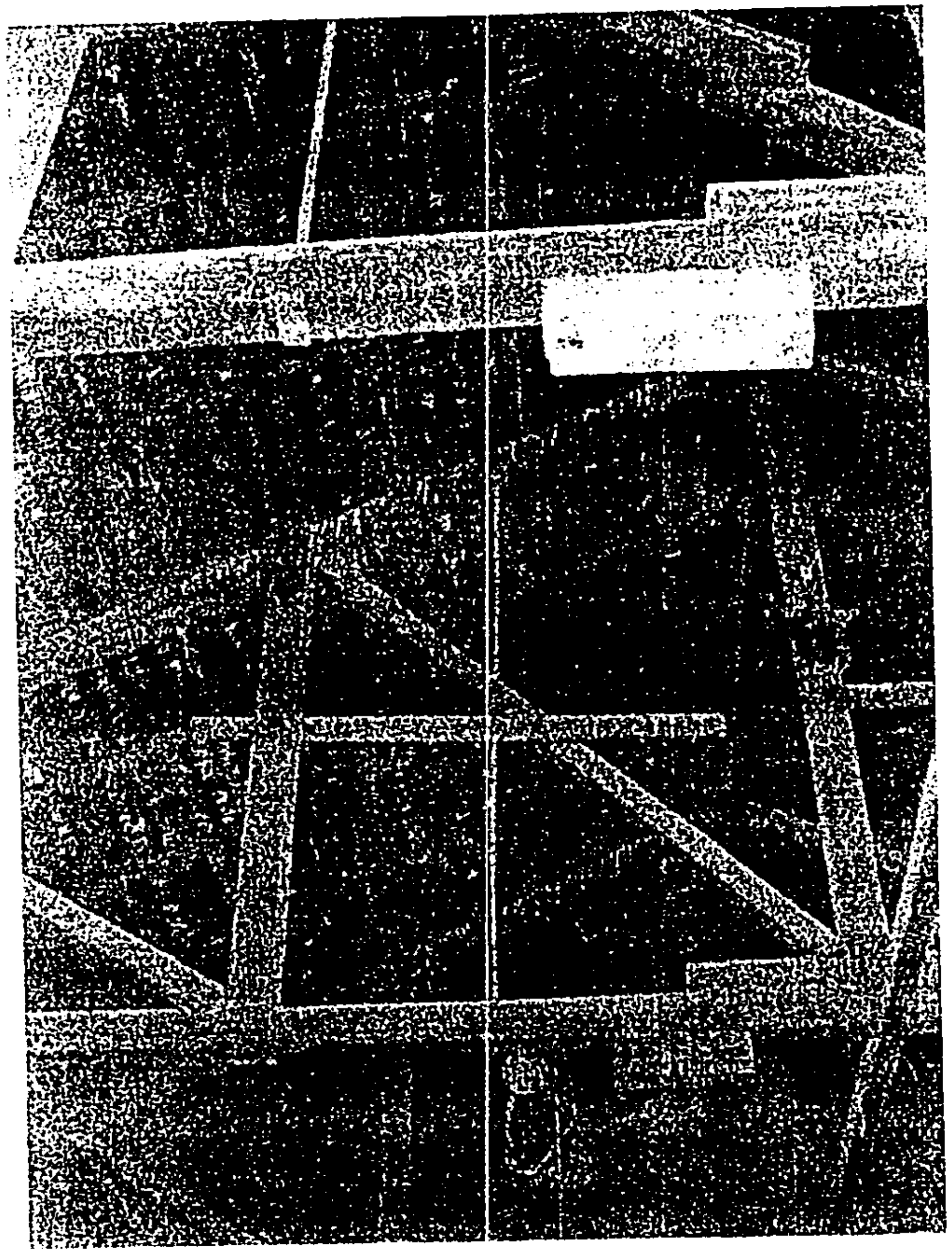


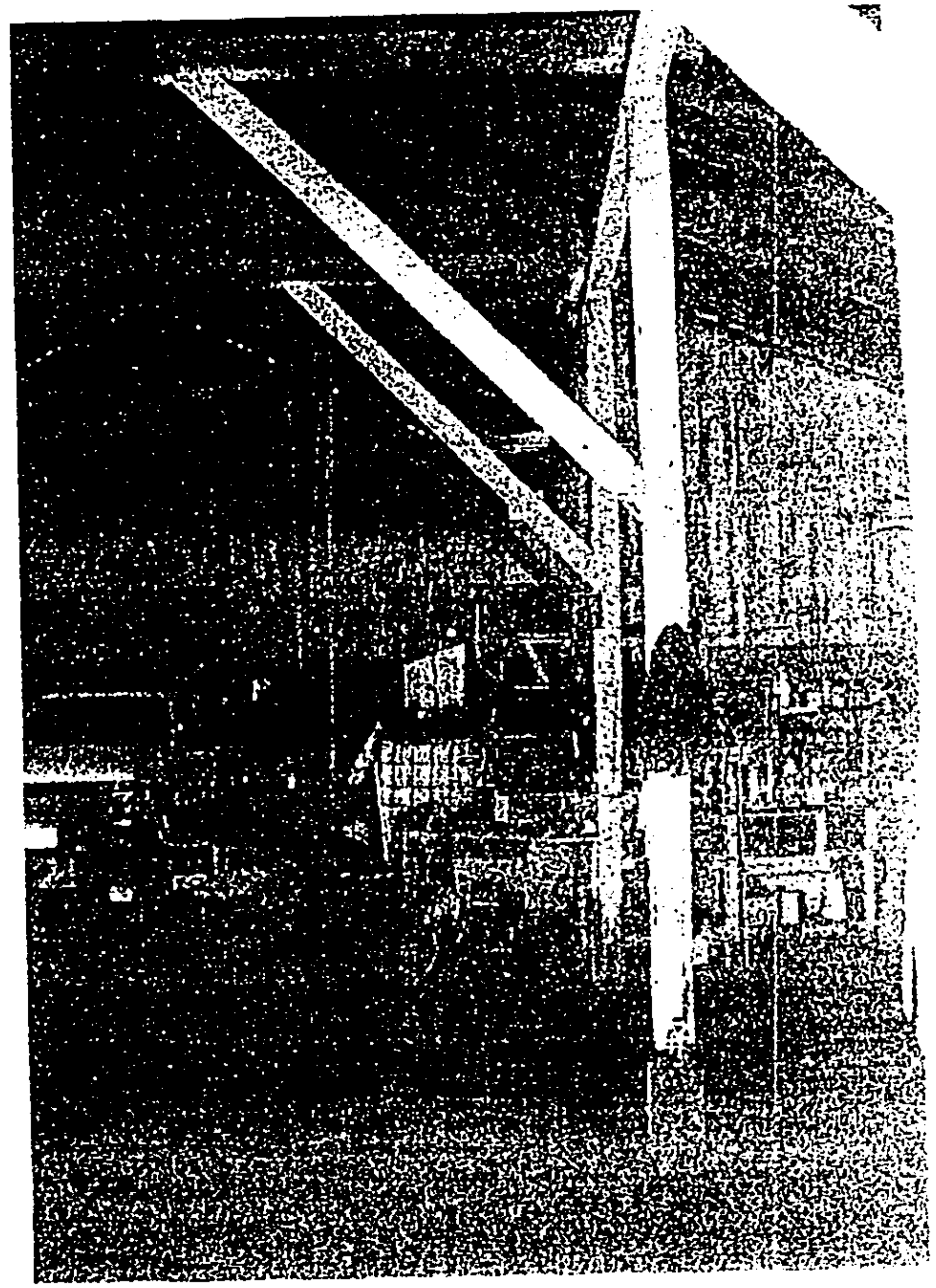
Roof framing & interior demising wall

B11-12



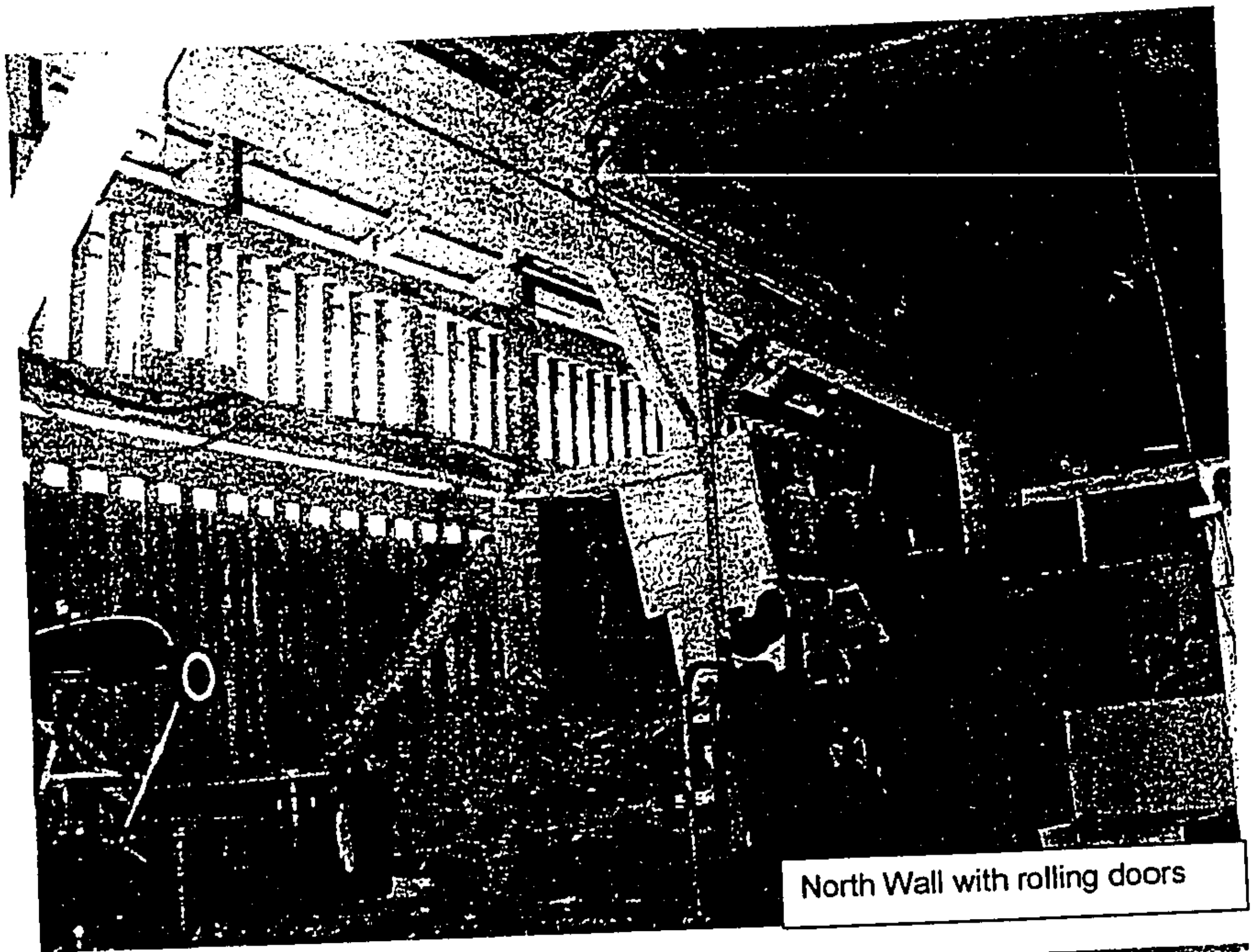
B13

Trusses



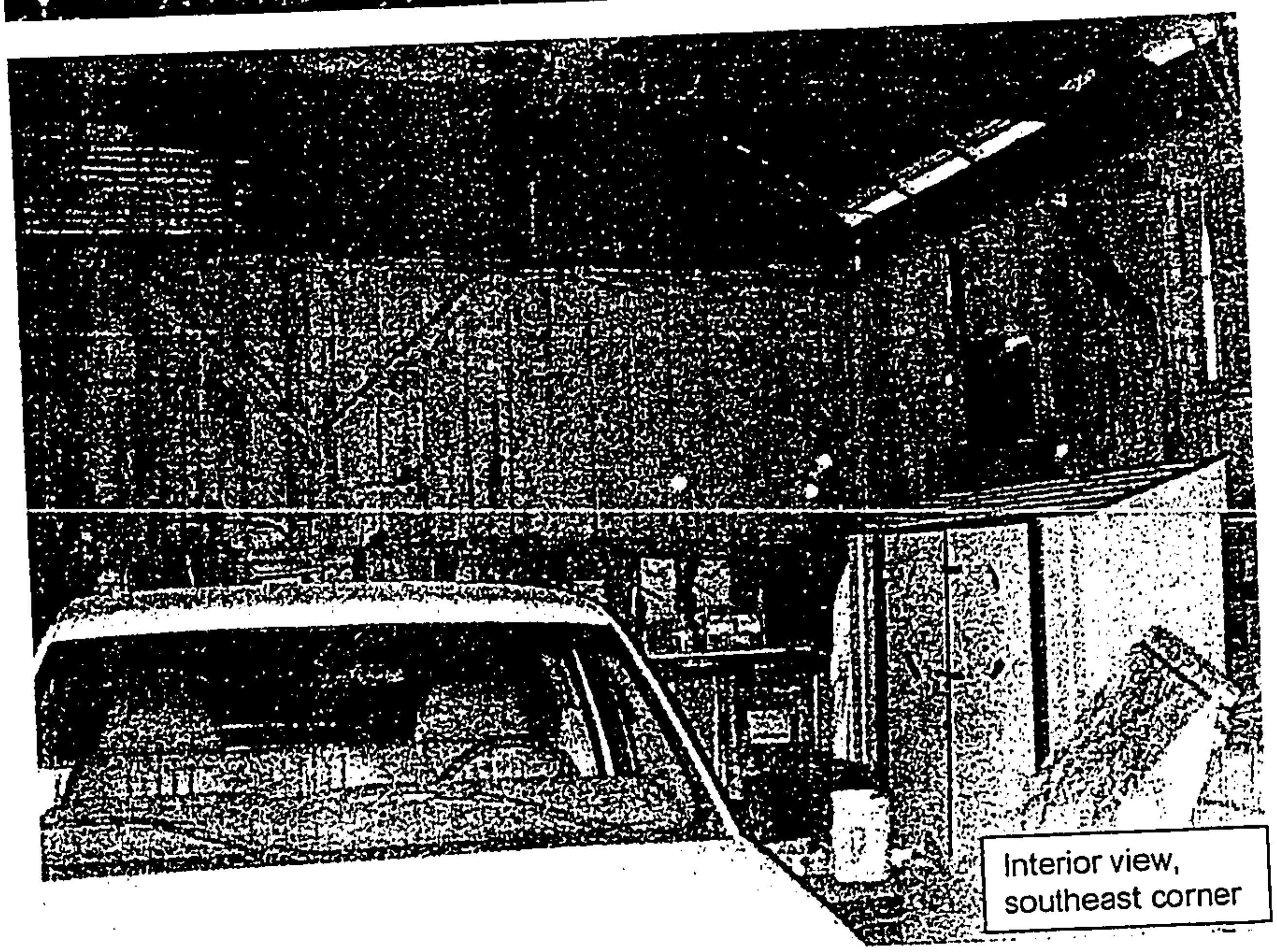
B14

B15



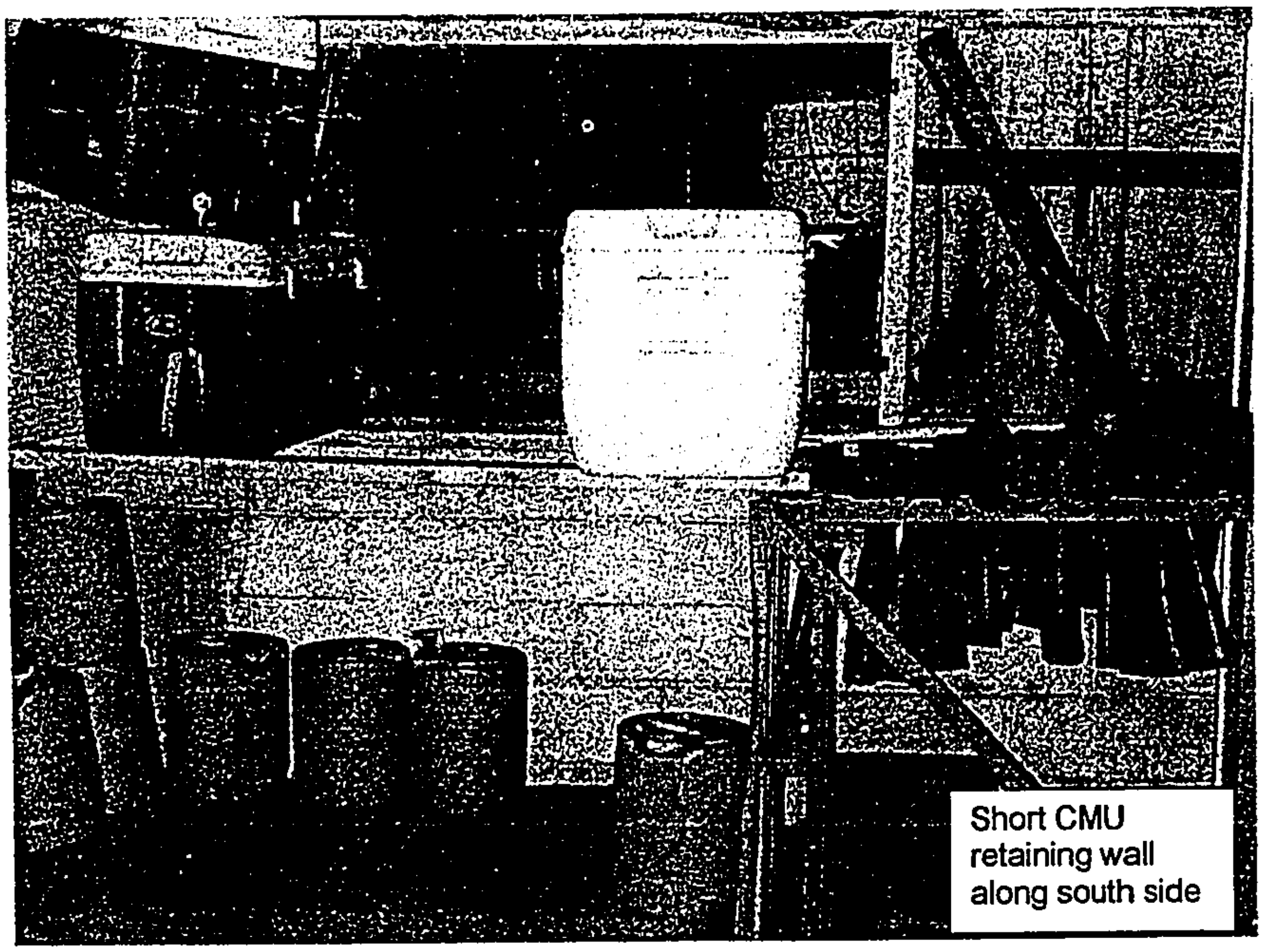
North Wall with rolling doors

B16



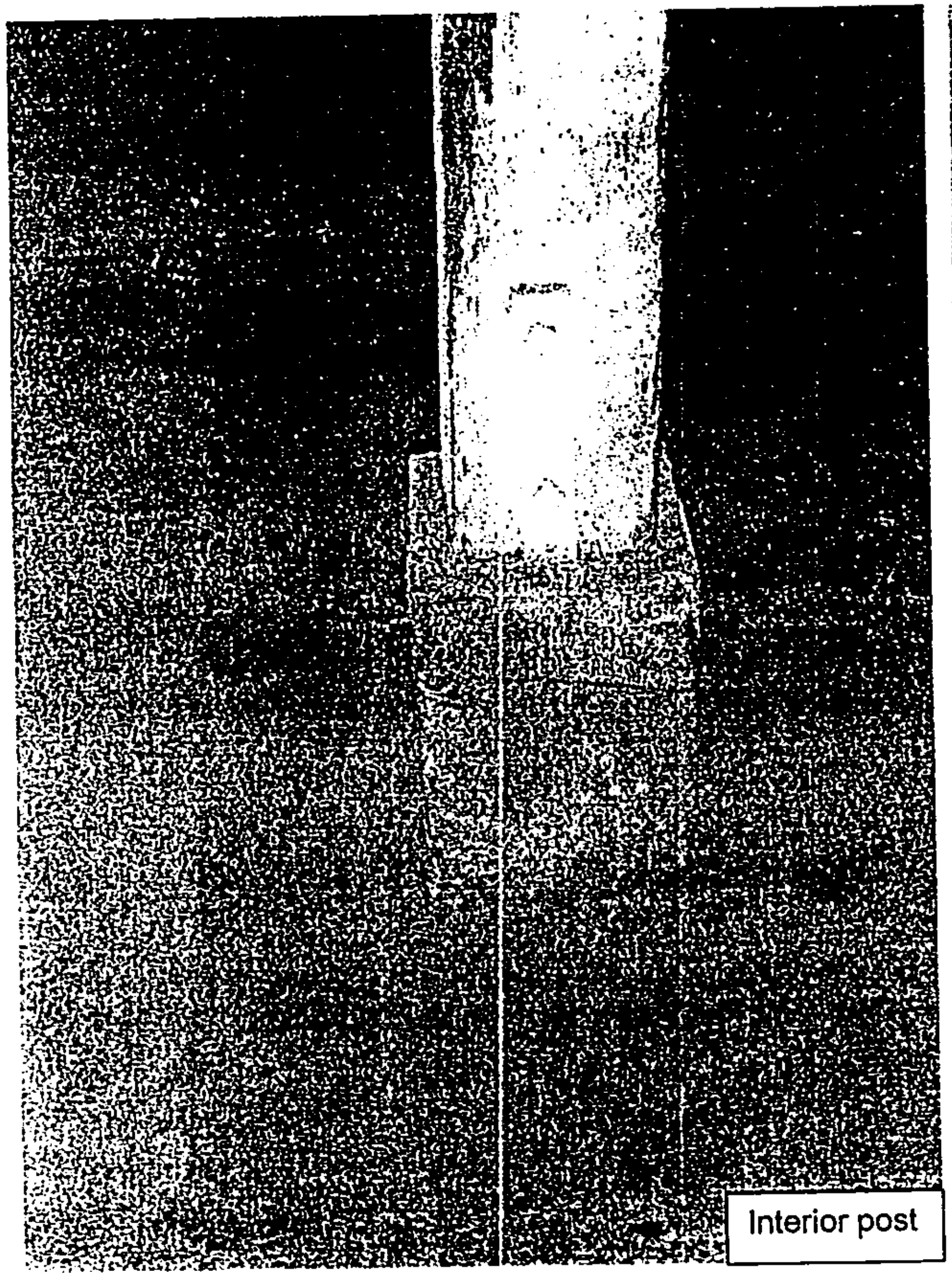
Interior view, southeast corner

B17



B18

Truss/beam/post condition with no anchorage



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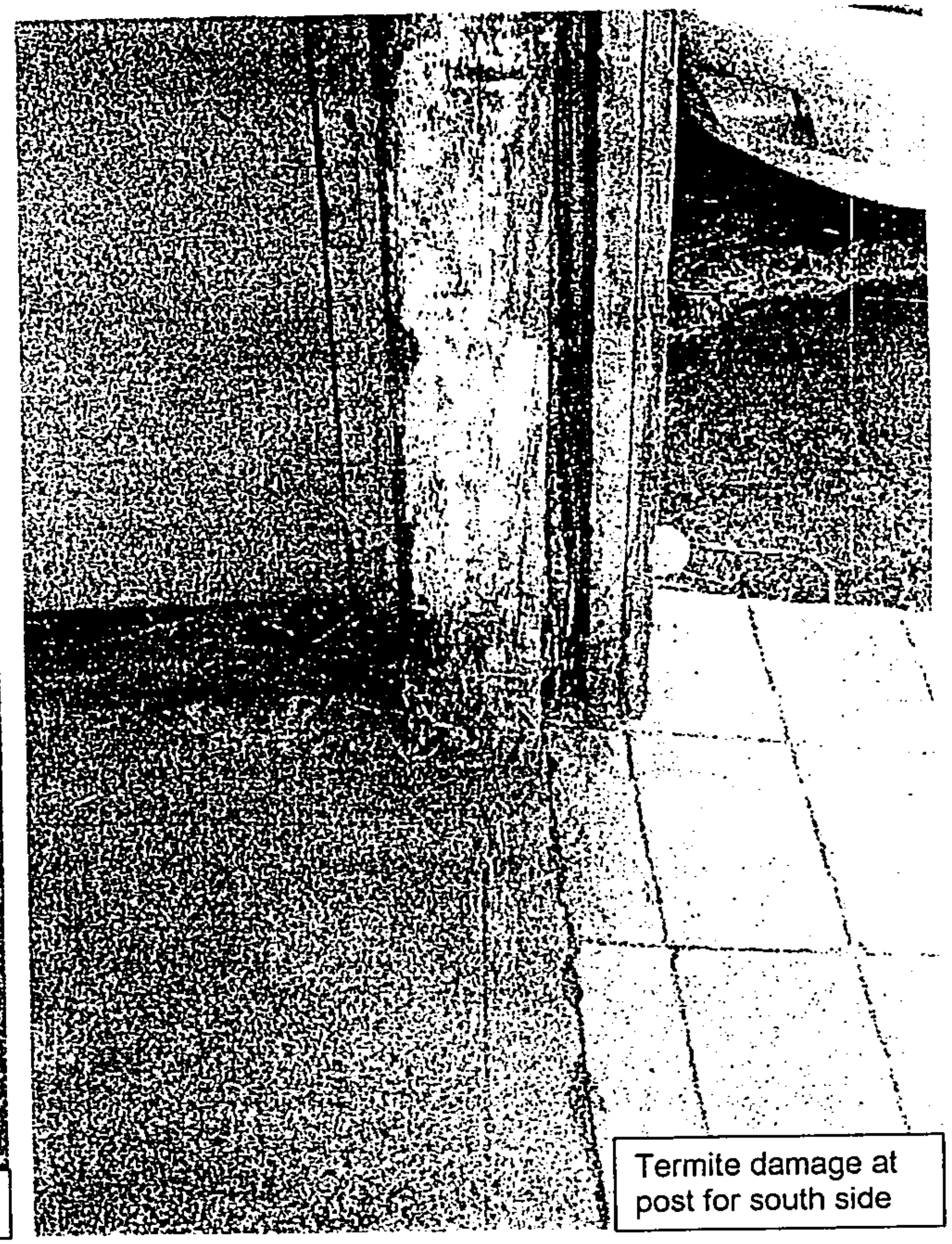

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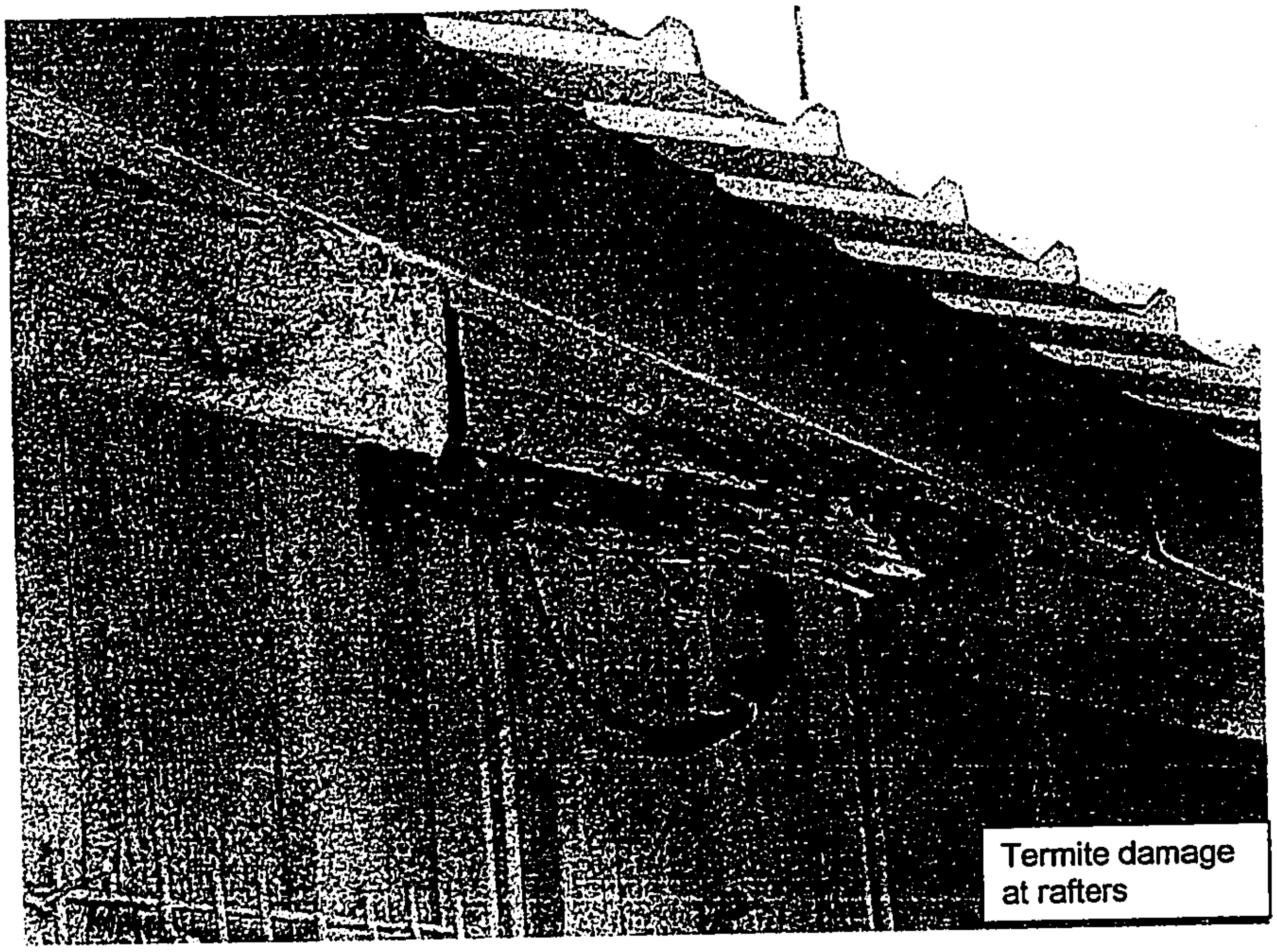
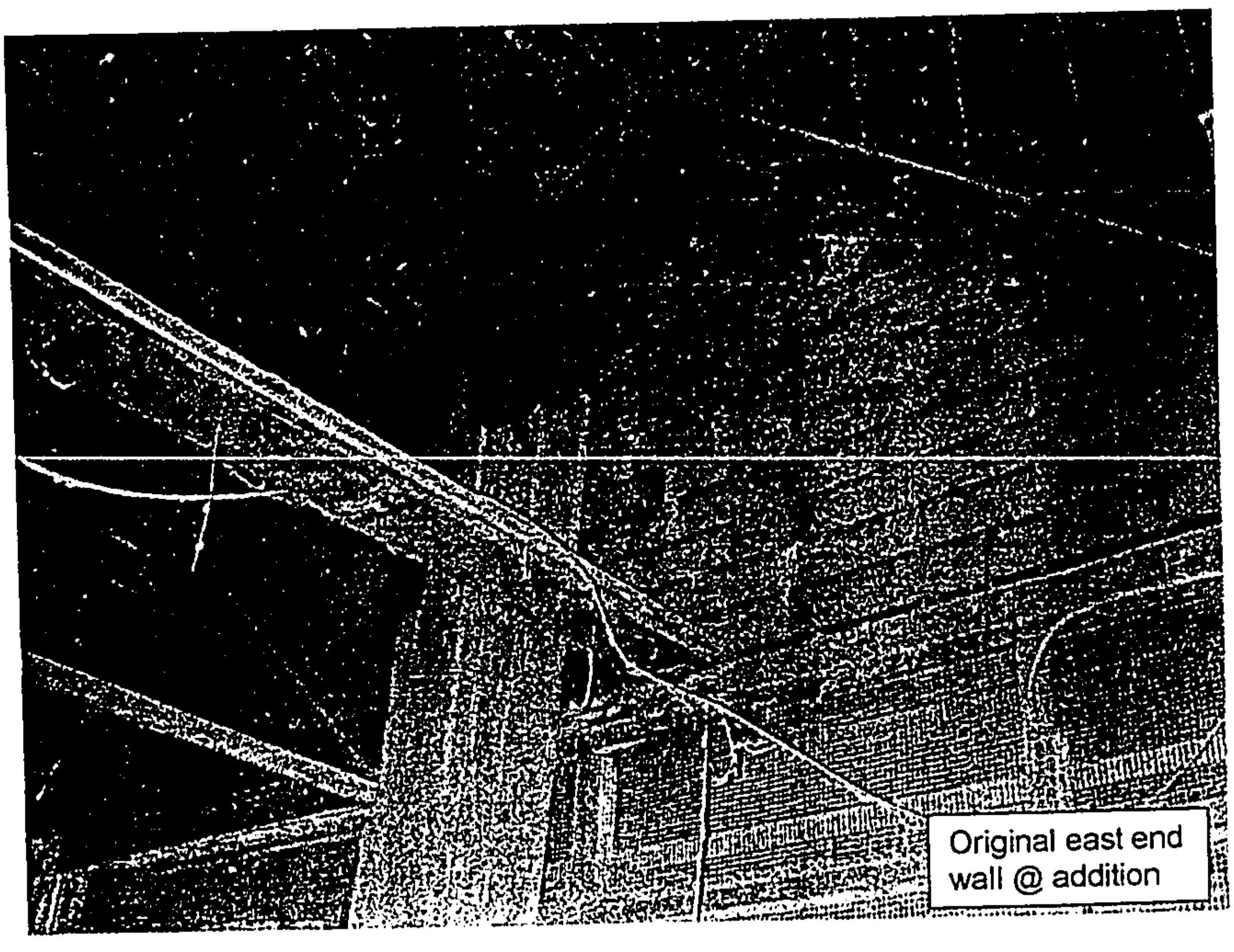


B22

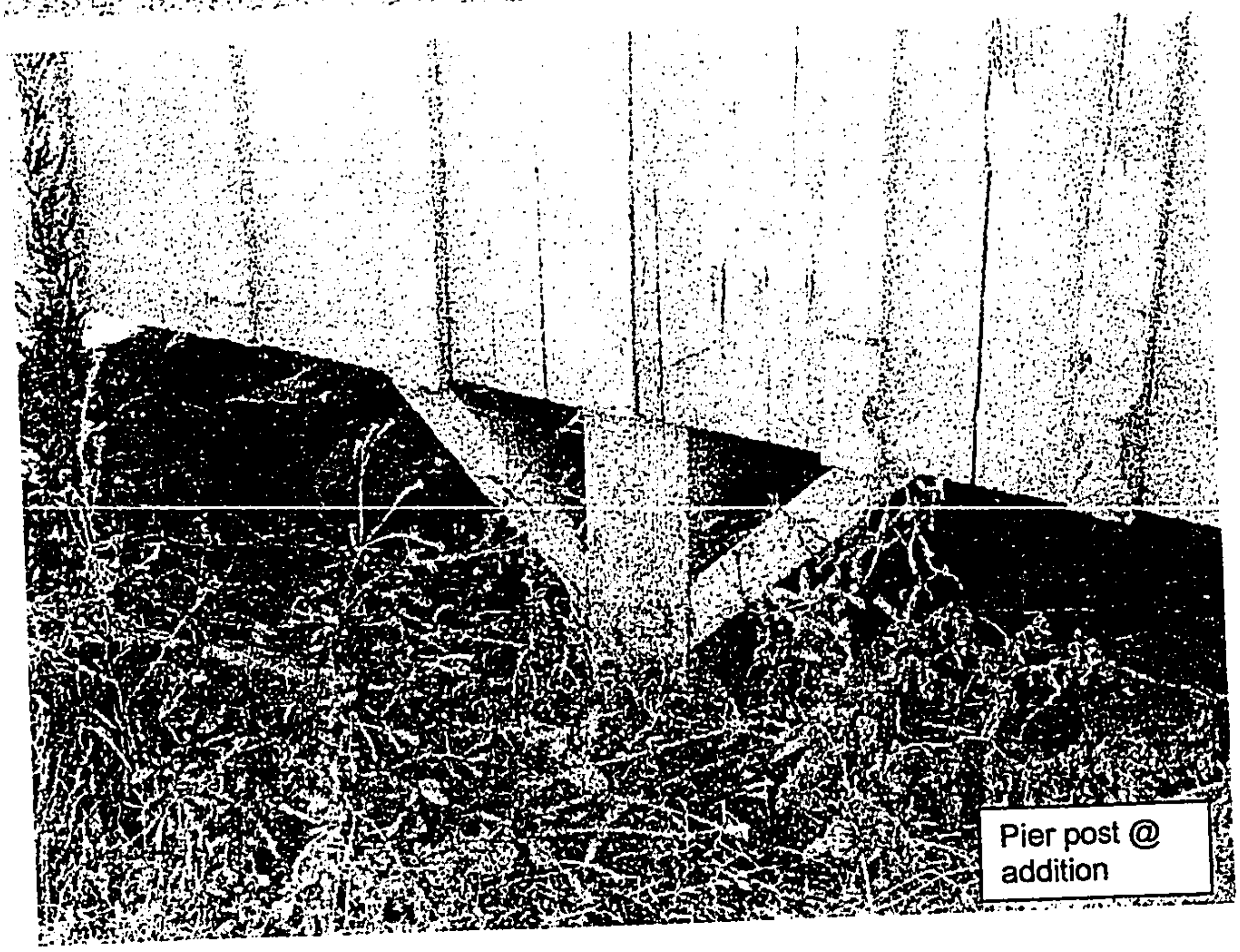
B23



B24

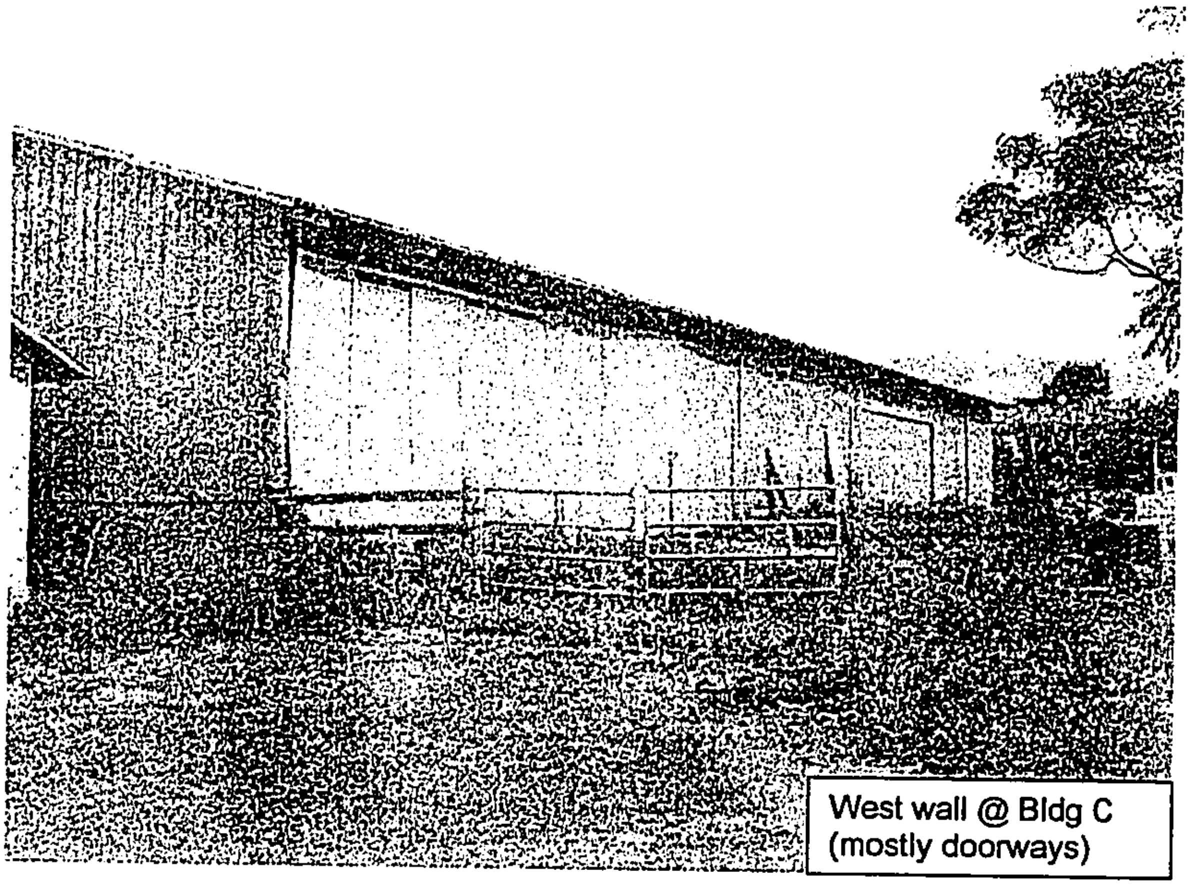
Pier post.
Termite damage
@ addition

B25



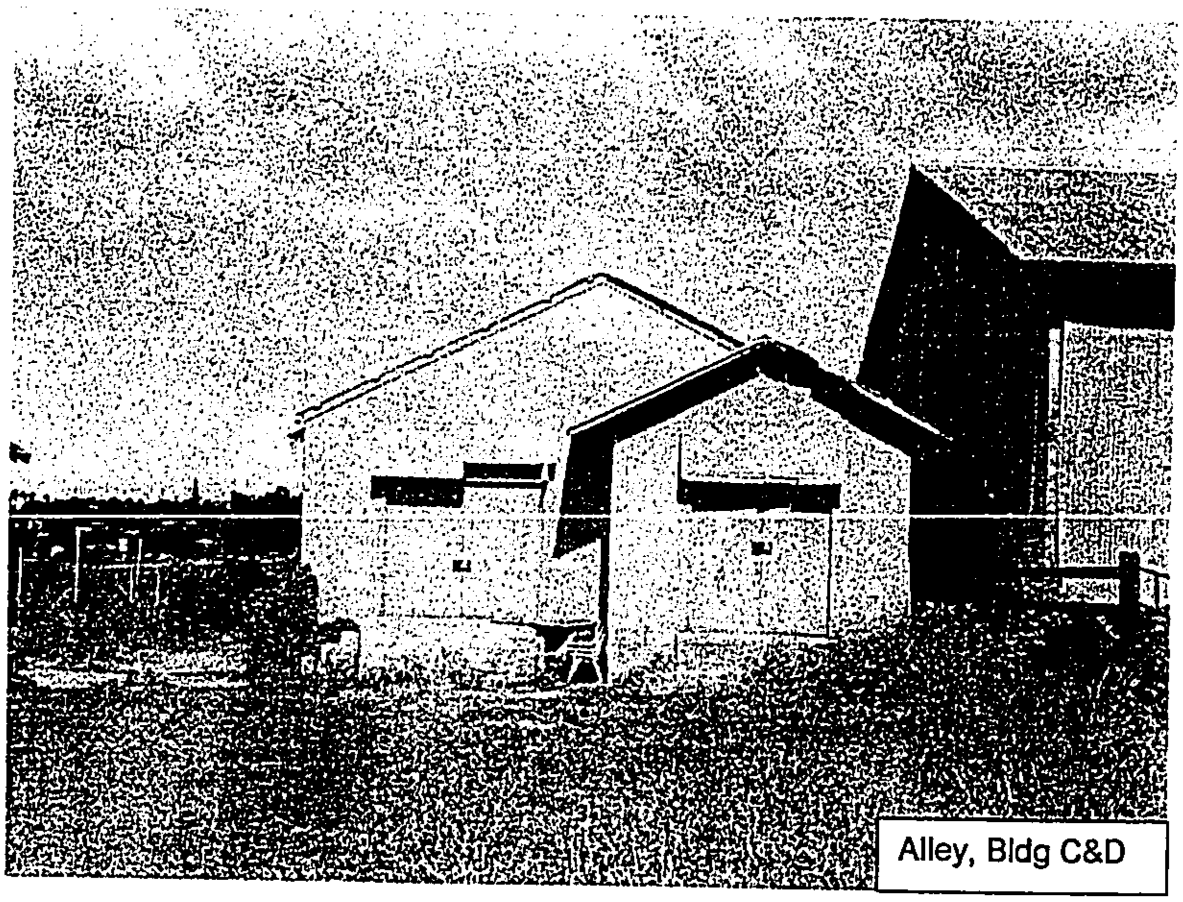
Pier post @
addition

B26



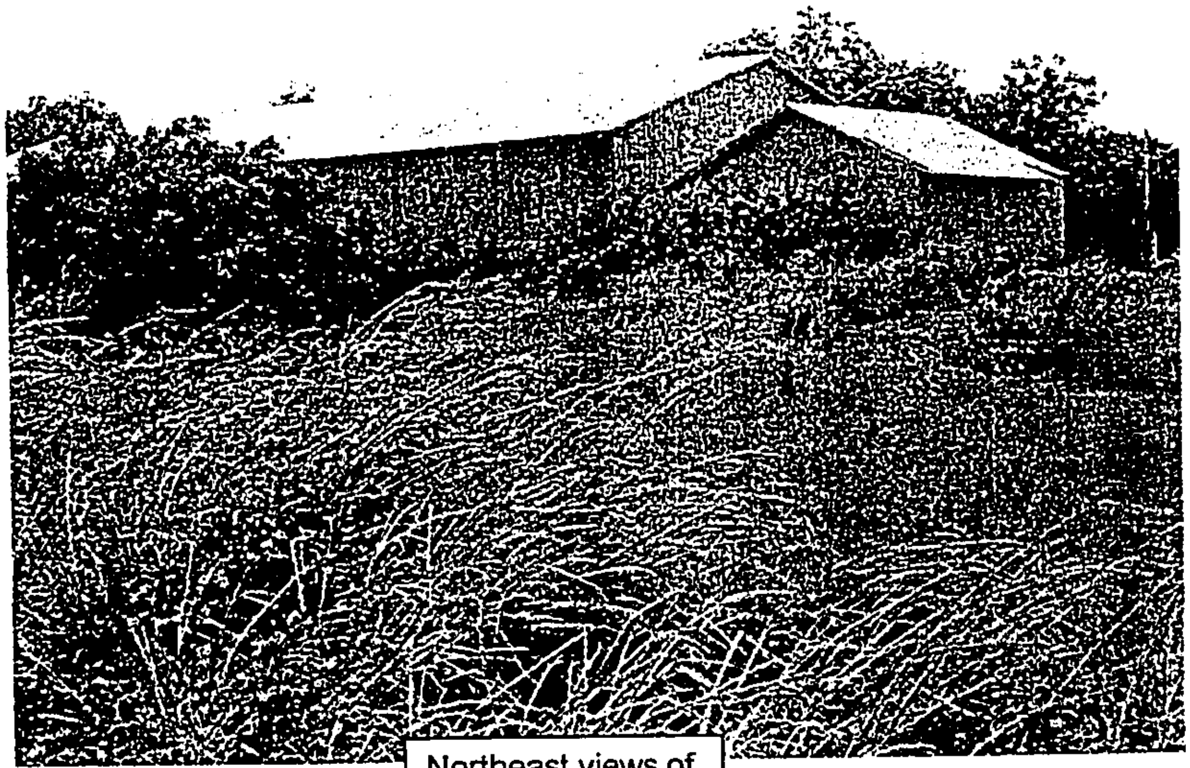
West wall @ Bldg C (mostly doorways)

C1



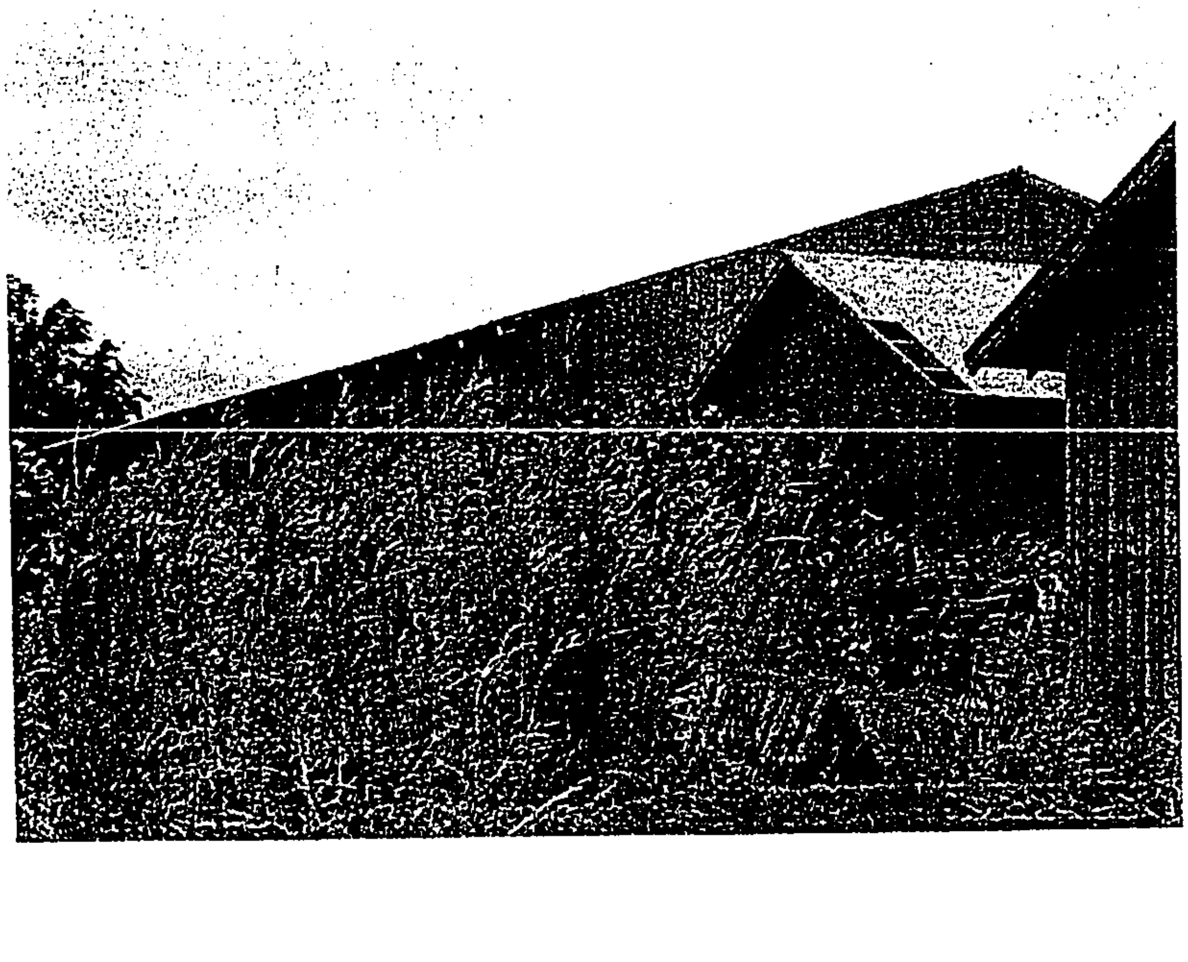
Alley, Bldg C&D

C2



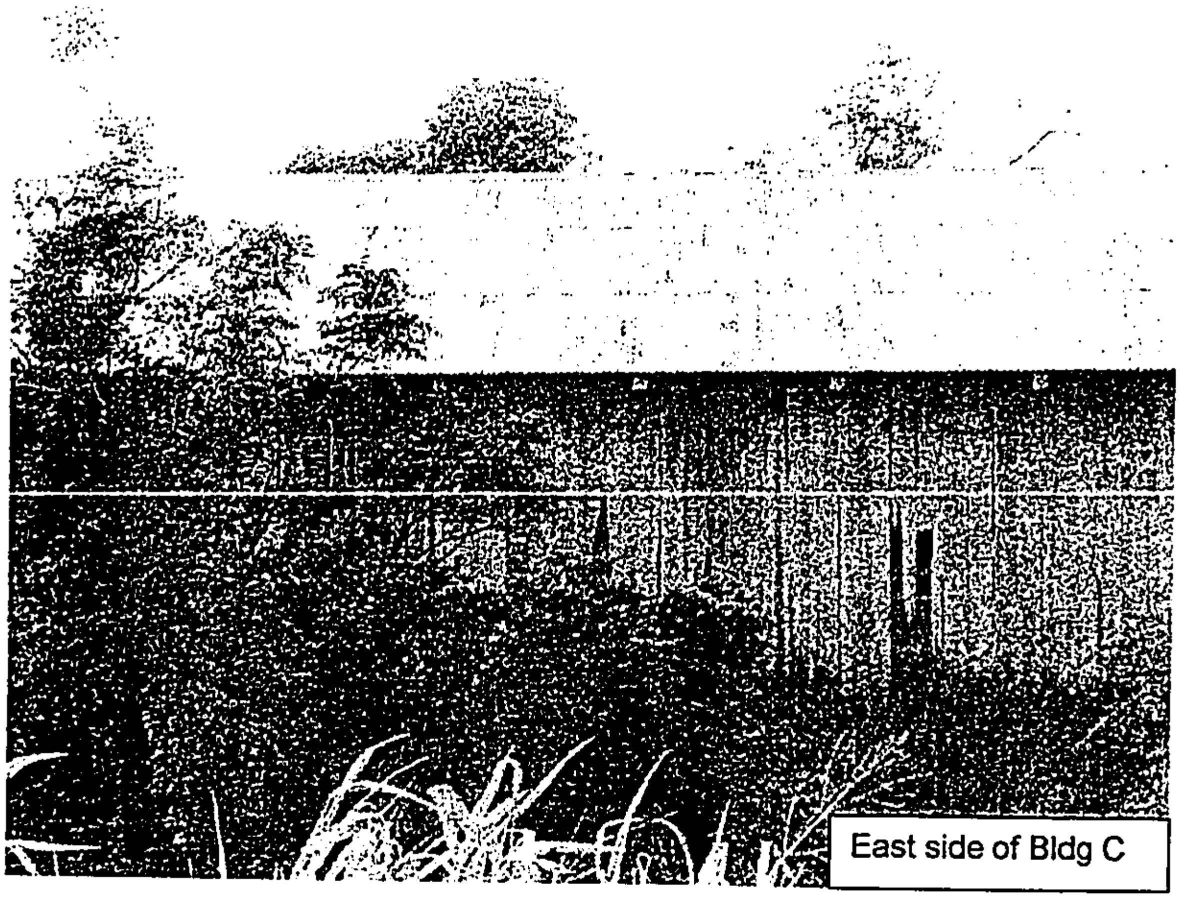
C3

Northeast views of
Bldgs C&D

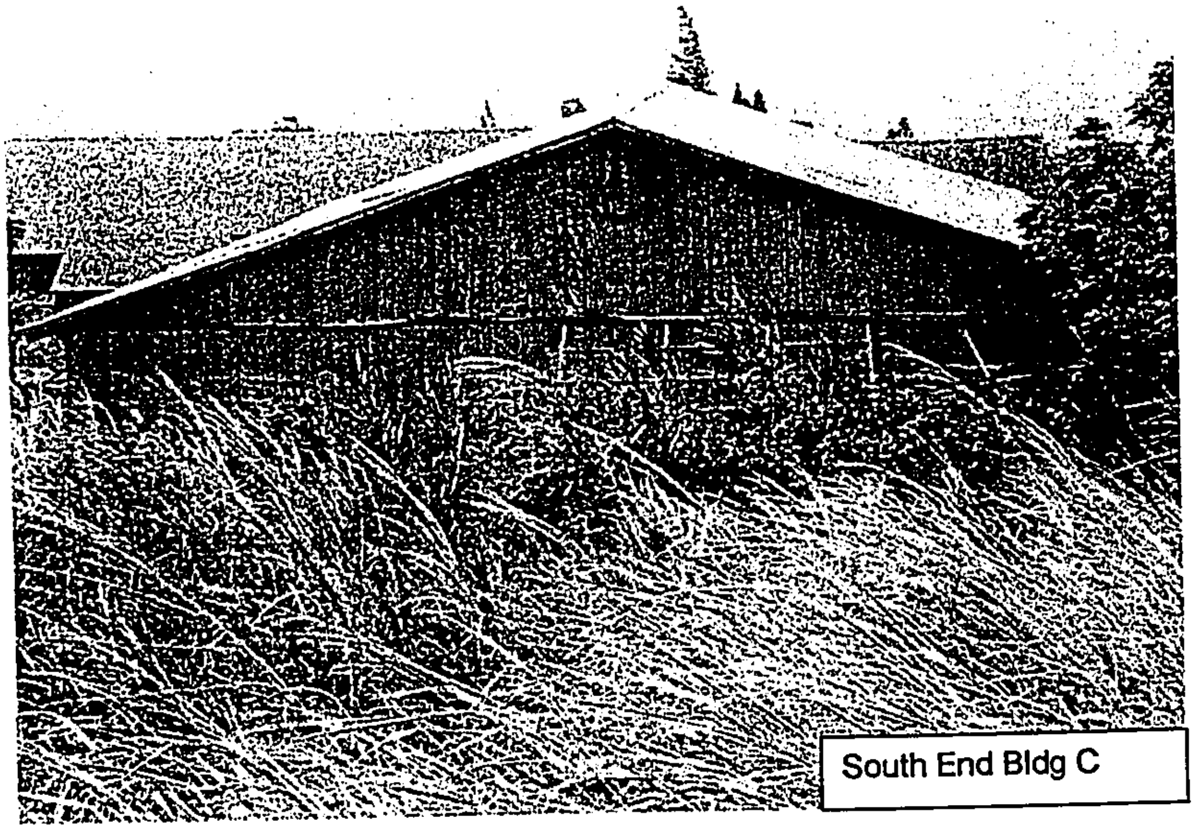


C4

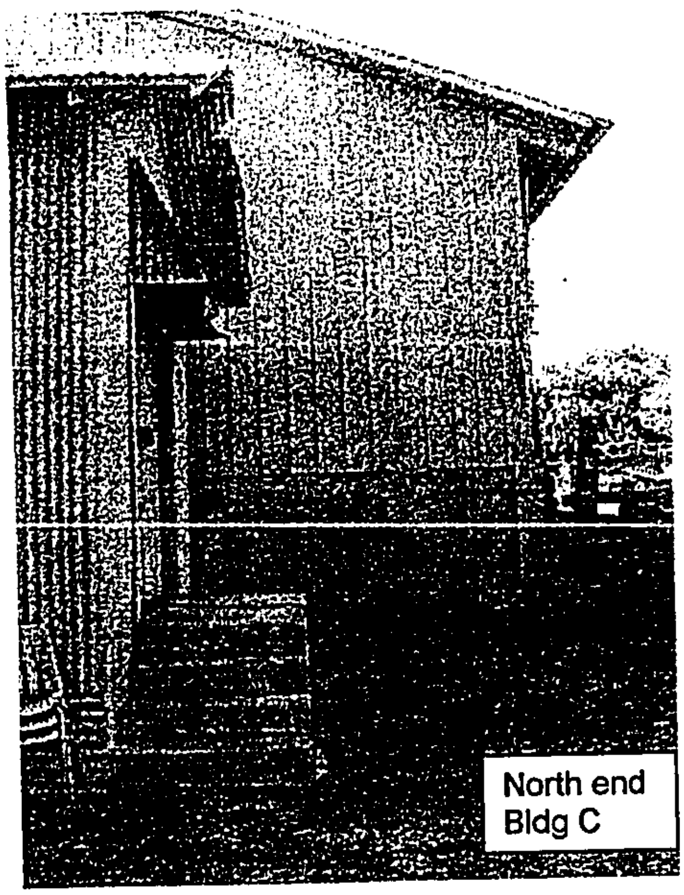
C5



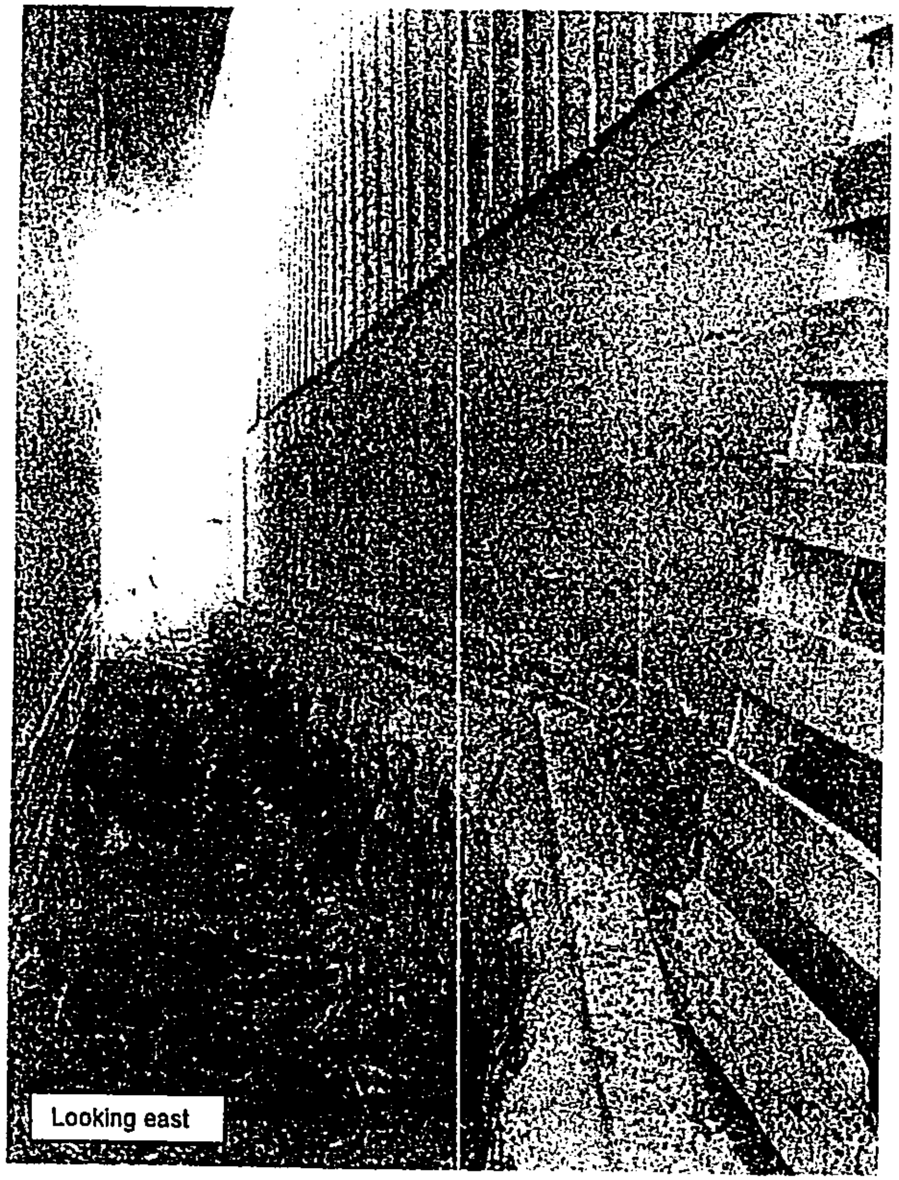
C6


South End Bldg C

C7


North end Bldg C

C8



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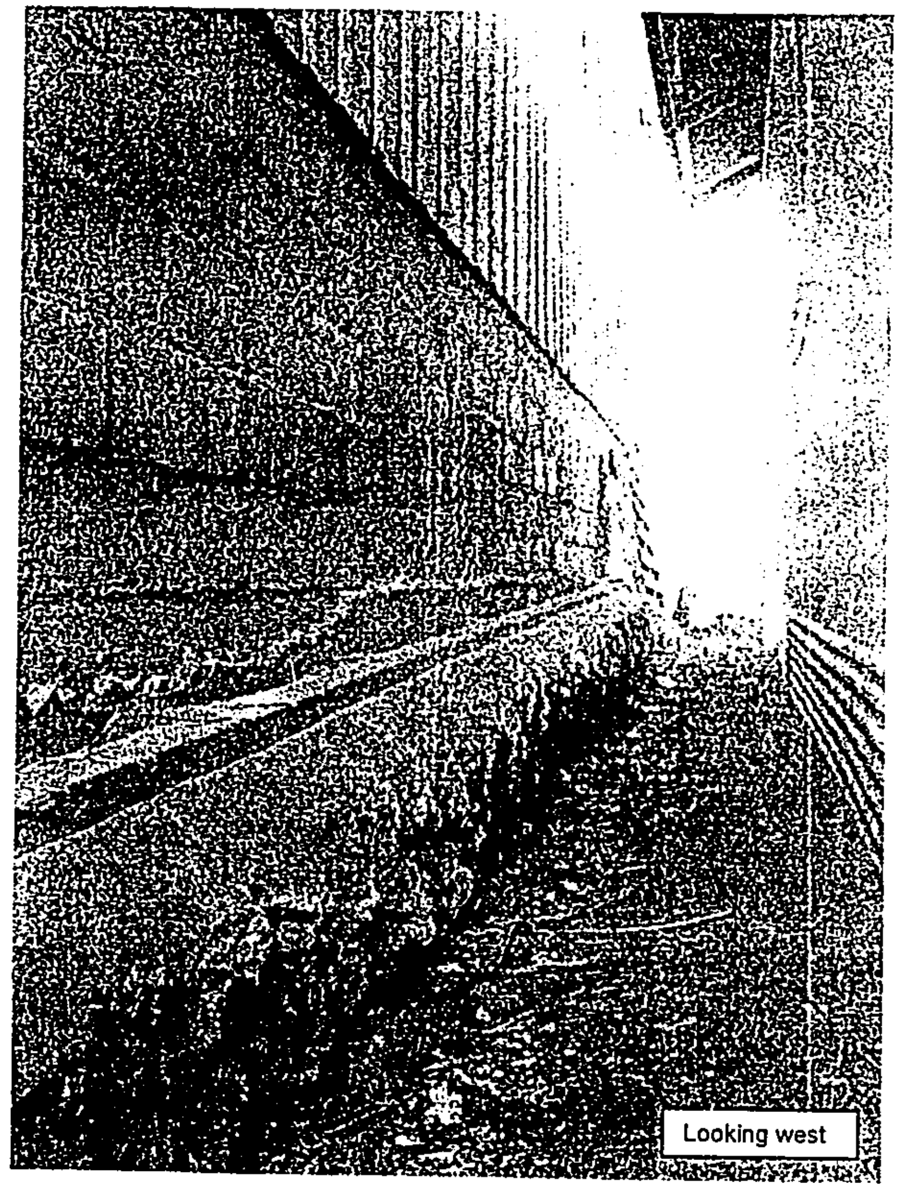
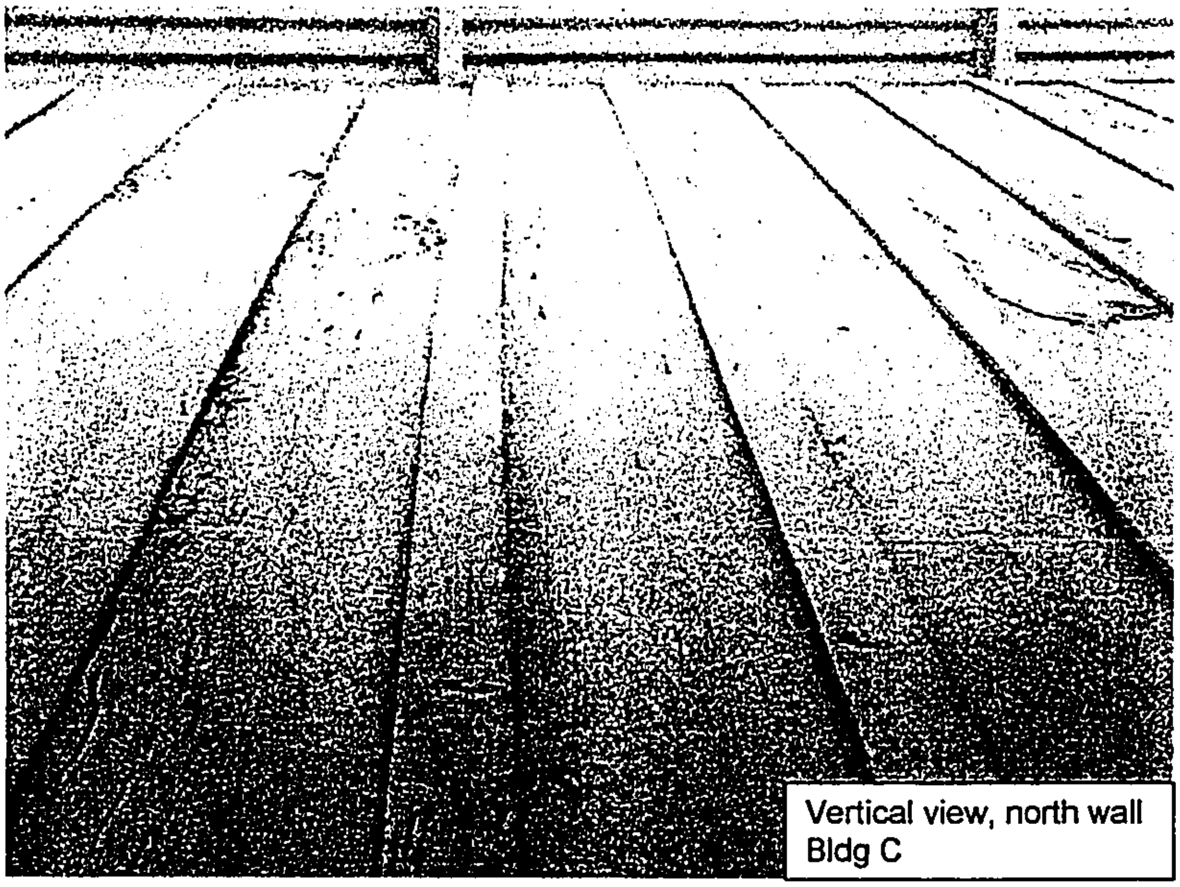


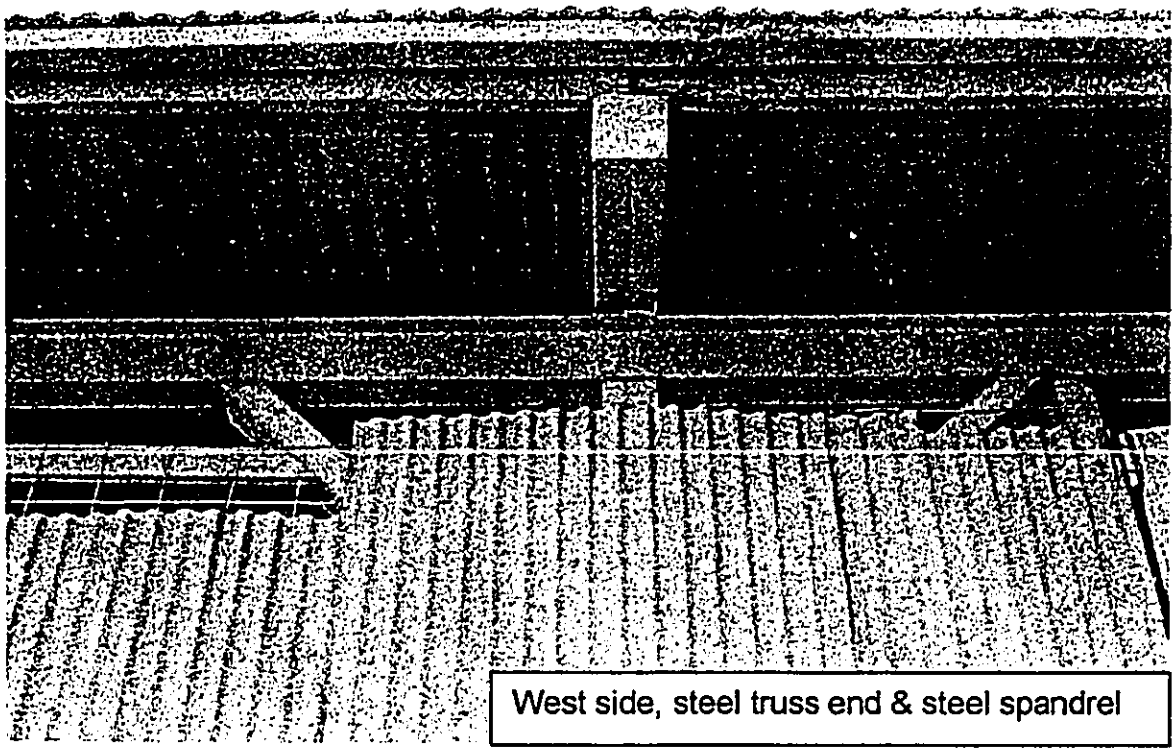
C10

Alley Between
Bldgs C & D



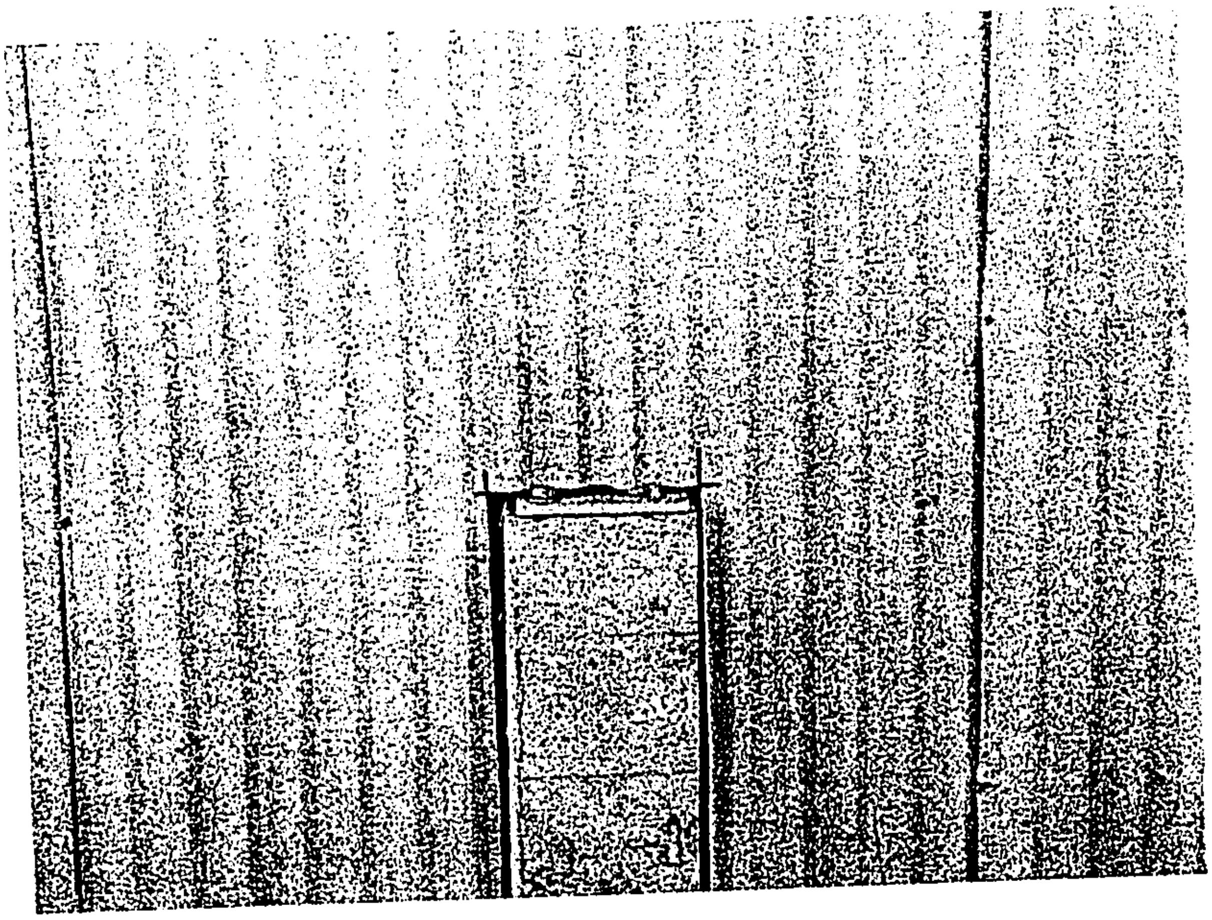
Vertical view, north wall
Bldg C

C11



West side, steel truss end & steel spandrel

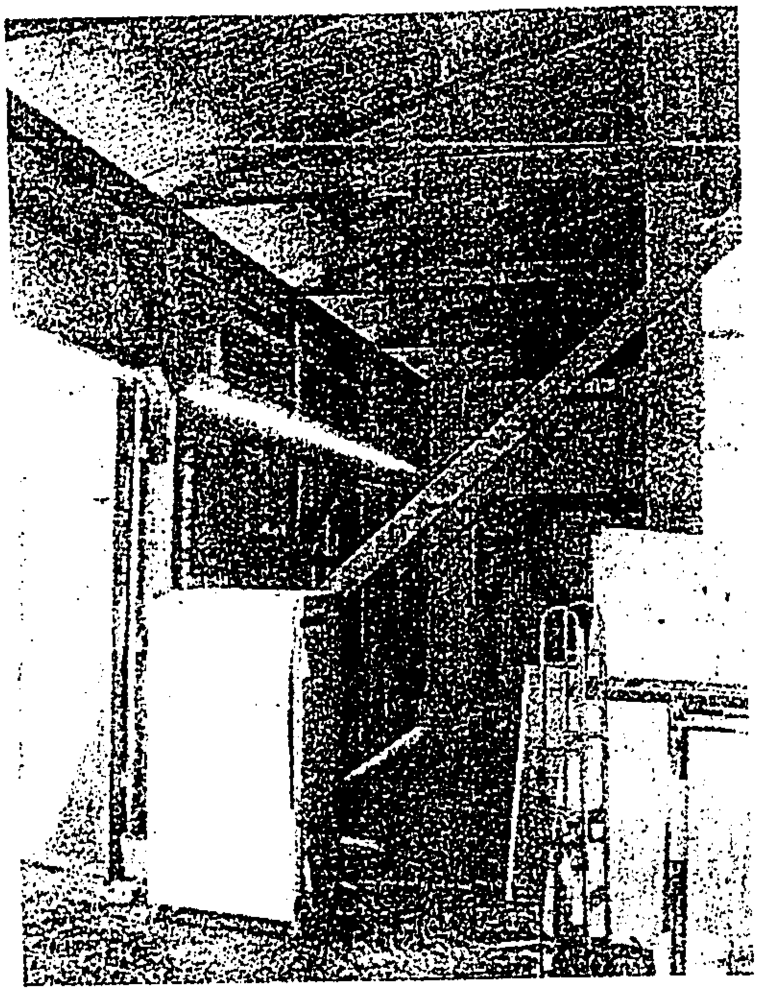
C12



C13

Concrete piers
@ steel frame

C14

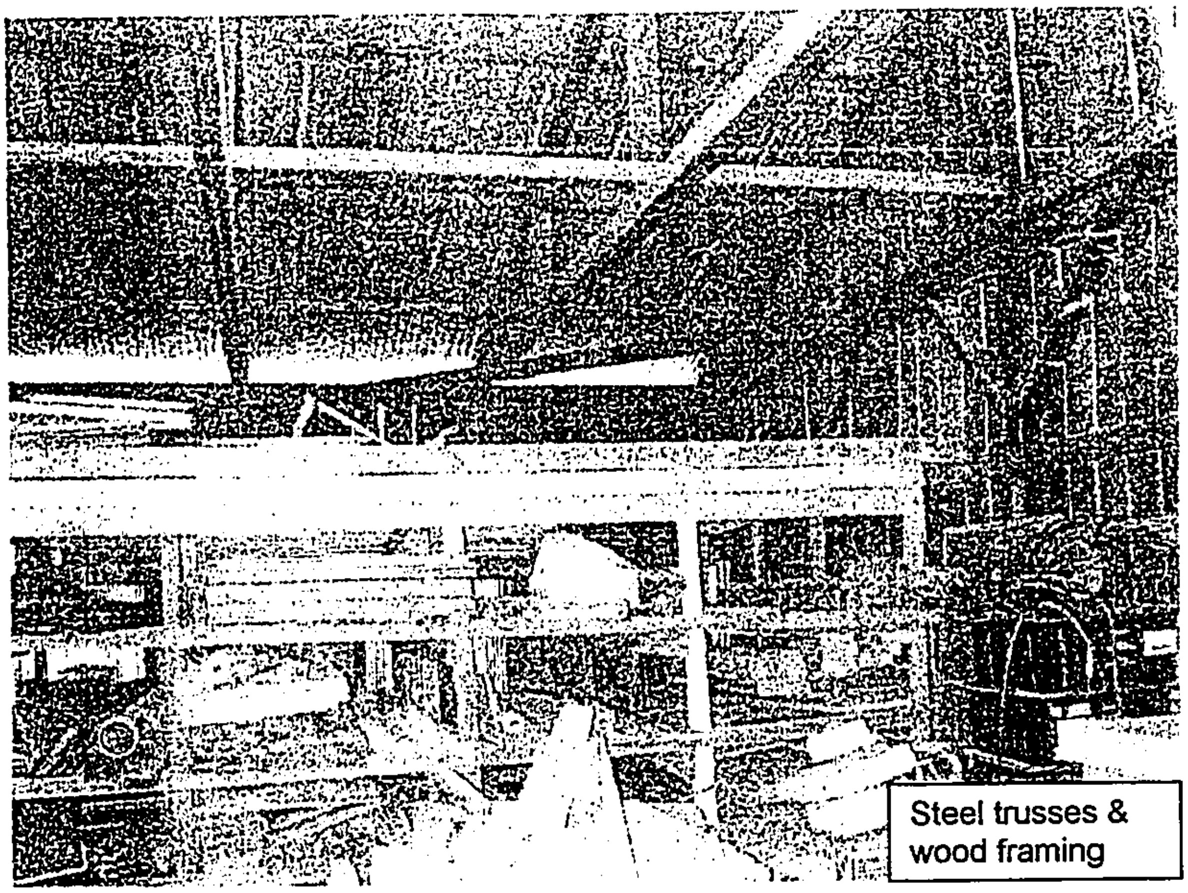


C15

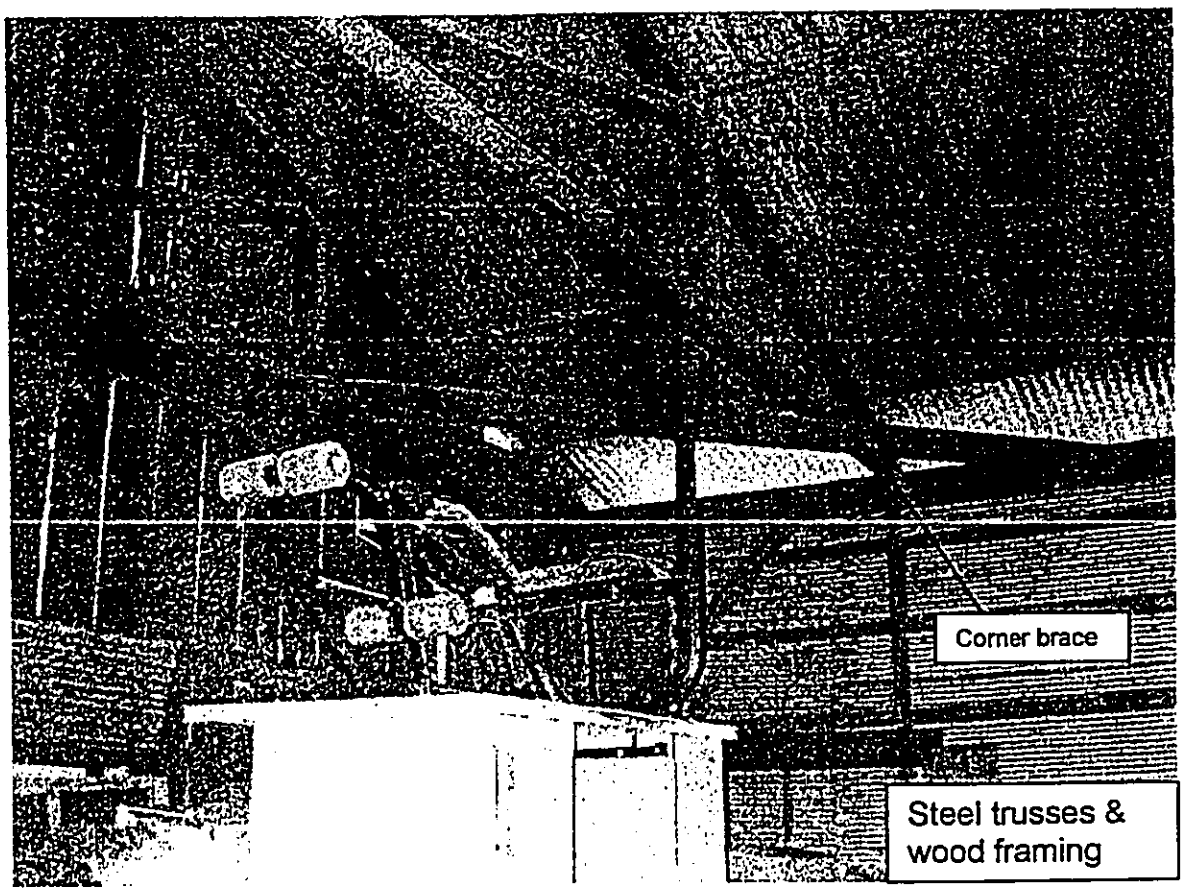
Steel diagonal bracing

C16

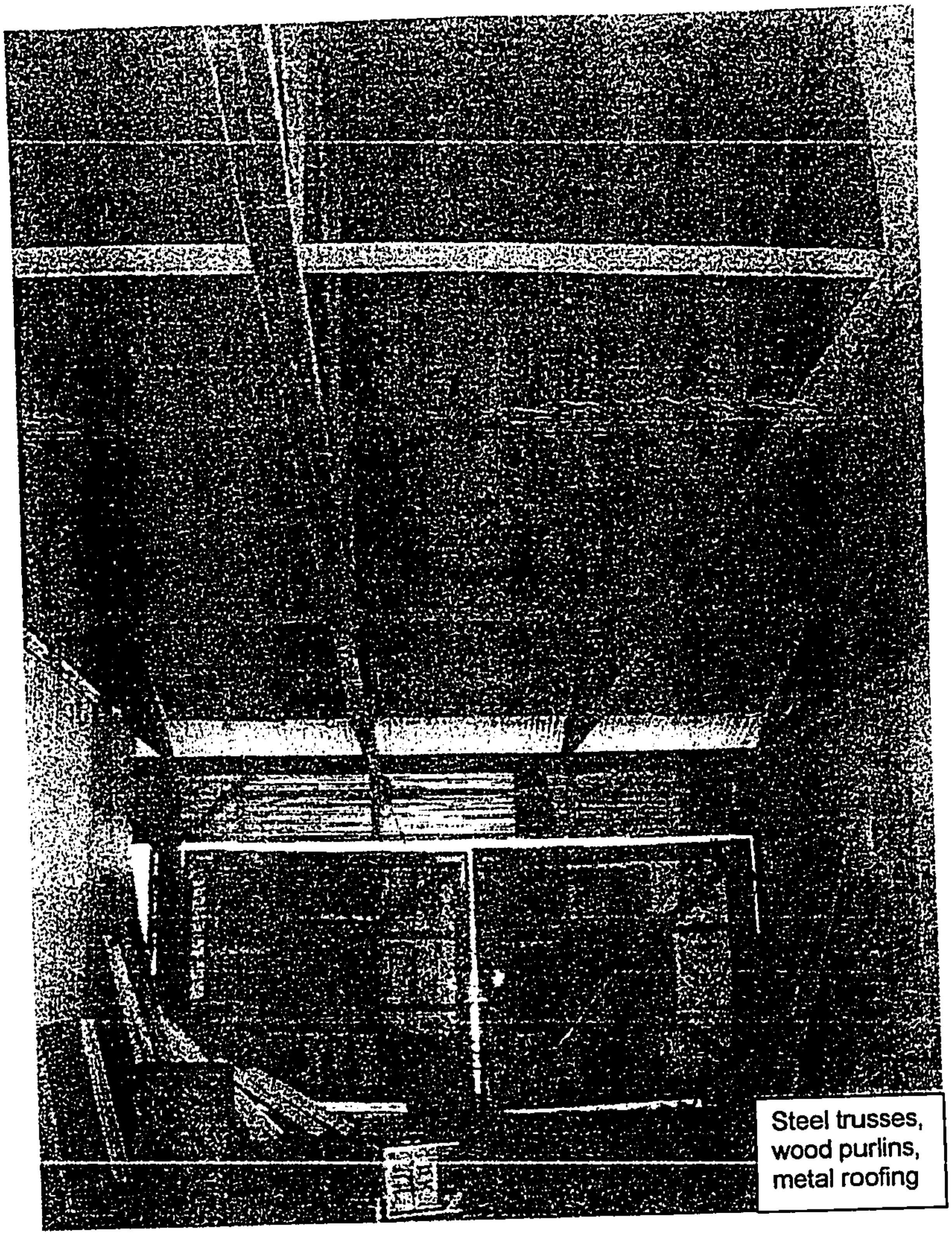
Steel roof truss & diagonal bracing


Steel trusses &
wood framing

C17


Corner brace
Steel trusses &
wood framing

C18



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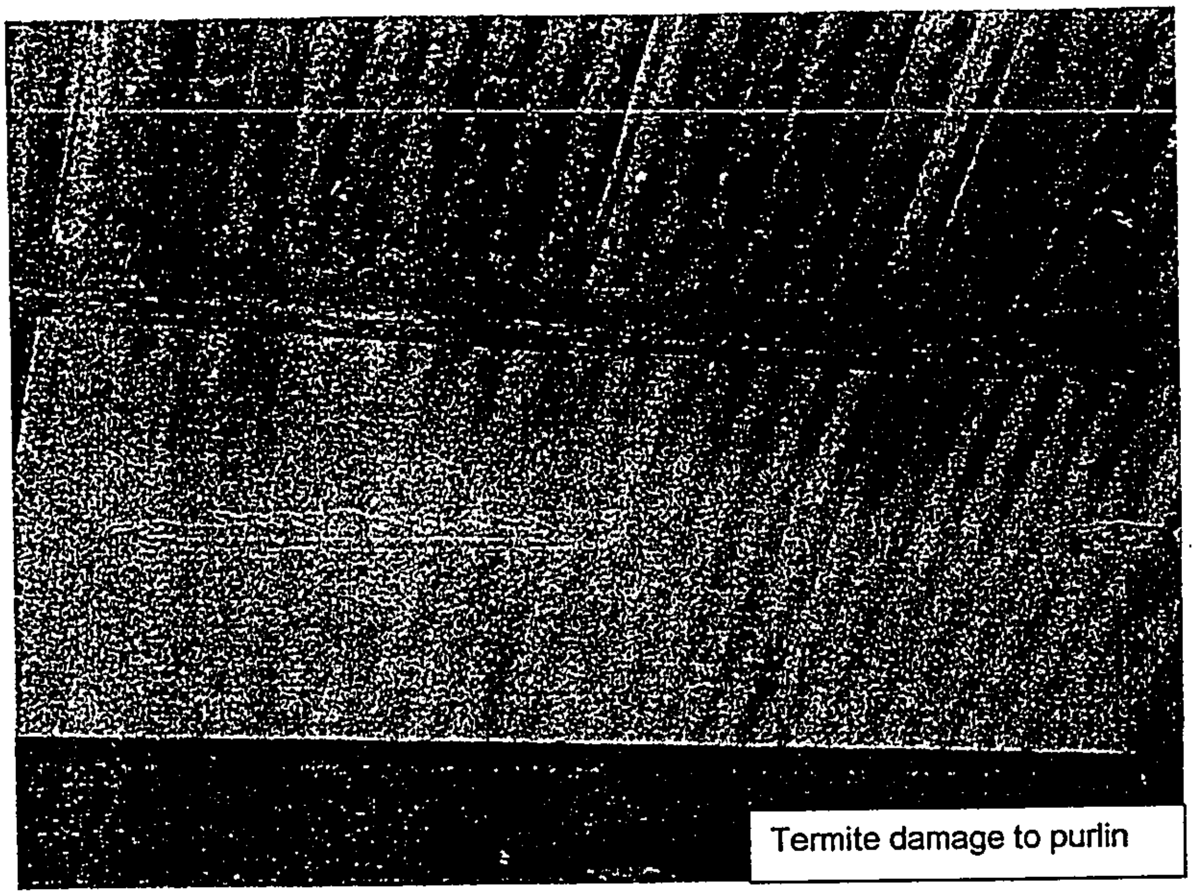

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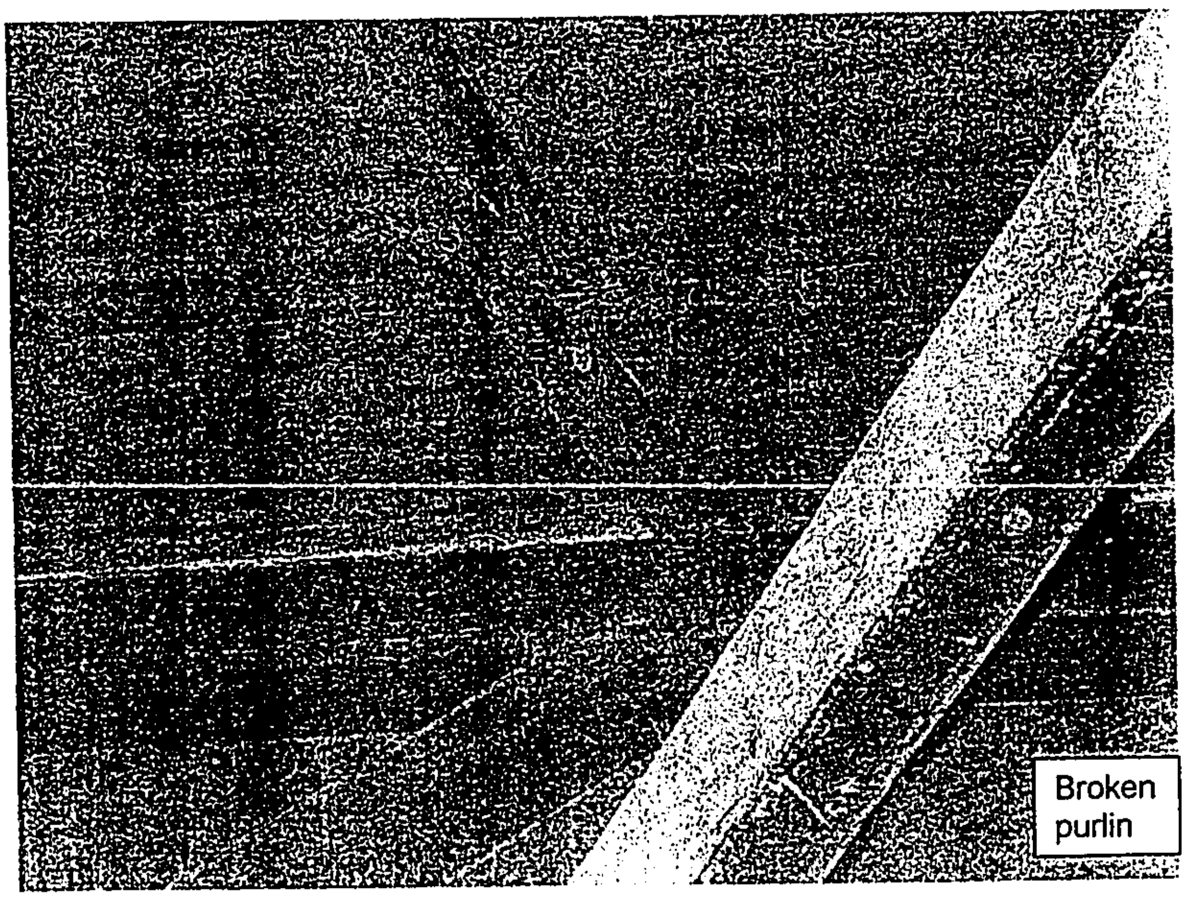


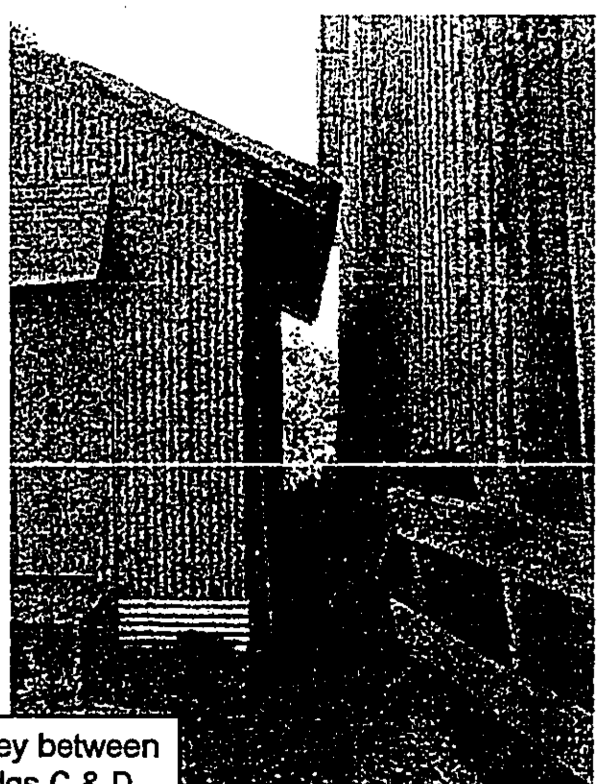
C21

West side Bldg D, north end Bldg C

D1

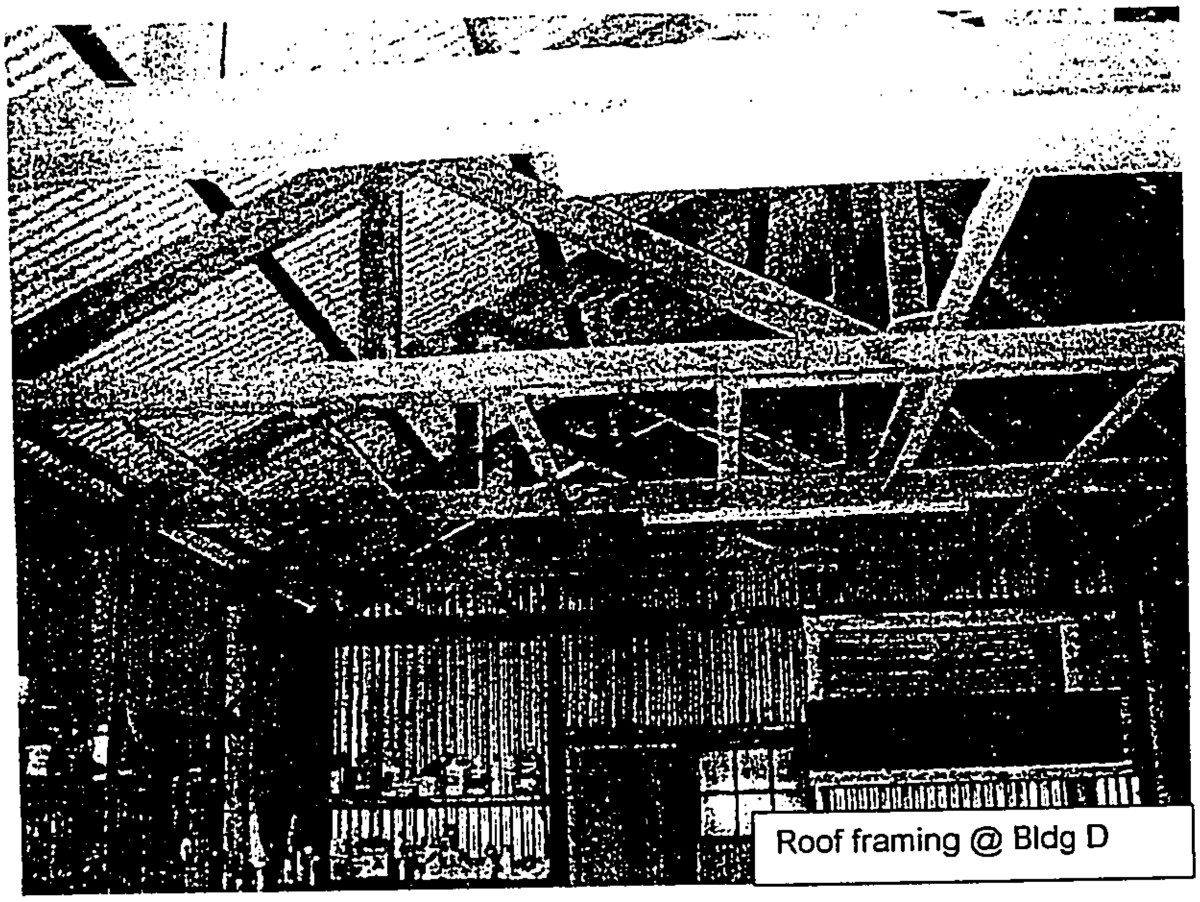
D2

Concrete stairs to Bldg D



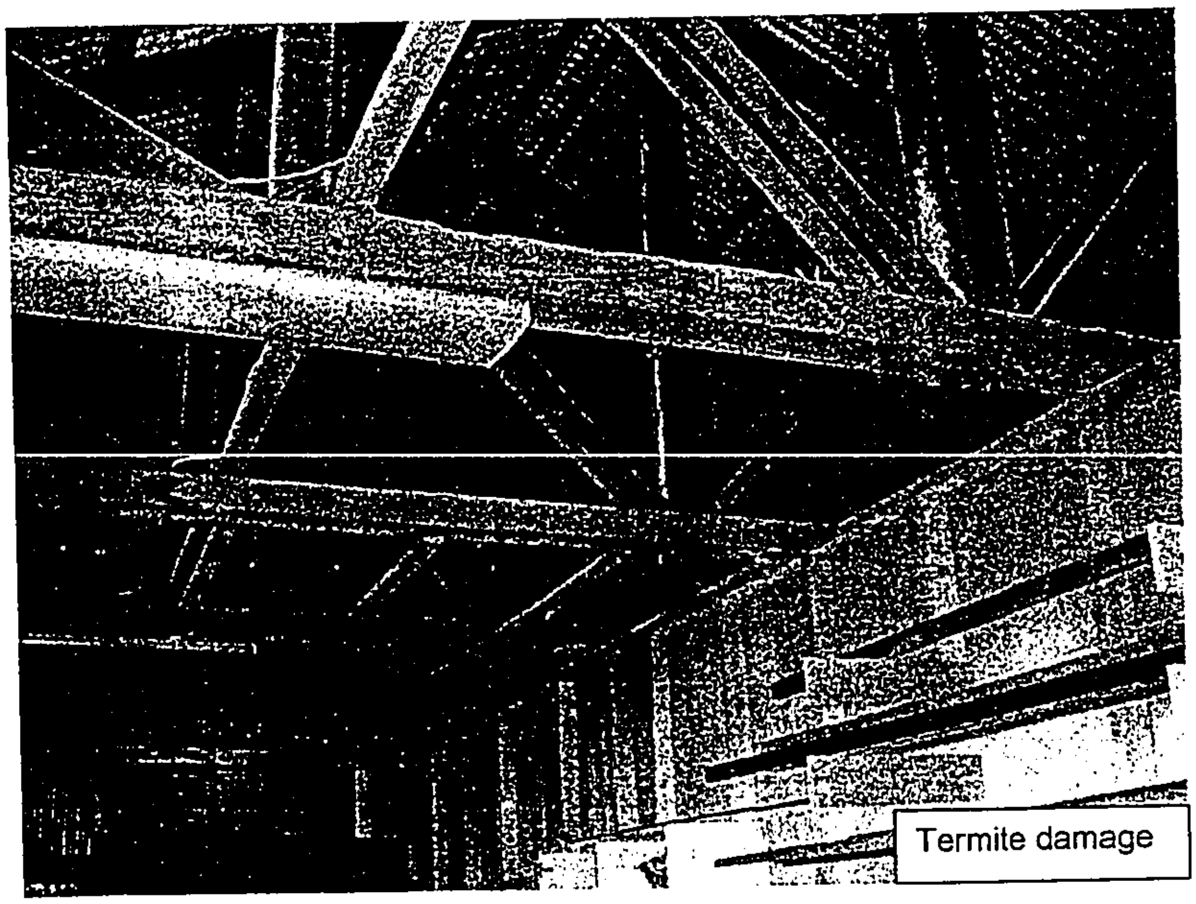
D3

Alley between Bldgs C & D



Roof framing @ Bldg D

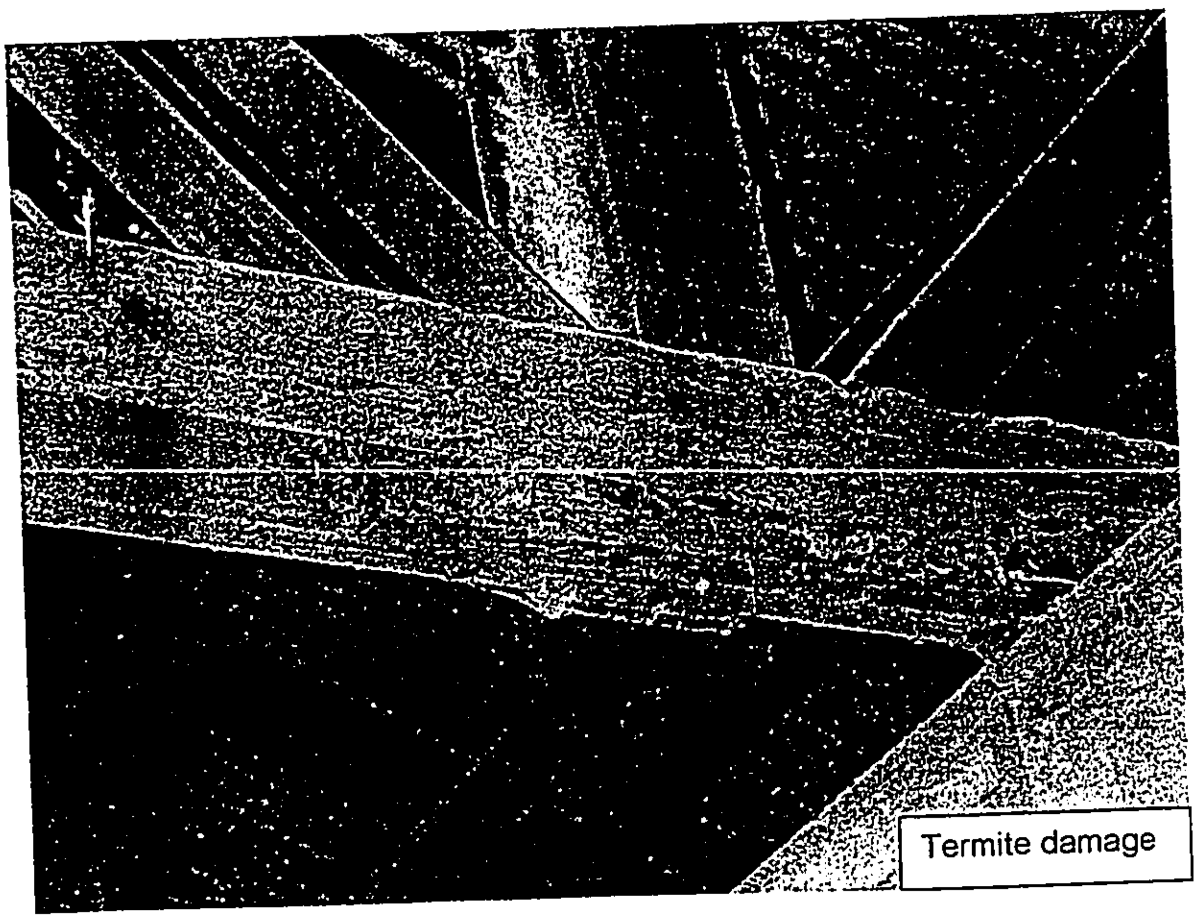
D4



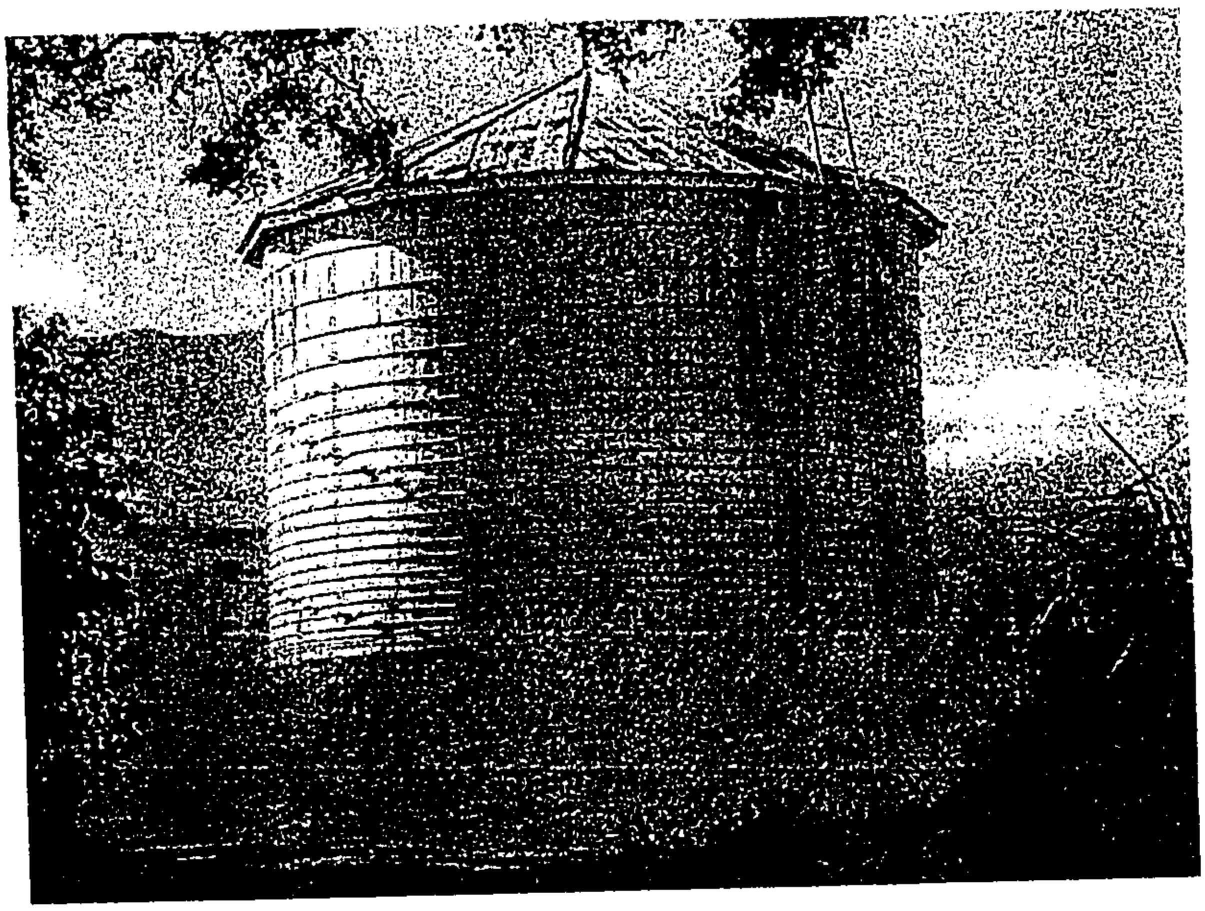
Termite damage

D5

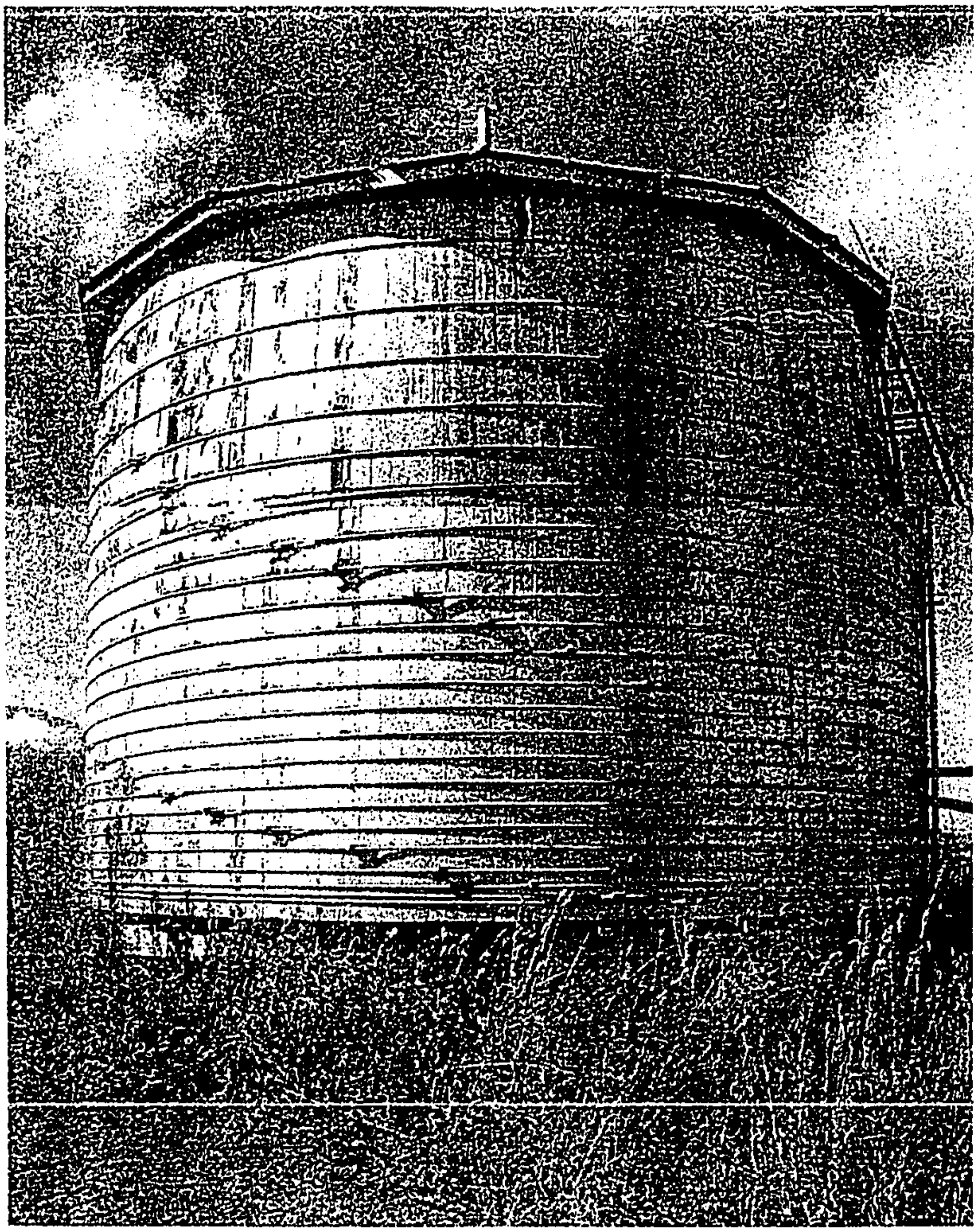
D6



D7



T1



T2-3

Appendix N

History and Architectural Analysis of Corn Mill Camp, Makawao, Maui, Hawaii (Niess & Duensing, January 2003)

HISTORY AND ARCHITECTURAL ANALYSIS OF CORN MILL CAMP
MAKAWAO, MAUI, HAWAII
TMK 2-3-07:08

Prepared for:

Maui Land & Pineapple Company, Inc.

Prepared by:

Jim Niess, AIA, Maui Architectural Group, Inc.
and Dawn E. Duensing, Historian

JANUARY 2003

TABLE OF CONTENTS

LIST OF FIGURES

EXECUTIVE SUMMARY

This report presents the results of on-site fieldwork and research conducted regarding the former Corn Mill Camp, TMK 2-3-07:08, in Makawao, Maui, Hawaii. Four historic warehouse buildings and one water tank remain on the site. The report was prepared for the Maui Land & Pineapple Company, Inc.

Historian Dawn Duensing prepared the historical section of this report, which discusses the origins of the Makawao Corn Mill Company in the 1890s and subsequent use of the site that eventually became known as "Corn Mill Camp." This history was based on research conducted in the Maui Land & Pineapple Company and Haleakala Ranch Company records. Additional research was completed at the Hawaii State Archives, the University of Hawaii Hamilton Library, the Hawaiian Historical Society library, and public libraries.

The "Building Inventory and Structural Analysis," prepared by Jim Niess, AIA, describes Corn Mill Camp's four potentially historic structures, which were built in the 1930s. The building inventory includes approximate construction dates as well as information on the structures' physical data and appearance. The structural analysis investigates each building's physical condition and judges the potential of each for rehabilitation and reuse.

The analysis of the former Corn Mill Camp, based on the research and fieldwork conducted, concluded that the four warehouse buildings retain a certain amount of historic integrity and may potentially be eligible for the Hawaii or National Register of Historic Places. Although the structures have undergone significant changes that may compromise their historic integrity, the buildings maintain some of historic character and are potential candidates for historic preservation. The structures are intact examples of plantation industrial architecture and construction methodology. These interesting utilitarian structures are evidence of the historical process through which these buildings have evolved to their present state.

The report concludes with an analysis and recommendations for the adaptive reuse of the warehouse structures. A discussion of adaptive reuse issues follows which includes the standards for rehabilitation of historic structures, and tax incentives for preservation. Analysis by a structural engineer should be undertaken to determine the economic and technical feasibility of bringing these structures into compliance with contemporary codes and thus evaluate the potential for adaptive re-use.

HISTORY OF CORN MILL CAMP

The Makawao Corn Mill Company: Origins and Early Success

The establishment of a corn mill on Maui dates to an era when the Hawaiian Islands were more self reliant and less dependent on importing supplies from the Mainland. Prior to the development of large-scale agricultural crops such as sugar and pineapple for commercial export, farmers and ranchers in Hawaii experimented with a variety of crops, including corn, rice, and potatoes. The earliest mention of growing corn on Maui was probably in 1854 when George Bates noted that "Indian corn crops grown in Makawao attained great perfection."[1] Corn had become a profitable crop by the mid 1860s when the Hawaiian Islands exported 29,853 pounds of the product.[2] In 1889 the Kula area was described as "very desirable for raising corn."[3]

In January 1892 Louis von Tempsky decided that corn could be a profitable commodity and founded the Makawao Cornmill Company. His partners in this enterprise were his brother, Randall von Tempsky, and Llewellyn F. Hughes. Von Tempsky's new company operated on two acres of land in Makawao known as the "David Crowningburg pasture," which was leased from the Haleakala Ranch Company. The exact location of this two-acre parcel is not clear. Haleakala Ranch granted von Tempsky permission to establish a corn-grinding business on the property and provided surplus water privileges that would allow him to run a twelve to fifteen horsepower engine, which would presumably drive his corn mill. Von Tempsky was also allowed pasture privileges for thirty head of oxen, which were to be used to cart material (corn) to and from the premises. For the privilege of starting his corn mill operations, von Tempsky was to pay Haleakala Ranch $125 annually for a period of ten years.[4]

The *Hawaiian Gazette* disclosed that von Tempsky's corn mill was in operation and grinding out "first-class cracked corn" in February 1892. In an era when plantation agriculture depended on draft animals rather than machines, the newspaper optimistically expected corn to be a lucrative product in the Hawaiian Islands. It noted that corn was a superior feed for stock, being better than ground barley at about half the price. Maui plantations reportedly placed large orders for von Tempsky's corn, which sold for $30 per ton. Approximately 4,000 acres of corn were being grown in Kula at the time with expectations that nearly the entire crop could be sold on Maui. The newspaper predicted that von Tempsky's corn mill would be a Makawao landmark, noting that a whistle was to

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[1] George Washington Bates, *Sandwich Island Notes By a Haole*, (New York: Harper and Bros., 1854), 317-318.
[2] "Annual Review of the Commerce and Agriculture of the Hawaiian Islands for 1865," *Pacific Commercial Advertiser*, February 2, 1866.
[3] "History from our Files -- 60 Years Ago - 1889," *Honolulu Advertiser*, July 8, 1949, 12.
[4] Lease between Louis von Tempsky and Haleakala Ranch, January 1, 1892.

be installed "whose clarion notes will wake the echoes of pastoral Makawao several times a day."[5]

The Makawao Cornmill Company appeared to be successful by the end of its first year of operation, with an estimated 1892-1893 production exceeding 300 tons. Its customers included Haleakala Ranch Company, Paia Plantation, and von Tempsky's own Erewhon Cattle Station. Although it is unclear whether von Tempsky was involved with the actual growing of corn, he purchased corn from growers in Omaopio and Pulehunui. Other unspecified areas, probably also in the Kula District, were also under corn cultivation.[6]

The last known mention of the corn mill company in Makawao was in *Husted's Directory of Honolulu and Hawaiian Territory* for 1900-1901. The publication listed Haleakala Ranch Company as the proprietor of the "Haleakala Corn Mill" in Makawao. At that time, the corn mill was managed by Louis von Tempsky, who had also been named manager of the Haleakala Ranch Company in 1898.[7] It is not clear when the business became part of Haleakala Ranch. A Haleakala Ranch Company history published in *The Maui News* in 1926 noted that Haleakala Ranch leased 1,000 acres for corn planting during the 1890s and produced about 3,000 pounds of shelled corn at the company's mill.[8]

Corn Production on Maui, 1900-1920

Although no written records were located to verify the continued existence of the Makawao (Haleakala) Cornmill Company after 1901, the business may have operated through the World War I years.

During the early 1900s, Hawaii had a good market and good prices for field corn, with local production not able to keep up with demand. Although corn crops were plagued by a variety of "serious obstacles," including pests and high winds, a number of farmers and ranchers were using modern machinery and planting new crop varieties to cultivate corn on a larger scale.[9] By 1909 3,200 acres of corn were planted in Hawaii, with only sugar and pineapple surpassing corn in the number of acres under cultivation. While corn was most successfully grown at higher elevations (up to 5000'), the Kula area on Maui was noted for producing moderate yields. A major factor limiting corn production in Hawaii was rainfall.[10] Rainfall was a problem in Kula, where a drought in 1912 limited production

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[5] "The Kula Corn Mill," *Hawaiian Gazette*, February 23, 1892, 9; *Hawaiian Gazette*, March 8, 1892, 10.
[6] Agreement of Sale for Corn Crop between Haleakala Ranch Company and Makawao Corn Mill Company, October 1, 1892; Paia Plantation ledger sheet, November 1892.
[7] *Husted's 1900-1901 Directory of Honolulu and Hawaiian Territory*, (Honolulu: Polk-Husted Directory Company, 1912), 621, 659; John William Siddall, ed., *Men of Hawaii*, V. II (Honolulu: Star-Bulletin Ltd., 1921), 395.
[8] "Ranch Life on Slopes of Giant Haleakala," *The Maui News*, December 4, 1926, sect. 6, 3.
[9] Jared G. Smith, *Agriculture in Hawaii*, (Honolulu: Evening Bulletin Print, 1908) 35.
[10] Perry F. Philipp, *Diversified Agriculture in Hawaii*, (Honolulu: University of Hawaii Press, 1953),127-128.

so severely that farmers were advised to grow onions until it was possible to successfully irrigate corn.[11]

Historian Ralph Kuykendall reported that cornmeal was being ground and coming to market in "considerable quantity" on Maui during World War I. He explained that the popularity of corn and cornmeal was a patriotic response to the Territorial Food Commission's 1917 request for citizens to observe "wheatless Wednesdays" by consuming cornmeal and other grains instead of white flour.[12] While "wheatless days" were also encouraged on the Mainland, it was considered especially important in the Hawaiian Islands as a way to conserve valuable shipping space and thus help the Allied war effort. *The Maui News* reported that Mauians were quite successful in their quest to go "wheatless." The Lahaina Store announced that it had reduced its wheat sales by such a large margin that it might not stock any wheat products in the future.[13] By mid 1918 Maui had such a surplus of white flour on store shelves that officials considered shipping the flour back to the Mainland before it spoiled.[14]

Kuykendall's claim that Maui was producing "considerable quantities" of cornmeal during World War I could not be verified in a search of newspaper accounts and the Territorial Food Commission records at the Hawaii State Archives. Commission documents did not mention corn milling in Makawao. One letter did note, however, that the "five gentlemen comprising the Baldwin family" were contemplating how best to dry corn and then send it to Honolulu for milling,[15] which raises the question of whether the Makawao corn mill was in operation. It is reasonable to assume that the Makawao corn mill was in business during the war and that the Baldwins requirement for facilities to mill their corn meant that the Makawao was operating at peak capacity. According to *The Maui News*, "thousands of acres of corn, beans, and other food crops on a large farm or plantations scale" (including Grove Ranch and Paia Plantation) were being grown on Maui in 1918. After the patriotic "wheatless days" were enacted on Maui, the demand for corn feed increased, and prices skyrocketed.[16] This abundant production of corn along with the high demand for cornmeal and corn feed probably kept the Makawao mill quite busy, as there was no other known mill on Maui to grind corn.

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11 *The Maui News*, September 21, 1912, 1.
12 Ralph Kuykendall, *Hawaii in the World War*, 358-359.
13 "County Agent's Weekly Report," *The Maui News*, May 17, 1917, 3.
14 "Ban on White Flour Results in Surplus," *The Maui News*, June 14, 1918, 8.
15 Letter from the Governor of Hawaii to Secretary of the Interior, U.S. Food Administration, February 8, 1918.
16 "What Gardening Has Done for Maui," *The Maui News*, May 31, 1918, 4; "County Agent's Weekly Report," *The Maui News*, May 17, 1917, 3; "Why Egg are so High," *The Maui News*, January 11, 1918, 7.

Corn Fails; Pineapple Succeeds

No evidence was located to indicate the continued existence of a corn mill on Maui after World War I ended in 1918. Although corn's profitability continued during a 1919-1920 postwar boom, and farmers increased Hawaii's corn plantings to 10,000 acres, production quickly declined to less than 1900 acres thereafter.[17] Corn production on Maui was in serious trouble by the end of the 1920s. Bad agricultural practices had stripped the Kula area of topsoil, which ruined what old-timers had called the "richest corn acreage in Hawaii."[18]

As Maui's corn production decreased, pineapple production increased. Haleakala Ranch appeared to have eliminated its corn production at some time prior to 1922, when a *Maui News* article noted that the company grew pigeon peas, raised 3,500 head of cattle, and had 470 acres in pineapple and grasses.[19] There was no mention of growing corn or a corn mill operation. During the 1920s the Haleakala Ranch Company expanded its pineapple production after purchasing an additional 1,100 acres of land on the Kula side of Makawao. This newly planted pineapple acreage produced "fine crops."[20] The Haleakala Ranch Company's continued success in growing pineapple led it to separate its pineapple department from the ranch in 1929. The pineapple department was incorporated as the Haleakala Pineapple Company.[21]

Transformation to Corn Mill Camp

Corn Mill Camp was probably established during the late 1910s or early 1920s as a housing complex for pineapple workers employed by the Haleakala Ranch Company. During a 1986 oral history interview, Maui Pineapple Company retiree Mitsugu Jio stated that he believed his family moved to Corn Mill Camp in 1926. His recollection is the earliest known reference to Corn Mill Camp. He noted that it was called Corn Mill Camp because "they used to raise corn and they used to have a mill up there ... to grind corn for the cattle."[22] Another Maui Pineapple Company retiree, Henry J. Baldwin, recalled Corn Mill Camp as early as 1932. He, too, stated that there had been a corn mill and corn was grown in the area.[23] Their memories, however, are only recollections of what they had been told when they were younger. Evidently, by the time Jio and Baldwin were acquainted with Corn Mill Camp, the Makawao corn mill was a distant memory.

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[17] Philipp, *Diversified Agriculture in Hawaii*, 127-128.
[18] "Sheet Erosion Stealing Away Rich Kula Soil," *The Maui News*, March 12, 1930.
[19] *The Maui News*, October 10, 1922, sect. 4, 2.
[20] Baldwin, *A Brief History and Commentary on the Pineapple Industry of Maui, Hawaii.* (n.p., 1938), 20.
[21] Baldwin, *A Brief History and Commentary on the Pineapple Industry*, 24.
[22] Dania Keane, interviewer, Mitsugu Jio Interview Transcript, October 12, 1984, 3.
[23] Dania Keane, interviewer, Henry J. Baldwin Interview Transcript, June 18, 1985, 2.

Although the corn mill was probably located at this site, the corn, as previously stated, was likely being grown in the Kula area.

Corn Mill Camp was a typical plantation workers' camp. Like other plantation camps in Hawaii in the first half of the twentieth century, the plantation provided its workers with housing, recreational facilities, medical services, and a clubhouse. Jio recalled that Corn Mill Camp had about fifty homes. Its ethnic makeup was primarily Japanese, with a Korean family named Chur in residence as well as one Filipino family and perhaps a few Chinese and Hawaiians. During the early years when the camp was almost entirely Japanese, Jio remembered that there was also a public bath.[24] One unique feature of Corn Mill Camp, according to Baldwin's recollections, was a boarding house (with its own cook) that housed young unmarried men.[25] Maui Pineapple Company retiree Takashi Sakuma recalled that sixty boarders, sleeping six to seven boys per room, lived at the boarding house from 1937 to 1940.[26] A separate cookhouse serviced the boarding house.[27]

Corn Mill Camp residents were provided with numerous services. One never needed to go shopping as every other day a salesman would come, take your shopping order, and deliver it the next day.[28] Medical services were provided at the camp dispensary by a plantation doctor or nurse who came from Haliimaile each day to check on Corn Mill Camp residents. After the dispensary closed in 1947, the plantation provided health care to its workers by driving them to the Haliimaile dispensary.[29] Children were provided transportation to and from school on plantation company trucks.[30]

Recreation and other activities played an important role at the camp, and facilities included a basketball court, baseball grounds, and at least for a while, a sumo wrestling ring. Baldwin recalled that the athletic programs at Corn Mill Camp produced "great baseball players." Sakuma reminisced that residents used to produce their own Christmas play and entertainment, which included packages of candy for the children. A clubhouse served as the hub of activity.[31]

In addition to serving plantation workers, Corn Mill Camp was a supply and service center for the various pineapple companies that held title to the land. In the camp's early days, stables housed mules and horses needed for work in the pineapple fields.[32] During the

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[24] Dania Keane, interviewer, Takashi Sakuma Interview Transcript, October 26, 1984, 8; Jio interview, 4-5.
[25] Baldwin interview, 10.
[26] Dania Keane, interviewer, Takashi Sakuma Haliimaile Tour Notes, November 8, 1984, 4.
[27] Building Values Record, Corn Mill Camp, Tax Key 2-3-07-08, 1954.
[28] Sakuma Haliimaile Notes, November 8, 1984, 4.
[29] Baldwin interview transcript, 12; Sakuma Haliimaile Notes, November 8, 1984, 7.
[30] Jio interview transcript, 4; Sakuma interview transcript, 12.
[31] Baldwin interview transcript, 17; Sakuma interview transcript, 11; Map, Corn Mill Camp, Maui Pineapple Company Ltd., May 4, 1956.
[32] Sakuma interview transcript, 16.

1920s garages, gas and oil warehouses, oil tanks, a tire house, and other structures had been built to service a mechanized plantation.[33] Baldwin reported that Corn Mill Camp was the main supply center and headquarters for the Haleakala Ranch Company's pineapple department.[34] When the Haleakala Ranch Company partitioned its ranch and pineapple holdings in 1929, the pineapple lands and operations, including the parcel that comprised Corn Mill Camp, became part of the Haleakala Pineapple Company. In 1932 the Haleakala Pineapple Company merged with the Maui Agricultural Company's pineapple department to form the Maui Pineapple Company, which had its headquarters at Haliimaile. Corn Mill Camp then became part of the Maui Pineapple Company.[35]

Corn Mill Camp continued to serve the Maui Pineapple Company as a secondary base of operations until the 1960s when the company's activities were centralized at Haliimaile. According to Sakuma, much of the Maui Pineapple Company spraying operations were based at Corn Mill Camp.[36] With the unionization of pineapple workers in 1946, many residents purchased homes and moved to Haliimaile. In 1954 there were still about forty dwellings with wash houses at Corn Mill Camp. The plantation continued to provide services and built a new gas station in 1954. Housing and residential services were finally phased out during the 1960s. A Maui Pineapple Company ledger indicated that most of the camp's remaining houses were sold for removal in 1966 and 1967, and a few structures were demolished. The company closed its books on the Corn Mill Camp residences in 1968.[37]

In 2003 four warehouses and a water tank were all that remained of the former Corn Mill Camp. The three wood-frame warehouses, numbered 680, 681, and 682 on Maui Land & Pineapple Company records, date to circa 1924. The fourth warehouse, built in 1950, was built of steel structural components.[38] The area included a banyan tree, which was probably planted in the 1940s,[39] two Italian cypress trees, and remnant foundations.

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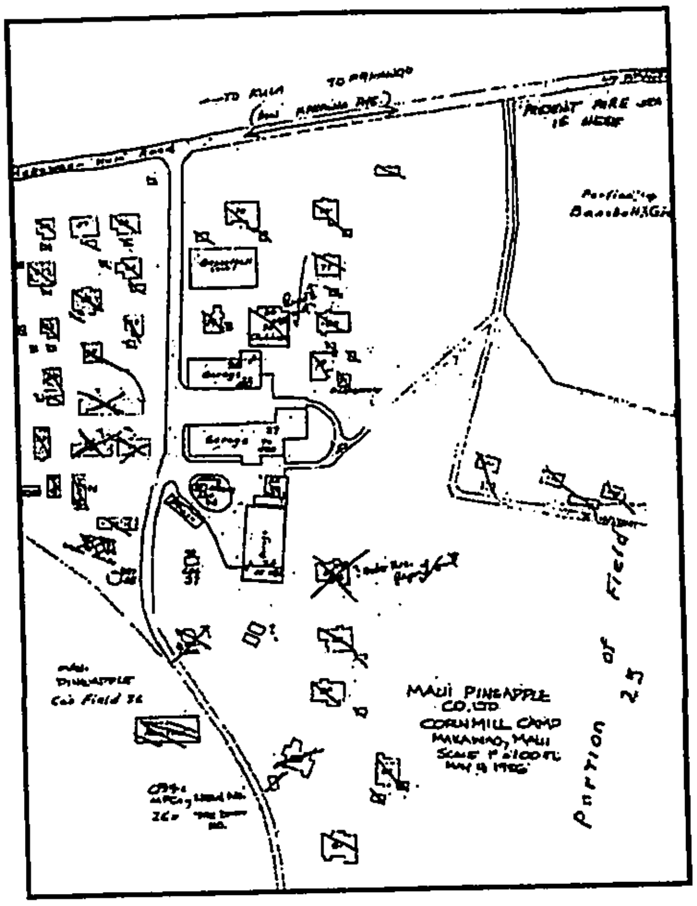
[33] Building Values Record, Corn Mill Camp, Tax Key 2-3-07-08, 1954; Map, Corn Mill Camp, Maui Pineapple Company Ltd., May 4, 1956.
[34] Baldwin interview transcript, 10-11.
[35] 1929 Partition of Lands of Haleakala Ranch Co. and Keahua Ranch Co. Ltd., March 28, 1928; Baldwin, *A Brief History and Commentary on the Pineapple Industry*, 25.
[36] Baldwin interview transcript, 7; Sakuma interview transcript, 13.
[37] Sylvia Hunt to Dania Keane, Memo, July 2, 1985; Building Values Record, Corn Mill Camp, Tax Key 2-3-07-08, 1968.
[38] Building Values Record, Corn Mill Camp, Tax Key 2-3-07-08, 1954.
[39] Sakuma Haliimaile Notes, 2.


TO KULA
MAUI PINEAPPLE
CO. LTD
CORNHILL CAMP
MAKAWAO, MAUI
Portion of Field 25

Map (1956)

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Untitled article, *Hawaiian Gazette*, March 8, 1892.

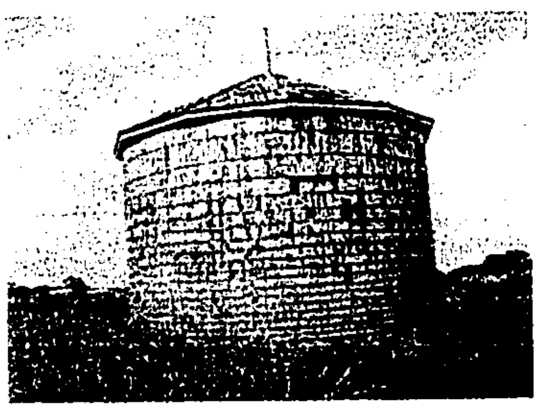
BUILDING INVENTORY AND STRUCTURAL ANALYSIS

Site Description

The buildings remaining at the former "Corn Mill Camp" are located directly mauka of the Pukalani Fire Station on TMK#2-3-07:08. They are currently in close proximity to and can be viewed from the Pukalani By-pass Highway. They are owned by Maui Land & Pineapple Company.

The site slopes at approximately eight percent (8%) from mauka to makai. A service road along the south of the site provides access to the buildings from Makawao Avenue. Structures on the site include four separate warehouse buildings and a redwood water tank of substantial proportion. The structures are rectangular in plan-shape; three of them orient their long axis perpendicular to the slope (north-south) while the fourth runs parallel to the slope (east-west). The asphalt paving between the structures is in poor condition.

Vegetation has been recently cleared from the area allowing better assessment of the buildings' condition. Two Italian cypress and a banyan tree remain from the plantation-camp era. The structures are warehouses and currently being used as such. Tenants include a building contractor, automobile/mechanical storage, feed storage, and others.

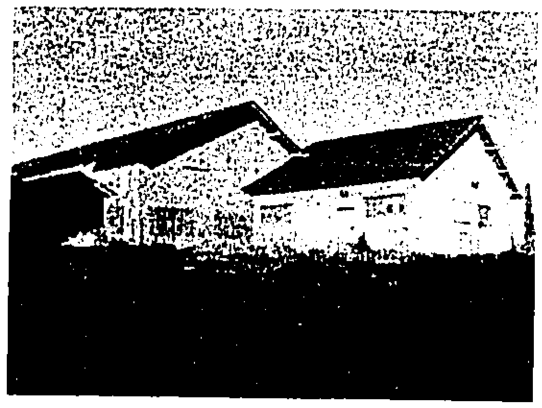


Water Tank

Current Tenant

figure 1

Building Descriptions



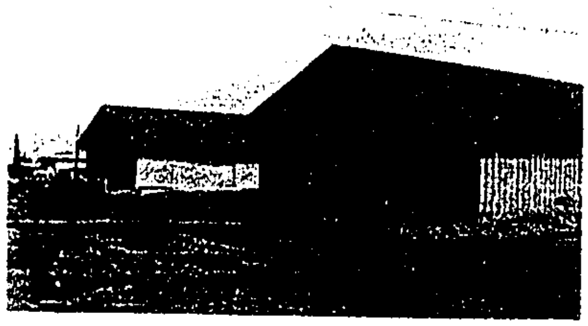


figure 2

Buildings #680, #681, Constructed *circa* 1924

The buildings are identified by Maui Land and Pineapple on records dated c. 1967 as Numbers 680 through 683. Two of the structures (#680 and #681) utilize similar construction materials and assembly methods. They are essentially wood post-and-beam structures with wood site-built trusses, spaced roofing sheathing, and (originally) cedar shingle roofing. It appears that the walls were originally all single-wall, vertical board-and-batten type, ruff-sawn, Douglas fir siding. They are all oriented the same way and were probably constructed at the same time.

Posts are spaced at twelve foot (12 ft) on center and directly support and are braced to the roofing trusses. Three by five inch (3x5) major purlins span between the trusses and run perpendicular to the roof's slope at approximately six foot (6 ft) on center. Two by four inch (2x4) members bear on these purlins, run parallel to the roof slope, and are spaced at approximately three foot (3 ft) on center. One by three inch (1x3) minor purlins spaced at approximately three foot (3 ft) on center bear on the 2x4s and run again perpendicular to the slope. Finally cedar shingles are nailed directly to these minor purlins forming the complete roof system.

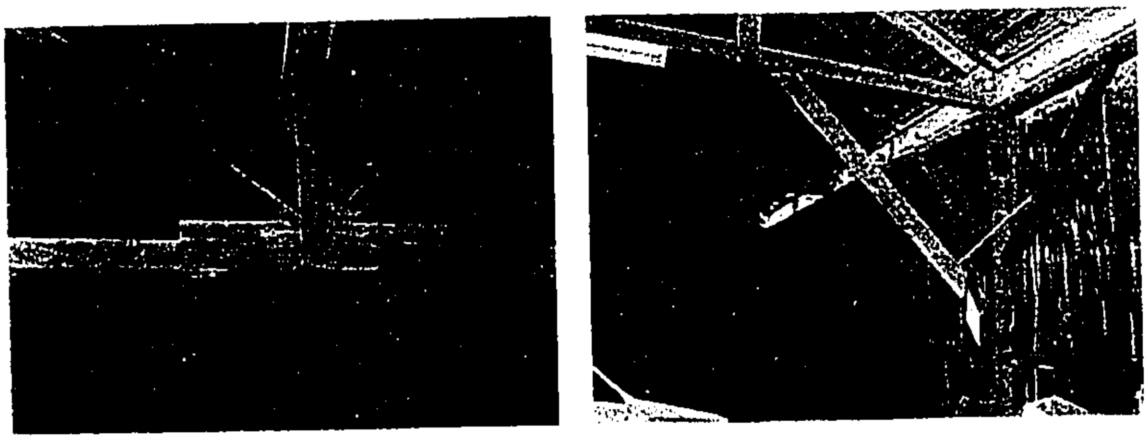


figure 3

This was the original system. With the passage of time modifications have taken on curious forms. For instance, the windward walls on the buildings under discussion have been covered in various materials to improve protection from the weather. Currently Building # 681 has curling, asphalt shingles over the original siding; building # 681 has cedar shingles; and building # 683 has corrugated sheet metal. The roofing system also has been modified as time has passed. All buildings now include red, pre-finished steel roofing over this entire system to provide adequate protection from the elements.

Foundations for these buildings are concrete slabs that, in some cases, where earth is retained or the slab is above existing grade, are supported by early-style concrete blocks. These blocks, while similar in appearance and dimension to their contemporary counterparts, have four interior cavities rather than the two found in today's block.

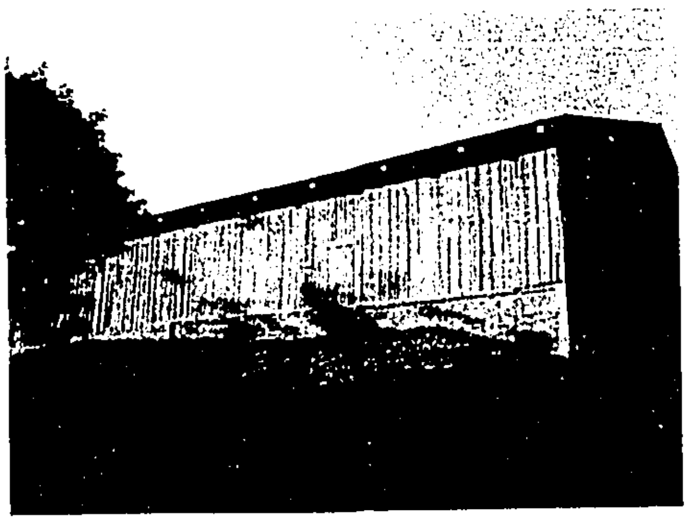


figure 4

Building #682

According to Building Value records this warehouse structure was constructed in 1950. It is located mauka and differs markedly from the others. Its orientation is perpendicular to the other buildings and its main structural material is steel. Wood and concrete block is also found playing minor roles in this curious composite structure. Steel columns support steel header beams which, in turn, support steel trusses. These trusses are spaced approximately seven feet (7ft) on center and are made from rectangular steel tubes, two of which are welded together to form the bottom and top cords. Web members are then welded to these cords and the trusses that span fifty-six feet (56 ft) are supported on either end by Steel "I" beams. Two by four inch (2x4") wood purlins run perpendicular to the trusses, are spaced approximately six feet (6") on center, and support corrugated sheet steel roofing panels. The back wall of this structure is the original 1x12 board and batten, fir siding as seen on the other wood framed structures.

figure 5

figure 6

Building # 683

Wood Framed smaller, light frame construction, repair work in the recent past, date in concrete landing "November 11, 1958."

figure 7

Details

Interesting details and floor plan quirks can be found in each structure. The original sliding doors had a ventilating wood grill at the top of each door. Records mark some of these buildings for fertilizer storage, perhaps obviating the need for adequate ventilation.

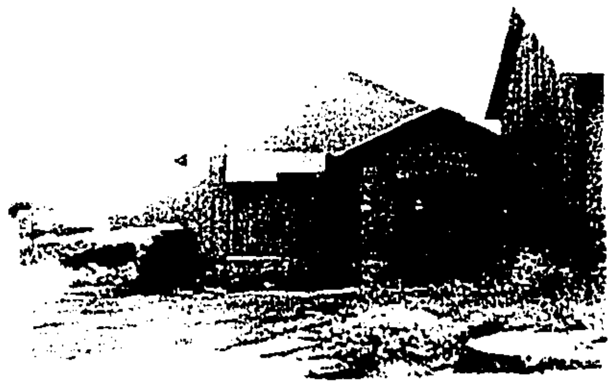


figure 6

Building # 683

Wood Framed smaller, light frame construction, repair work in the recent past, date in concrete landing "November 11, 1958."

figure 7

Details

Interesting details and floor plan quirks can be found in each structure. The original sliding doors had a ventilating wood grill at the top of each door. Records mark some of these buildings for fertilizer storage, perhaps obviating the need for adequate ventilation.

Figure 8

Building #681 has a floor pit for vehicle maintenance. Before hydraulic lifts came into use, these narrow trenches were common in mechanics' garages. The vehicle drives over the pit, which is approximately four feet deep. The mechanic can then crawl into the pit and perform maintenance and inspection duties on the vehicle. This building also has an addition that was apparently used for administrative functions. An apparent pay window exists on the south side of this addition suggesting that this was an important locus of employer/employee interchange. This addition has a wood floor made of one inch (1") fir planking.

SIGNIFICANCE EVALUATION

Significance: Historic Integrity

Historic integrity is defined as the authenticity of a building's historic identity and appearance. Evidence of historic integrity is provided in the survival of physical characteristics that date to the building's historic period. In the case of the four warehouses at the former Corn Mill Camp, the structures' historic period is the 1930s (approximate construction dates) through 1953.[40]

The four warehouse structures remaining at the former Corn Mill Camp have been modified over the years. Some of the modifications have become part of the buildings' historic fabric and character. Other modifications, such as new roofing materials, are not historic, nor are they irreversible changes to potentially historic structures. Despite the changes over the decades, the warehouses maintain a certain amount of historic integrity.

The criteria established for listing properties on the National Register of Historic Places (NR) are useful as the basis for identifying and evaluating historic structures. These criteria for evaluation are based on the quality of significance in American history, architecture, archaeology, engineering, and culture that is present in districts, sites, buildings, structures, and objects. NR criteria require that historic properties possess integrity of location, design, setting, materials, workmanship, feeling, and association; as well as one of four other specified criteria (A - D). The four warehouse buildings at the former Corn Mill Camp may be potentially eligible for the Hawaii Register of Historic Places and the National Register of Historic Places under criterion C. Criterion C includes properties that embody the distinctive characteristics of a type, period, or method of construction . . . or represent a significant and distinguishable entity whose components lack individual distinction. The warehouses are potentially eligible under Criterion C as they are fine examples of plantation industrial architecture, especially the wood-framed structures. These warehouses collectively represent a type of architecture that is rapidly disappearing in Hawaii.

These unique utilitarian structures are also significant as evidence of the historical process through which these buildings have evolved to their present state. The two-foot long gash in the shingle roofing of one structure (due to a lightning strike) led to re-roofing decisions for all of the structures. The reuse of another structure for fertilizer storage generated the modification of the sliding doors to provide adequate ventilation. Severe deterioration of windward siding materials gave rise to varied yet expedient solutions to the same problem. The history of process is written poetically throughout these humble structures.

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[40] A building's historic period must be more than fifty years, hence the historic period would end in 1953.

RECOMMENDATIONS

Adaptive Reuse of Historic Buildings

Historic buildings sometimes outlive their original purposes. "Adaptive Reuse" is a process that allows old or historic buildings to be modified for new uses while retaining and maintaining an emphasis on the structure's historic features. Adaptive reuse of old buildings, including historic buildings, is an important means to help preserve a community's identity and historic continuity. In addition, adaptive reuse allows for old or historic buildings to become economically viable. As an alternative to demolition, adaptive reuse can be a tool to generate investment and economic development.

The four warehouse structures at the former Corn Mill Camp need to be inspected and analyzed by a structural engineer to assess their structural integrity. The structural engineer should also analyze how much, if any, work is necessary to make the structures code compliant. The extent and cost of necessary modifications will determine the feasibility of adaptive reuse of these structures. If sensitively handled as adaptive re-use structures, these buildings can maintain enough of their history to be respected ambassadors of a previous generation as well as notable examples for the redevelopment of this property.

The redevelopment of the former Corn Mill Camp site provides an excellent opportunity for the preservation and adaptive reuse of the plantation industrial structures. These buildings can serve as a centerpiece of economic development and at the same time, enhance the community's pride in its historic heritage.

If the four warehouse buildings are designated for preservation and adaptive reuse, the project should be undertaken in consultation with the State Historic Preservation Division. In addition, since the County of Maui is a "Certified Local Government" under historic preservation regulations, the Maui County Cultural Resources Commission should also be involved in any consultations.

Suggestions for Adaptive Reuse

The proposed Upcountry Town Center includes space for "cottage industries" and "small, artisan and light manufacturing operations." These small, independent operations would complement the Upcountry Town Center's "rural town development theme."[41]

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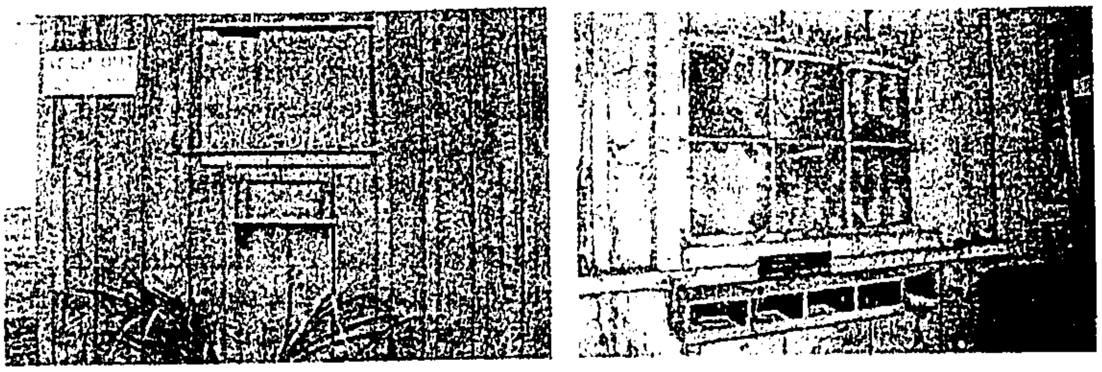
[41] Maui Land & Pineapple Company, Inc., *Draft Environmental Impact Statement, Upcountry Town Center, Pukalani, Maui, Hawaii*, April 2002. Prepared by Group 70 International, Honolulu, Hawaii, 3-4.

The adaptive reuse of the four warehouse buildings in the former Corn Mill Camp would complement and enhance Maui Land & Pineapple Company's emphasis on the "local nature" and "rural" qualities of the proposed development. Adaptive reuse of the buildings for cottage industries and light or artisan manufacturing would allow the historic structures of the former Corn Mill Camp to continue to be used as industrial buildings. The apparent payroll master's area, located in Building #681, might be an appropriate space for a display detailing the history of the Makawao Corn Mill and the former Corn Mill Camp.



Pay Master Window
Figure 9

A sensitive adaptive reuse of the four warehouse buildings would include preserving the buildings *in situ* and allowing certain interior qualities, such as the carpenter trusses of the roofing system, to remain visible. Another possible feature of historic interest for display would be the building's old-fashioned electrical wiring system.

Standards for Rehabilitation and Adaptive Reuse

The Secretary of the Interior's "Standards for Rehabilitation" provide accepted general guidelines for rehabilitation and adaptive reuse of historic structures.

The Standards for Rehabilitation were originally published in 1977 and revised in 1990 as part of the Department of the Interior regulations (36 CFR Part 67, Historic Preservation Certifications). The Secretary of the Interior's Standards for Rehabilitation are ten basic principles created to help preserve the distinctive character of a historic building and its site, while allowing for reasonable change to meet new needs. The standards pertain to historic buildings of all materials, construction types, sizes, and occupancy and encompass the exterior and the interior of historic buildings. The Standards also encompass related landscape features and the building's site and environment as well as attached, adjacent, or related new construction.

The Secretary's Standards are to be applied to specific rehabilitation projects in a reasonable manner, taking into consideration economic and technical feasibility.

The Secretary of the Interior's Standards include:

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.

4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.

6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.[42]

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[42] The Secretary of the Interior's Standards for Rehabilitation can be accessed on the web at http://www2.cr.nps.gov/tps/tax/rehabstandards.htm.

Preservation Tax Incentives

The Federal government encourages preservation of old and historic building through tax incentives. Preservation tax incentives reward private investors for rehabilitating historic or old properties. Through this program, the Federal government recognizes that historic buildings are tangible links with the past that help give a community of sense of identity, stability, and orientation.

Current tax incentives for preservation were established by the Tax Reform Act of 1986 (PL99-514; Internal Revenue Code Section 47 [formerly Section 48(g)]). The tax act provides for two programs:

- 20% tax credit for certified rehabilitation of certified historic structures

or

- 10% tax credit for the rehabilitation of non-historic, non-residential buildings built before 1936.

To be eligible for the 20% tax credit, a property must be a certified historic structure, that is, listed on the National Register of Historic Places or located in a registered historic district. Certification requests are submitted to the National Park Service through the State Historic Preservation Division.

The other tax incentive program, a 10% tax credit, is given for the rehabilitation of non-historic, non-residential buildings built before 1936. The 10% credit applies only to buildings that will be used commercially. Projects taking advantage of the 10% credit must meet a specific physical test for retention of external walls and internal structural framework. In addition, a building eligible for the tax credit must remain in its original location.

Questions regarding implementation of historic preservation for tax incentives should be directed to the State Historic Preservation Division in Honolulu and/or tax professionals.

Appendix O

Architectural Reconnaissance and Cultural Impact Statement, Piiholo Well Site (Jeffrey Panteleo, July 2003)

JPC2003-2

ADDENDUM: ARCHAEOLOGICAL AND CULTURAL ASSESSMENT OF THE PROPOSED PIIHOLO ROAD WELL SITE HALI'IMAILE *AHUPUA'A*, MAKAWAO, MAUI ISLAND (TMK 2-4-12:por.6)

by

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ABSTRACT

At the request of Group 70 International, Inc., representing the Maui Land and Pineapple Company, Jeffrey Pantaleo Consultants, LLC, of Honolulu, conducted an archaeological and cultural impact assessment of an approximate 0.50-acre parcel of land located in Häli'imaile *ahupua'a*, Makawao, Maui Island (TMK 2-4-12:por. 6). The project area is being proposed for a well site in conjunction with the Upcountry Town Center in Pukalani. Currently, a house occupied by Maui Land and Pineapple staff is located along the northern boundary of the parcel, and the remaining portion of the parcel includes isolated stands of guava trees, fallow sugarcane, and various grasses.

Archaeological and historical background research was conducted to enhance site predictability and interpretation. No surface cultural remains or areas of exposed subsurface cultural deposits were encountered during the surface survey. An initial cultural assessment was conducted to identify knowledgeable elders in the community and determine the levels of cultural use of the project area to assess the potential impact of the proposed development to existing cultural practices and beliefs.

Due to the negative results of the current survey, no further archaeological procedures appear to be warranted prior to commencing development activities. Archaeological monitoring during construction is also deemed unwarranted. Further research regarding traditional or continuing cultural practices of the area is recommended.

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INTRODUCTION

At the request of Group 70 International, Inc., of Honolulu, on behalf of the Maui Land & Pineapple Company, Inc., Jeffrey Pantaleo Consultants, LLC, of Honolulu, undertook archaeological and cultural assessments of a parcel of land in Häli'imaile *ahupua'a*, Makawao, Maui Island. The subject project area is being proposed for a well in conjunction with the proposed "Upcountry Town Center" project in Pukalani. Results of this assessment will be included as an addendum to the existing archaeological inventory survey for the Upcountry Town Center. Field work was conducted on July 3, 2003, by Lisa Rotunno-Hazuka, B.A.

PROJECT LOCATION

The project area, encompassing approximately 0.5-acres, is situated in Häli'imaile *ahupua'a*, Makawao, Maui Island (Fig. 1). The parcel (TMK 2-4-12:por. 6) is bounded by Piiholo Road to the west, an existing residence occupied by Maui Land and Pineapple, Inc. staff to the north, Maliko Gulch to the east, and open land to the south (Figs. 2 and 3).

ENVIRONMENT

The project area occurs on the northwestern slope of Haleakala, on a plateau adjacent to the west of Maliko Gulch and the cinder cone Piiholo. Elevation in the project area is 1800 feet above mean sea level. Rainfall averages between 20 to 50 inches annually, with most occurring during the months of October to April. Vegetation in the project area includes isolated stands of guava (*Psidium guajava* L.), fallow sugarcane (*Saccharum officinarum* L.), and various grasses.

Soils in the project area include Makawao silty clay, 3-7% slopes, and rock land. Makawao silty clay, 3-7% slopes, is well-drained soil developed in volcanic ash and weathered from basic igneous rock and occurs on smooth side slopes and intermediate slopes in the uplands. Permeability is moderately rapid, runoff is slow, and the erosion hazard is slight. This soil is used for pasture, pineapple, truck crops, and homesites.

Rock land is made up of areas where exposed rock covers between 25-90% of the surface. These outcrops and very shallow soils are mainly composed of basalt and andesite. Rock land is used for pasture, wildlife habitat, water supply, and urban development.

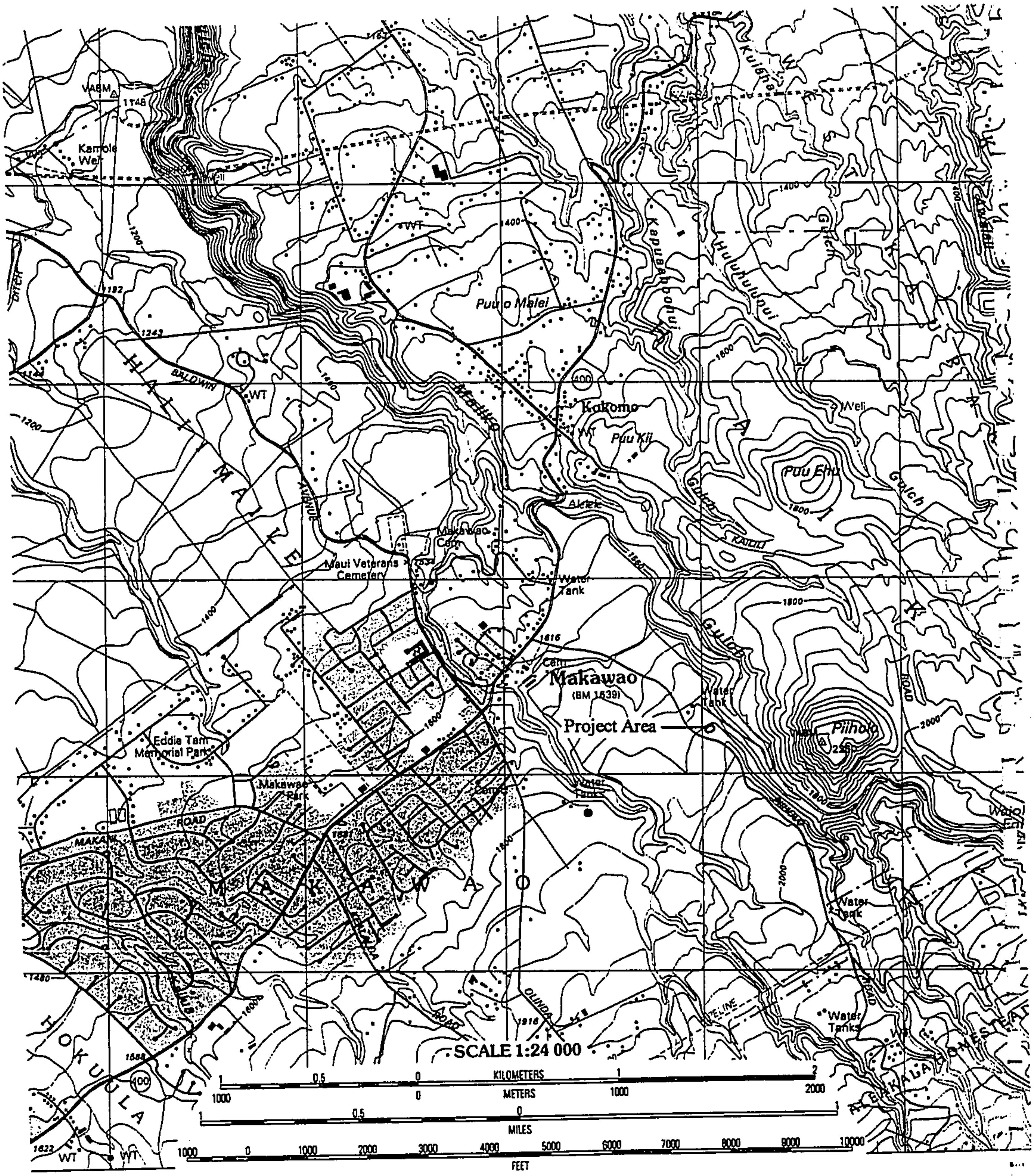

Figure 1. Location of Project Area on USGS Haiku Quadrangle

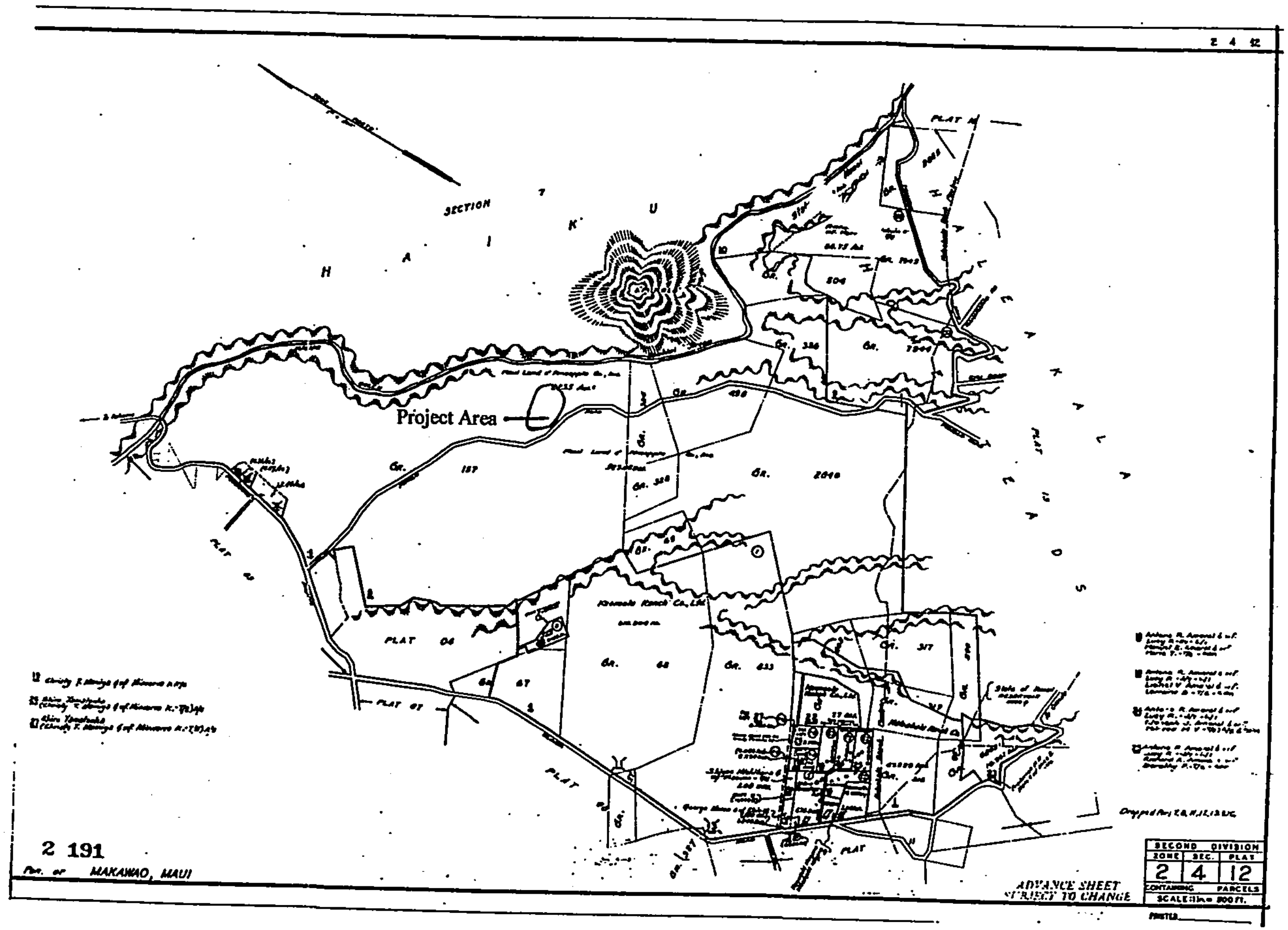

Figure 2. Project Area on TMK 2-4-12

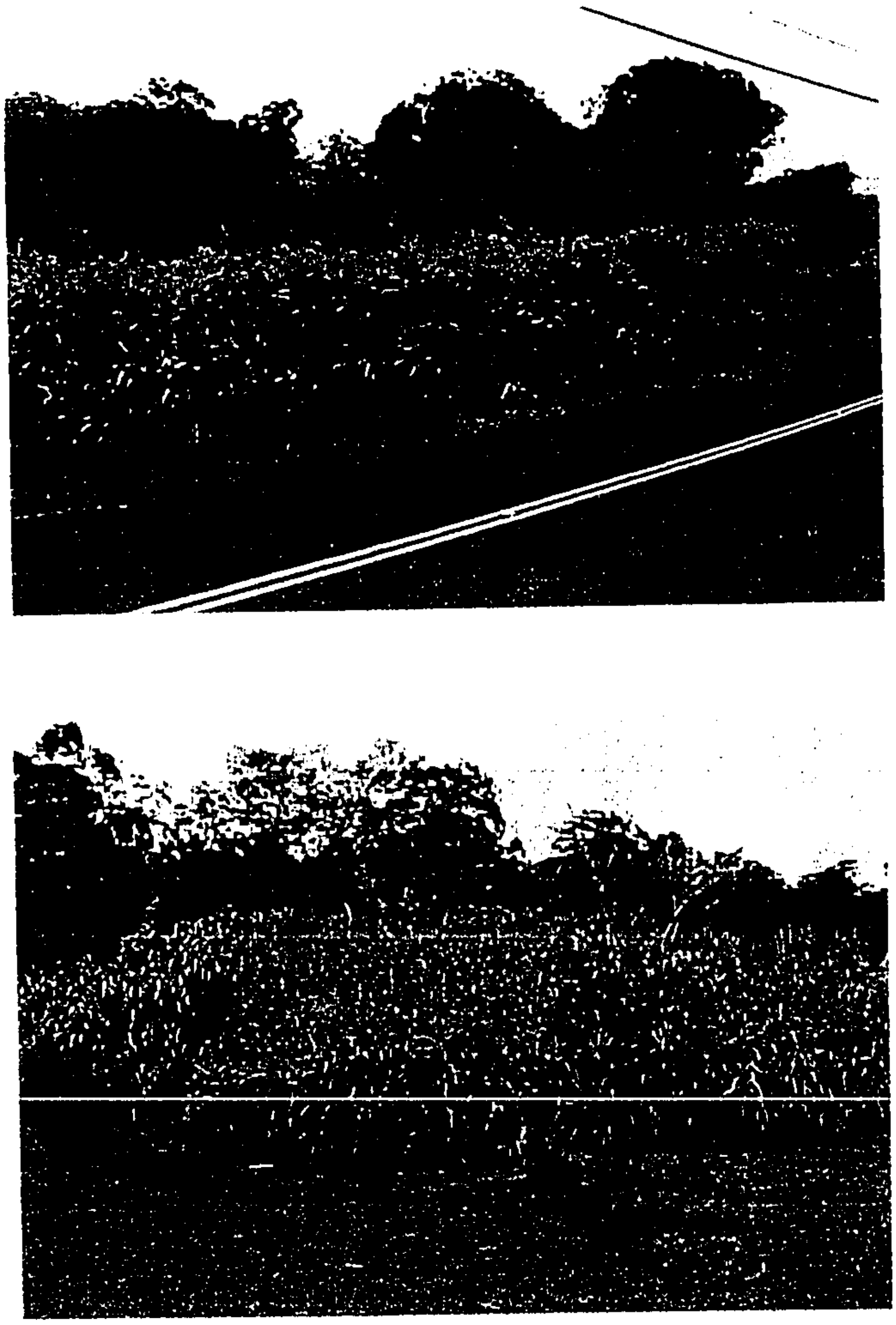

Figure 3. Top: Overview of Project Area from Piiholo Road. View to East.
Bottom: Overview of Project Area. View to East

HISTORICAL BACKGROUND

Background information regarding Makawao and Kula was summarized in Sinoto and Pantaleo (2002). Only a brief summary of this work will be included here. For a more detailed historical summary, the reader is directed to Wong Smith (Appendix in Donham 1990).

The current project area is located in Häli'imaile *ahupua'a,* formerly in the district of Hamakuapoko. The literal meaning of Häli'imaile is "*maile* vines strewn" (Pukui et al. 1974: 39). Häli'imaile is not a typical *ahupua'a* encompassing the uplands to the coast, but is cut off about a mile from the sea.

The Pi'iholo area was traditionally known as an area that was once heavily forested with *koa* (*Acacia koa*) trees and other endemic plants. The area was perhaps visited often by *kia manu* (feather collectors) and people who gathered large *koa* logs or other trees to fashion their large canoes or other heavy implements. The Häli'imaile area was once famous for the large amounts of *maile* (*Alyxia Olivaeforis*) that grew profusely within this upland forest. *'Iliahi* or Sandalwood was probably gathered from this area during the Sandalwood trade era.

Makawao literally means "forest beginning" (Pukui and Elbert 1986). Early accounts of Makawao consist of descriptions of the area or accounts of notable events that took place. The rain of Makawao is mentioned often in poetical sayings as well as in journals of early visitors (Wong Smith in Donham 1990:A-1). The Hawaiian historian Kamakau mentioned the following event that he estimated to have taken place around 1785:

> When Kekaulike heard that Alapa'i, the ruling chief of Hawaii was at Kohala on his way to war against Maui, he was afraid and fled to Wailuku in his double war canoe named Ke-aka-milo...and the fleet landed at Kapa'ahu at the pit of 'Aihako'ko in Kula [old name for Makawao]. Here on the shore the chiefs prepared a litter for Kekaulike and bore him upland to Haleki'i in Kukahua (1961:69)

By around the 1800s, agriculture in the Kula area underwent a transformation from subsistence to commercial. The arrival of whalers created a demand for fresh produce including vegetables, meat, and fruit. The increase in the number of whaling ships after 1840 caused an increase in demand for fresh produce. Although, at first only sweet potatoes were available, but by the mid-1830s, Irish potatoes were being cultivated. Since they were so well suited to be raised in Kula, it was soon called the "potato district" (Kuykendall 1965:313).

The Irish potato blight and the California gold rush of 1849 started a potato "boom" and an annual yield of 20,000 barrels of commercial Irish potatoes was estimated in the years between 1847 and 1854. The gold rush also created a market for potatoes, other vegetables, and sugar and molasses. The potato boom was short-lived, but sugar cane and pineapple would have a profound effect upon landuse and tenure over a large part of Maui.

During the Mahele, Hāli'imaile was awarded to M. Kekauonohi, great granddaughter of Kekaulike and wife of Kealiiahonui. One Grant was awarded within the current project area. Grant 157, consisting of 370.0-acres in Makawao, was awarded to W.A. McLane in 1849. Based on descriptions in the award document, this grant appears to consist of *koa* and *kukui* trees.

Several other Grants were awarded in the vicinity along Waiahiwi Stream in Maliko Gulch, but not directly associated with the project parcel. Grant 324, consisting of 12.35-acres in Olinda, was awarded to Naheana for $11.35 in July of 1851; Grant 326, consisting of 13.0-acres in Makawao, was awarded to Kuli for $13.00 on July 2, 1850; Grant 328, consisting of 8.9-acres in Olinda, was awarded to Nuole for $8.00 on July 2, 1850; Grant 498, consisting of 23.35-acres in Makawao, was awarded to Kalimaimoku for $22.37 on January 16, 1851; Grant 504, consisting of 24.0-acres in Makawao, was awarded to Kekino for $23.00 on January 16, 1851; and Grant 2840, consisting of 110.54-acres in Olinda, was awarded to Kekua in 1862.

PREVIOUS ARCHAEOLOGY

No previous archaeological studies have been undertaken within the boundaries of the current project area. For detailed information regarding previous archaeological studies in Makawao, the reader is referred to Sinoto and Pantaleo (2002). Only those studies pertinent to the current project will be included here.

Paul H. Rosendahl Inc. (Donham 1990) conducted an archaeological inventory survey of five potential upcountry Maui high school sites in Haliimaile, Hokuula, Kailua, and Makaeha *ahupua'a*, Makawao. Each parcel measured approximately 35 acres and was cultivated in pineapple. Parcel 5 was located northwest of the current project area. No archaeological sites were identified during the survey. Four lithic artifacts, including a basalt flake, an *ulu maika* fragment, a complete basalt adz, an adz fragment, and a ceramic sherd were collected from the surface of Parcel 4. A small piece of water-worn coral and Cellana shells were observed on the surface of Parcel 3. Other cultural remains included ceramic sherds in Parcel 1, a horseshoe and metal in Parcel 2, and a complete basalt quadrangular adz in Parcel 5. No further work was recommended for Parcels 1-3, and 5; however, additional archival work including land tenure research and cartographic sources was recommended for Parcel 4.

Aki Sinoto Consulting (Sinoto and Pantaleo 2002) conducted an archaeological inventory survey and cultural impact assessment of the Upcountry Town Center project (also referred to as "Pukalani Triangle") in Makaeha *ahupua'a*, Makawao, Maui Island (Fig. 4). A total of eleven backhoe trenches were excavated throughout the parcel to determine presence/absence and extent of subsurface cultural remains. No subsurface cultural remains were encountered in these trenches. State Site 50-50-06-5169, existing warehouse buildings and other ancillary structures associated with the "Corn Mill Camp", was recorded. This site was deemed significant under Criteria A, D, and E of the Hawaii Register of Historic Places. No further work was recommended prior to development activities; however, preservation of some of the extant structures associated with the "Corn Mill Camp" was recommended.

SETTLEMENT PATTERN AND SITE EXPECTABILITY

No extensive permanent settlements were indicated in this specific region until the historic period. Until that time, the prevailing landuse pattern was most likely associated with the seasonal exploitation of upland forest resources in the form of assorted plants and animals. Thus, sites associated with such endeavors would consist of rockshelters, small temporary habitation structures such as C-shapes, and trails. Although, the *Kula* areas further east and south were known for extensive dryland agricultural pursuits, the current project area, in terms of elevation appeared to have been peripheral or marginal in productivity for prehistoric agricultural activities. Thus, features related to such activity would be limited in extent and consist of small plots and gardens in selected areas in the vicinity of gulches and drainages, where the terrain was more suitable. The places for religious and ceremonial activities such as *heiau* are found in neighboring *ahupua'a* such as Omaopio in corresponding elevations. The paucity of prehistoric period sites in Makawao may be attributable to the extensive terrain alteration that took place with the advent of large-scale commercial agricultural ventures during the historic period.

By the mid-1800s, much of the upland forests had been cleared for agriculture, both cultivation and cattle grazing. The current project area is devoid of forest trees and consists of secondary growth following clearing. Thus, the most likely cultural remains to be encountered in the study

Figure 4. Location of the Upcountry Town Center project (from Sinoto et al. 2002:2)

area would be historic features and artifacts associated with agricultural pursuits. Some 900 acres of homestead grants were awarded in the Makawao District in a pre-Mahele experimental program and some remains associated with such homesteads could be encountered.

METHODS

Archaeological and historical literature and documents research was conducted to gain some insight into the prehistoric and historic background of the project area and enhance the predictability of the nature and extent of potential cultural resources in the subject area. This research was conducted at the State Historic Preservation Division (SHPD) library of the Department of Land and Natural Resources (DLNR) in Kapolei and the Bureau of Conveyances and Land Management Branch of DLNR in Honolulu.

The initial cultural impact assessment was conducted to identify individuals familiar with the subject project area and provide a brief summary of any potential cultural beliefs and practices. Ms. Kalei Tsuha conducted the initial cultural impact assessment. The pertinent information from this assessment is presented below.

The pedestrian surface survey of the project area revealed no significant surface cultural remains. The personnel consisted of Lisa Rotunno-Hazuka, B.A. Jeffrey Pantaleo, M.A., acted as principal investigator. All procedures followed generally accepted archaeological methods and standards. All field notes, maps, and photographs generated in connection with the current project will be curated at the Jeffrey Pantaleo Consultants, LLC, office in Honolulu.

RESULTS OF SURVEY

No significant surface features or areas of exposed subsurface cultural deposits were encountered during the surface survey. The entire project area has previously undergone disturbances from agricultural activities and pasture, and included overgrown fallow sugarcane and grasses and isolated stands of guava trees (Fig. 5). A wooden horse shelter is located along the western boundary of the parcel (Fig. 5). Due to the absence of surface cultural remains and lack of cultural remains in neighboring parcels, subsurface testing was deemed unwarranted.

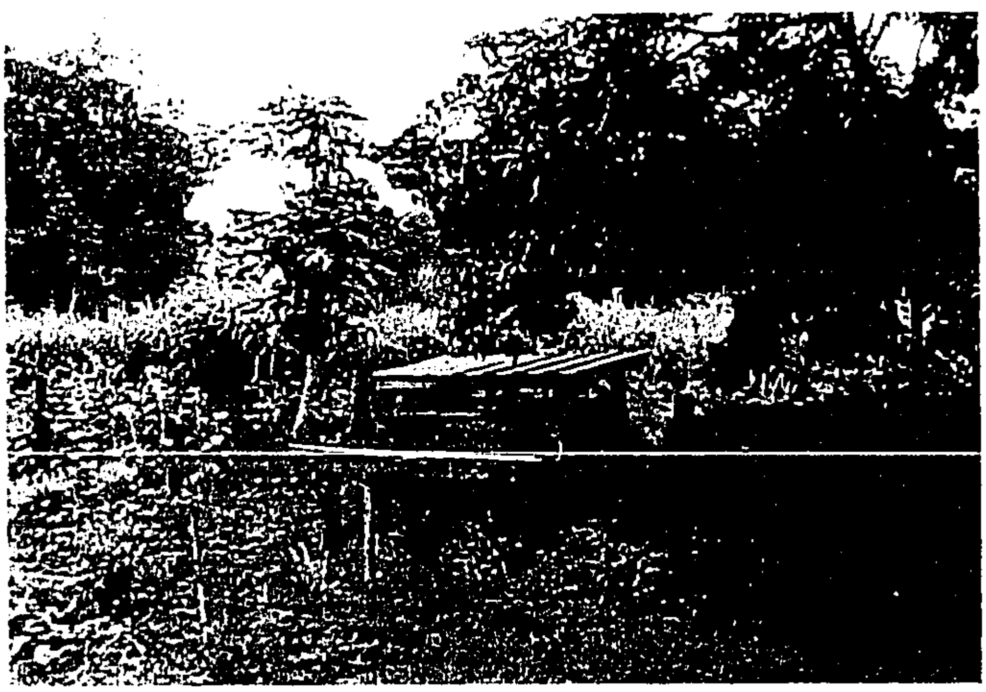

Figure 5. Top: Overview of Project Area, View to Southeast.
Bottom: Project Area Showing Existing Horse Shelter, View to Northeast

INITIAL CULTURAL IMPACT ASSESSMENT

The current initial cultural impact assessment was prepared in conjunction with the archaeological assessment undertaken by Jeffrey Pantaleo Consultants, LLC, for the proposed Piiholo Well project in Hāli'imaile *ahupua'a*, Makawao. Both procedures were conducted as an addendum to the archaeological inventory survey for the Upcountry Town Center in Pukalani being proposed by the Maui Land and Pineapple Company, Inc. (MLP).

PROJECT LOCATION

The project area, encompassing approximately 0.5-acres, is situated in Hāli'imaile *ahupua'a*, Makawao, Maui Island. It is bounded by Piiholo Road to the west, Maliko Gulch to the east, an existing residence to the north, and open land to the south (see Fig. 1).

MANDATES AND METHODS

The subject cultural impact assessment follows the methods and protocol set forth by the OEQC's *Guidelines for Assessing Cultural Impacts* (November 19, 1997) in meeting Act 50 of the Hawaii Revised Statues. Information obtained from this assessment will be used to determine the levels of cultural use of the project area and subsequently applied towards assessing the potential impact of the proposed development to existing cultural practices and beliefs. The scope of work for this assessment included:

1) identifying individuals with expertise regarding the cultural practices and beliefs of the area;
2) conducting documentary research;
3) identifying the resources, practices, and beliefs within the project area; and
4) evaluating the impact of the proposed development and recommending further work, if warranted.

Ms. Kalei Tsuha, Cultural/Education Coordinator of the Kaho'olawe Island Reserve Commission, conducted the initial cultural assessment. Literature and documents review was conducted in conjunction with the archaeological assessment. For detailed historical and archaeological background information, the reader is referred to Sinoto and Pantaleo (2002) and the current archaeological assessment report. Only a brief summary of historical background will be included here.

HISTORICAL BACKGROUND

Pi'iholo is located on the boarder of the districts of Hāmākuapoko and Hāmākualoa in Hāli'imaile *ahupua'a*. Hāli'imaile, literally meaning "*maile* vines strewn", is not a typical *ahupua'a* encompassing the uplands to the coast, but is cut off about a mile from the sea.

Prehistoric Period

Traditionally, the Pi'iholo area was known as an area that was once heavily forested with *koa* (*Acacia koa*) trees and other endemic plants. The area was perhaps visited often by *kia manu* (feather collectors) and by people who gathered large *koa* logs or other trees to fashion their large canoes or other heavy implements. The Hāli'imaile area was also once famous for the large amounts of *maile* (*Alyxia Olivaeforis*) that grew profusely within this upland forest.

The Pi'iholo area is also known for the 'Ulalena rain, which is a type of orange tinged rain that occurs often during the sunset hours of Hāmākuapoko. This rain usually begins out in the ocean and travels inland along the Ha'ikū area and passes up through the Pi'iholo and Makawao areas. It is a light rain, which is appreciated by the locals of the area.

No archaeological sites have been recorded in the immediate vicinity of the project area. Isolated artifacts including traditional lithic flake tools, adz fragments, and an *ulumaika* as well as historic period china fragments and metal tools were recovered during an inventory survey of five potential locations for an upcountry Maui high school (Donham 1990). The paucity of extant structural remains may be attributed to the extent and duration of commercial pineapple cultivation in the area.

Historic Period

'*Iliahi* or sandalwood was probably gathered from this area during the Sandalwood Trade era, but more research needs to take place in order to confirm this deduction.

Pineapple cultivation has been continuous in Makawao for over 80 years. Although pineapple was probably not cultivated within the boundaries of the current project area, an existing residential structure, occupied by Maui Land and Pineapple, Inc. staff, is situated adjacent to the north of the project area.

The Mahele Period

During the Mahele, Hāli'imaile was awarded to M. Kekauonohi, great granddaughter of Kekaulike and wife of Kealiiahonui. One Grant was awarded within the current project area. Grant 157, consisting of 370.0-acres in Makawao, was awarded to W.A. McLane in 1849. Based on descriptions in the award document, this grant appears to consist of *koa* and *kukui* trees.

INITIAL FINDINGS

The initial findings of the current cultural impact assessment in regards to the proposed Piiholo Road Well project is summarized below:

1) Pre-contact use of the area may have included gathering large *koa* or other trees for canoes or other heavy implements and feathers.

2) Historic use of the area may have included gathering sandalwood. Although pineapple was cultivated in Makawao for over 80 years, pineapple was not cultivated within the boundaries of the current project area.

DISCUSSION

The negative results of the archaeological assessment indicated that the subject project area was most likely not intensively utilized for habitation or agricultural activities during the prehistoric and early historic periods. The results of the background research also supported this conclusion. However, with the advent of large-scale commercial agricultural activities, the adverse effects of land clearing and construction associated with this activity may have effectively impacted and destroyed any remains that may have once existed.

Preliminary results of the initial cultural assessment indicated that traditional use of the area may have been for seasonal exploitation involving the gathering and harvesting of hardwoods such as *koa* (*Acacia koa*) and other plants, and collecting feathers. Historic use of the area may have been for gathering sandalwood. Pineapple cultivation did not occur within the boundaries of the project area; however, guava trees may have been previously planted in the project. The project area is current used as pasture.

RECOMMENDATIONS

Based on the negative results of the current survey; together with the prior disturbances over much of the parcel, paucity of cultural remains from the neighboring areas, and lack of evidence regarding traditional or contemporary cultural use of the area; the project area does not appear to hold much archaeological significance. Therefore, no further archaeological procedures appear to be warranted and thus, are not recommended prior to commencement of development activities. Should any inadvertent discoveries be made during construction, work in the immediate area should be halted, and SHPD-DLNR shall be notified.

The current initial cultural impact assessment was conducted to identify the resources, practices, and beliefs within the project area. Recommendations for further work regarding cultural impact to the current project area follows:

1) Conduct informal interviews with individuals who have expertise regarding the cultural practices and beliefs of the area.

2) Determine whether any of these potential cultural practices or beliefs in the current project area continues.

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Appendix P (Addition to the Revised Final EIS)

Supplemental Phase II Subsurface Investigation

Former Corn Mill Camp, Pukalani, Maui, Hawaii

(Clayton Group Services, December 7, 2001)

<u>VOLUME I</u>

Supplemental Phase II Subsurface Investigation

Former Corn Mill Camp
Pukalani, Maui, Hawaii

Clayton Project No. 85-01221.00
December 7, 2001

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VOLUME I

Supplemental Phase II Subsurface Investigation

Former Corn Mill Camp Pukalani, Maui, Hawaii

Clayton Project No. 85-01221.00
December 7, 2001

Prepared for:
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VOLUME I.

Clayton Group Services

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EXECUTIVE SUMMARY

Carlsmith Ball, LLP, retained Clayton Group Services, Inc. ("Clayton") to perform a supplemental Phase II subsurface investigation of the Maui Land & Pineapple Company, Inc. property, formerly known as the Corn Mill Camp (the "subject property"), located at the junction of Makawao Avenue and Pukalani Bypass Road in Pukalani, Maui, Hawaii. The subject property includes four structures located in the northwest corner. The structures are referred to as Buildings A, B, C, and D. The Phase II subsurface investigation focused on the areas of Buildings B and C.

The purpose of this project was to (1) prepare a work plan to delineate the horizontal and vertical extent of soil impacted by organochlorine pesticides, pentachlorophenol, and arsenic, (2) assess the presence of dioxin, which is associated with pentachlorophenol, and (3) recommend preliminary remedial alternatives for use in planning development activities of the property.

In addition, one boring was advanced and three soil samples collected to assess the presence or absence of petroleum in soil at the location of a former diesel underground storage tank (UST). The samples were analyzed for total petroleum hydrocarbons –scan using EPA Method 8015-modified.

Previous Investigation

On April 18, 2001, Clayton collected soil samples at 13 locations within the subject property. The sample locations were selected in the immediate areas of the two buildings (Buildings B and C) historically used to store chemicals and areas likely to be impacted by releases of the stored materials. The soil samples were collected from depths of two to six inches below ground surface (bgs). Eleven of the samples were selected for analysis.

Organochlorine pesticides (4,4-DDE and 4,4-DDT) were detected above the State of Hawaii Department of Health (DOH) Tier 1 Soil Action Level (SAL) in ten of the eleven samples analyzed. Phenols analysis revealed concentrations of pentachlorophenol above the EPA Region IX Preliminary Remediation Goal (PRG) in one sample. Arsenic was detected in soil samples at concentrations ranging from 6.0 to 150 milligrams per kilogram (mg/kg). Two samples exceeded the SAL of 22 mg/kg. Organophosphorus pesticides and chlorinated herbicides were not detected in any of the samples above the laboratory Method Reporting Limits (MRL). Laboratory analytical results indicated VOCs were not detected at or above the MRLs.

Field Activities

From July 23 to 26, 2001, Clayton advanced nine borings, and collected 17 shallow surface soil samples at the subject property. Clayton logged the borings using the Unified Soil Classification descriptions, and collected soil samples from varying depths.

On November 10, 2001, Clayton returned to the site and collected an additional 8 shallow surface soil samples. Six of the samples were selected for analysis and two samples were archived by the laboratory.

A total of 30 soil samples were collected from Boreholes B-1 to B-8, at depths between 4 and 20 feet bgs. Lithified ash and bedrock were encountered in the borings at depths of 16 to 20 feet bgs. Borehole B-9 was drilled at the former location of an underground storage tank just south of Building C. A total of three soil samples were collected from Borehole B-9, at depths of 8 to 16 feet bgs.

Twenty-five shallow surface soil samples were collected at depths of 0.4 to 2 feet bgs. The samples mostly consisted of dark brown silty clay and clay, and were dry to slightly moist. There was no discoloration or strong odor observed in the shallow soils.

Laboratory Results

Fifty soil samples were analyzed for organochlorine pesticides using EPA Method 8081A, *and pentachlorophenol using EPA Method 8270C. Forty four soil samples were* analyzed for arsenic using EPA Method 7060A. Ten soil samples were analyzed for dioxins using EPA Method 8290. The three samples from Borehole B-9 were analyzed for total petroleum hydrocarbons –scan using EPA Method 8015-modified.

Organochlorine pesticides, Dieldrin, Toxaphene, and DDT (4,4-DDD, 4,4-DDE or 4,4-DDT), were detected above the State of Hawaii DOH Tier 1 SAL in 12 of the 44 samples analyzed. None of the constituents of concern for organochlorine pesticides were detected above their respective PRGs/SALs from soil samples collected at or below four feet bgs.

Concentrations of pentachlorophenol were detected above the PRG of 11 mg/kg in 10 samples. However, the Method 8270C analysis required sample dilution and included matrix interference resulting in an elevated laboratory Method Reporting Limit (MRL). Because the MRL was elevated above the PRG, the results of the analysis were reported as less than the MRL. The average depth of the samples with results above the PRG was 1.2 feet bgs. None of the samples had concentrations of pentachlorophenol above their respective MRL. The MRL for the project ranged from 1 to 20 mg/kg.

Arsenic was detected, above the MRL, in 30 of the samples analyzed. One shallow soil sample (SS-23) contained an arsenic concentration greater than the PRG of 22 mg/kg.

Congeners of dioxin, expressed as the TCDD toxic equivalent quantity (TEQ), were detected in all of the ten samples analyzed. The concentrations ranged from 0.052 to 8,978 nanograms per kilogram (parts per trillion). The highest concentration, found in SS-24, was above the PRG of 5,000 parts per trillion. The deepest samples analyzed (B-2-5.0 and B-4-5.0) had dioxin TEQs more than three orders of magnitude below the PRG.

The results of the TPH-Scan analysis for the three samples collected from Borehole B-9 were *not detected* at or above the laboratory MRL.

Conclusions and Recommendations

Results of the subsurface investigation and laboratory analysis of 50 soil samples indicate the presence of chlorinated pesticides across the area investigated, to a depth of less than five feet bgs. Pentachlorophenol impacted soil at the subject property is confined to surface soils to an average depth 1.2 feet bgs. The vertical extent of contamination at the subject property was delineated to DOH SALs or EPA PRGs by this investigation.

The lateral extent of contamination was delineated to DOH SALs or EPA PRGs by this investigation, except for concentrations of DDT in shallow soils to the northeast of Building C. The investigation revealed the extent of DDT impacts extends to the northeast at the bottom of the drainage culvert. However, because the principle mode of transport for these contaminants in the immediate area is surface runoff, it is unlikely impacts extend up-slope from the bottom of the culvert.

Based on the analytical results for soil samples obtained during this investigation and physical conditions at the site, it is Clayton's opinion that pentachlorophenol concentrations above the PRG are confined to the unpaved area to the immediate northeast of Building C.

Based on the results of our investigation, Clayton recommends the following:

- Submit this report to the DOH for their review.
- Prepare an analysis of remedial alternatives that includes consideration of the planned development activities of the site and limited remedial excavation.
- Initiate dialog with the DOH to discuss possible remedial alternatives, site priority, DOH oversight, and schedule.

1.0 INTRODUCTION

Carlsmith Ball, LLP, retained Clayton Group Services, Inc. ("Clayton") to perform a preliminary Phase II subsurface investigation at the Maui Land & Pineapple Company, Inc. property, formerly known as the Corn Mill Camp (the "subject property"), located at the junction of Makawao Avenue and Pukalani Bypass Road in Pukalani, Maui, Hawaii.

1.1 BACKGROUND

In September of 1996 Levine Fricke Recon performed an Environmental Compliance Audit of the Haliimaile Section of Maui Pineapple Company, that included the subject property. The draft audit report identified historical uses of two Corn Mill Camp buildings that included the mixing and storage of agricultural chemicals. According to the report, the subject property was used in the 1940s and 1950s for storage of pentachlorophenol phenate, DDT, and disodium methanearsenate (Levine Fricke, 1997).

Maui Land & Pineapple Company, Inc. acquired the subject property in the early 1960s at which time the two buildings were cleaned of residual dust by washing the floors and walls with water. The water was allowed to escape through floorboards and infiltrate into the ground beneath the two buildings. According to Mr. Doug MacCluer, of Maui Pineapple Company, the subject property may have been used for storage and mixing of agricultural chemicals historically used by Haleakala Pineapple Company. Those chemicals included Lindane, Chlordane, DBCP, PCP, DDT, and arsenic compounds. Mr. MacCluer stated that at least two mixing tanks with capacities of less than 1,000 gallons were known to have been located at one of the buildings and used to mix chemical pesticides and herbicides prior to crop application. The subject property has historically been used for offices, pesticide application vehicle and equipment storage, and agricultural chemical storage and mixing until the mid-1960's. Thereafter the subject property was used only for storage purposes.

On April 18, 2001, Clayton collected soil samples at 13 locations within the subject property. The sample locations were selected in the immediate areas of the two buildings used to store chemicals and areas likely to be impacted by releases of the stored materials. The soil samples were collected from depths of two to six inches below ground surface (bgs).

Based on their locations, eleven of the samples were selected for analysis. The samples were sent under standard chain-of-custody procedures to Columbia Analytical Services, Inc. (CAS), Canoga Park, California, for analysis. CAS sent a subsample of each sample to West Coast Analytical Services, Inc., Santa Fe Springs, California, for analysis.

The samples were analyzed for (1) organochlorine pesticides using EPA Method 8081A, (2) organophosphorus pesticides using EPA Method 8141, (3) chlorinated herbicides using EPA Method 8151A, (4) volatile organic compounds (VOCs) using EPA Method 8260B, (5) phenols using EPA Method 8270C, (6) arsenic using EPA Method 7060A, and (7) chromium and copper using EPA Method 6010B.

Organochlorine pesticides (4,4-DDE and 4,4-DDT) were detected above the State of Hawaii Department of Health (DOH) Tier 1 Soil Action Level (SAL) in ten of the eleven samples analyzed. Phenols analysis revealed concentrations of pentachlorophenol above the EPA Region IX Preliminary Remediation Goal (PRG) in one sample. Arsenic was detected in soil samples at concentrations ranging from 6.0 to 150 milligrams per kilogram (mg/kg). Two samples exceeded the SAL of 22 mg/kg. Organophosphorus pesticides and chlorinated herbicides were not detected in any of the samples above the laboratory Method Reporting Limits (MRLs). Laboratory analytical results indicated VOCs were not detected at or above the MRLs.

Based on the results of the investigation, Clayton recommended preparation of a work plan to delineate the horizontal and vertical extent of soil impacted by organochlorine pesticides, pentachlorophenol, and arsenic, and assess the presence of dioxin at the subject property. In addition, Clayton recommended an analysis of preliminary remedial alternatives for the subject property to be incorporated into the planned development.

1.2 PURPOSE

The purpose of this project is to (1) prepare a work plan to delineate the horizontal and vertical extent of soil impacted by organochlorine pesticides, pentachlorophenol, and arsenic, and (2) assess the presence of dioxin, which may be associated with pentachlorophenol, and (3) recommend preliminary remedial options for use in planning development activities for the property.

In addition, one boring was advanced and three soil samples collected to assess the presence or absence of petroleum in soil at the location of a former diesel underground storage tank (UST). The samples were analyzed for total petroleum hydrocarbons –scan using EPA Method 8015-modified.

2.0 SCOPE OF WORK

Clayton performed the following tasks:

Task 1: Work Plan Preparation and DOH Liaison

- Prepared a work plan in accordance with the Technical Guidance Manual for Implementation of the Hawaii State Contingency Plan to delineate the horizontal and vertical extent of soil impacted by organochlorine pesticides, pentachlorophenol, and arsenic, and assessed the presence of dioxins in soils at the site.

- Initiated dialog and coordinated with the State of Hawaii DOH to ensure agency concurrence with planned activities.

Task 2: Exploratory Drilling and Sampling

- Advanced nine boreholes using a conventional drill rig and collected samples for laboratory analysis at five-foot intervals to a depth of 20 bgs.
- Contained drill cuttings and decontamination water on-site pending disposal.
- Analyzed samples from eight boreholes for:

  (1) Organochlorine pesticides using EPA Method 8081A

  (2) Pentachlorophenol using EPA Method 8270C

  (3) Arsenic using EPA Method 6020A
- Analyzed three of the boreholes soil samples for congeners of dioxin using EPA Method 8290.
- Analyzed three samples from one borehole for total petroleum hydrocarbons-scan using EPA Method 8015-modified.

Task 3: Surface Soil Sampling

- Collected 25 additional surface soil samples at select locations and depths on the subject property. Hand sampling methods were used to collect the samples.
- Analyzed the soil samples for:

  (1) Organochlorine pesticides using EPA Method 8081A,

  (2) Pentachlorophenol using EPA Method 8270C,

  (3) Arsenic using EPA Method 6020A,
- Analyzed seven select soil samples for dioxins using EPA Method 8290.

Task 4: Data Analysis

- Reviewed analytical results and compared them to EPA Region IX PRGs and DOH Tier 1 Action Levels. Identified areas of concern that may impact planned development at the property and require special attention.
- Used the data to complete an analysis of preliminary remedial alternatives to identify appropriate remedial options for the subject property.

Task 5: Reporting

- Prepared this report summarizing the results of the Phase II investigation.
- Conducted dialog and attended meetings with various parties, including Maui Pineapple representatives, planning consultants, and DOH, as necessary.

3.0 PROPERTY DESCRIPTION

The subject property consists of approximately 40 acres of mountainside land located along Makawao Avenue, on the western flank of the Haleakala Volcano (Figures 1 and 2, Figures Tab).

A portion of the subject property is improved with warehouse buildings and offices in a commercial and light industrial setting. Adjacent properties are used for agricultural and residential purposes. The subject property fronts the Pukalani Bypass Road/Haleakala Highway to the northeast and Makawao Avenue to the northwest. A paved access road connects the subject property to Makawao Avenue.

The subject property includes four structures located in the northwest corner. The structures are referred to as Buildings A, B, C, and D. The Phase II investigation was focused on the areas of Buildings B and C (Figure 2).

4.0 PHYSICAL SETTING

According to the U.S. Geological Survey, Haiku, Maui, Hawaii, 7.5-minute topographic quadrangle map, the subject property is located in the town of Pukalani in the Makawao District of the Island of Maui, Hawaii. The area is characterized by a moderate to steep grade in a northwesterly direction (Figure 1). Elevations at and around the subject property range from approximately 1,630 to 1,650 feet above mean sea level (amsl) (USGS 1997).

4.1 SOIL CONDITIONS

According to the U.S. Department of Agriculture Soil Conservation Service, the ground beneath the subject property is listed *as Haliimaile silty clay loam*, on 7 to 15 percent slopes (mapping unit *HgC*). The *Haliimaile* series consists of well-drained soils on uplands on the island of Maui. These soils developed in material weathered from basic igneous rock.

In a representative profile, the surface layer is dark reddish-brown, silty clay about 15 inches thick. The subsurface soil, more than 60 inches thick, is a dark reddish-brown silty clay and very dark, grayish-brown clay that has a subangular blocky and angular blocky structure. The substratum is soft, weathered basic igneous rock. The soil is strongly acidic in the surface layer and strongly to medium acidic in the subsurface. Permeability is moderately rapid, runoff is medium, and the erosion hazard is moderate.

Soil encountered during the assessment included a dark brown silty clay and dark brown clay. Lithified ash and bedrock were encountered at depths of 16 to 20 feet bgs.

4.2 GROUNDWATER CONDITIONS

Regional groundwater at the subject property is derived from the Makawao aquifer system of the Central sector on the island of Maui, as stated in the Aquifer Identification and Classification for the island of Maui: Groundwater Protection Strategy for Hawaii, Technical Report No. 185, published by the Water Resources Research Center at the University of Hawaii. The aquifer system below the subject property consists of an upper and lower aquifer.

Based on the technical report, the upper aquifer is an unconfined high level aquifer, perched in volcanic lithology. Its status is described as currently used, replaceable, fresh drinking water supply (salinity <250 milligrams per liter [mg/L] Chloride). This aquifer has a high vulnerability to contamination.

Based on the technical report, the lower aquifer is an unconfined basal aquifer occurring in a flank type (horizontally extensive lavas) volcanic lithology. Its status is described as potentially useful, irreplaceable, fresh drinking water supply (salinity <250 mg/L Chloride). This aquifer has a moderate vulnerability to contamination.

The estimated depth to first groundwater near the subject property vicinity is greater than 100 feet bgs, and the basal aquifer is over 1,000 feet bgs. The inferred groundwater flow direction is expected to be northwest towards the Pacific Ocean. The local gradient and flow direction under the subject property for both the upper and lower aquifers may be influenced naturally by zones of higher or lower permeability, or by nearby pumping or recharge, and may deviate from the regional trend.

According to the State of Hawaii Department of Land and Natural Resources (DLNR), there are no wells on the subject property and no drinking water or injection wells within ½ mile. There is one irrigation supply well located approximately one mile west of the subject property at an elevation of 1,086 feet amsl. The well was drilled to a total depth of 1,130 feet bgs and had a static water level of 8 feet amsl (DLNR, 2001).

5.0 <u>FIELD ACTIVITIES</u>

5.1 SAMPLING STRATEGY

Sampling locations were selected based on the results of the previous investigation, information provided by Maui Pineapple personnel, and the physical conditions at the site. Based on the information above, the source of impacts to soils of the subject property appeared localized. Therefore, there was minimal need to step-out the borings from the previous investigation.

The boring locations were selected in the immediate unpaved areas to the north of Buildings B and C, the impacted areas revealed during the previous investigation, and in the asphalt-paved areas surrounding the north end of Building C.

Shallow surface soils sampling locations were also selected based on the previous investigation and the assumption of a localized source at the subject property with contaminants entrained in runoff originating from the unpaved areas adjacent to Buildings B and C. A limited number of samples were selected from asphalt-paved areas.

5.2 SOIL SAMPLING ACTIVITIES

5.2.1 Surface Sampling

From July 23 to July 26, and on November 10, 2001, Clayton hand-augered a total of 25 boreholes (SS-14 through SS-38) and collected a total of 25 soil samples, one from each borehole. Soil sample locations are depicted in Figure 2 behind the *Figures* tab. The soil samples were collected from depths of four inches to two feet bgs. Samples were collected using hand-operated sampling devices, such as trowels, augers and spatulas constructed of stainless steel.

The soil samples were collected in pre-cleaned 8-ounce glass jars with Teflon™-lined caps. The samples were then sealed with packing tape, labeled and stored with frozen gel-ice in a portable ice chest. The samples collected in July were delivered to CAS, Canoga Park, California, and samples collected in November were delivered to Curtis & Tompkins Analytical Laboratories (CTAL), Berkeley, California, for analysis following standard chain-of-custody procedures.

Field duplicate samples (SS-15 and SS-30) were collected from within two inches of each other from bare soil, at a depth of two feet bgs, at the northeast margin of Building C. Samples SS-14 and SS-17 were also collected from 2-foot depths. Soil sample SS-23 was collected from beneath the asphalt concrete of the driveway between Building B and C, from a depth of 1-foot bgs. Soil samples SS-24 to SS-27, SS-36 were collected from a densely vegetated area northeast of Building B. Samples SS-20, SS-21, SS-33, SS-34 and SS-35 were collected from low points down slope of the other sample locations. These low points are likely impacted by runoff originating from the unpaved areas adjacent to Buildings B and C.

No odor or discoloration was detected in surface soils during the sampling activities. The soils encountered in the shallow boreholes was predominately dark brown to dark reddish brown silty clay with some gravel and organic matter. The shallow boreholes were backfilled with native soil.

5.2.2 Subsurface Sampling

On July 24 and July 25, 2001, Clayton subcontractor Valley Well Drilling advanced nine boreholes using a hollow-stem auger and split-spoon soil sampler. A total of 30 soil samples were collected from boreholes B-1 to B-8. The soil samples were collected from depths of 4 to 20 feet bgs. A total of three soil samples were collected from borehole B-9, at depths of 8 to 16 feet bgs. Borehole locations are depicted in Figure 2 behind the *Figures* tab. Samples were collected using the split-spoon sampler containing precleaned brass or stainless steel sleeves. The sample sleeves were removed from the sampler and capped with Teflon™ liners and plastic caps, and sealed with packing tape. The samples were then labeled and stored with frozen gel-ice in a portable ice chest. The samples were delivered to CAS for analysis following standard chain-of-custody procedures.

During collection of the soil samples, no odor or discoloration was detected. The soils generally appeared very homogenous, had a very soft to stiff consistency, and were dry to slightly moist.

The soil encountered in the boreholes was predominately dark brown to dark reddish brown silty clay with some gravel. Lithified ash and basalt bedrock were encountered at depths of 16 to 20 feet bgs. The boreholes were backfilled with bentonite chips.

5.3 DECONTAMINATION PROCEDURES

The sampling equipment was cleaned between each sample location. The cleaning process involved brushing or scraping off excess soil particles, rinsing with water, washing and scrubbing the equipment in a non-phosphate detergent solution, rinsing in a bucket of tap water and triple rinsing with distilled water, followed by air-drying.

The final distilled water rinse was collected during the investigation. At the completion of sampling activities, Clayton collected one sample of the rinsate for laboratory analysis in two pre-cleaned 1-liter, amber glass jars. The jars were sealed, labeled, and placed in a portable cooler with frozen gel-ice.

6.0 STATE AND FEDERAL SOIL ACTION LEVELS

The subject property is located above the State of Hawaii Underground Injection Control (UIC) Line; therefore, groundwater at the subject property is considered to be a source of potable water. The State of Hawaii DOH Tier 1 Action Levels for soil and groundwater (rainfall ≤200 centimeters/year) for sites where a drinking water source is threatened are applicable to this site.

In June of 1996, the State of Hawaii DOH established soil and groundwater action levels in their guidance document titled "Risk-Based Corrective Action and Decision Making at Sites with Contaminated Soil." The guidance document uses the Aquifer Identification and Classification Technical Report No. 185, published by the Water Resources Research Center at the University of Hawaii, to assist in determining drinking water and non-drinking water aquifers. According to this report, the aquifers below the subject property are drinking water aquifers.

The DOH established the Tier 1 Action Levels based on (1) potential adverse impact on groundwater due to leaching of residual contamination from impacted soil, (2) potential adverse impact on groundwater due to remobilization of product in impacted soil, and (3) potential threats to human health due to direct exposure to impacted soil.

The EPA Region IX, which includes Hawaii, established PRGs for contaminants based on a risk-based analysis.

The applicable State of Hawaii DOH Tier 1 SAL and EPA Region IX PRGs are shown on Tables 1 through 5.

7.0 LABORATORY RESULTS

Soil samples SS-14 through SS-36 were analyzed for organochlorine pesticides using EPA Method 8081A, and pentachlorophenol using EPA Method 8270C. Samples SS-14 through SS-30 were analyzed for arsenic using EPA Method 6020A. Samples SS-14 through SS-17, SS-19, SS-24, and SS-30 were analyzed for 2,3,7,8-TCDD (dioxin) and congeners of dioxin using EPA Method 8290. Field duplicate samples included SS-15 and SS-30.

The 30 samples collected from borings B-1 to B-8 were analyzed for (1) organochlorine pesticides using EPA Method 8081A, (2) pentachlorophenol using EPA Method 8270C, and (3) arsenic using EPA Method 6020A. Three soil samples were analyzed for dioxins using EPA Method 8290. Three soil samples were collected from boring B-9, and analyzed for total petroleum hydrocarbons –scan using EPA Method 8015-modified.

Clayton collected one sample of rinsate generated during decontamination of the sampling equipment and analyzed the rinsate sample for 4,4-DDD, 4,4-DDE, and 4,4-DDT using EPA Method 8081A. The sample contained detectable concentrations of 4,4-DDE (0.0073 micrograms per liter (ug/L)) and 4,4-DDT (0.041 ug/L). However these are estimated concentrations as they were below the MRL of 0.052 ug/L.

Organochlorine pesticides, Dieldrin, Toxaphene, and DDT (4,4-DDD, 4,4-DDE or 4,4-DDT), were detected above the State of Hawaii DOH Tier 1 SAL in 12 of the 50 samples analyzed. DDT exceedences are depicted in Figure 3. None of the constituents of concern for organochlorine pesticides were detected in soils above their respective PRGs/SALs from soil samples collected at or below four feet bgs.

Pentachlorophenol analysis revealed concentrations above the PRG (11 mg/kg) in 10 samples. However, the Method 8270C analysis required sample dilution and included matrix interference resulting in an elevated laboratory MRL. Because the MRL was elevated above the PRG, the results of the analysis were reported as less than the MRL. The average depth of the samples with MRL results above the PRG is 1.2 feet bgs. Pentachlorophenol exceedences are depicted in Figure 4.

The reported pentachlorophenol concentration for the field duplicate samples (SS-15, <5 mg/kg, and SS-30, <20 mg/kg) indicates the variability among the Method 8270C analytical results related to sample extract dilutions and matrix interference. However, with the exception of one sample (B-1-5.0, <20 mg/kg), none of the samples collected below four feet bgs had detectable concentrations of pentachlorophenol or MRLs above the PRG.

Arsenic was detected, above the MRL, in 30 of the samples analyzed. One shallow soil sample (SS-23, 35 mg/kg) contained an arsenic concentration greater than the PRG of 22 mg/kg. Arsenic exceedences are depicted in Figure 5.

There are a total of 17 congeners of polychlorinated dibenzo(p)dioxins (PCDDs) and polychlorinated dibenzo(p)furans (PCDFs). The most studied and also considered most toxic congener is the 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Congeners of dioxin, expressed as the TCDD toxic equivalent quantity (TEQ), were detected in all of the ten samples analyzed. The concentrations ranged from 0.052 to 8,978 nanograms per kilogram (parts per trillion). The highest concentration, found in SS-24, was above the PRG of 5,000 parts per trillion. The deepest samples analyzed (B-2-5.0 and B-4-5.0) had dioxin TEQs more than three orders of magnitude below the PRG.

The laboratory analytical results are summarized in Tables 1 through 5 included behind the Tables Tab. The laboratory analytical reports and chain-of-custody forms are included herein and make up Volumes II to IV of this report.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Results of the subsurface investigation and laboratory analyses of 50 soil samples indicate the presence of chlorinated pesticides across the area investigated, to a depth of less than five feet bgs. Pentachlorophenol impacted soil at the subject property is confined to surface soils to an average depth 1.2 feet bgs. The vertical extent of contamination at the subject property was delineated to DOH SALs or EPA PRGs by this investigation.

The lateral extent of contamination was delineated to DOH SALs or EPA PRGs by this investigation, except for concentrations of DDT in shallow soils to the northeast of Building C. The investigation revealed the extent of DDT impacts extends to the northeast at the bottom of the drainage culvert. However, because the principle mode of transport for contaminants of concerns in the immediate area is surface runoff, it is unlikely impacts extend up-slope from the bottom of the culvert.

Based on the analytical results for soil samples obtained during this investigation and physical conditions at the site, it is Clayton's opinion that pentachlorophenol concentrations above the PRG are confined to the unpaved area to the immediate northeast of Building C.

Based on the results of our investigation, Clayton recommends the following:

- Submit this report to the DOH for their review.
- Prepare an analysis of remedial alternatives that includes consideration of the planned development activities of the site and limited remedial excavation.
- Initiate dialog with the DOH to discuss possible remedial alternatives, site priority, DOH oversight, and schedule.

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December 7, 2001

REFERENCES

Clayton Group Services

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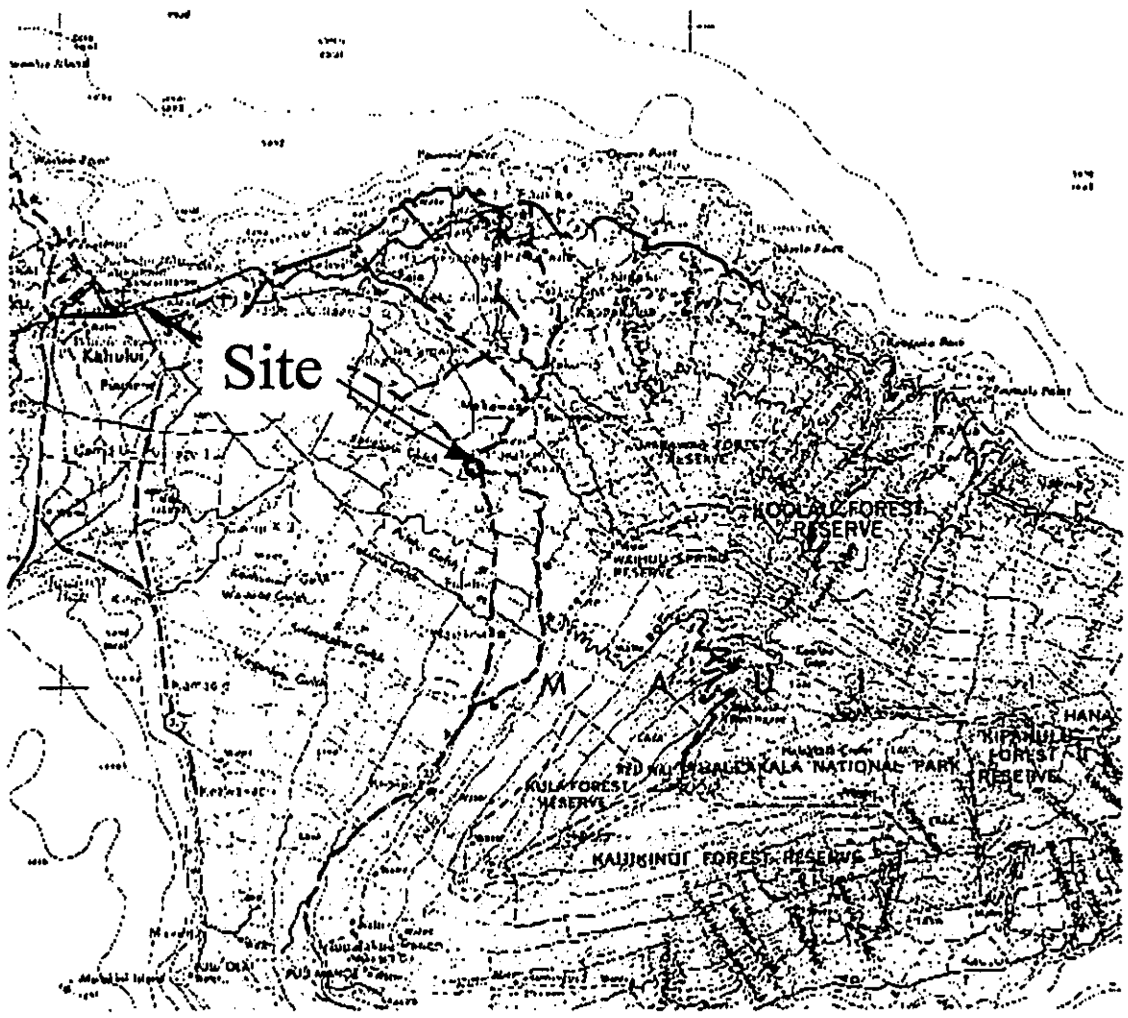
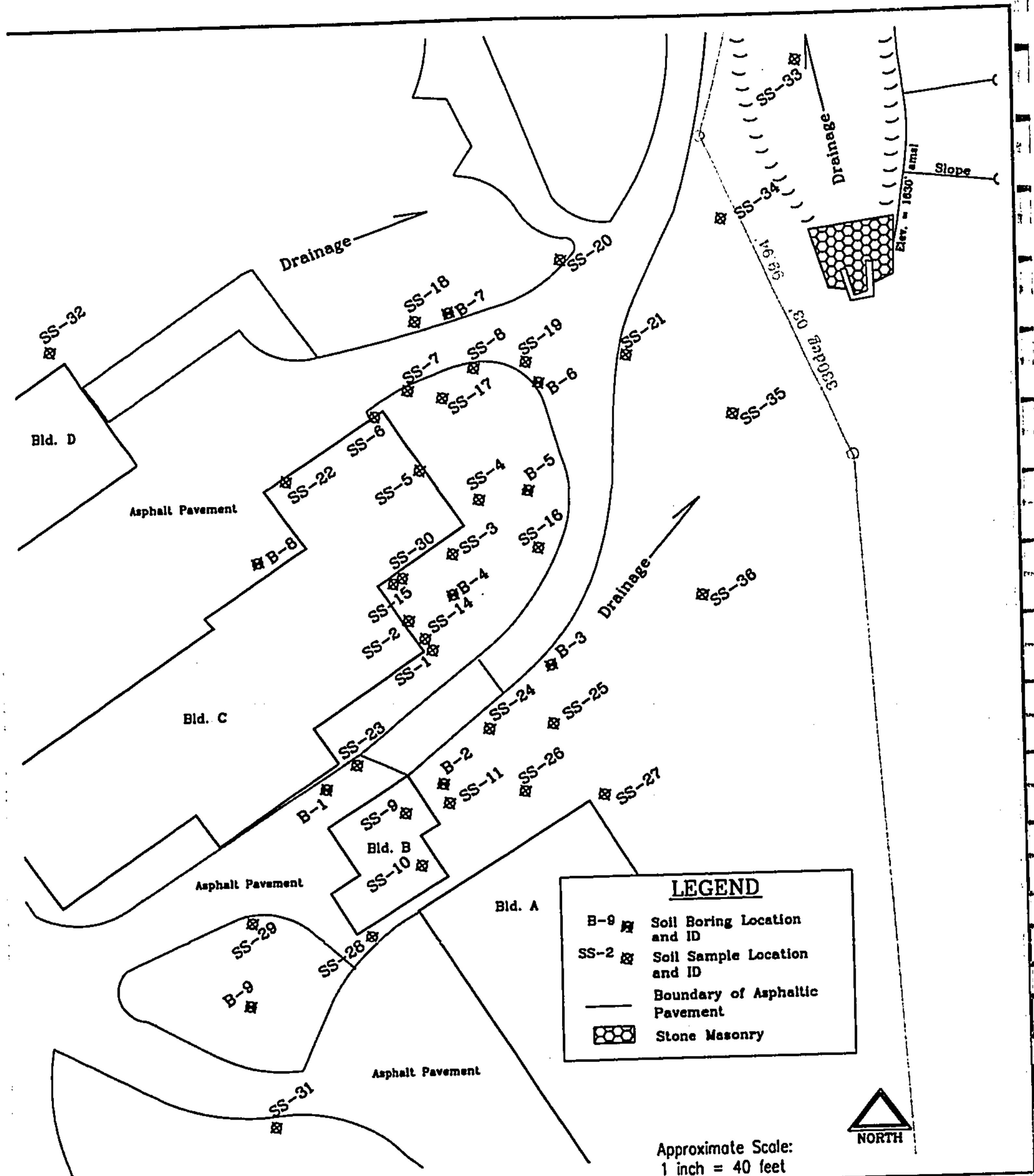
FIGURES



Compiled from US Quadrangles 1:24,000 and 1:62,500
United States Department of the Interior
Geological Survey
Hawaiian Islands, NF 4–16 Maui, Hawaii 1974

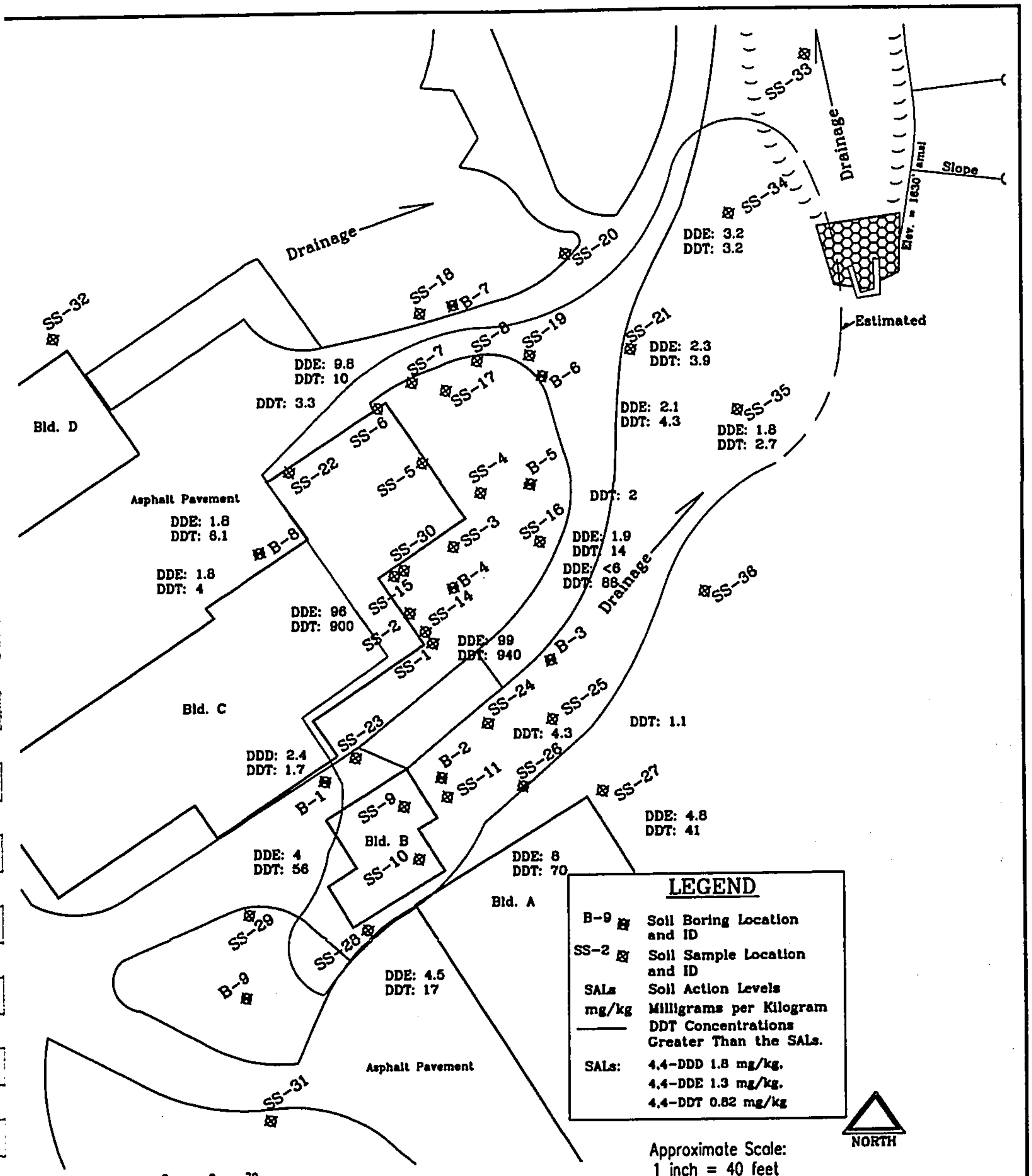
NORTH

Clayton Group Services	Project No.: 85-01221.00	Title: SITE LOCATION MAP	FIGURE 1
	Date: 5/29/01	Location: Former Corn Mill Camp, Pukalani, Maui, Hawaii	
	Revised By: SS		
	Checked By: DPF	Client: Carlsmith Ball, LLP	



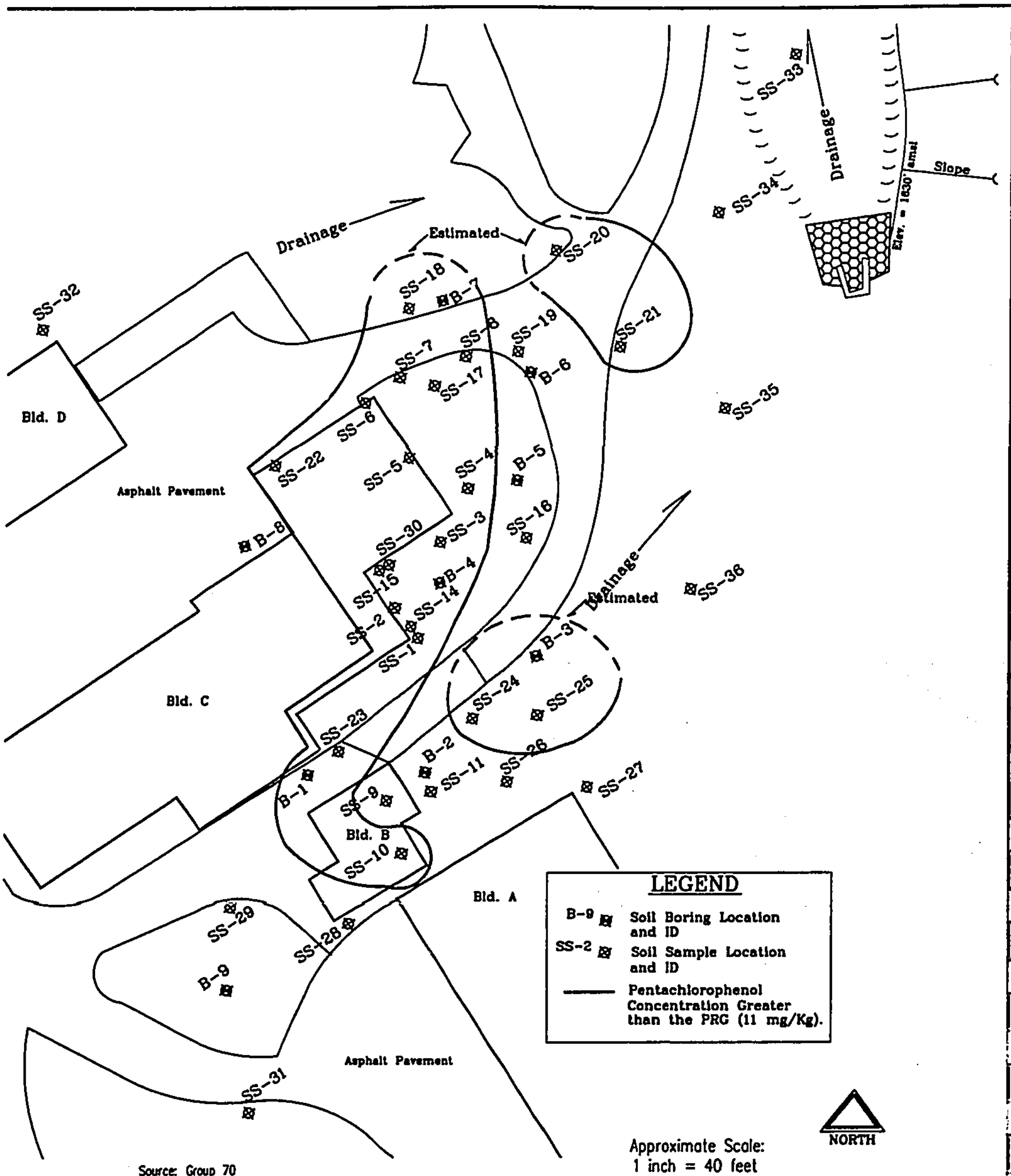
Source: Group 70

Clayton GROUP SERVICES	Project No.: 85-01221.00	Title: SOIL SAMPLE AND BORING LOCATIONS	FIGURE 2
	Date: 10/01/01	Location: Former Maui Pine Cornmill Camp, Pukalani, Maui, Hawaii	
	Revised By: RLF		
	Checked By: DPF	Client: Carlsmith Ball LLP	



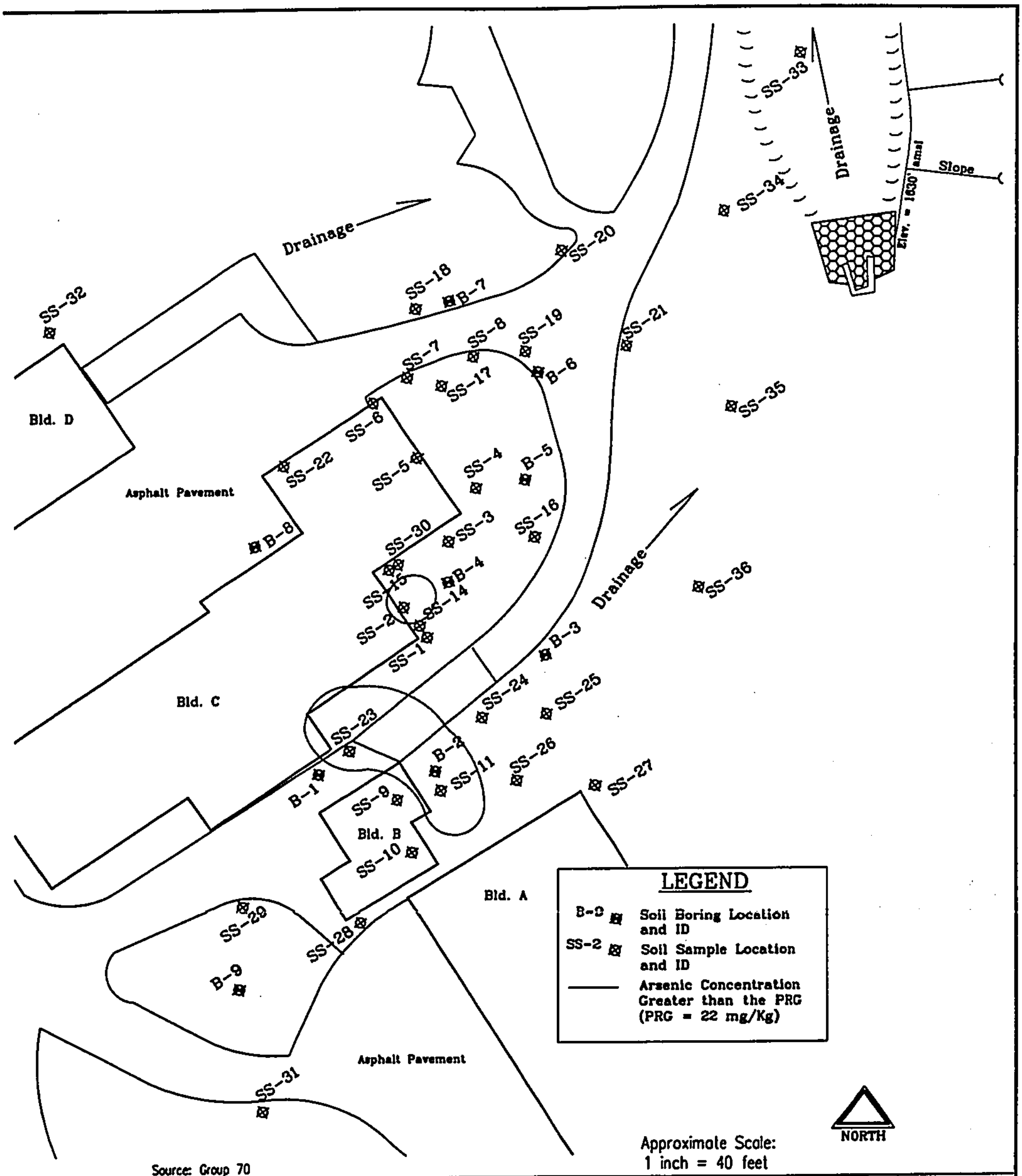
Source: Group 70

Clayton GROUP SERVICES	Project No.: 85-01221.00	Title: DDT EXCEEDENCES IN SOIL	FIGURE 3
	Date: 10/01/01	Location: Former Maui Pine Cornmill Camp Pukalani, Maui, Hawaii	
	Revised By: RLF		
	Checked By: DPF	Client: Carlsmith Ball LLP	



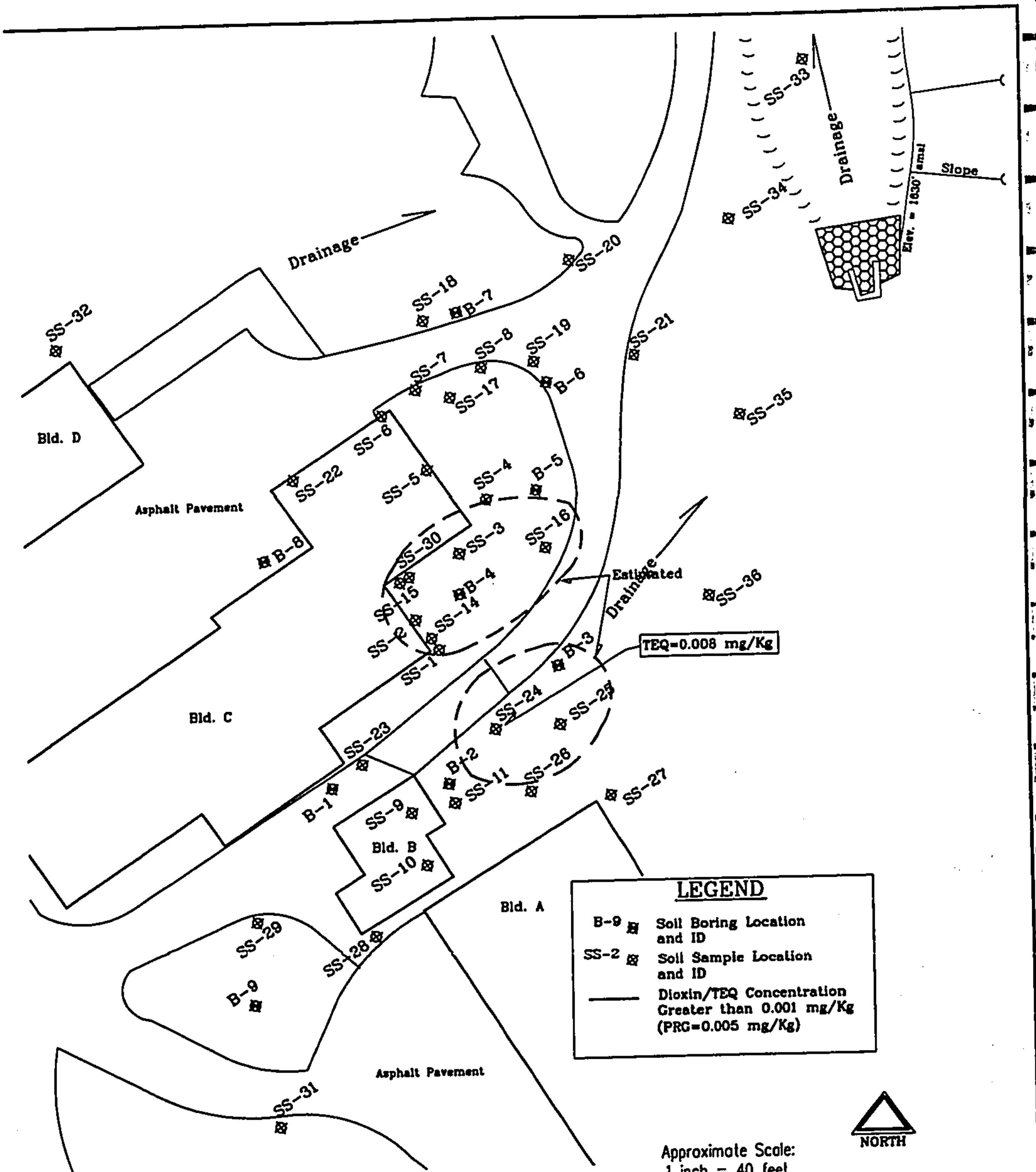
Source: Group 70

Clayton GROUP SERVICES	Project No.: 85-01221.00	Title: PENTACHLOROPHENOL EXCEEDENCES IN SOIL		FIGURE 4
	Date: 10/01/01	Location: Former Maui Pine Cornmill Camp Pukalani, Maui, Hawaii		
	Revised By: RLF			
	Checked By: DPF	Client: Carlsmith Ball LLP		



Source: Group 70

Clayton GROUP SERVICES	Project No.: 85-01221.00	Title: ARSENIC EXCEEDENCES IN SOIL		FIGURE 5
	Date: 10/01/01	Location: Former Maui Pine Cornmill Camp Pukalani, Maui, Hawaii		
	Revised By: RLF			
	Checked By: DPF	Client: Carlsmith Ball LLP		



Source: Group 70

Clayton GROUP SERVICES	Project No.: 85-01221.00	Title: DIOXIN EXCEEDENCES IN SOIL
	Date: 10/01/01	Location: Former Maui Pine Cornmill Camp Pukalani, Maui, Hawaii
	Revised By: RLF	
	Checked By: DPF	Client: Carlsmith Ball LLP

FIGURE 6

TABLES

Table 1
Laboratory Analytical Results
(EPA Method 8081A)
Soil Samples
Date Sampled: July 23 -26, 2001
Clayton Project No.: 85-01221.00

EPA Method 8081A Organochlorine Pesticides	PRG/(SAL) (ug/kg)	SS-14 (ug/kg)	SS-15 (ug/kg)	SS-15DL (ug/kg)	Field Dup SS-15 (ug/kg)	Field Dup SS-15DL (ug/kg)	SS-16 (ug/kg)	SS-16DL (ug/kg)	SS-17 (ug/kg)	SS-18 (ug/kg)	SS-19 (ug/kg)	SS-20 (ug/kg)	SS-20DL (ug/kg)
alpha-BHC	NS	<3.4	<85	<420	<17	<85	<85	<1700	<8.5	<8.5	<1.7	<17	<85
beta-BHC	NS	<3.4	<85	<420	<17	<85	<85	<1700	<8.5	<8.5	<1.7	<17	<85
delta-BHC	NS	<3.4	<85	<420	<17	<85	<85	<1700	<8.5	<8.5	<1.7	<17	<85
gamma-BHC (Lindane)	NS	<3.4	<85	<420	48P	<85	<85	<1700	<8.5	<8.5	<1.7	<17	<85
Heptachlor	550	<3.4	<85	<420	<17	<85	<85	<1700	<8.5	<8.5	<1.7	<17	<85
Aldrin	150	<3.4	<85	<420	<17	<85	<85	<1700	<8.5	<8.5	<1.7	<17	<85
Heptachlor Epoxide	270	<3.4	<85	<420	<17	<85	<85	<1700	<8.5	<8.5	<1.7	<17	<85
Endosulfan I	--1	<3.4	<85	<420	<17	<85	<85	<1700	<8.5	<8.5	<1.7	<17	<85
Dieldrin	150	<6.6	<160	<820	<33	<160	<160	<3300	<16	<16	<3.3	<33	<160
4,4-DDE	(1300)	14	1800	2000	300	340	1900	2200	23	87	1.6	170	190
Endrin	260000	<6.6	<160	<820	<33	<160	<160	<3300	<16	<16	<3.3	<33	<160
Endosulfan II	--1	<6.6	<160	<820	<33	<160	<160	<3300	<16	<16	<3.3	<33	<160
4,4-DDD	(1800)	2.6	1200	1200	260	280	400	700	3.2	2.6	<3.3	8.8	<160
Endosulfan Sulfate	NS	<6.6	<160	<820	<33	<160	<160	<3300	<16	<16	<3.3	<33	<160
4,4-DDT	(820)	56	4000	5100	930	1200	14000	26000	160	97	3.5	610	710
Methoxychlor	4400000	34	<850	<4200	<170	<850	<850	<170000	<85	<85	0.93	<170	<850
Endrin Aldehyde	NS	<6.6	<160	<820	<33	<160	<160	<3300	<16	<16	<3.3	<33	<160
alpha-Chlordane	--2	<3.4	<85	<420	<17	<85	<85	<1700	<8.5	<8.5	<1.7	<17	<85
Endrin Ketone	NS	<6.6	<160	<820	<33	<160	<160	<3300	<16	<16	<3.3	<33	<160
gamma-Chlordane	--2	<3.4	<85	<420	<17	<85	<85	<1700	<8.5	<8.5	<1.7	<17	<85
Toxaphene	2200	<340	<8500	<42000	<1700	<8500	<8500	<1700000	<850	<850	<170	<1700	<8500

Shaded values equal or exceed the PRG/SAL.
Bold values are estimated due to values outside the method calibration range.
The number following the "less than" symbol is the method reporting limit (MRL).
--1 Endosulfan I & II PRG = 5.3xE+06 ug/Kg.
--2 Chordane (alpha & gamma) PRG = 11,000 ug/Kg.
"DL" Indicates sample extract required dilution.
Field Dup: Field Duplicate is Sample No. SS-30.
ug/kg: Micrograms per kilogram (~parts per billion)
ND: Not Detected at the MRL
NS: No Standard
PRG: Preliminary Remediation Goal, EPA Region IX.
SAL: Soil Action Level, HDOH Tier 1 Soil Action Level where a drinking water source is threatened (rainfall <200 cm/yr).

Clayton Group Services

Table 1
Laboratory Analytical Results
(EPA Method 8081A)
Soil Samples
Date Sampled: July 23 -26, 2001
Clayton Project No.: 85-01221.00

EPA Method 8081A Organochlorine Pesticides	PRG/(SAL) (ug/kg)	SS-21 (ug/kg)	SS-21DL (ug/kg)	SS-22 (ug/kg)	SS-22DL (ug/kg)	SS-23 (ug/kg)	SS-23DL (ug/kg)	SS-24 (ug/kg)	SS-24DL (ug/kg)	SS-25 (ug/kg)	SS-25DL (ug/kg)	SS-26 (ug/kg)	SS-27 (ug/kg)
alpha-BHC	NS	<85	<420	<85	<850	<34	<170	<85	<420	<17	<85	<8.5	<1.7
beta-BHC	NS	<85	<420	<85	<850	<34	<170	<85	<420	<17	<85	<8.5	<1.7
delta-BHC	NS	<85	<420	<85	<850	<34	<170	<85	<420	<17	<85	<8.5	<1.7
gamma-BHC (Lindane)	NS	<85	<420	<85	<850	<34	<170	<85	<420	**31**	**35**	<8.5	<1.7
Heptachlor	550	<85	<420	<85	<850	<34	<170	<85	<420	<17	<85	<8.5	<1.7
Aldrin	150	<85	<420	<85	<850	<34	<170	<85	<420	<17	<85	<8.5	<1.7
Heptachlor Epoxide	270	<85	<420	<85	<850	<34	<170	<85	<420	<17	<85	<8.5	<1.7
Endosulfan I	~1	<85	<420	<85	<850	<34	<170	<85	<420	<17	<85	<8.5	<1.7
Dieldrin	150	<160	<820	<160	<1600	<66	<330	<160	<820	<33	<160	<16	<3.3
4,4-DDE	(1300)	2300	2600	1800	2000	**1100**	1300	**1000**	**1100**	**1000**	1400	**39**	**3.6**
Endrin	260000	<160	<820	<160	<1600	<66	<330	<160	<820	<33	<160	<16	<3.3
Endosulfan II	~1	<160	<820	<160	<1600	<66	<330	<160	<820	<33	<160	<16	<3.3
4,4-DDD	(1800)	**67**	<820	**180**	<1600	2400	2900	**53**	<820	**10**	<160	**5.4**	<3.3
Endosulfan Sulfate	NS	<160	<820	<160	<1600	<66	<330	<160	<820	<33	<160	<16	<3.3
4,4-DDT	(820)	3900	4800	6100	8300	1700	2000	4300	5300	1100	1400	**45**	**7**
Methoxychlor	4400000	<850	<4200	<850	<8500	<340	<1700	<850	<4200	<170	<850	<85	**1.2**
Endrin Aldehyde	NS	<160	<820	<160	<1600	<66	<330	<160	<820	<33	<160	<16	<3.3
alpha-Chlordane	~2	<85	<420	<85	<850	**27**	<170	<85	<420	<17	<85	<8.5	<1.7
Endrin Ketone	NS	<160	<820	<160	<1600	<66	<330	<160	<820	<33	<160	<16	<3.3
gamma-Chlordane	~2	<85	<420	<85	<850	<34	<170	<85	<420	<17	<85	<8.5	<1.7
Toxaphene	2200	<8500	<42000	<8500	<850000	<3400	<17000	<8500	<42000	<1700	<8500	<850	<170

Shaded values equal or exceed the PRG/SAL.
Bold values are estimated due to values outside the method calibration range.
The number following the "less than" symbol is the method reporting limit (MRL).
~1 Endosulfan I & II PRG = 5.3xE+06 ug/Kg.
~2 Chordane (alpha & gamma) PRG = 11,000 ug/Kg.
"DL" Indicates sample extract required dilution.
Field Dup: Field Duplicate is Sample No. SS-30.
ug/kg: Micrograms per kilogram (~parts per billion)
ND: Not Detected at the MRL
NS: No Standard
PRG: Preliminary Remediation Goal, EPA Region IX.
SAL: Soil Action Level, HDOH Tier 1 Soil Action Level where a drinking water source is threatened (rainfall <200 cm/yr).

Table 1
Laboratory Analytical Results
(EPA Method 8081A)
Soil Samples
Date Sampled: July 23 -26, 2001
Clayton Project No.: 85-01221.00

EPA Method 8081A Organochlorine Pesticides	PRG/(SAL) (ug/kg)	SS-28 (ug/kg)	SS-28DL (ug/kg)	SS-29 (ug/kg)	SS-31 (ug/kg)	SS-32 (ug/kg)	SS-33 (ug/kg)	SS-34 (ug/kg)	SS-35 (ug/kg)	SS-36 (ug/kg)	B-1-5.0 (ug/kg)	B-1-10.0 (ug/kg)	B-1-15.0 (ug/kg)
alpha-BHC	NS	<170	<1700	<8.5	<35	<19	<36	<180	<140	<36	<1.7	<1.7	<1.7
beta-BHC	NS	<170	<1700	<8.5	<35	<19	<36	<180	<140	<36	<1.7	<1.7	<1.7
delta-BHC	NS	<170	<1700	<8.5	<35	<19	<36	<180	<140	<36	<1.7	<1.7	<1.7
gamma-BHC (Lindane)	NS	<170	<1700	<8.5	<35	<19	<36	<180	<140	<36	<1.7	<1.7	<1.7
Heptachlor	550	<170	<1700	<8.5	<35	<19	<36	<180	<140	<36	<1.7	<1.7	<1.7
Aldrin	150	<170	<1700	<8.5	<35	<19	<36	<180	<140	<36	<1.7	<1.7	<1.7
Heptachlor Epoxide	270	<170	<1700	<8.5	<35	<19	<36	<180	<140	<36	<1.7	<1.7	<1.7
Endosulfan I	~1	<170	<1700	<8.5	<35	<19	<36	<180	<140	<36	<1.7	<1.7	<1.7
Dieldrin	150	<330	<3300	<16	<70	<38	<72	<360	<290	<73	<3.3	<3.3	<3.3
4,4-DDE	(1300)	4500	4600	100	730	200	73	3200	1800	380	25	<3.3	<3.3
Endrin	260000	<330	<3300	<16	<70	<38	<72	<360	<290	<73	<3.3	<3.3	<3.3
Endosulfan II	~1	<330	<3300	<16	<70	<38	<72	<360	<290	<73	<3.3	<3.3	<3.3
4,4-DDD	(1800)	200	<3300	2	<70	<38	<72	<360	<290	<73	94	<3.3	<3.3
Endosulfan Sulfate	NS	<330	<3300	<16	<70	<38	<72	<360	<290	<73	<3.3	<3.3	<3.3
4,4-DDT	(820)	17000	21000	100	400	110	290	3200	2700	170	13	<3.3	<3.3
Methoxychlor	4400000	<1700	<170000	<85	<350	<190	<360	<1800	<1400	<360	<17	<17	<17
Endrin Aldehyde	NS	<330	<3300	<16	<70	<38	<72	<360	<70	<73	<3.3	<3.3	<3.3
alpha-Chlordane	~2	<170	<1700	<8.5	<35	<19	<36	<180	<140	<36	<1.7	<1.7	<1.7
Endrin Ketone	NS	<330	<3300	<16							<3.3	<3.3	<3.3
gamma-Chlordane	~2	<170	<1700	<8.5	<35	<19	<36	<180	<140	<36	<1.7	<1.7	<1.7
Toxaphene	2200	<17000	<170000	<850	<700	<380	<720	<3600	<2900	<730	<170	<170	<170

Shaded values equal or exceed the PRG/SAL.
Bold values are estimated due to values outside the method calibration range.
The number following the "less than" symbol is the method reporting limit (MRL).
~1 Endosulfan I & II PRG = 5.3xE+06 ug/Kg.
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ND: Not Detected at the MRL
NS: No Standard
PRG: Preliminary Remediation Goal, EPA Region IX.
SAL: Soil Action Level, HDOH Tier 1 Soil Action Level where a drinking water source is threatened (rainfall <200 cm/yr).

Clayton GROUP SERVICES

Table 1
Laboratory Analytical Results
(EPA Method 8081A)
Soil Samples
Date Sampled: July 23 -26, 2001
Clayton Project No.: 85-01221.00

EPA Method 8081A Organochlorine Pesticides	PRG/(SAL) (ug/kg)	B-1-20.0 (ug/kg)	B-2-5.0 (ug/kg)	B-2-10.0 (ug/kg)	B-2-15.0 (ug/kg)	B-3-5.0 (ug/kg)	B-3-10.0 (ug/kg)	B-3-15.0 (ug/kg)	B-4-5.0 (ug/kg)	B-4-10.0 (ug/kg)	B-4-15.0 (ug/kg)	B-5-5.0 (ug/kg)	B-5-10.0 (ug/kg)
alpha-BHC	NS	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
beta-BHC	NS	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
delta-BHC	NS	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
gamma-BHC (Lindane)	NS	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	**0.89**	<1.7	<1.7	<1.7	<1.7
Heptachlor	550	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Aldrin	150	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Heptachlor Epoxide	270	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Endosulfan I	--1	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Dieldrin	150	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
4,4-DDE	(1300)	<3.3	**0.64**	<3.3	<3.3	<3.3	<3.3	<3.3	**0.41**	<3.3	<3.3	<3.3	<3.3
Endrin	260000	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
Endosulfan II	--1	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
4,4-DDD	(1800)	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
Endosulfan Sulfate	NS	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
4,4-DDT	(820)	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	**0.73**	<3.3	<3.3	<3.3	<3.3
Methoxychlor	4400000	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17
Endrin Aldehyde	NS	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	**0.69**	<3.3	<3.3	**0.62**
alpha-Chlordane	--2	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Endrin Ketone	NS	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
gamma-Chlordane	--2	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Toxaphene	2200	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170

Shaded values equal or exceed the PRG/SAL.
Bold values are estimated due to values outside the method calibration range.
The number following the "less than" symbol is the method reporting limit (MRL).
--1 Endosulfan I & II PRG = 5.3xE+06 ug/Kg.
--2 Chordane (alpha & gamma) PRG = 11,000 ug/Kg.
"DL" Indicates sample extract required dilution.
Field Dup: Field Duplicate is Sample No. SS-30.
ug/kg: Micrograms per kilogram (~parts per billion)
ND: Not Detected at the MRL
NS: No Standard
PRG: Preliminary Remediation Goal, EPA Region IX.
SAL: Soil Action Level, HDOH Tier 1 Soil Action Level where a drinking water source is threatened (rainfall <200 cm/yr).

Table 1
Laboratory Analytical Results
(EPA Method 8081A)
Soil Samples
Date Sampled: July 23 -26, 2001
Clayton Project No.: 85-01221.00

EPA Method 8081A Organochlorine Pesticides	PRG/(SAL) (ug/kg)	B-5-15.0 (ug/kg)	B-6-4.0 (ug/kg)	B-6-9.0 (ug/kg)	B-6-14.0 (ug/kg)	B-6-18.0 (ug/kg)	B-7-5.0 (ug/kg)	B-7-10.0 (ug/kg)	B-7-15.0 (ug/kg)	B-8-5.0 (ug/kg)	B-8-10.0 (ug/kg)	B-8-15.0 (ug/kg)	B-8-20.0 (ug/kg)
alpha-BHC	NS	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
beta-BHC	NS	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
delta-BHC	NS	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
gamma-BHC (Lindane)	NS	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Heptachlor	550	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Aldrin	150	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Heptachlor Epoxide	270	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Endosulfan I	~1	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Dieldrin	150	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
4,4-DDE	(1300)	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
Endrin	260000	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
Endosulfan II	~1	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
4,4-DDD	(1800)	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
Endosulfan Sulfate	NS	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
4,4-DDT	(820)	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	0.8
Methoxychlor	4400000	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17
Endrin Aldehyde	NS	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
alpha-Chlordane	~2	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Endrin Ketone	NS	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
gamma-Chlordane	~2	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Toxaphene	2200	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170

Shaded values equal or exceed the PRG/SAL.
Bold values are estimated due to values outside the method calibration range.
The number following the "less than" symbol is the method reporting limit (MRL).
~1 Endosulfan I & II PRG = 5.3xE+06 ug/Kg.
~2 Chordane (alpha & gamma) PRG = 11,000 ug/Kg.
"DL" Indicates sample extract required dilution.
Field Dup: Field Duplicate is Sample No. SS-30.
ug/kg: Micrograms per kilogram (~parts per billion)
ND: Not Detected at the MRL
NS: No Standard
PRG: Preliminary Remediation Goal, EPA Region IX.
SAL: Soil Action Level, HDOH Tier 1 Soil Action Level where a drinking water source is threatened (rainfall <200 cm/yr).

Clayton Group Services

Table 2
Laboratory Analytical Results
(EPA Methods 8270C and 8290)
Soil Samples
Date Sampled: July 23-26, 2001
Clayton Project No.: 85-01221.00

EPA Method 8270C (Pentachlorophenol)	Result (mg/Kg)	Dioxin (ng/Kg)
SS-14	<1.0	2318
SS-15	<20.0	1136
SS-16	<5	3309
SS-17	<5	30.36
SS-18	<20	
SS-19	<1	0.1012
SS-20	<20	
SS-21	<20	
SS-22	<20	
SS-23	<20	
SS-24	<20	8978
SS-25	<20	
SS-26	<2	
SS-27	<10	
SS-28	<20	
SS-29	<10	
SS-30	<5	4829
SS-31	<9.8	
SS-32	<2.1	
SS-33	<2	
SS-34	<2	
SS-35	<2	
SS-36	<10	
B-1-5.0	<20	
B-1-10.0	ND<1.0	
B-1-15.0	ND<1.0	
B-1-20.0	ND<1.0	
B-2-5.0	ND<1.0	1.503
B-2-10.0	ND<1.0	
B-2-15.0	ND<1.0	
B-3-5.0	ND<1.0	
B-3-10.0	ND<1.0	
B-3-15.0	ND<1.0	
B-4-5.0	ND<1.0	0.655
B-4-10.0	ND<1.0	
B-4-15.0	ND<1.0	
B-5-5.0	ND<1.0	
B-5-10.0	ND<1.0	
B-5-15.0	ND<1.0	
B-6-4.0	ND<1.0	0.05202
B-6-9.0	ND<1.0	
B-6-14.0	ND<1.0	
B-6-18.0	ND<1.0	
B-7-5.0	ND<1.0	
B-7-10.0	ND<1.0	
B-7-15.0	ND<1.0	
B-8-5.0	ND<1.0	
B-8-10.0	ND<1.0	
B-8-15.0	ND<1.0	
B-8-20.0	ND<1.0	
Method Blank	ND	–
PRG	11	5000

Shaded values equal or exceed the PRG.
The number following the "less than" symbol is the method reporting limit (MRL).
ng/kg: Nanograms per kilogram (~parts per trillion)
mg/kg: Milligrams per kilogram (~parts per million)
ND: Not Detected at the MRL.
NS: No Standard
PRG: Preliminary Remediation Goal, EPA Region IX.
Dioxin reported as TCDD Toxicity Equivalent Quantity.

Table 3
Laboratory Analytical Results
(EPA Methods 6020A)
Soil Samples
Sampled: April 18, 2001
Clayton Project No.: 85-01221.00

EPA Method 6020A Total Arsenic	Result (mg/Kg)
SS-14	1
SS-15	1.3
SS-16	1.4
SS-17	0.97
SS-18	1.1
SS-19	1.1
SS-20	1.6
SS-21	2.2
SS-22	0.98
SS-23	35
SS-24	4.7
SS-25	1.8
SS-26	1.2
SS-27	1.1
SS-28	6.4
SS-29	0.89
SS-30	1.3
B-1-5.0	1.4
B-1-10.0	<0.50
B-1-15.0	<0.50
B-1-20.0	0.56
B-2-5.0	0.56
B-2-10.0	<0.50
B-2-15.0	<0.50
B-3-5.0	<0.50
B-3-10.0	<0.50
B-3-15.0	<0.50
B-4-5.0	0.62
B-4-10.0	<0.50
B-4-15.0	<0.50
B-5-5.0	0.75
B-5-10.0	<0.50
B-5-15.0	0.61
B-6-4.0	0.54
B-6-9.0	<0.50
B-6-14.0	0.56
B-6-18.0	<0.50
B-7-5.0	0.61
B-7-10.0	0.79
B-7-15.0	0.62
B-8-5.0	0.53
B-8-10.0	<0.50
B-8-15.0	<0.50
B-8-20.0	0.53
Method Blank	<0.50
PRG	22

Previous Investigation

April 2001	Result (mg/Kg)
SS-1	9
SS-2	38
SS-3	10
SS-4	ND<5
SS-5	ND<5
SS-6	ND<5
SS-7	6
SS-8	ND<5
SS-9	ND<5
SS-10	7
SS-11	150

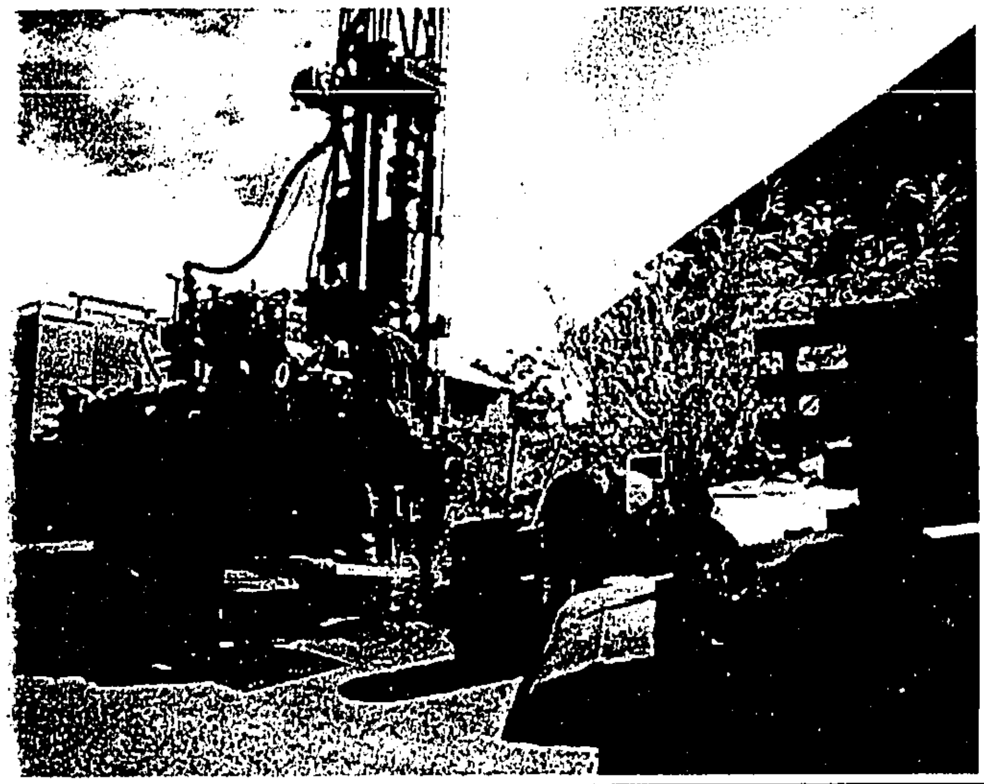
Shaded values equal or exceed the PRG.
mg/kg: Milligrams per kilogram (~parts per million)
ND: Not Detected at the Method Reporting Limit (MRL).
NA: Not Applicable
PRG: Preliminary Remediation Goal, EPA Region IX.
<: The number following the "less than" symbol is the MRL.

Clayton Group Services

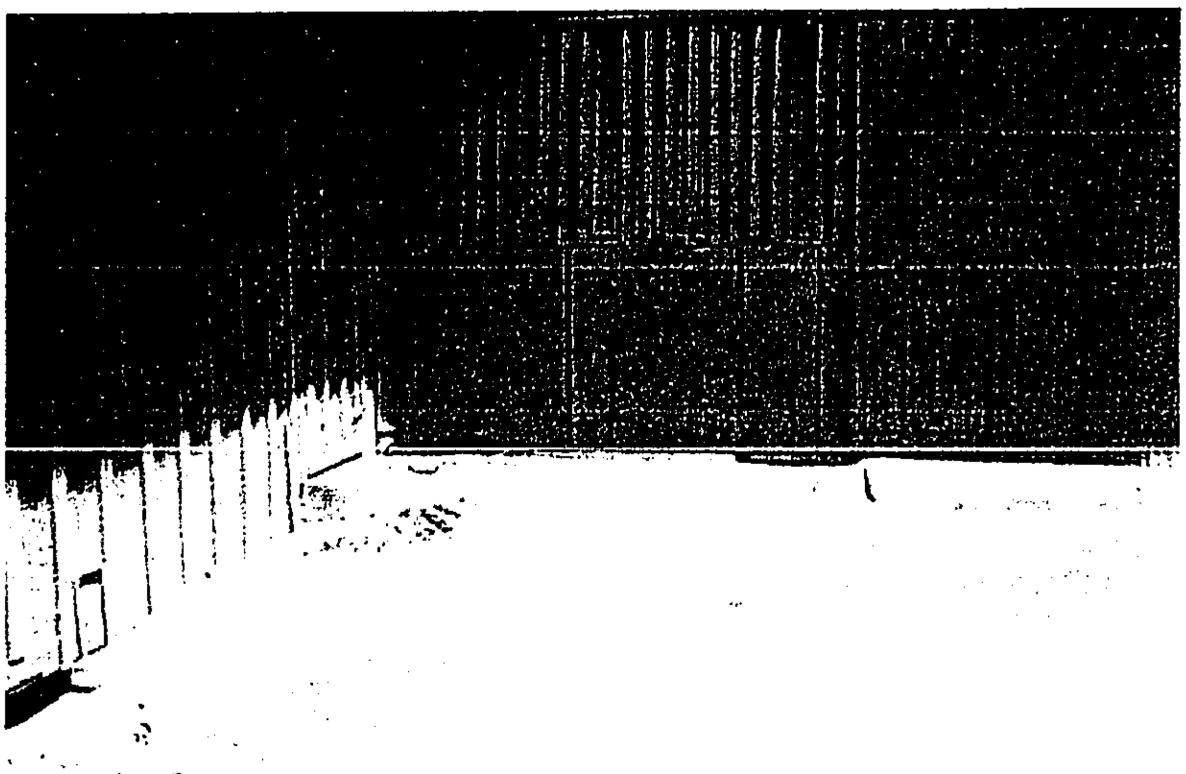
Table 4.
Laboratory Analytical Results
(EPA Method 8015-m)
Clayton Project No.: 85-01221.00
Sampling Date: July 25, 2001

Analyte	EPA Method	B-9-8.0 (mg/kg)	B-9-12.0 (mg/kg)	B-9-16.0 (mg/kg)	Method Blank (mg/kg)	DOH SAL (mg/kg)
TOTAL PETROLEUM HYDROCARBON-SCAN						
GRO (C6-C12)	8015M	ND<10	ND<10	ND<10	ND<10	2,000
DRO (C13-C22)	8015M	ND<10	ND<10	ND<10	ND<10	5,000
HRO (C23-C33)	8015M	ND<10	ND<10	ND<10	ND<10	5,000

mg/kg:	Milligrams per kilogram (equivalent to parts per million)
GRO:	Gasoline Range Organics (C6-C12)
DRO:	Diesel Range Organics (C13-C22)
HRO:	Heavy Oil Range Organics (C23-C33)
ND:	Not Detected at or above the method reporting Limit (MRL).
<:	The number following the less than symbol is the MRL.
DOH SAL	HDOH Tier 1 Soil Action Level where a drinking water source is threatened (Rainfall <200 cm/yr)



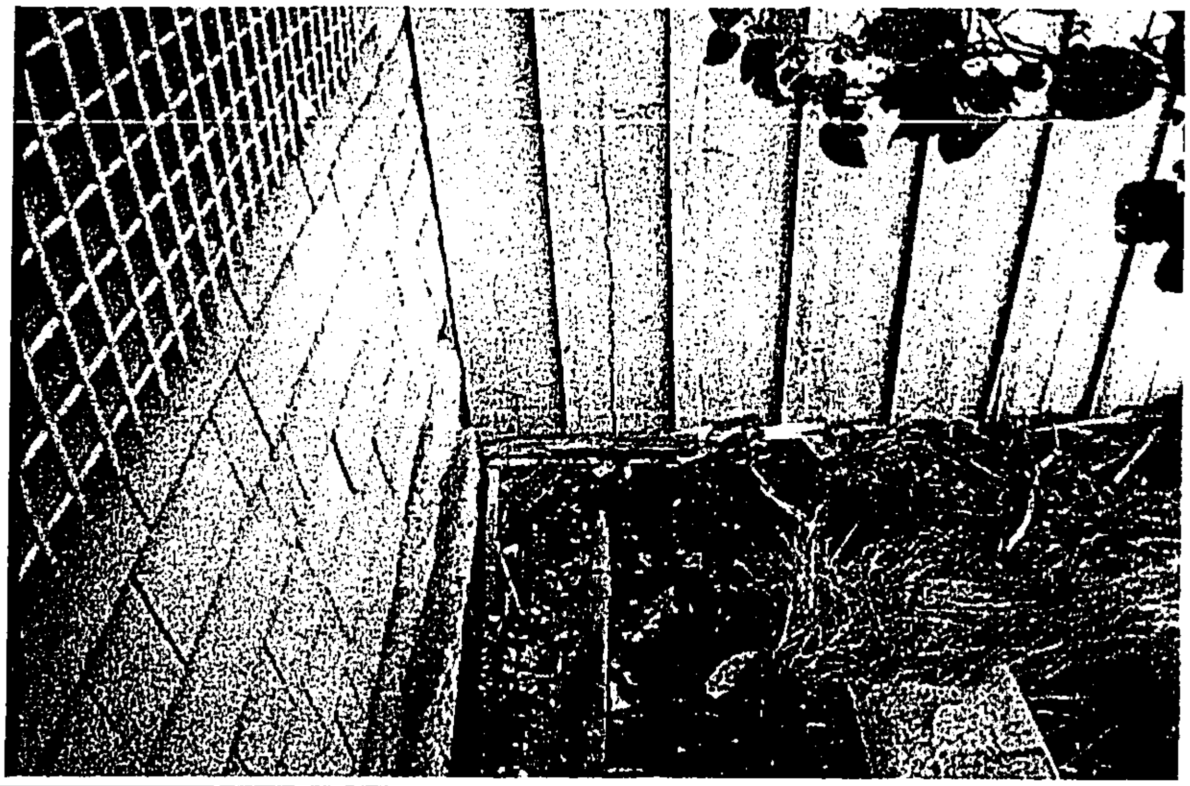
Clayton Project No.	Description	Drill rig at boring location B6 shown.	Photo 1
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	Photo Date
85-01221.00	Client	Carlsmith Ball LLP	7/24/01



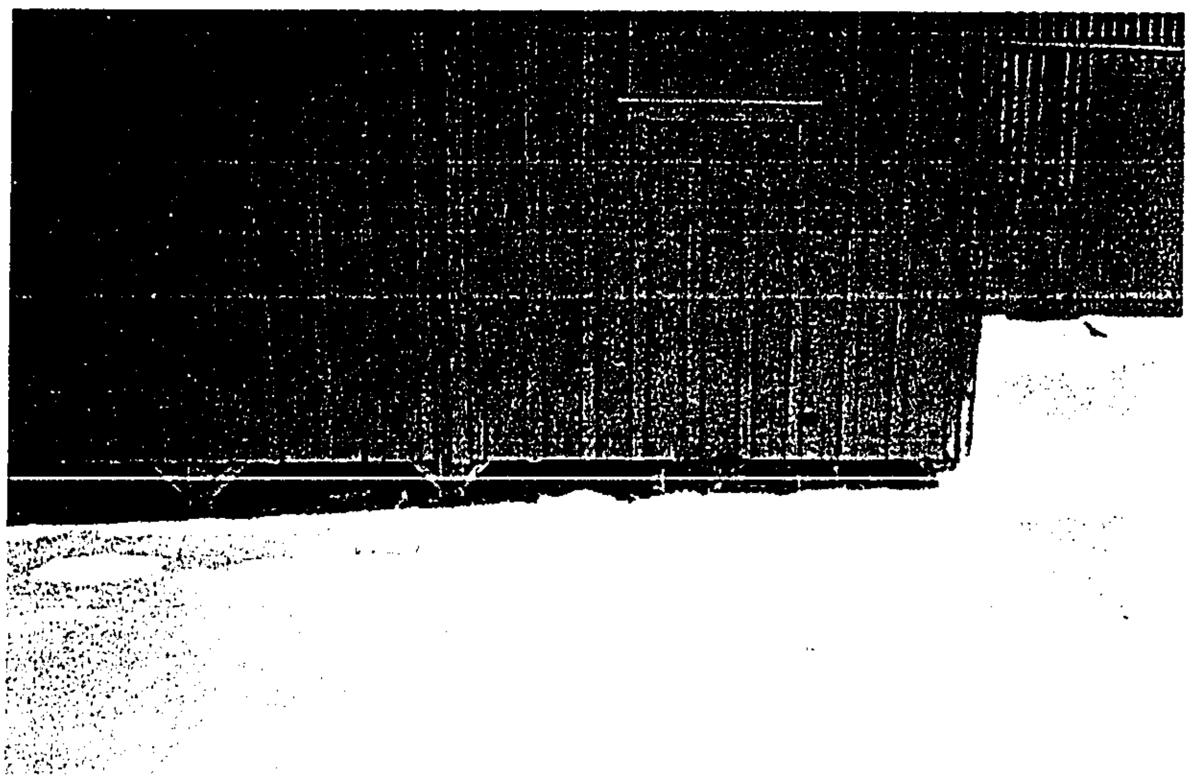
Clayton Project No.	Description	Building C shown. Boring B8 is shown to the right of the photo	Photo 2
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	Photo Date
84-0221.00	Client	Carlsmith Ball LLP	7/24/01

Clayton Project No.	**Description**	Boring location B2 shown adjacent to SS-11 and Building B.	**Photo 3**
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	**Photo Date**
85-01221.00	**Client**	Carlsmith Ball LLP	7/25/01

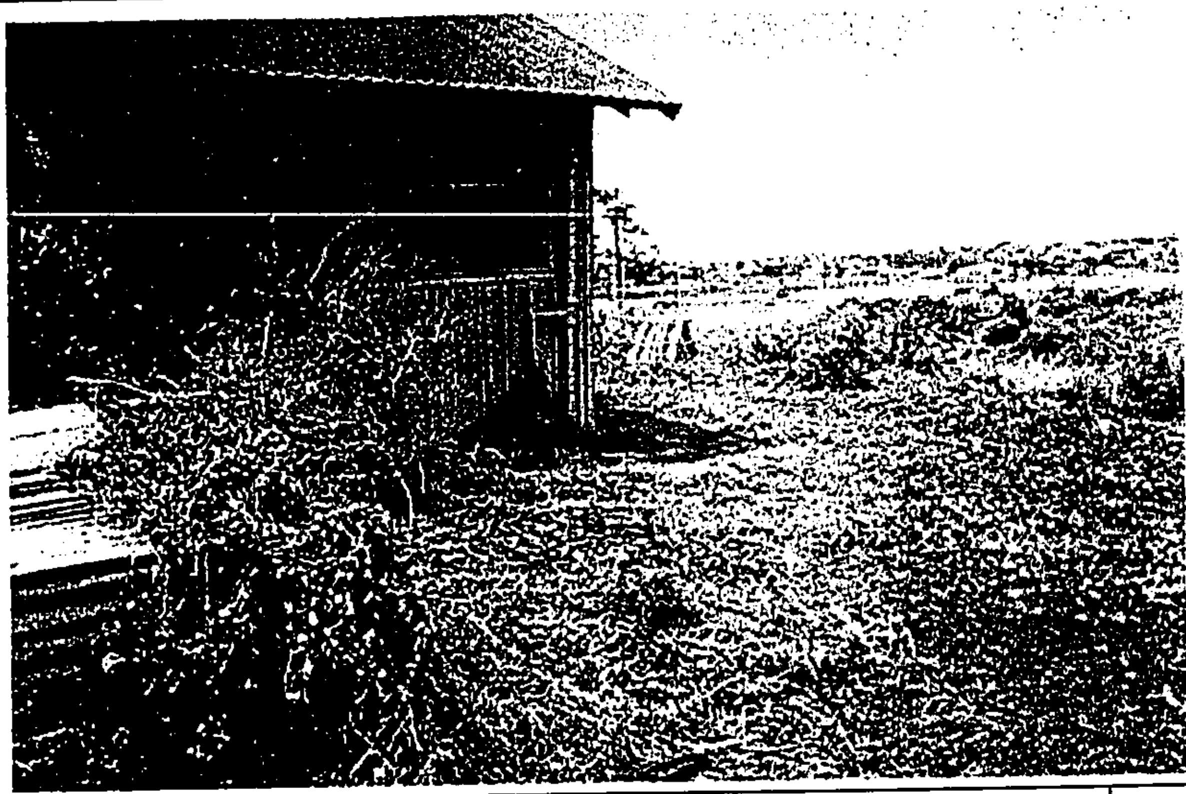
Clayton Project No.	**Description**	Boring location B7 shown looking west to Building D.	**Photo 4**
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	**Photo Date**
84-0221.00	**Client**	Carlsmith Ball LLP	7/23/01



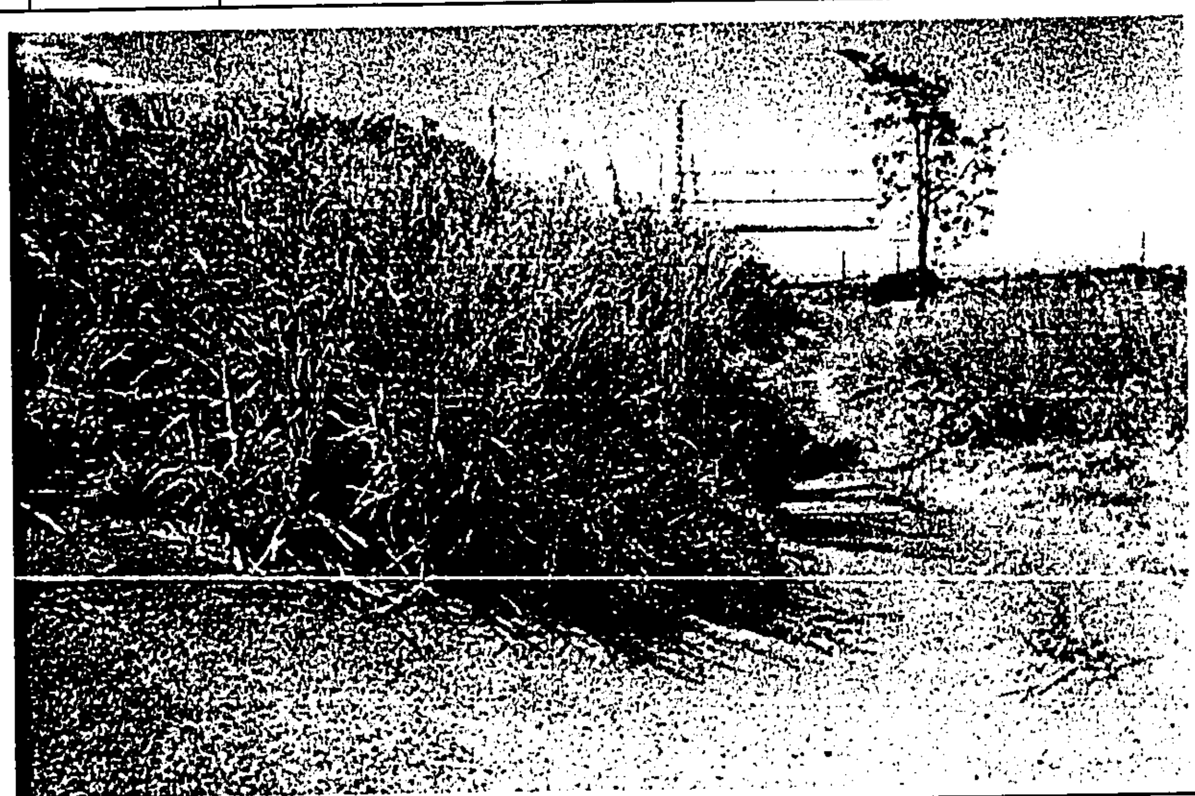
Clayton Project No.	Description	The location of SS-15 and SS-30 is shown at the corner of Building C.	Photo 5
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	Photo Date
85-01221.00	Client	Carlsmith Ball LLP	7/25/01



Clayton Project No.	Description	Shallow soil sample SS-22 sown at the west side of Building C.	Photo 6
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	Photo Date
84-0221.00	Client	Carlsmith Ball LLP	7/25/01



Clayton Project No.	Description	NE corner of Building C shown. Boring B-4 is flagged in foreground.	Photo 7
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	Photo Date
85-01221.00	Client	Carlsmith Ball LLP	7/25/01

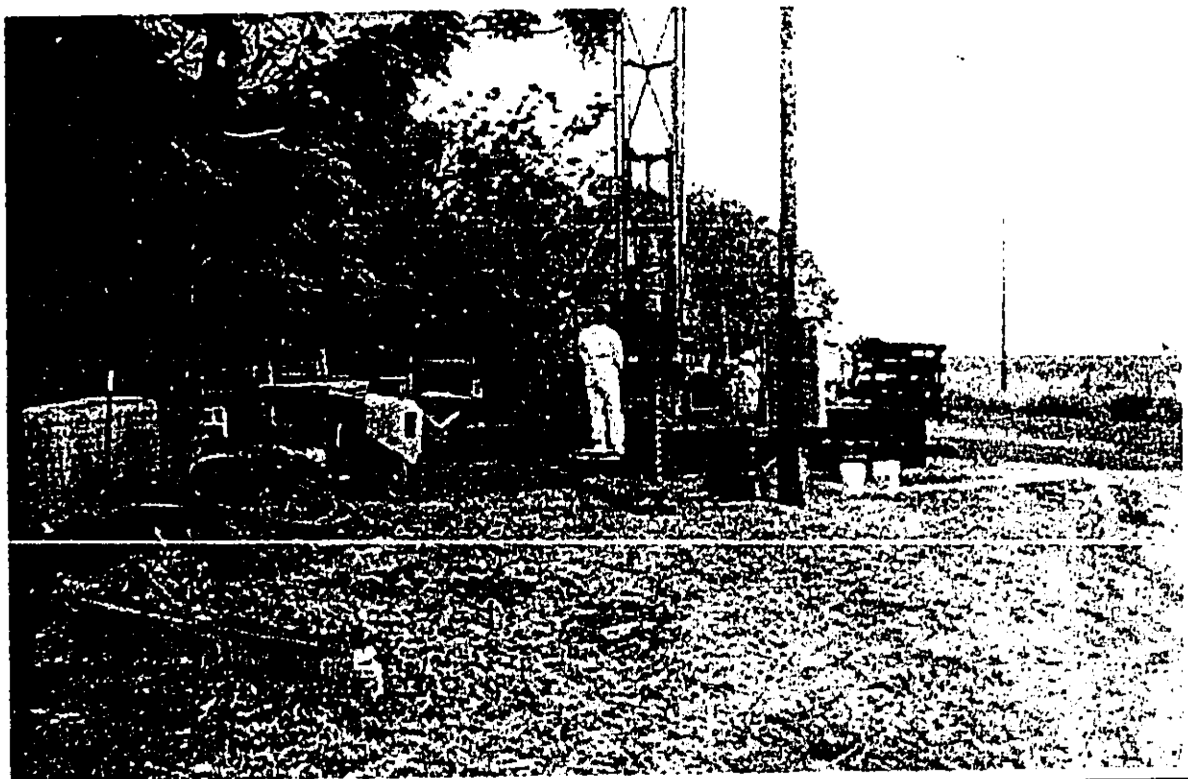


Clayton Project No.	Description	Shallow soil sample SS-20 is shown just off the asphalt concrete.	Photo 8
	Site Name	Pukalani Triangle, Pukalani, Maui, H	Photo Date
84-0221.00	Client	Carlsmith Ball LLP	7/25/01

Clayton Project No.	**Description**	View northeast toward the Pukalani bypass road showing drainage.	**Photo 9**
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	**Photo Date**
85-01221.00	**Client**	Carlsmith Ball LLP	7/24/01

Clayton Project No.	**Description**	View looking south, across the drainage, at Buildings A, B, C, & D.	**Photo 10**
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	**Photo Date**
84-0221.00	**Client**	Carlsmith Ball LLP	11/10/01

Clayton Project No.	Description	Location of SS-28 shown in orange between Buildings A and B.	Photo 11
85-01221.00	Site Name	Pukalani Triangle, Pukalani, Maui, HI	Photo Date
	Client	Carlsmith Ball LLP	7/25/01

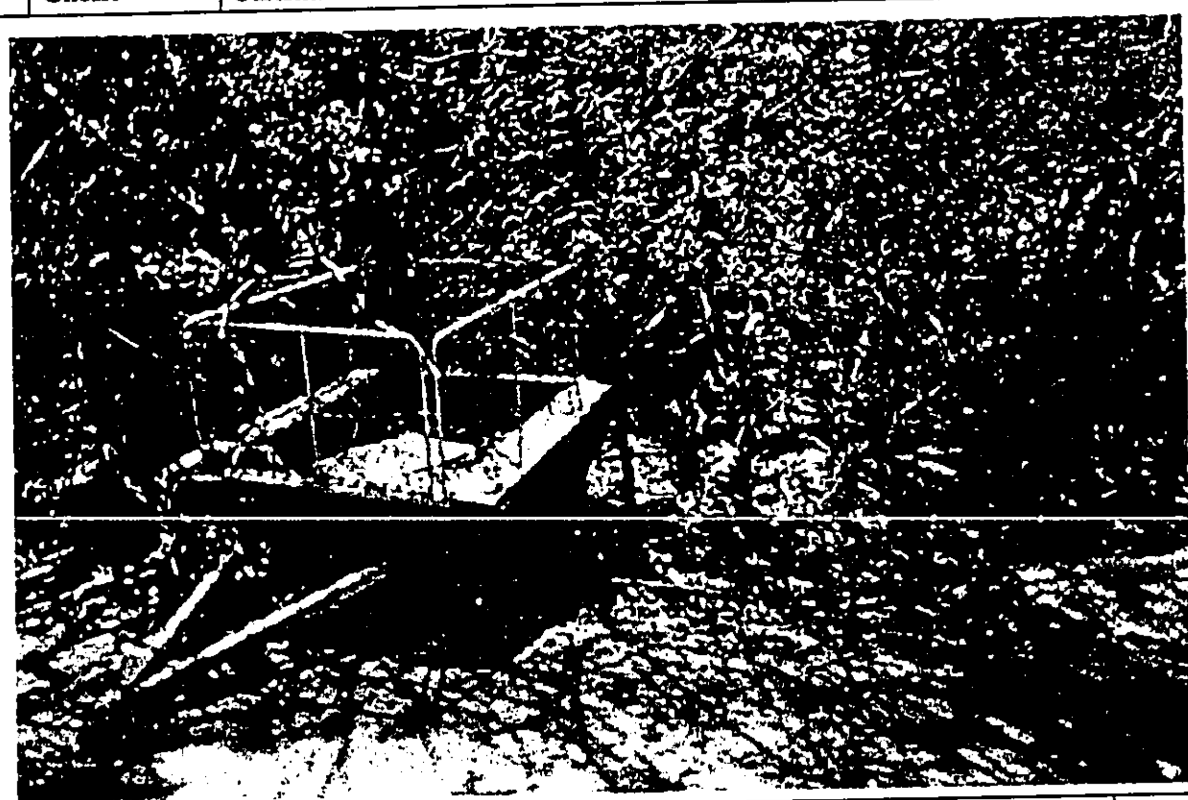


Clayton Project No.	Description	The location of boring B9 shown, looking southwest.	Photo 12
84-0221.00	Site Name	Pukalani Triangle, Pukalani, Maui, HI	Photo Date
	Client	Carlsmith Ball LLP	7/25/01

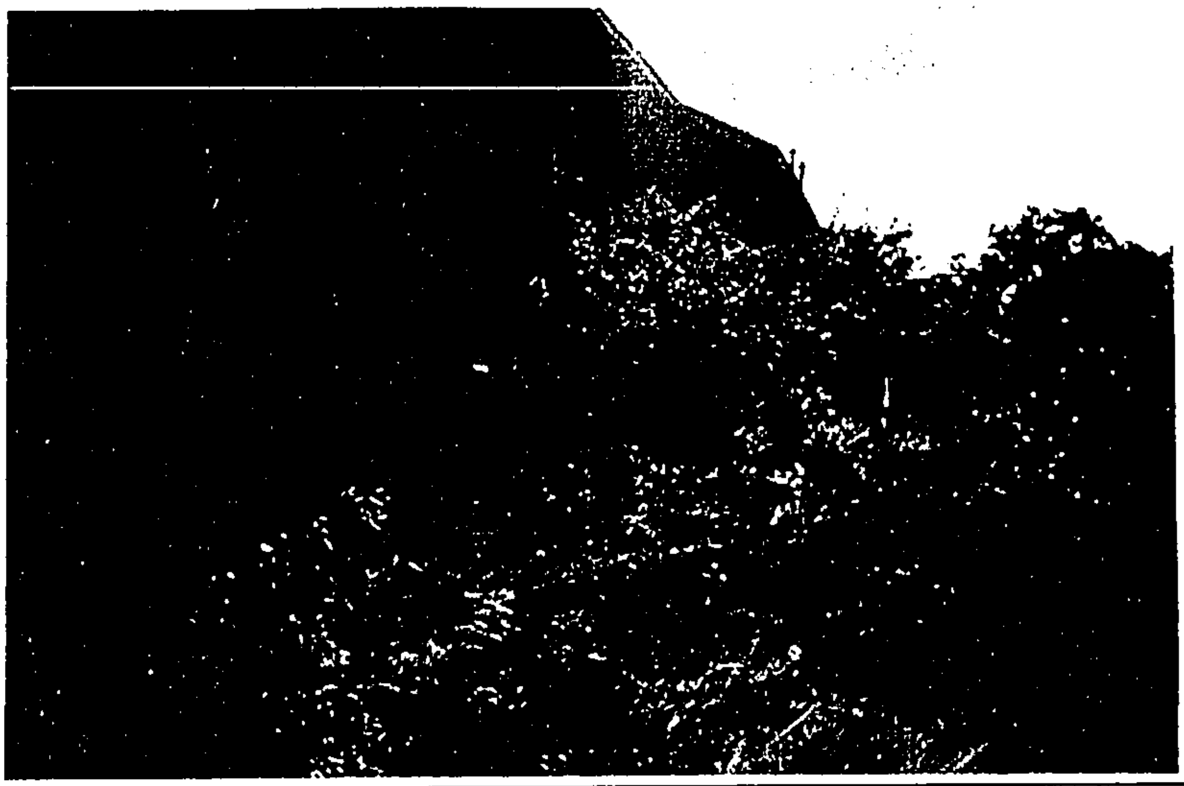
Clayton Project No.	Description	Drainage area shown with shallow soil sample SS-35 in the foreground.	Photo 13
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	Photo Date
85-01221.00	Client	Carlsmith Ball LLP	11/10/01

Clayton Project No.	Description	Shallow soil sample SS-36 shown looking toward Buildings A and B.	Photo 14
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	Photo Date
84-0221.00	Client	Carlsmith Ball LLP	11/10/01

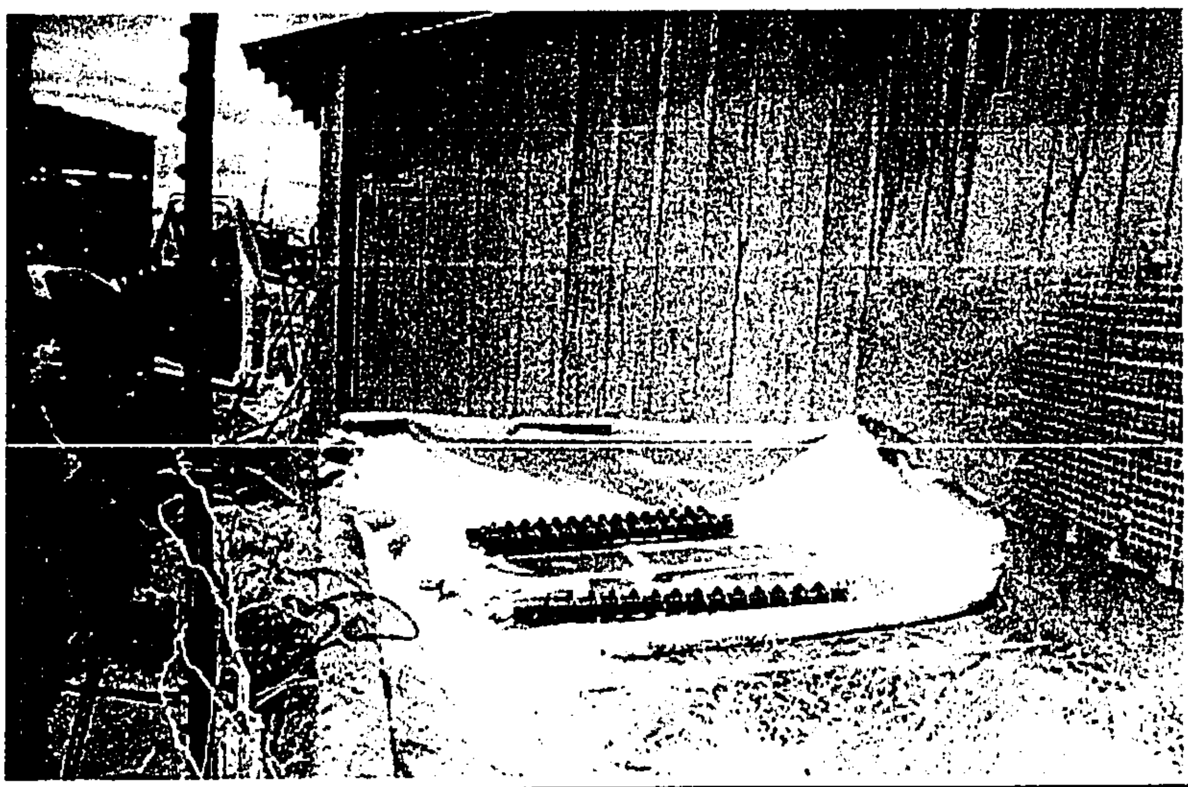
Clayton Project No. 85-01221.00	Description	Drainage area and samples SS-33 and SS-34 shown, looking north.	Photo 15
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	Photo Date
	Client	Carlsmith Ball LLP	7/24/01



Clayton Project No. 84-0221.00	Description	Location of shallow soil sample SS-31 shown, looking south.	Photo 16
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	Photo Date
	Client	Carlsmith Ball LLP	11/10/01



Clayton Project No.	**Description**	Location of soil sample SS-32 shown, looking south at Building D.	**Photo 17**
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	**Photo Date**
85-01221.00	**Client**	Carlsmith Ball LLP	11/10/01



Clayton Project No.	**Description**	Decontamination basin for augers shown.	**Photo 18**
	Site Name	Pukalani Triangle, Pukalani, Maui, HI	**Photo Date**
84-0221.00	**Client**	Carlsmith Ball LLP	7/24/01

BOREHOLE LOG SHEETS

Clayton GROUP SERVICES

BORING/WELL CONSTRUCTION LOG

Project Number 85-01221.00
Project Name Former Corn Mill Camp Phase II
Location Pukalani, Maui, Hawaii
Drilling Method Hollow-Stem Auger
Sampling Method 2-Inch Split-Spoon
Ground Elevation 1646 ft. amsl
Top of Casing na
Logged By S. Simmons
Remarks Borehole backfilled with bentonite.

Boring/Well Number B-1
Date Drilled July 25, 2001
Casing Type/Diameter NA
Screen Type/Slot NA
Gravel Pack Type None
Grout Type/Quantity None
Depth to Water NA
Groundwater Elevation

PID (ppm)	BLOW COUNTS (6-in.)	RECOVERY (inches)	SAMPLE ID.	EXTENTS	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (FT.)	WELL DIAGRAM
						ML		Logged cuttings. Dark brown gravelly silt, dry, medium stiff.		
	8/9	24	PB-1-5					Change to dark brown clayey silt, dry, stiff.		
					6					
	8/8	24	PB-1-10					Change to dark brown and brown, mottled, silt.		
					12					
	50/--	10	PB-1-15			CL		Change to dark brown and gray mottled saprolite, hard.		
	50/--	5	PB-1-20		18			Gray, weathered, non-vesicular basalt, dry, hard		
								Borehole completed at approx. 18.4 ft. bgs.		
					24					

Clayton GROUP SERVICES

BORING/WELL CONSTRUCTION LOG

Project Number 85-01221.00
Project Name Former Corn Mill Camp Phase II
Location Pukalani, Maui, Hawaii
Drilling Method Hollow-Stem Auger
Sampling Method 2-Inch Split-Spoon
Ground Elevation 1846 ft. amsl
Top of Casing na
Logged By S. Simmons
Remarks Borehole backfilled with bentonite.

Boring/Well Number B-2
Date Drilled July 25, 2001
Casing Type/Diameter NA
Screen Type/Slot NA
Gravel Pack Type None
Grout Type/Quantity None
Depth to Water NA
Groundwater Elevation

PID (ppm)	BLOW COUNTS (6-in.)	RECOVERY (inches)	SAMPLE ID.	EXTENTS	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (FT.)	WELL DIAGRAM
						ML		Logged cuttings. Brown silt, dry, hard. Change to gray at 4 ft. bgs.		
	40/41 /38	24	PB-2 -5		6	CL		Gray saprolite, dry, hard. Some cemented ash.		
	14/16 /21	24	PB-2 -10		12			light gray/yellowish-brown silt (ash), dry, hard. (interbedded with cinders and cobble.)		
	28/ 50/-	18	PB-2 -15			ML		Gray slightly weathered, non-vesicular basalt at depth. Refusal at 16.8 ft. bgs.		
					18			Borehole completed at 16.8 ft. bgs.		
					24					

Clayton GROUP SERVICES

BORING/WELL CONSTRUCTION LOG

Project Number 85-01221.00
Project Name Former Corn Mill Camp Phase II
Location Pukalani, Maui, Hawaii
Drilling Method Hollow-Stem Auger
Sampling Method 2-Inch Split-Spoon
Ground Elevation 1646 ft. amsl
Top of Casing na
Logged By S. Simmons
Remarks Borehole backfilled with bentonite.

Boring/Well Number B-3
Date Drilled July 25, 2001
Casing Type/Diameter NA
Screen Type/Slot NA
Gravel Pack Type None
Grout Type/Quantity None
Depth to Water NA
Groundwater Elevation

PID (ppm)	BLOW COUNTS (6-in.)	RECOVERY (inches)	SAMPLE ID.	EXTENTS	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (FT.)	WELL DIAGRAM
						ML		Logged cuttings. Brown silt, dry, hard.		
	40/41 /38	24	PB-3 -5		6			Change to gray weathered ash and cinder, dry, very stiff.		
	14/16 /21	24	PB-3 -10		12	CL				
	28/ 50/-	18	PB-3 -15			ML		Change to gray/reddish-brown silt (weathered ash and cinder).		
					18			Refusal at 17.7 ft. bgs.		
								Borehole completed at 17.7 ft. bgs.		
					24					

Clayton GROUP SERVICES

BORING/WELL CONSTRUCTION LOG

Project Number 85-01221.00
Project Name Former Corn Mill Camp Phase II
Location Pukalani,-Maui, Hawaii
Drilling Method Hollow-Stem Auger
Sampling Method 2-Inch Split-Spoon
Ground Elevation 1846 ft. amsl
Top of Casing na
Logged By S. Simmons
Remarks Borehole backfilled with bentonite.

Boring/Well Number B-4
Date Drilled July 25, 2001
Casing Type/Diameter NA
Screen Type/Slot NA
Gravel Pack Type None
Grout Type/Quantity None
Depth to Water NA
Groundwater Elevation

PID (ppm)	BLOW COUNTS (6-in.)	RECOVERY (inches)	SAMPLE ID.	EXTENTS	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (FT.)	WELL DIAGRAM
						ML		Logged cuttings. Brown silt, dry, medium stiff.		
	10/12/19	24	PB-4-5					Change to very dark brown, very stiff. Some yellowish-brown weathered cinder.		
					6					
	3/4/5	24	PB-4-10			CL		Change to dark brown/yellowish-brown saprolite, slightly moist, medium stiff.		
					12					
	50/-	8	PB-4-15					Weathered basalt at depth.		
								Refusal at 15.2 ft. bgs. Borehole completed at 15.2 ft. bgs.		
					18					
					24					

Clayton GROUP SERVICES

BORING/WELL CONSTRUCTION LOG

Project Number 85-01221.00
Project Name Former Corn Mill Camp Phase II
Location Pukalani, Maui, Hawaii
Drilling Method Hollow-Stem Auger
Sampling Method 2-Inch Split-Spoon
Ground Elevation 1646 ft. amsl
Top of Casing na
Logged By S. Simmons
Remarks Borehole backfilled with bentonite.

Boring/Well Number B-5
Date Drilled July 25, 2001
Casing Type/Diameter NA
Screen Type/Slot NA
Gravel Pack Type None
Grout Type/Quantity None
Depth to Water NA
Groundwater Elevation

PID (ppm)	BLOW COUNTS (6-in.)	RECOVERY (inches)	SAMPLE ID.	EXTENTS	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (FT.)	WELL DIAGRAM
						ML		Logged cuttings. Tan and brown silt, dry, medium stiff. Organic fraction 10 % at surface.		
	18/19/30	24	PB-5-5					Change to very dark brown clayey silt, hard. Somewhat cemented ash and weathered cinder at 5 ft. bgs.		
					6					
	13/16/26	24	PB-5-10							
					12					
	26/50/-	16	PB-5-15					Change to dark brown silt. Some weathered cinder.	15.5	
								Weathered basalt/cemented ash, dry hard.		
								Refusal at 16 ft. bgs. Borehole completed at 16.0 ft. bgs.		
					18					
					24					

Clayton Group Services

BORING/WELL CONSTRUCTION LOG

Project Number 85-01221.00
Project Name Former Corn Mill Camp Phase II
Location Pukalani, Maui, Hawaii
Drilling Method Hollow-Stem Auger
Sampling Method 2-Inch Split-Spoon
Ground Elevation 1646 ft. amsl
Top of Casing na
Logged By S. Simmons
Remarks Borehole backfilled with bentonite.

Boring/Well Number B-6
Date Drilled July 24, 2001
Casing Type/Diameter NA
Screen Type/Slot NA
Gravel Pack Type None
Grout Type/Quantity None
Depth to Water NA
Groundwater Elevation

PID (ppm)	BLOW COUNTS (6-in.)	RECOVERY (inches)	SAMPLE ID.	EXTENTS	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (FT.)	WELL DIAGRAM
								Asphaltic concrete	0.2	
								Logged cuttings. Brown silty gravel, dry [Fill].	4.0	
	11/11/21	24	PB-6-4			GM		Dark brown silt, slightly moist, stiff.		
					6					
	6/11/28	24	PB-6-9			CL		Brown/gray/reddish-brown saprolite, very stiff, moist.		
	33/50/--	18	PB-6-14		12			Gray weathered basalt (saprolite) dry, hard.		
	50/-	6	PB-6-18		18			Borehole completed at approximately 18 ft. bgs.		
					24					

Clayton
GROUP SERVICES

BORING/WELL CONSTRUCTION LOG

Project Number 85-01221.00	Boring/Well Number B-7
Project Name Former Corn Mill Camp Phase II	Date Drilled July 24, 2001
Location Pukalani,-Maui, Hawaii	Casing Type/Diameter NA
Drilling Method Hollow-Stem Auger	Screen Type/Slot NA
Sampling Method 2-Inch Split-Spoon	Gravel Pack Type None
Ground Elevation 1646 ft. amsl	Grout Type/Quantity None
Top of Casing na	Depth to Water NA
Logged By S. Simmons	Groundwater Elevation

Remarks Borehole backfilled with bentonite.

PID (ppm)	BLOW COUNTS (6-in.)	RECOVERY (inches)	SAMPLE ID.	EXTENTS	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (FT.)	WELL DIAGRAM
						GM		Logged cuttings. Brown silty gravel, dry [Fill].	3.0	
	12/15	24	PB-7-5		6			Very dark brown silt, dry, very stiff.		
	5/15	24	PB-7-10		12	ML		Change to yellowish-brown/gray/dark brown, mottled at 8 ft. bgs. (Some saprolite and cobble apparent.)	13.0	
	40/50	20	PB-7-15			CL		Gray saprolite, dry, very hard. Some yellowish-brown. Gray saprolite at depth. Refusal at 17 ft. bgs.		
					18			Borehole completed at 17 ft. bgs.		
					24					

Clayton GROUP SERVICES

BORING/WELL CONSTRUCTION LOG

Project Number 85-01221.00
Project Name Former Corn Mill Camp Phase II
Location Pukalani, Maui, Hawaii
Drilling Method Hollow-Stem Auger
Sampling Method 2-Inch Split-Spoon
Ground Elevation 1646 ft. amsl
Top of Casing na
Logged By S. Simmons
Remarks Borehole backfilled with bentonite.

Boring/Well Number B-8
Date Drilled July 24, 2001
Casing Type/Diameter NA
Screen Type/Slot NA
Gravel Pack Type None
Grout Type/Quantity None
Depth to Water NA
Groundwater Elevation

PID (ppm)	BLOW COUNTS (6-in.)	RECOVERY (inches)	SAMPLE ID.	EXTENTS	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (FT.)	WELL DIAGRAM
								Asphaltic concrete	0.2	
						GC		Logged cuttings. Gray-brown silty gravel, slightly moist [Fill]. Some clay. Grades to dark brown clayey silt. More clayey at 4 ft. bgs.	4.0	
	13/15	24	PB-8-5		6			Very dark brown clayey silt, slightly moist, stiff.		
	7/7	24	PB-8-10		12	ML				
	29/50	20	PB-8-15					Grades to very dark brown and brown, varigated, at 14 ft. bgs. Hard. Some saprolite apparent. Some basalt cobble at 17 ft. bgs.		
	19/50+	18	PB-8-20		18			Very hard basalt at depth.		
					24			Borehole completed at 20 ft. bgs.		

Clayton GROUP SERVICES

BORING/WELL CONSTRUCTION LOG

Project Number 65-01221.00	Boring/Well Number B-9
Project Name Former Corn Mill Camp Phase II	Date Drilled July 24, 2001
Location Pukalani, Maui, Hawaii	Casing Type/Diameter NA
Drilling Method Hollow-Stem Auger	Screen Type/Slot NA
Sampling Method 2-Inch Split-Spoon	Gravel Pack Type None
Ground Elevation 1646 ft. amsl	Grout Type/Quantity None
Top of Casing na	Depth to Water NA
Logged By S. Simmons	Groundwater Elevation

Remarks Borehole backfilled with bentonite.

PID (ppm)	BLOW COUNTS (6-in.)	RECOVERY (inches)	SAMPLE ID.	EXTENTS	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (FT.)	WELL DIAGRAM
								Logged cuttings. Tan and brown sandy silty, dry.		
					6			Dark brown silt, dry, stiff. No odor or staining apparent.		
	11/12 /15	24	PB-9 -6						7.8	
								Gray-brown cemented ash.		
	10/14 /45	18	PB-9 -12		12	CL		Light gray and gray weathered ash and saprolite, dry, hard. Small vesicules visible. No odor or staining apparent.		
	50/-	6	PB-9 -16							
								Borehole completed at 16 ft. bgs.		
					18					
					24					

Appendix Q (Addition to the Revised Final EIS)

Land Use Commission EIS Acceptance Hearing, October 23, 2003 Transcript

LAND USE COMMISSION

STATE OF HAWAI'I

ACTION

A03-740 MAUI LAND & PINEAPPLE COMPANY, INC. (Maui))

HEARING

Held on October 23, 2003 in the Pikake Room at the Wailea Marriott, an Outrigger Resort, 3700 Wailea Alanui, Wailea, Hawai'i, commencing at 9:55 a.m.

REPORTED BY: HOLLY M. HACKETT, RPR, CSR #130
Certified Shorthand Reporter

APPEARANCES:

COMMISSIONERS:
ROY CATALANI
BRUCE COPPA
ISAAC FIESTA, JR.
LAWRENCE N.C. ING (Chairman)
STEVEN LEE MONTGOMERY
PETER YUKIMURA

EXECUTIVE OFFICER: ANTHONY CHING
SECRETARY: CAROLINE LORENZO
STAFF PLANNER: RUSSELL KUMABE

DEPUTY ATTORNEY GENERAL (via conference call)

A03-740 Maui Land & Pineapple Company, Inc. (Maui)

For the Petitioner: STEVEN LIM, ESQ.
RANDY ENDO
ROBERT MCNATT

For the County: (No appearance)

For the State of Hawai'i: JOHN CHANG, ESQ.
Deputy Attorney General
ABE MITSUDA, Office of Planning

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Sally Raisbeck

Petitioner's Witnesses
Robert McNatt
Randall Endo
Jeff Overton

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CHAIRPERSON ING: I welcome the Land Use Commission staff for the agenda items. Beginning with the adoption of minutes, the Commissioners, have you had a chance to review the minutes?

COMMISSIONER FIESTA: So moved.

CHAIRPERSON ING: Motion's been made to approve the minutes as circulated. Any second?

COMMISSIONER YUKIMURA: Second.

CHAIRPERSON ING: Second by Commissioner Yukimura. Discussion? All those in favor of the motion signify by saying aye. (Aye) All those opposed say nay.

Motion is carried. Thank you. I'll call upon our executive officer, Anthony Ching, to talk about our tentative meeting schedule.

MR. CHING: So, Commissioners, reminder, first meeting in November we're on Kauai. At this point we have updated action items or items on our agenda so you can refer to that. The first item is a combined action under one petition with a split ownership. So there will actually be two motions before you at that time.

With respect to our December 4th and 5th meeting in Honolulu, you'll note that we're on our workshop items. I'll note for you that I do expect that we will have a presentation by DOE as well as a reaction panel comprised of developer groups as well as a presentation by the DOT

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director on their priority projects statewide. That's to give you folks a bit more orientation.

There may be some other items added but I do foresee that the 4th and 5th meeting will be at very minimum interesting with respect to the range of topics that we'll cover. So I would encourage you to make plans to attend that particular one.

I also expect that we'll have a report on the prospective findings of the agriculture working group that has been working in the last year to devise solutions for the Ag District. And the other items that are noted there I'm in the midst of finalizing. The only other item of note is that at this point I anticipate only one meeting in January instead of the usual two, given our calendar and the start of the legislative session.

CHAIRPERSON ING: Tony, just for clarification, we will be coming back to Maui November 20, 21?

MR. CHING: Yes.

CHAIRPERSON ING: Any questions, comments to Tony? Okay. Thank you. The next item on our agenda is to discuss whether to appeal the circuit court decision which was filed in Civil No. 02-1-1759-07. At this time I'll entertain a motion for us to go into executive session so we can discuss legal matters with our Deputy Attorney General.

COMMISSIONER FIESTA: So moved.

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COMMISSIONER COPPA: Second.

CHAIRPERSON ING: Moved and seconded. Discussion? All those in favor signify by saying aye. (Aye) All those opposed say nay. Okay. Thank you. Motion passed. We will meet outside. Easier for us to go.

MR. CHING: We should stay.

CHAIRPERSON ING: Okay. May we ask the members of the general public to step outside while we discuss matters with our attorney general.

(10:30 Executive session.)

CHAIRPERSON ING: We're back on the agenda item to discuss whether to appeal the circuit court decision, Civil No. 02-1-1759-07. We've had opportunity to discuss the matter with our Deputy Attorney General by telephone. And now I'm going to ask the pleasure of the Commission as to do we appeal or not.

Excuse me. I must also announce that Commissioner Roy Catalani in the original Petitioner's presentation had previously recused himself. So at this time that recusal continues so he's not going to participate

in the motion and discussion and vote. Gentlemen.

COMMISSIONER COPPA: Mr. Chair, in listening to, as you said, to our attorney general and thinking it over I'd like to make a motion that we appeal the Koa Ridge decision as indicated by Judge Hifo.

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CHAIRPERSON ING: Okay. Motion is made to appeal the circuit court decision which was rendered in the Castle and Cooke Koa Ridge project. Any second to the motion?

COMMISSIONER FIESTA: Second.

CHAIRPERSON ING: Second by Commissioner Fiesta. Discussion?

COMMISSIONER MONTGOMERY: Mr. Chairman.

CHAIRPERSON ING: Yes.

COMMISSIONER MONTGOMERY: In listening to the discussion considering the advice from the AG, I don't see any compelling case to challenge the Hifo ruling. Especially with the news that the applicant is proceeding to prepare an EIS it seems unnecessary to appeal what is a very sensible ruling.

CHAIRPERSON ING: Okay. Further discussion or comments? Peter.

COMMISSIONER YUKIMURA: I think this appeal -- I think the judge's decision is kind of a, kind of a groundbreaking decision especially for us and other agencies or commissions. So I think by filing the appeal, I think it will give us more time to look at the -- to study the decision a little bit more and then maybe -- and then we will see what happens.

COMMISSIONER FIESTA: Mr. Chair.

CHAIRPERSON ING: Commissioner Fiesta.

COMMISSIONER FIESTA: For me I think we should appeal.

AUDIENCE MEMBER: Can't hear.

COMMISSIONER FIESTA: As for me I think we should appeal because, on the grounds we don't want to have a precedence set in tying the hands of any future petitioners that come in front of us. So I'd be voting in favor of the appeal.

CHAIRPERSON ING: Any further? Okay. I'll ask Anthony Ching to poll the Commissioners on the motion.

MR. CHING: Commissioners, on the motion made to appeal the judge's decision in Civil No. 02-1-1759-07. Commissioner Coppa?

COMMISSIONER COPPA: Aye.

MR. CHING: Commissioner Fiesta?

COMMISSIONER FIESTA: Aye.

MR. CHING: Commissioner Yukimura?

COMMISSIONER YUKIMURA: Yes.

MR. CHING: Commissioner Montgomery?

COMMISSIONER MONTGOMERY: No.

MR. CHING: Chair Ing?

CHAIRPERSON ING: Yes.

MR. CHING: Your motion fails by the vote of 4, for, 1 no, 1 abstention, and 2 absent.

CHAIRPERSON ING: So your interpretation,

Mr. Ching, is that you need a majority of the Commissioners not the majority of those participating.

MR. CHING: Right. I believe that our rules speak to needing affirmative vote of 5 in all matters other than consideration of a district boundary amendment.

CHAIRPERSON ING: Okay. Thank you. So as announced by our executive officer the motion to appeal the matter failed.

The next item on our agenda is election of officers. As you can see we don't have all of our Commissioners here. And one of the Commissioners who is not present will be present at a later meeting, so he asked that the matter be deferred to that meeting. In accordance with our honoring such a request, if the Commissioners have no objections we will defer this to either tomorrow or the next meeting date. Okay. Thank you. Before going on to the next agenda item let's take a 10-minute break.

(10:45 recess.)

CHAIRPERSON ING: Bear with me with my long opening statement. This is an action item on Docket No. A03-740 Maui Land & Pineapple Company, Inc. to consider acceptance of Petitioner's Revised Final Environmental Impact Statement for the reclassification of approximately 40.6 acres of land from the State Land Use Agricultural District to the Urban District at Pukalani, Maui, Hawai'i

for the development of the Upcountry Town Center.

On August 8, 2003 the Commission determined that the Petitioner was required to prepare an environmental impact statement pursuant to the order for summary judgment issued by the Second Circuit Court, State of Hawai'i on April 16, 2003 and the petition for reclassification of approximately 40.6 acres of land currently in the

Agricultural District.

At various times between August 13 and October 13, 2003 the Commission received agency and individual comments regarding the revised draft EIS. Comments were received, and please forgive me for using initials, DBEDT's Research and Economic Analysis Division, DAGS, OEQC, the Maui County Department of Housing and Human Concerns, the Maui Police Department, DLNR, Malama Maui, the Maui County Department of Parks and Recreation, the Office of Hawaiian Affairs, the Kula Community Association, Mrs. Barbara Long, the Maui County Department of Planning, the University of Hawai'i at Manoa, the Pukalani Community Association and the Maui County Department of Public Works.

On October 13, 2003 the Commission received the revised final EIS Volumes I and II from the Petitioner. On October 21, 2003 the Commission received communication from the Maui County Planning Department indicating that they would not be present at this proceeding but stood on the

substance of their correspondence of October 10, 2003.

On October 22, 2003 the Commission received correspondence from the Office of Environmental Quality Control which noted that they found that the document on five of the seven points of administrative acceptability to be in compliance.

I note for all those present that the EIS is a disclosure document that analyzes the effects of the proposed project on the environment. This in-depth study must provide mitigation measures to prevent or reduce the project's negative effects and present alternative methods,

modes or designs of the proposed action.

In determining whether the revised final EIS is accepted, the Commission will seek to determine if the document is complete and technically adequate.

This is the standard prescribed under Chapter 343 Hawaii Revised Statues and which the Commission utilizes. Acceptance of the revised final EIS in this docket is required before the Commission can move on and properly entertain the petition for district boundary amendment.

As is our usual custom, public testimony will precede the delivery of the staff report and presentation by the Petitioner.

During this proceeding there are no parties before the Commission except the Petitioner. It is their

burden to present an EIS which is complete and technically adequate.

If I might go over the procedure for today. I'll ask the Petitioner and author of the revised environmental impact statement to identify themselves. I'll call upon the individuals to provide public testimony to come forth. At this time we have five people signed up. They will be sworn in and present their testimony.

After completion of the public testimony the staff will provide the Commission with its analysis. Then the Petitioner will present its revised EIS for the Commission's consideration.

Probably about every hour we'll take a break either for lunch or to stretch. Are there any questions to this procedure? If not, I'll ask the Petitioner to introduce themselves.

MR. LIM: Good morning, Mr. Chairman, members of the Commission, Steven Lim representing the Petitioner, Maui Land & Pineapple Company, Incorporated.

With me today are the vice president of planning and development, Mr. Robert McNatt who is the third gentleman down to my right. To his left is Randall Endo who is the development manager. Immediately to my right is Jeff Overton of Group 70, our project planner.

CHAIRPERSON ING: Thank you. The five public

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witnesses who have signed up, Barbara Long, Isaac Hall, Eric Nakashima, Abe Mitsuda and John Chang, so we'll start with Barbara Long. Barbara, while you're distributing what you had, Commissioner Catalani had a question that he wanted to ask.

COMMISSIONER CATALANI: Excuse me. I'm looking at something I guess we just received this morning on our desk here called Supplements to Revised Final EIS. It looks like it's about 15 or 20 pages. And I would gather that this probably responds to comments made by our staff as well as maybe comments made by others.

I'm wondering whether, for efficiency purposes, whether or not the five public witnesses have seen this and it's going to affect the comments they probably spent some time to prepare. And whether it's worth having them look at this document before they make their testimony so we know what it is they are either supporting or criticizing.

CHAIRPERSON ING: What Commissioner Catalani is referring to is what has been titled Supplements to Revised Final EIS. It has a stamp that it was received by the Land

Use Commission September 19, 2003.

MR. KUMABE: Slight error on the date. It needs to be referred to today's date. Probably the last time we used the stamp. The staff apologizes.

CHAIRPERSON ING: Today's date.

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MR. KUMABE: Received today.

CHAIRPERSON ING: Okay. I stand corrected. It was received today. So that's the point that Commissioner Catalani is making that he's not sure if it would affect public testimony.

THE WITNESS: May I comment, Mr. Chair?

CHAIRPERSON ING: Let me swear you in then.

THE WITNESS: Swear me.

CHAIRPERSON ING: Do you swear to tell the truth in this matter?

THE WITNESS: I do.

CHAIRPERSON ING: Give us your name and address for the record.

THE WITNESS: My name is Barbara Long. Post Office Box 523 Kula, Maui. And, yes, I would like to comment that I have received neither that document nor the final EIS in this instance, which would have been very helpful for me to have read the other comment letters and the responses to those.

So before I even offer my testimony I'd like to say that it would be very helpful with regard to adequate public participation to defer this matter so that those who want to comment today and possibly others would have an opportunity to read not only the final EIS but that document.

CHAIRPERSON ING: Let me suggest this, Barbara. I think you're prepared to present public testimony so maybe go ahead present your public testimony. Then you can always come back after you've had opportunity to read some of the other documentation.

THE WITNESS: Okay. It's my understanding, though, that that final EIS will not be given out until it is accepted by this body.

CHAIRPERSON ING: Let me ask our executive director to clarify that.

MR. CHING: Commissioners, I'm referring to the Environmental Guidebook that is issued by the Office of Environmental Quality Control. It's dated October 1997. And it indicates that it was prepared by OEQC.

On page 20 of that guidebook with respect to the preparation of the statement, this particular section describes the environmental impact statement and the requirements.

On page 20, again, with respect to the final EIS item No. 4 it says "Response letters. Responses must be made directly to the writers of comment letters and reproduced in the comments/responses section.

No. 5. Response to comments. Verbatim changes to the DEIS text must be included in response letters.

And 6. Changes to text. Any changes to the text

must be easily distinguishable. New text can be listed in italics following the original text or printed side by side

next to the original text.

Language changes in the FEIS should be identical to those listed in the response letters. Commenters need not, therefore, be sent a copy of the FEIS."

I believe at this point the FEIS or the final one that is approved or accepted by us does not exist. What exists is a submittal of a revised final EIS by the Petitioner for your consideration. I would submit that per the OEQC guidebook the requirement is that comments or people submitting comments must receive a response to their comments and that it should be included in the submittal to the Commission. The commenters, again, the last sentence is instructive in that I believe it says that they're not sent a copy of the FEIS but rather a copy of their response.

Subsequently, as a courtesy or otherwise when the FEIS is approved or accepted by this body, then the distribution could be made. So that the clarification for the Commission is that you are the only ones that have received and been circulated at this point Volumes I and II of the revised FEIS.

CHAIRPERSON ING: Let me see if I can help on this. Because we are just acting as the receiving and approving body, that subsequently to this you'll have a

whole lot of petitions that will have to be filed, one is to come to reclassify, then zoning and whatever else will follow. And I'm thinking at that time the public will again have opportunity to give their input.

THE WITNESS: I'll let the attorneys figure this one out. I'd like to go forward with the testimony I've prepared for today.

COMMISSIONER CATALANI: If I could just clarify my comment. I understand the letter would be in response to the comments made by these people as well. My thoughts on that were if they got a response letter, so they're going to testify today on the adequacy of that response. But it could be affected by what's in the supplement in terms of whether or not the response is now better or worse given what's in this contents today, but the response is more than probably what they got in the response letter.

MR. CHING: Additional clarification. I think from a staff standpoint, we truly apologize about that date stamp. We received that this morning. It's my understanding that actually these supplements are probably part and parcel of the Petitioner's presentation and that they had for efficiency given it to us. So staff typically puts it down. I don't think it's officially been offered by the Petitioner.

But for efficiency as soon as we receive it we

stamp it and put it before you. I think that's technically our error in that regard in that it wasn't presented as part -- I do believe that it's part of their presentation.

COMMISSIONER CATALANI: I don't mean any criticisms there. My only point was this supplement, if the public has a chance to look at it today or public witnesses have a chance to look at it today, that it may respond to and answer the questions they were going to raise in the public testimony. I understand that it's not going to be part of the record today.

CHAIRPERSON ING: Barbara, please.

THE WITNESS: Thank you. And thank you for the clarification on the final EIS. I'd like to say Dick Mayer from the Kula Community Association is off island, could not be here. But I know I speak for him in saying I hope that when you consider Maui Pine's petition for the change in designation, that you hold a meeting more convenient for the people who live in the affected area, Upcountry at Kula or possibly at the Tavares Community Center, somewhere where people wouldn't have to drive for an hour to come to a meeting. I truly hope you will take that into consideration.

CHAIRPERSON ING: Barbara, we will. And we may ask you for assistance in looking for places. I know when we held our meetings at the Lahaina Civic Center they were

not equipped with all the sound and recording devices so we had to bring someone in from Honolulu with all the equipment at a charge of over $2,000. So I'm not sure if we have any place that is outfitted. But if not we will bring in people.

THE WITNESS: When Kula Community Association meets they have a sound system which is used at the Kula Community Center.

CHAIRPERSON ING: Meaning more than recording system.

THE WITNESS: I would be delighted to either work with you or put you in touch with somebody who could work with you on Maui. We have the technology here. Honest we do.

Okay. I'm here today obviously to talk with you about Maui Land and Pine's proposed Upcountry Town Center.

And you're here to determine whether to accept the final EIS for that center preliminary to considering their petition to reclassify the land from state land use Ag District to Urban District.

I believe the final EIS, which I have not seen yet, is not ready for your acceptance according to the EIS rules. Section 11-200-2, acceptance requires the EIS document to do three things. 1. Fulfill the requirements and definitions of the law. 2. Adequately describe

environmental impacts. And 3. Satisfactorily respond to comments received during review.

First, regarding the requirement to respond satisfactorily. In my letter of September 19, 2003 commenting on the draft revised EIS, my question No. 3 asked for, quote "clarification of the complete buildout square footage" unquote of the proposed Upcountry Town Center.

I ask this because the draft is ambiguous and presents at least six varying estimates of total buildout space including in the appendixes for market analysis, electrical, traffic and engineering studies and in the text Sections 3 and 7.

To understand and evaluate the total scale and size of this project and its cumulative impact on the environment, economy and character of the region, the final EIS must contain accurate figures. I believe the response in Group 70's October 10th, 2003 letter is inadequate and inaccurate.

It states, responding to my comment letter, that buildout capacity is described in Section 3 of the draft

revised EIS and mentions two figures for square footage of office and commercial space and a figure for size of cottage industry lots.

It does not respond by giving an estimate of total square footage at buildout and it attempts to explain

the widely varying estimates in the appendixes. They vary from over 300,000 square feet to 269,000 square feet.

My careful review of Section 3 of the draft, revised draft, and appendix A which is Hallstrom's market analysis and cost assessment, pages 38 and 39 -- and believe me I've been intimately involved with the original draft, the original final and now this revised draft -- it seems to indicate that the Upcountry Town Center buildout total square footage for commercial/retail, business/civic and cottage industry structures will total -- and the total that I come up with in my testimony which you have in front of you, there's a breakdown, 253,561 square feet.

That includes 112,000 square feet of commercial/retail; 6,000 square feet for the Maui Fresh Store; 80,000 for business and civic; Corn Mill Camp building C, which we are informed that Waiulu Farm is going to use -- that's from the dimension from appendix M at 8,800 square feet; and the cottage industry buildings, nine of them, at 46,761 square feet. That figure is from the market analysis.

So we have a total square figure of more than 253,000 square feet which does not include possible retention of additional historical Corn Mill Camp warehouse structures, nor does it include the senior housing components.

The environmental impact of a project of this

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scale must be accurately assessed. At 253,500 square feet, if accurate, the Upcountry Town Center would be larger than the Maui Mall by 25 percent. Maui Mall contains 191 square feet of leasable space which includes the theater and the old Woolworth's. It would almost be the size of the Maui Marketplace on Dairy Road which has 263,000 square feet of leasable space, according to the Maui Databook.

Because of the applicant's responsibility to provide accurate information I ask that you require the final EIS to contain total estimates of buildout square footage for the proposed Upcountry Town Center for all components as the law states in 11-200-19 "convey the information in a form easily understood without the need for cross-references."

My second point, as the EIS rules state, the final must fulfill the requirements of the statute. In 11-200-17, DEIS content requirements Section F "alternatives." The consideration of alternatives should contain quote "rigorous exploration and objective evaluation of the environmental impacts of alternative actions."

I believe the applicant's consideration of a less intensive development, which is Section 7.5 on page 7.6 of the draft, that that section only considers a project with 50 percent of the proposed plan.

It does not consider other downsizing

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alternatives such as eliminating components of the mix or adaptive reuse of the three historic structures remaining

from Corn Mill Camp in lieu of cottage industry lots.

I believe this analysis is inadequate and that the applicant should expand this section in the final EIS using alternative scenarios.

Finally, I believe that the final EIS, though I haven't seen it, does not presently fulfill the requirements of the 11-200-17 Section G which requires, quote, "special emphasis shall be placed on environmental resources that are rare or unique to the region and the project site including natural or human-made resources of historic, archaeological or aesthetic significance." Unquote.

Only the persistent attention comments and requirements of the Maui County Cultural Resources Commission and other historic preservationists have caused the applicant to acknowledge the significance of the historic agricultural site and structures that comprise Corn Mill Camp.

A history of the camp, architectural analysis, and engineering review of the structures is now part of the final EIS with further recommendations from the CRC. However, this unique historic resource has not, in my opinion, been given adequate or appropriate consideration for the value its retention would impart to any development

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of the proposed project.

Please determine whether the EIS is ready for acceptance in light of this serious environmental omission in the document. Thank you for considering my concerns.

I believe the law is clear and that it's your responsibility to ensure that the final EIS is complete so you and all reviewing agencies and community participants have accurate, easy to comprehend, thorough information on which to base such an important land use decision. Thank you very much.

CHAIRPERSON ING: Thank you. Barbara has served a 5-year term as a Planning Commissioner for Maui County. I recall you may have been president of the Outdoor Circle.

THE WITNESS: I was Chair of the Urban Design Review Board. I was president of the Maui Historical Society. I've been on the Outdoor Circle Board.

CHAIRPERSON ING: She's participated in, as far as I can recall, many of the last state planning conferences, including the last one we had. Are there questions from the Petitioner to this witness?

MR. LIM: We have no questions.

CHAIRPERSON ING: Questions from the Commissioners?

COMMISSIONER COPPA: I just had one question.

CHAIRPERSON ING: Bruce.

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COMMISSIONER COPPA: This is not in the historic preservation right now, is that correct?

THE WITNESS: They have not been listed on the state register of historic sites. However, they have been -- the structures have been given numbers that put them into the state records as significant historic structures.

COMMISSIONER COPPA: Who does that?

THE WITNESS: I believe those were assigned by the archaeologists or someone from the State Historic Preservation Office. I'd have to check my notes on that. That's in the Sinoto Archaeological Appendix.

CHAIRPERSON ING: Questions, Commissioners? Steven.

COMMISSIONER MONTGOMERY: Yes. Ms. Long, you pointed out that you had commented on the draft EIS. But did I understand you correctly you hadn't had any reply such as the demonstration of their considering of your comments?

THE WITNESS: Oh, no. I did receive a response letter. I'm saying that response letter was inadequate.

COMMISSIONER MONTGOMERY: Was inadequate. Okay. Now I'm clear on that. You've heard Mr. Ching or our staff explain as he was reading the OEQC process. So as you understand that process you're saying that they haven't complied with that process because of their faulty incomplete response to your comments. You're saying that

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this document is unacceptable because of their glossing over or ignoring your comments.

Can you give me -- is that a correct interpretation of what you're saying?

THE WITNESS: Sure. Let me clarify. My first point refers to the response letter that I did receive from Group 70 to a question that I asked or to my comment letter. And that is the one about the total square footage of the Upcountry Town Center at buildout.

The other two are not based on my comments or their response but my observation of what is contained in the final document, assuming it's the same as the draft, which I think do not meet the test of the Chapter 343.

COMMISSIONER MONTGOMERY: Have you had any feedback with the applicant since you received this inadequate response to your comments?

THE WITNESS: No. I thought the appropriate place to bring it up a little more powerfully would be here.

COMMISSIONER MONTGOMERY: That may well be true. I'm just asking so I can have a full knowledge of all the administrative remedies you may have exhausted even though it may not necessarily have been a requirement on your part as obviously a very busy citizen of your community in pursuit of the public interest on this planning matter.

It seems puzzling to me that your computation of

the square footage at buildout, you've got a lot of detail here coming up with probably 250,000 square feet. I'm puzzled that all of the consultants aren't able to come up with something realistic. Have you got any idea about why you're so proficient at this compared to their own performance?

THE WITNESS: What consultants are you referring to?

COMMISSIONER MONTGOMERY: Well, the consultant, whoever it is, that's supposed to estimate the amount of square footage available at buildout and compare it to existing and available square footage elsewhere like Kulamalu and other shopping centers.

THE WITNESS: I think that you should probably address that to the consultant. What I'm saying here is that the draft -- neither the draft EIS nor the consultant's response to me gives a total accurate figure of what the anticipated estimated buildout square footage would be.

And will, as the law states, it doesn't give it in one place without any need for cross-referencing.

COMMISSIONER MONTGOMERY: Okay.

THE WITNESS: If you look at Section 3 you'll see exactly what I mean. They do not include the cottage industry buildings. What they tell you is that there are going to be nine lots measuring 15,000 square feet. That's

not a buildout figure.

COMMISSIONER MONTGOMERY: Well, since the applicant passed on the opportunity to ask comments or questions, maybe they don't have any concerns with your assessment to your computation of 253,000. Perhaps later they'll have a chance to expand on their position.

You also mentioned that Dick Mayer wasn't able to be present on the island today. Since you're not speaking on behalf of the Kula Community Association, is he -- and he is a member of that group -- is there someone else who he's sending to speak one their behalf? Or what kind of perspective can we get from that neighborhood group?

THE WITNESS: I'm a member but I'm not a board member of KCA. I did see the comment letter that was sent but I have not seen the applicant's response letter. I have not been designated to have anything, any comments at all about KCA other than I know that Dick asked me to ask you to please hold the meeting in the community.

COMMISSIONER MONTGOMERY: Do you have knowledge of members of that community who would be present if this had taken place in a venue such as the Tavares Center who are not here today?

THE WITNESS: Quite a few.

COMMISSIONER MONTGOMERY: Thank you.

THE WITNESS: Thank you.

CHAIRPERSON ING: Other questions by the Commissioners? If not, thank you very much. Isaac Hall followed by Eric Nakashima. I hope you're not going to read all of that. Isaac, let me swear you in. Do you swear to tell the truth in this matter?

THE WITNESS: I do.

CHAIRPERSON ING: Give us your name, the organization which you represent and your address.

THE WITNESS: Good morning, Mr. Chairperson and members of the State Land Use Commission. My name is Isaac Hall. And I'm here representing Malama Maui.

CHAIRPERSON ING: Okay. Address?

THE WITNESS: My address of my law office is 2087 Wells Street, Wailuku, Maui, Hawai'i, 96793.

CHAIRPERSON ING: Please proceed.

THE WITNESS: I too on behalf of Malama Maui would like to object to this as a meeting place. I don't know why the Land Use Commission feels obliged to meet in resorts when it doesn't have any jurisdiction, by and large, over urban areas or resorts. It's inconvenient for those people affected by the projects before them to come to resorts.

This meeting should have been held, I believe, in the area affected by this application. Many more people would have come.

I would like to formally ask this Commission to continue or defer this matter because of a procedural error

that is taking place right now.

I disagree with Mr. Ching's interpretation. The final EIS or the revised final EIS should have been delivered to interested members of the public, commenters before this action meeting.

It's as if we're in Russia to think that interested members of the public like Malama Maui, who filed the lawsuit over an EIS, should come here, participate in a public meeting on whether you should accept the final EIS and not have a final EIS.

You have it. Every member of the Commission has it. Maui Land & Pine has it. They know we are vitally interested in it, but we don't even have it. How can I comment on a final EIS I don't even have?

This is a public meeting. Chapter 343 is intended to enhance public participation in the EIS process. I disagree with Mr. Ching's interpretation. The OEQC guidelines --

COMMISSIONER COPPA: Mr. Chair --

THE WITNESS: Do you want me to stop?

COMMISSIONER COPPA: Mr. Chair, just a question. Before we go any further, I don't know who you represent.

THE WITNESS: Malama Maui.

COMMISSIONER COPPA: I don't know what that is. So I'm trying to get a sense of who you represent.

THE WITNESS: I represent a group of individuals that reside in the Upcountry area that are interested in protecting and preserving prime agricultural lands and Class A agricultural lands, open space area in there and preventing -- preserving the open space between Kekaulike

High School and the existing urban area and Pukalani and preventing urbanization where it's unnecessary.

COMMISSIONER COPPA: Thank you very much.

CHAIRPERSON ING: That's a good point. Isaac, maybe you could expand upon that. Because we have had sometimes in the past where we required people to come in with a letter saying that they represent -- sometimes people would get up say, "I represent this organization," it comes out they did not. But is it a non-profit organization?

THE WITNESS: I understand there's authority for it if you want to -- are you evoking that authority under your rules that you want me to get a letter? Is that what Mr. Coppa --

COMMISSIONER COPPA: No. Mr. Chairman, just a --

CHAIRPERSON ING: Usually we don't require this of attorneys.

THE WITNESS: I know it's in your rules so if you distrust me and want a letter --

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COMMISSIONER COPPA: Let me be clear about my point. You came up and said you represented an organization and then just started talking away. All I wanted to know is -- I don't know what -- I've never heard this organization.

THE WITNESS: I did file a Notice of Intent to Intervene. I assume the Commission is aware of that. I intend to intervene in these proceedings. The Commission has recognized that the group I represent intends to intervene so we have a quasi-intervention.

COMMISSIONER COPPA: Again --

CHAIRPERSON ING: But let me ask --

COMMISSIONER COPPA: I just wanted to make clear that Mr. Coppa, as you said, is not asking for whether the rules apply. Mr. Coppa was asking on behalf of just being a little bit more knowledgable about who you are when you come up here and start speaking right off the top of your head and I have no idea who you were. That's all my point was. So thank you.

THE WITNESS: I've already appeared before the Commission through a letter. I filed a letter asking -- your rules --

COMMISSIONER COPPA: Thank you, Mr. Chair.

THE WITNESS: No, no. I want to make it clear. It's not like I'm a stranger in these proceedings. I've

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already filed a letter with this Commission saying I intend to intervene. There's a notice sent out saying, "Do you intend to intervene?"

I filed a notice that I intended to intervene. I got a letter recognizing the fact that my clients were intending to intervene. So this isn't the first time I've appeared on this matter.

CHAIRPERSON ING: Isaac, more clarification. Is it a registered non-profit corporation?

THE WITNESS: No, it is not. It is not.

CHAIRPERSON ING: Unregistered association.

THE WITNESS: Yes. Right, correct. I'd like to take issue with what Mr. Ching said because I don't think he read correctly -- or interpreted correctly what the guidelines said about the duty to provide a final EIS to commenters. Certainly the regulations themselves would supersede whatever's in the guidebook.

I'd like to go through the regulations themselves to make it clear with you that there was a duty to have provided us as commenters a copy of the final EIS before this action meeting.

In Section 11-200-20 the filing of a final EIS is covered in Section sub(b) within parentheses. That's where the final EIS has to be filed with the proposing agency. The original signed final EIS has to be filed.

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Distribution is covered in Section 11-200-21. That's the next section. The last sentence under "distribution" says, "For final statements the agency or applicant shall give the commenter an option of requesting a copy of the final EIS or portions thereof."

So at a very minimum after it was filed we were entitled to an option of whether we wanted the final EIS or not. I've never had that option.

After that, the next section following that is on acceptability. So the section on acceptance follows the section on our option to have the final EIS.

And I will say as a matter of practice I've been in a number of action meetings on the acceptances of EIS's. And I've never been in one where some entity took the position that people commenting who had public rights under 92-3 to comment on a final EIS were not entitled to have the final EIS in front of them to comment on. How in the world are we supposed to participate in this proceeding without having that?

I think it's a procedural error. It's a

violation of Chapter 343 and regulations thereunder not to have had that document in our hands well before this meeting so that we could participate meaningfully on whether or not this document is acceptable.

So I ask formally that you continue or defer this

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item until that document, the revised final EIS, is distributed to us, me in particular. It's not as if Malama Maui has not been involved in this process. Malama Maui is a plaintiff in a lawsuit already about the acceptability of this lawsuit. (sic) We were prevailing party in a lawsuit. We already demonstrated to have been vitally interested in having an acceptable EIS. So it's not -- we're a known party who's interested.

It's not that it would have been an administrative burden to have gotten one of these to us before this meeting. All of you have them. Everybody at the table has them.

CHAIRPERSON ING: Isaac, don't repeat yourself.

THE WITNESS: I'm not repeating myself.

CHAIRPERSON ING: You did. You just did. Because you already had said that. Let me ask our executive director are we under any time deadline to act on this? Certain things we have 45 days; certain things we have one year.

MR. CHING: Chair, to your questions my understanding in reading that the Commission has 30 days to issue its ruling with respect to the proposed revised environmental impact statement.

THE WITNESS: That date can be extended under the rules.

CHAIRPERSON ING: Let me ask Isaac this. Have you asked for the draft or the document?

THE WITNESS: Well, that brings up another point. It's my understanding that most of these parties here and the Commission scheduled this meeting on the acceptance well in advance of when you put out your agenda notice.

I wasn't -- even though Malama Maui is a quasi Intervenor in this proceeding already -- I wasn't given the benefit of any adequate notice of this proceeding. All I was sent was your regular agenda. That's all I got. I understand that Maui Land & Pine knew about this meeting well in advance of the meeting. They didn't just have to rely on your agenda notice. I don't think the state just had to.

CHAIRPERSON ING: Answer my question.

THE WITNESS: So the question is I didn't know about your meeting 'til I got your agenda. So I didn't -- I was hoping I would get it but I didn't get it. It's their duty to get it to me. It's not my duty to search around and find it.

CHAIRPERSON ING: Okay. You want to continue?

THE WITNESS: I've asked for one. Yes, I do.

CHAIRPERSON ING: No, do you want to continue your testimony?

THE WITNESS: Oh, do I want to continue with

my -- I mean it's very difficult for me. I want an action on my request for continuance.

CHAIRPERSON ING: We will wait until you finish.

THE WITNESS: It's -- I cannot comment on the revised final EIS. I haven't seen it. All I can comment on is the draft EIS which I supplied comments on. I can't -- I can't really -- that doesn't do anything because you're not here to review the draft EIS.

This 28 pages that I presented to you is on the draft EIS and why that's inadequate. What you're going to tell me is, well, that's on the wrong document because we're here to look at the final document. And I can't really comment on it.

But I suspect the final EIS is as inadequate as the draft EIS. I can give you some reasons why I believe it's inadequate. But the procedural errors that have taken place already are enough to require its non-acceptance.

No. 1. The procedural error we are talking about now is that we're having an acceptance meeting where interested members of the public don't even have the document.

No. 2. There was no consultation process. We asked to be consulting parties. And there was no consultation with us. Group 70 takes the position that consultation is the equivalent of the comment/response

period. But that's not what consultation means under the rules. There was no consultation.

And I reiterate the same problem. I do know that with our own comments the responses that we got were equally deficient under the rules. They were general, just plugged-in comments that really didn't address the issues that we raised. So the comments weren't adequate. The procedures weren't followed.

As far as substance goes, one very, very important issue to us is the fact that these lands are Class A prime agricultural lands. One thing we said in our comments was you have a duty to rigorously study alternatives.

One obvious alternative that would be important to the State Land Use Commission as that entity that must protect prime agricultural lands and must protect Class A agricultural lands, is is there any alternative that you have to locate this project on lands that are not prime or Class A lands? And they refused to study any alternatives for location of a shopping center on lands that aren't prime Class A lands.

That to me is a huge deficiency of which should be of great importance to the State Land Use Commission. One of the things you need to know, a large landowner like Maui Land & Pine that owns lots of acreage on Maui, is why

should you use up all of our or some prime Class A lands if you have an alternative available to you? That's precisely the kind of analysis that should take place in an EIS that didn't take place in this EIS. That's makes one major reason this EIS is defective.

Another reason it's defective is what Barbara Long was getting at. It's very vague when you start talking about the details of the shopping center. It's vague as to the square footage. It's also vague as to what it looks like.

She was getting at the square footage being as

large as one of our shopping centers in Kahului. And yet when you look at the EIS you don't ever get any sense that what you are looking at or analyzing the impacts of is a shopping center as large as a shopping center in Kahului.

If this is supposed to be a disclosure document, disclosing the scope and breadth of a project as well as adverse impacts, what's happened -- and I think what Barbara was trying to get at maybe -- was the fact that these impacts are being obscured through vague descriptions.

You didn't get any real description of what that shopping center was going to look like, what the parking lots were going to look like, what the office buildings were going to look like or what the whole project as a whole was going to look like. You have no idea what it's going to

look like. It's too vague.

A disclosure document is supposed to take something, warts and all, and put it in front of you, say here it is. If you can handle that, and you want to approve it, go right ahead.

But what I find over and over again that happens, instead, is that you get someone who provides, instead, a very self-serving document. Because you get Group 70 that has to not only -- that does the EIS and they are going to be the advocate for the petition for the boundary amendment. And it's a conflict of interest that they don't get over. And what it leads to is inadequate EIS's.

What Group 70's goal is to get this project approved. And it leads to give you -- to try to obscure the adverse impacts to try to give you vague descriptions. So in doing so they violate Chapter 343 and the regulations thereunder.

I think you haven't been given the kind of detail and the kind of adequate description of this project that you should have before you can truly deal with it.

Likewise, with the -- I spent a lot of time in my comment letter and in this letter that you have now talking about the various community plan, policies and objectives. If you look at that one area of the analysis of the community plan, policies and objectives and the responses I

got, that's one good area you can see where the comments and responses -- or the responses were inadequate. They just gloss over these very clear community plan, policies and objectives which would dictate that this project not be located in this place.

I'm not going to spend any more time going through this. I really think that the most important -- I think it's inadequate, shouldn't be accepted by you. But most importantly I think you ought to do something about the procedural error that's going on now, and continue this matter until people have copies of this document and can participate in this important matter of whether it should be accepted. Thank you.

CHAIRPERSON ING: Thank you. Questions by the Petitioner?

MR. LIM: We have no questions. We'll answer some of the issues during our presentation.

CHAIRPERSON ING: Commissioners, questions? Steven.

COMMISSIONER MONTGOMERY: There ought to be

enough lawyers around here I can get an answer to the question about whether the state's automatic approval statute would apply in this case if we don't take an action today on accepting this EIS.

We were told earlier that there are 30 days for

the accepting agency to make an action. So what kind of legal constraints are we in because of this nefarious statute?

CHAIRPERSON ING: The 30 days, if it's 30 days, would start October 13. So it would end November 14? 12.

THE WITNESS: I know there's an extension provision in here 11-200-21-(d).

CHAIRPERSON ING: I'm sure if the Petitioner waives that 30-day provision or they could have some other alternatives, they could withdraw the petition request. But there is that 30 days.

COMMISSIONER MONTGOMERY: That's good to have your perspective as an accomplished attorney yourself. Could I hear from other folks? We may not in the future have Mr. Hall on the witness stand. I'd like his perspective on this question because it's a fairly new law. There were considerable predictions by --

COMMISSIONER COPPA: Mr. Chair, I think Commissioner Montgomery has raised a concern that I don't know that you want to be getting opinions from all the attorneys, but I think it does call for a time to make a motion to go into executive session.

CHAIRPERSON ING: At this time I think we would like to dispose of this public witness. (Laughter)

THE WITNESS: Can I just say something before you

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dispose of me?

CHAIRPERSON ING: Yes.

THE WITNESS: In reading this rule it says the applicant's got to request the extension. So they put us in this position. They didn't give us the EIS. But it is within their power to do something about it.

CHAIRPERSON ING: Any questions to the witness in regards to his testimony?

COMMISSIONER MONTGOMERY: I would like to know if the witness will be available for further questions when we reconvene because I believe that I'm likely to have some for this witness.

THE WITNESS: Under those circumstances I will stay around, yes.

CHAIRPERSON ING: Roy?

COMMISSIONER CATALANI: Actually I leave this to the Chair. I guess we have two procedural issues that I would also, like Commissioner Montgomery, like to hear from counsel. One is the 30-day extension.

The other is the impact or the consequence or the requirement relating to the distribution of the final EIS prior to this public hearing and the right for the public to review that before they submit testimony.

I want to know whether the Chair wants to hear from counsel on that issue before we go into executive

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session or after we consult with our attorney.

CHAIRPERSON ING: I was trying to dispose of

Mr. Hall. Can we dispose of him?

COMMISSIONER CATALANI: I'm asking, like Commissioner Montgomery, I'd also like to hear from counsel on this question. I don't know if you want to do it now or....

CHAIRPERSON ING: A little later. Mr. Hall, thank you very much.

COMMISSIONER COPPA: Thank you.

CHAIRPERSON ING: We had three other public witnesses signed up. That's who I'm concerned about. I think we have Erin Nakashima. Excuse me. I'm mispronouncing the name? Eric. Okay. We have also Abe and John. Now I'm concerned whether we should hear these people first, especially Mr. Nakashima first before we do some other things so at least he has a chance to come up, say his peace today. He's been waiting all this time. In so far as Abe and John I don't know if you would be willing to defer your public testimony.

MR. CHANG: We would be willing to wait until after you come out of executive session. That's not a problem with us.

CHAIRPERSON ING: Okay. If that's okay.

Mr. Nakashima, do you swear to tell the truth in this

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matter?

THE WITNESS: Yes.

CHAIRPERSON ING: Thank you. Please be seated. Give us your name and your address.

THE WITNESS: My name is Eric Nakashima. My Address P. O. Box 88-0323, Pukalani, 96788.

CHAIRPERSON ING: Thank you. Please proceed.

THE WITNESS: I guess in listening to the prior testimony I don't know if maybe my testimony is quite adequate as far as maybe saying measurements and dates and things that pertain to the EIS, the final EIS.

I guess I might have just a personal few questions about, I guess, going back on this thing, the buildings listed in the EIS, Maui Land & Pine's storage buildings being that they said they was historical.

To me I guess maybe I should have made a comment earlier about this archaeological studies that maybe something maybe more important might be the water tank which has been there longer than those, maybe the same period. Yeah?

But the thing is, I guess, I'd like just to say as far as the EIS goes I'm not very knowledgeable because it's pretty long reading. But this thing is -- I guess it has to be made.

Right now, I guess, speaking as an individual

I've seen a lot of things going on as far as the triangle is concerned and been part of it and also some other developments in the area, been part of that.

I listed myself as an individual for testimony but I guess I am -- I should introduce also that I'm also the owner -- one of the owners and managers of Pukalani Superette, a business that right now is presently in negotiation with Maui Land & Pine. Also I'm the president of the Pukalani Community Association.

I guess maybe my next comments might not even pertain to the EIS but in general, just making a few

comments. I think that this is a good idea, I mean in support of this thing, this triangle thing development. Because we want businesses in Pukalani to be on the fringes of Pukalani.

I think we kind of were following the Upcountry General Plan. A lot of things that proceeded in our meetings with Pukalani Association business trying to open within the corridors of Old Haleakala Highway kinda, could kinda see the public wanted it on the fringes of Pukalani -- I mean businesses on the fringes of Pukalani.

I guess things like the Kulamalu project seemed okay at the time. Following that the triangle being developed it kind of developed in the same way. It was still on the fringes of the Pukalani proper, the community.

I guess right now that kind of ends my testimony. But are there any questions?

CHAIRPERSON ING: Thank you for your testimony. Questions from the Petitioner?

MR. LIM: We have no questions.

CHAIRPERSON ING: Thank you. Commissioners, questions to Mr. Nakashima? Seeing none, well, thank you for your participation this morning. I'm going to call for a 10-minute break, personal privilege they call it. 10-minute break.

(Recess held.)

CHAIRPERSON ING: Ladies and gentlemen, let's reconvene the Land Use Commission meeting on action item A03-740 Maui Land & Pineapple Company, Inc. I think one of the proposals before we had a recess was we would ask counsel what he thought his response as to the legal objections and concerns raised by the public witnesses. And we'll ask very busy Mr. John Chang for his response too. Steven.

MR. LIM: Thank you, Mr. Chairman. Briefly the procedure that's suggested by Malama Maui today is not supported by either Chapter 343 or the EIS rules. It may sound like a good idea but that's not what the rules provide. Essentially what happens is you comment on the draft EIS. You can send 10 comment letters if you want.

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Then the only thing that they see in the end is the final EIS after the agency accepts the EIS.

There's no provisions for pre-review of final EISs and there's no legal requirement for that. I think what the practical result of what -- accepting what Mr. Hall is recommending is that Commission, and I guess any other accepting authority, is going to be engaged in a quasi-contested case hearing of the acceptance of the final EISs.

Please remember that the acceptance of the final EIS does not approve the project and it doesn't even make a final determination of whether the findings in the EIS are sound or unsound. It's merely to determine whether the Petitioner has adequately described the potential range of impacts.

So one of the critical issues, I guess, essentially Mr. Hall is saying that he should have been provided with the draft of the final EIS. As the Chairman noted and Mr. Hall testified, he didn't even ask for one, yet now he comes today to the Commission arguing that's a legal error. We think that he's waived any right to ask for

it in that respect.

He also made an incorrect statement on the rule on 11-200-21 where he said that -- he tried to use the last sentence of that rule to tell you that the Commission is supposed to provide a copy of the final EIS to the

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commenters if they request it.

That's incorrect. Because that statement basically says, "For final statements the agency or applicant shall give the commenter an option of requesting a copy of the final EIS or portions thereof."

What that presupposes is that there is a final EIS that's been accepted by the Commission. And to this date there hasn't been one.

CHAIRPERSON ING: Questions to Mr. Lim?

MR. LIM: I'm sorry. One final point is that remedy for Malama Maui or any person who disagrees with the content requirements for the final EIS, if accepted by the Commission, is to appeal to the circuit court pursuant to HRS Section 343-7 which would be 60 days from the publication of the notice of the acceptance in the environmental bulletin.

CHAIRPERSON ING: Thank you. Roy?

COMMISSIONER CATALANI: Steve, I understand your comments as well as your reading of the Section 21. I guess I'm just not used to this procedure, I suppose. I guess I've always thought in the past discussions on the rules. I'm used to the public witnesses having seen the proposed final EIS while they're up there testifying so we are actually talking about the same thing.

If I understand what you're saying for the public witness to understand what it is we're looking at they would have to look at the draft EIS, combine it with the letter that the developer has given them and that would equal what we have in front of us.

Is that the process the public witness has to go through to have an understanding of what it is we're looking at?

MR. LIM: Under the existing set of rules and the statute, yes.

COMMISSIONER CATALANI: Isn't that kind of contrary to the idea that the public in this context isn't supposed to have to cross-reference documents in order to know what the agency is reviewing?

MR. LIM: To some degree I can understand the desire to give the public more opportunity to comment. However, like I said, that is a process that is laid out in the statute and the rules thus far and we are not aware of any precedence to the contrary.

CHAIRPERSON ING: Any other questions? Mr. Steven Montgomery.

COMMISSIONER MONTGOMERY: Yes, thank you. I'm not sure when we'll have another opportunity. I'd like to know if the applicant can give some comment on the square footage question, which in the view of Barbara Long showed how inadequate this document is.

MR. LIM: Obviously we disagree with her comments. But I'll be presenting that evidence with

Mr. Overton's explanation. I think it would be better presented during that period of time. If you like it now I can have him take it out of turn.

CHAIRPERSON ING: When they get to their presentation.

COMMISSIONER MONTGOMERY: I'll be patient.

CHAIRPERSON ING: John, I don't know if you had opportunity to review for your commenting on what the procedure questions that were raised by Mr. Hall. I know you're a very busy person.

MR. CHANG: Well, our position is that, you know, the advice that you got from your counsel, you know, should be what you should follow at this time. I think that, you know, we really don't have a position as far as what he mentioned as to the lack of procedure that was followed. I think the Petitioner has stated what they feel is correct. But us not being a party at this time I'm not sure whether we should answer those questions.

CHAIRPERSON ING: Okay. Any questions to John?

COMMISSIONER CATALANI: How about just the very specific question, a straight legal question? Mr. Hall says that I think it's 11-200-21 states that the public witnesses are entitled at least -- entitled to have a copy of the

proposed final EIS or at least entitled to be asked if they want a copy of the proposed final EIS.

Mr. Lim says that that rule applies solely to the final EIS. There's no final EIS yet so there's nothing for which they're supposed to be asked about whether or not they want a copy of. What's your interpretation of that rule?

MR. CHANG: Unfortunately we have not had a chance to review it during the break. I can't at this time give you an opinion as far as that position is.

COMMISSIONER CATALANI: Okay.

CHAIRPERSON ING: Peter?

COMMISSIONER YUKIMURA: Mr. Chair, I move that we go into executive session before lunch break so we can maybe talk to our attorney and get his view.

COMMISSIONER FIESTA: Second.

CHAIRPERSON ING: Motion by Commissioner Yukimura to move into executive session to discuss legal issues with our counsel and seconded by Commissioner Fiesta. Any discussion? All those in favor of the motion signify by saying aye. (Aye) All those opposed say nay. Motion is carried. For the parties and members of the general public, we will go into executive session, go out of it and go for lunch. So maybe be back at 1:30.

(12:15 Executive Session.)

CHAIRPERSON ING: Let me reconvene the Land Use

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Commission meeting on item A03-740. We are still in executive session. The reason, we had asked our Deputy Attorney General in Honolulu to research some of the questions that had been asked. And he was to get back to us. So if we may ask the members of the public and the parties to excuse themselves. It should be a short continuation of our executive session. So thank you.

(1:40 recess)

CHAIRPERSON ING: Thank you for your indulgence. We are over with our executive session. We're back on A03-740 Maui Land & Pineapple Company, Inc.. Where we left

off was with our public witnesses. We had three public witnesses testify. We have three more that have signed up. I'd like to call upon Abe Mitsuda followed by John Chang followed by Sally Raisbeck.

MR. MITSUDA: John is going to go first.

MR. CHANG: I'll be very brief. The Office of Planning --

CHAIRPERSON ING: We want to see if you're going to tell the truth, John. Do you swear to tell the truth in this matter?

MR. CHANG: Yes.

CHAIRPERSON ING: Okay. Give us your name, position, address.

MR. CHANG: John Chang, Deputy Attorney General

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representing the Office of Planning. The Office of Planning submitted written comments to the Petitioner on May 9th, 2002 and received Petitioner's response to our comments. The Office of Planning feels that at this time the EIS meets minimal standards and should be accepted by the Commission.

Abe is here to answer any questions that the Commission may have on that position.

CHAIRPERSON ING: And are you available for questions?

MR. CHANG: Yes.

CHAIRPERSON ING: What diet were you on when you lost all that weight? I'm only joking. Abe, are you going to make a presentation?

MR. MITSUDA: As John said I'm here to answer questions.

CHAIRPERSON ING: Do you swear to tell the truth in this matter?

MR. MITSUDA: I swear.

CHAIRPERSON ING: So no presentation but you're here to answer any questions.

MR. MITSUDA: That's right.

CHAIRPERSON ING: Petitioner, do you have any questions?

MR. LIM: No questions for Office of Planning.

CHAIRPERSON ING: Thank you. Commissioners?

Steven.

COMMISSIONER MONTGOMERY: Mr. Mitsuda, you heard the testimony that we heard from Ms. Long earlier today. She had some questions about the capacity of alternatives and additional alternative commercial property. And made the statement that this environmental document was inadequate by not discussing those alternatives.

As a planner did you share her feelings at all about the lack of this information that gives the whole picture about the commercial space on Maui?

MR. MITSUDA: I think for projects such as this it's very conceptual. As you know there is a shopping center, I mean a commercial development very close to this one that has community plan approval. I think the community plan process should play out as far as what the county feels. I assume that they would go for community plan approval with working with the community and getting more detail in their planing.

So in terms of specific square footage, I'm not speaking for the Petitioner, but at this time I think it's

really difficult to really nail down the square footage.

COMMISSIONER MONTGOMERY: Her point is that this document is one of disclosure that seems to not place this proposed development in the context of other similar developments. It just seems common sense would tell me --

I'm not a trained planner -- but it's reasonable to have all of these aspects disclosed in a document of this sort. If it doesn't it's not adequate.

So that's why I'm asking as a planner what do you think about it at this stage rather than wait till it goes before some county agency? Why not as early as possible, as much information as possible for everyone involved in reviewing the proposal?

MR. MITSUDA: I think there's questions out there regarding the other commercial site. I understand they're selling lots. For us to evaluate whether or not another one is needed I guess we have to talk about the type of development proposed to really evaluate whether or not a second commercial area should be approved. We also have to look at the agricultural question.

MR. CHANG: Steve, if I can also comment. I think as far as one of our questions that we posed to the Petitioner we asked a similar type question. And apparently the Petitioner answered by saying that their proposed development was about 150,000 square feet. Therefore, would not be a big commercial development. So we're just basing it on that's the answer to us.

Now, we're saying our position is then we feel that the EIS is adequate. However, when it comes up for actual discussion before the Commission, I think that

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that -- hopefully that will be made clearer as to what it is. I mean they seem to answer us saying that 150,000 square feet, that was the approximate size.

COMMISSIONER MONTGOMERY: Let's turn now to the question about the historic resource. Barbara Long points out that only the persistent attention of the county Cultural Resources Commission caused the applicant to acknowledge the significance of this historic agricultural site.

Since you gentlemen are representing a state agency which has also jurisdiction to protect historic sites, I'm surprised at the brevity of your comments to our Commission. We depend very much on agencies such as the DLNR's Historic Preservation unit.

I wonder if you could summarize for me what their position is about these resources, because Ms. Long is an active community member and she says that this historic resource has not been given adequate or appropriate consideration.

MR. MITSUDA: Well, there's been some discussion about preserving of the buildings. There's a water tank. There's buildings associated with ag on the property. Once the petition is filed we'd circulate it to DLNR and get their comments. They have commented before on the EIS. So you get a lot more details as we progress in the petition.

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COMMISSIONER MONTGOMERY: Do you recall whether their comments about this historic resource as to whether

they felt this resource was adequately treated and adequately represent in these documents?

MR. MITSUDA: Well, my understanding is that buildings are there. They're still there. They haven't been demolished. So if the buildings are to be preserved there is that alternative.

COMMISSIONER MONTGOMERY: Thank you, Mr. Chairman.

CHAIRPERSON ING: Thank you. Further questions? Roy.

COMMISSIONER CATALANI: I guess I'm a little bit confused on your response, maybe it's from Mr. Chang, that your conclusion or your comfort with the EIS is based upon a response that you received saying that the buildout is 150,000 square feet. Did I hear that correctly?

MR. MITSUDA: That number was mentioned today by the witness, the public witness.

COMMISSIONER CATALANI: She mentioned the 150,000 square feet or who are you referring to?

MR. MITSUDA: I'm looking at my notes. It says -- I see a figure of 253,000 square feet.

COMMISSIONER CATALANI: Okay. But I thought I heard your counsel say that his assessment or his comfort

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with the EIS was based on a response that said there was 150,000 square foot buildout.

MR. MITSUDA: Well, she compared --

COMMISSIONER CATALANI: I'm talking about your --

CHAIRPERSON ING: Abe, it's a remark that John made, nothing that you said or Mrs. Long said. That John said he had raised a question on the magnitude. And the response from the Petitioner was that the size would be 150,000 square feet. Based upon that it was like you moved on.

MR. CHANG: My understanding was we questioned -- the Office of Planning did raise a question about the size of the commercial units. And the response by Group 70 was that the design is typical of a neighborhood retail center less than 150,000 square feet.

COMMISSIONER CATALANI: So if you understood, I mean this is in the response letter to Mrs. Long as well as the EIS itself, it clearly has square footage that's over 210,000 square feet. I can't add it all up here. I'm not sure it's not even all itemized. Assuming that we take the EIS at its word and the response letters at their word, does that change your analysis of the impact?

MR. MITSUDA: Well, I think we would have to take a look at it more carefully. And like I said before we'd also like to look at the other commercial site. We'd like

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to get the county involved also.

COMMISSIONER CATALANI: But we have to evaluate this EIS today, most likely if not tomorrow, within the next several hours. I'm just asking you, assuming we are going to make a decision today or at the latest tomorrow, unless there's some other reason for putting this off to another day, what's your position with respect to the adequacy of the EIS if you understand it to be in excess of 210,000 square feet of buildout rather than less than 150,000 square feet?

MR. MITSUDA: I think it depends on the type of

commercial activity they're proposing.

COMMISSIONER CATALANI: Okay. But that's what the EIS is supposed to tell you. You're supposed to be able to say that --

MR. MITSUDA: Right. Many times -- well, I hate to speak for the Petitioner, but at this stage it's very conceptual. And I think that question should be directed to them and should come out during the course of the hearing.

COMMISSIONER CATALANI: Okay. Actually I'm just asking for your office's opinion as to whether or not this document adequately analyzes the impacts.

MR. MITSUDA: I think they're giving it the best shot they can at this time. I think the county also has to make a call in terms of two commercial sites, the possibility of two commercial sites.

COMMISSIONER CATALANI: Okay. But --

CHAIRPERSON ING: He's asking --

MR. MITSUDA: We're going around in circles, I know.

COMMISSIONER CATALANI: Is this an adequate assessment of the impacts?

CHAIRPERSON ING: He's asking your opinion.

MR. MITSUDA: My opinion?

COMMISSIONER CATALANI: You're here representing the state.

MR. MITSUDA: My opinion they're giving it the best shot they can at this time.

COMMISSIONER CATALANI: So even though you're not basing it upon a specific square footage, you're saying this is an adequate assessment of the impacts.

MR. MITSUDA: Yes, I am.

COMMISSIONER CATALANI: Okay.

MR. LIM: Mr. Chairman, perhaps I could interrupt. We haven't given our presentation. I think part of the confusion is that the Commission is asking questions off of the figures or facts on all these issues given by public witnesses. Once we get the Group 70 representative up here to testify and give the Petitioner's position all these issues might be clear.

CHAIRPERSON ING: That's very true. I guess whenever we have Abe or John under oath we like to ask them

a lot of questions. Any other questions? Okay. Thank you. Sally Raisbeck. Do you swear to tell the truth in this matter?

THE WITNESS: I do.

CHAIRPERSON ING: Give us your name and address.

THE WITNESS: My name is Sally Raisbeck. I live at 427 Liholiho Street in Wailuku. I'm testifying as a private individual.

I understand that today the question is whether you are accepting the EIS or not. And there will be opportunity in the future to testify about, in detail about this project?

CHAIRPERSON ING: That's very correct.

THE WITNESS: Is that correct? Okay. In that case I will just say that my concern is about water. And the plans here are to drill a well which I scaled off a map as being 2,000 feet from our existing Po'okela well, although it says in the text here it's 3,000 feet away.

And I will be asking questions during the interim between now and when you consider it to find out whether that well might be likely to interfere at all with the supply of the Po'okela well.

The Upcountry water system is a separate water

system of Maui County, separate from the water system that supplies Central and South Maui. Has a long-standing problem with shortage of water for people for 20 or 30 years. It has been a real difficult process for people Upcountry to get a water meter.

My feeling about that, which is that the county has been unable to provide infrastructure to process surface water, stream water, or to drill wells sufficiently. So that this one proposes to drill a well and makes the claim that excess water not needed by the project will be used -- will be available probably for purchase to the county system or by arrangement.

The Upcountry water system has a list for meters of 700 names, some of which have multiple, multiple requests -- requests for multiple meters. Some estimates are there's maybe 2,000 people waiting for water Upcountry.

And this well will provide water probably by arrangement with the Water Department ahead of all those people. All of those people will continue waiting for water meters while this project gets water.

And that -- you're not concerned with this fact but it does lead to great anger among a lot of people Upcountry that they have to wait. And meanwhile development projects, large development projects go in where the developer has enough money to drill a well, get his own

water and then turn it over to the county. It also has what to me is a deleterious effect on the county system. This is entirely my own opinion.

But it means that the county system develops where developers want it developed and control where things are developed in that way.

I also see it this well, which I believe is at 1800 feet, that's going to be very expensive water that they pump out of it. It will be expensive to provide that water. And when they turn it over to the county system, with our normal ways of charging for water, that will raise the price

of water for everybody in the county actually to add source which is extremely expensive, then essentially raises the cost to everybody.

So I have problems with this way of developing the county water system. But it's perfectly legal and it's probably going to happen.

But I will try to be more specific if we discuss this matter again in future. Thank you. So, oh, I guess I would have to say that the economic effects of providing water in this way might be something that the EIS might be expected to cover. Thank you.

CHAIRPERSON ING: Thank you. Questions by the Petitioner of this witness?

MR. LIM: We have no questions.

CHAIRPERSON ING: Questions by the Commissioners? Steven.

COMMISSIONER MONTGOMERY: Since the item before us is whether this document is adequate as reflecting the impacts of, I believe you said earlier you've spent some time serving on the County Water Commission. Have you read this section in the draft EIS on water? And what are your feelings about its adequacy at the present time as an EIS?

THE WITNESS: I haven't -- I haven't studied it thoroughly. I have read it but I haven't studied it thoroughly. I'm not an engineer myself. I'm not a hydrologist. So that from those aspects I wouldn't be able to criticize it.

I do feel that the economic effect of having -- the effect on the county water system of having developers essentially do our planning for us and provide infrastructure where they get water for projects, and other people have to wait for many, many years, I think that has a deleterious effect on the county. As I say this particular well will raise the price of water for everybody in the county. So that's my answer.

COMMISSIONER MONTGOMERY: Thank you.

CHAIRPERSON ING: Any other questions? If not, thank you.

THE WITNESS: Thank you.

CHAIRPERSON ING: Now we come to the Petitioner's turn to make its presentation.

MR. LIM: Were you going to give the staff report first?

CHAIRPERSON ING: You're very correct. Staff report. We're all waiting for the Petitioner.

MR. LIM: We're anxious also.

MR. KUMABE: I will make my staff report brief. Staff would like to do two things. First, give a locational perspective of the Petition Area and then very briefly summarize our report to you.

For a locational perspective for the Petition Area I'd like to direct your attention to our map 1 here. This is our official State Land Use Commission map. And it was generated through GIS comprising of four quads in the Maui area. I'll just go briefly. The quads of Paia, Pu'u O Kali, Haiku, and Kilohana. The scale on this map is 1 inch equal to 2,000 feet.

As usual we have the state land use districts shown on the map. Red areas are the Urban District. Brown

areas, which is over here, are in the Rural District. Green areas outlining is in the Conservation District and the uncolored areas are the Agricultural District.

If the Commission can see, we have highlighted the Petition Area here in yellow. The location of this

Petition Area is the confluence between three major roadways which has been pretty much described earlier: The Pukalani Bypass Highway which is this portion here, Makawao Avenue which is this roadway going here, and the Old Haleakala Highway coming down here.

If you were to take a look at the photo above the map that's a panoramic composite of the Petition Area kind of looking at it from this angle from the existing Pukalani Superette parking lot.

We'd like to point out that a significant existing docket, which the Commission had approved, is this area which is kind of kitty corner from the Petition Area which is special permit 93-385 which is a site for the King Kekaulike High School.

Does the Commission have any questions on the orientation?

CHAIRPERSON ING: Commissioners, any questions to Russell? Okay.

MR. KUMABE: Staff would just like to briefly summarize their report. Our report pretty much summarizes three basic topics. One is the Commission's action today. I won't go into that because that issue or that topic has been discussed pretty extensively so far.

The next topic or area of staff report is Petitioner's compliance with Chapter 343. If you'd indulge me I have to turn over the board and I've got something to show you guys. In regard to the compliance as discussion had identified earlier, we had perceived that the compliance has to be met in two areas: The content and also the review, public review and response components.

As far as the compliance with the EIS requirements, staff believed that the criteria had been met with the exception of the following areas. This is a blow-up of a checklist that's on page 10 of your report. And I'll just briefly go down three areas that staff would like to point out is the area as far as relating to project description, assessment and things to that effect. I will kind of describe that a little bit later.

Development alternatives, the discussion thereof which also would address later.

And the other section is relationship to state or land use plans, policies and control.

That portion staff felt the discussion in the final EIS was not adequate.

So in relation to those three items that staff had pointed out, I would like to direct you to this table here. And this is the table that had been e-mailed and/or faxed to you just the other day.

And that basically pulls in from staff's analysis the issues we had pointed out on pages 13 and 14 of the EIS.

I'll just briefly go down as far as the seven sections that we had pointed out which relate to as far as meeting the

criteria of those three items I had described.

The first section had to do with Section 3.3 and also Section 3.22 market analysis and office/civic space. We would, I guess, request clarification in several areas: Amount of business civic space, demand in Upcountry originally, the amount of space that's provided by Kulamalu, other projects proposed 80,000 square feet of civic and office space that will augment or compete with Kulamalu. The type of civic uses that will be used. Pretty much these issues have been pointed out by several of our public witnesses.

The other section that we would like clarification is the residential component. Section 3.2.4 senior and multi-family. Basically seek clarification as far as determining what type of residential use will eventually be developed.

In the EIS two different types are being proposed, senior and multi-family. Both kind of provide their own, or generate their own respective impacts and/or benefits. So we feel that that perhaps could be clarified a bit more.

Next section is Section 3.3.4 water supply well. Similar to the last public witness that we had, not so much

the Po'okela well but I guess the relationship of the proposed Piiholo well that has been described in the EIS with the project water needs.

Fourth area of clarification would be the roadways, Section 3.3. Two aspects in this regard: One is, I guess, the situation with the Makawao Avenue street parking. I guess the number of stalls that are being proposed and I guess the purpose in the overall design of the project and how it fits in the existing parking situation.

Another component regarding transportation would be the pedestrian and bicycling access. Clarification as far as the size of the pathways that would be used for pedestrian and bicycling needs and the relationship with the surrounding areas outside the Petition Area and also the safety measures that will be proposed to be used.

The next section we'd like to point out is Section 5 which I had previously mentioned on the discussion on the Chapter 205 state land use law and Chapter 205A. Staff has been working with the Petitioner in identifying some of the needs needed for this section.

The 6th section is the one on utilities and waste management, Section 6.2.13. Staff's concern with the clarification of solid waste issues, namely on the amount of project waste stream that will be reduced by recycling and

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how recycling plans will be implemented for both components, both the business commercial section and also residential.

The last is alternatives to the proposed action. In light of the Commission's position on the Lanihau EIS previously I guess a more rigorous discussion on the development alternatives.

Staff would just kind of like to just end with, I guess, a summary of issues that were raised by reviewers in addition to the issues that you had heard earlier in regards to compliance of the EIS laws, project and market need and water issues.

Also other issues that were brought up was project design, agricultural resources, archaeological resources, soil contamination issues, water supply, wastewater issues, drainage; the compliance with the Makawao/Pukalani/Kula community plan and lighting and energy concerns were also raised.

A list of agencies and organizations that were solicited are provided in staff's report on pages 40 to 42. Those that have provided comments are listed on pages 5 and 6 of our report.

That concludes staff's report. Are there any questions?

CHAIRPERSON ING: Commissioners? Roy.

COMMISSIONER CATALANI: Russell, I know

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Petitioner is going to review this with us shortly with respect to the supplements to the revised EIS. But since we are not going to hear from staff again, I presume, did you have a chance to look at that and have you analyzed whether or not or to what extent it meets what you felt were shortcomings as you've listed them on the board?

MR. KUMABE: I think from the standpoint of the technical review of the EIS, with the clarification that staff had pointed out, I do believe we feel that if clarification is provided and the types thereof they would address, I guess, the technical requirements of the EIS with the merits of the project and the case will be explored further during the Commission hearing.

COMMISSIONER CATALANI: Is there anything with respect to their supplement or what we anticipate they will present as their supplement that you feel or staff feels needs something more than is there?

THE WITNESS: The stuff that we received today?

COMMISSIONER CATALANI: Yes.

MR. KUMABE: I think staff would feel more comfortable as far as looking over a lot of stuff, but I would say a few of the major issues that we had raised, the discussion on, including more discussion on 205 and 205A, I do believe that is satisfactory.

And I do point out the appropriate sections of

that particular sets of rules and statutes.

As far as for the others I do believe that -- oh, I forgot to mention one more thing was that in the EIS, FEIS review we had asked OEQC to kind of take a look at the document and provide some feedback on that.

And I'll defer to Petitioner being that OEQC had pretty much transmitted a formal transmittal which is in your packet. But what OEQC staff had shared with me was that the following issues should be added to the unresolved issues.

That would be DOE's fair share requirement for residential component and also the State Historic Preservation Division's confirmation of the archaeological inventory survey. Staff would concur with OEQC staff as far as including those items in a revised or in the final EIS.

COMMISSIONER CATALANI: Thank you.

MR. KUMABE: Sure.

CHAIRPERSON ING: Other questions? If not, thank you, Russell. Petitioner, now.

MR. LIM: Ready for our presentation?

CHAIRPERSON ING: Okay. Go ahead, proceed.

MR. LIM: Thank you very much, Mr. Chairman, members of the Commission. Thank you for allowing us to make our presentation. As you already have, I guess we'll call it Petitioner's Exhibit 1 to this hearing is the

supplement to the revised final EIS. That includes some additional information and expanded discussions on the areas that we discussed with the Land Use Commission.

We'd like to thank Tony and Russell for their hard work on this. They put in a lot of time on it. We feel that with the submittal of this information that the final EIS is complete.

I think that we will have Mr. Overton discuss the issues that you've been raising today at the hearing. So I think what I'll do was -- I think that the presentation will start out with -- I was going to go through the procedural history, but I think you got that both in your report and today from Russell. So we'll move straight into an overview of the Maui Land & Pineapple Company, Inc. operations by Mr. Randy Endo who is the development manager.

Then we'll move straight into the issues of concern to the Commission. That will be the chart there on the board. We will have Mr. Overton make his presentation, follow those items down to address the issues brought up by the public witnesses and by the staff.

CHAIRPERSON ING: You're going to have like a panel of witnesses? Okay. If everybody is going to be a witness, raise your right hand. Do you swear to tell the truth in this matter? Okay. Repeat after me. Do you swear to tell the truth in this matter? Say "I do".

MR. McNATT: I do.

MR. ENDO: I do.

MR. OVERTON: I do.

CHAIRPERSON ING: Introduce yourselves again beginning with Mr. Overton.

MR. OVERTON: Hi. I'm Jeff Overton. I'm chief environmental planner with Group 70 International.

CHAIRPERSON ING: Thank you.

MR. ENDO: Randy Endo from Maui Land & Pineapple Company, development manager.

CHAIRPERSON ING: Thank you.

MR. McNATT: I'm Bob McNatt with Maui Land & Pineapple Company, vice president of land planning and development and Randy's bodyguard.

CHAIRPERSON ING: Thank you.

MR. ENDO: Good afternoon, Chair Ing and Commissioners. I'm here to talk just briefly about Maui Land & Pineapple Company which I'll also refer to as ML&P for short.

I want to thank all of you for coming all this way to hear about our project and for considering the acceptance of our EIS. I'd also like to thank initially Tony Ching and Russell Kumabe for all their hard work in reviewing the EIS. While they have been tough on us they have been very fair and straight forward. We really and

sincerely appreciate that.

First, a very brief history lesson. Our company

traces its roots back to the 1800s when Dwight Baldwin, a missionary physician, was awarded, after many years of service, the ahupua`a of Mahinahina in West Maui.

He subsequently acquired further lands which became what was referred to a Honolua Ranch which was a ranching operation. Thereafter, he hired D. T. Fleming to become the plantation manager.

D. T. Fleming was into experimenting with all sorts of agricultural products, one of which was pineapples. Once the pineapples took off they kept on expanding to the point where the cattle grazing operation was discontinued. So they changed their name to Baldwin Packers.

Thereafter, through the decades and through several mergers with other pineapple companies including Haleakala Pineapple and Maui Agriculture, which are situated in Upcountry Maui, they became a larger pineapple operation and eventually became a subsidiary of Alexander and Baldwin.

However, in 1969 Colin Cameron, a direct descendent of Dwight Baldwin, engineered a separation from A&B through a leverage buyout to today what is known as Maui Land & Pineapple Company.

Maui Land & Pine has three primary divisions: the pineapple farming which is undertaken by the Maui Pineapple

Company, a wholly owned subsidiary which currently has over 10,000 acres under cultivation.

We have a commercial and property division which used to include the recently sold Queen Ka'ahumanu Center and the Napili Plaza and will hopefully, some day, the Upcountry Town Center.

Our third department is the resort and

development wing which is the Kapalua Resort which includes three golf courses and various resort and residential projects.

ML&P owns about 28,000 acres on Maui, about 23,000 in West Maui and 5,000 Upcountry.

Maui Land & Pine through its subsidiaries employs about 1800 people on Maui which makes it the largest private employer on this island.

ML&P has been a leader in water, soil and marine life conservation practices. Some examples, just to name a few, include contribution of land for marine reserve at Honokohau. The 8,600 acre Pu'u Kukui Preserve which is maintained by three fulltime Maui Land & Pine employees and contribution of 70 acres to the Gorilla Foundation, just to name a few examples.

Our company has been a vital contributor to Maui's community for many years and continually strives to do what is best for not only its shareholders but its

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employees, the community and the environment.

Today you have representatives, vice president McNatt and myself, who are within the development arm of the company. We believe the development diversifies the revenues and supports agriculture in our company during lean years.

For example, over the past three years the pineapple division had operational losses totaling over, or approximately $14 million. While at that same time period the development and commercial divisions contributed a total operational profit of $28.5 million. So while we're

confident that pineapple will return to profitability, in the meantime development profits help to support agriculture.

Moreover, the recent change in leadership at ML&P has not diminished the company's long-term commitment to agriculture. If anything, David Cole's arrival signals a renewed focus on strengthening the company's ag operations.

Now, turning to the 40-acre site in question. I just want to briefly talk about how the first concept began. Early on from the early '90s when the bypass highway was first constructed, say, from around 1995, everyone recognized this 40-acre piece of property to be an ideal candidate for commercial development, its central location, good access, and was adjacent to existing urban uses.

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However, midway through the decennial community plan update process, Maui Land & Pine withdrew its request, for business reasons. As such the parcel's community plan designation remains in agriculture.

Subsequently, in approximately 2000 Maui Land and Pine did a thoughtful reevaluation of this parcel and evaluated what the community's needs and desires which today results in the mixed use project that we will be reviewing in detail in a minute.

We've had substantial public input. We have made presentations to various organizations such as the Pukalani Community Association, Kula Community Association, Makawao Main Street Association, King Kekaulike PTSA and other groups.

I hope I didn't talk too fast, but that's it for my presentation. At this point I will be supplementing Jeff

Overton as he goes through the main elements of our project.

MR. OVERTON: Mr. Chair, if I could, please, I've got some exhibits. So what I'd like to do if I could use a standing mike at the easel -- Russell is this the only mike that has a cord on it?

MR. KUMABE: Do you want to be located on that side?

MR. OVERTON: Wherever is best. I could have brought a PowerPoint presentation, but I think we'd all be

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snoozing. I would like to use the board. It's a little more effective and intimate.

My name is Jeff Overton, planner with Group 70. We've been working on the project since sometime mid-2000 when we were invited to work with Maui Land & Pineapple Company to begin exploring opportunities for this property in Pukalani.

What I'd like to do in my presentation, if you could bear with me, is to give you a pretty solid briefing on what the project really is. Nobody has really talked about it. If you've had the chance to go through the EIS you've had some exposure to it.

But I'd like to kind of walk you through some of the basics of the project, what it's composed of and how we've gotten to the project itself. And then I can follow up on some of the EIS questions.

Russell did a good job of orienting everybody in terms of the location. I just want to reemphasize the position of the project.

With Haleakala Highway and Pukalani Bypass coming

up through this area, the project site is highlighted here, the triangular shape. You can see the street subdivisions of the urban area of Pukalani and how the site relates to what is the urban area here at Pukalani.

The other area of concentration in development in

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the Upcountry region is most dense -- oh, laser, okay. I'm going to use that -- the Makawao area, Makawao Avenue extends from Pukalani over into this area. You can see the density of development in this part of the region.

And the other well-known area, Upcountry subregion here would be Kula. You can see it's much less dense over here.

MR. HALL: Mr. Chairman, I want to object to this presentation. This is limited to the EIS and whether that document is acceptable. All he's supposed to be talking about is the EIS, that document and whether it's acceptable. I object to anything beyond that.

These long-winded presentations about the project as a whole are totally irrelevant as to what you're supposed to be doing here. All he's supposed to be talking about is the EIS and is it acceptable period. Thank you.

CHAIRPERSON ING: Objection so noted. I think the idea this witness is trying as part of his presentation to respond to some of the questions that were posed earlier as to density and to uses.

MR. OVERTON: If you'd like me to specifically answer those questions, I'll forego the presentation. That's somewhat different than the direction I was given by the executive director, to give a full explanation of why we're here, really.

CHAIRPERSON ING: Well, I would say continue with the presentation as originally planned.

MR. LIM: Why don't you go ahead and continue the presentation. That would be a better idea.

MR. OVERTON: So this gives you at least a good idea, the feeling, the setting in terms of densities in the existing urban community in which the project is planned in here.

It also shows the orientation of the well site that's to be located at Pi'iholo. It is in the area of Po'okela well. But that's some distance away from it. So we're not directly adjacent to that well there. We'll talk further about the water well. This orients you to the region in there.

Now, I will be referring to the actual EIS as we go along. Most of you have a copy of it. It might help for you to have that available as I refer to some of the pages in there so you can see the exhibits more closely than what I'm talking about.

I took the liberty of using Russell's summary sheet on the impact conclusions and keying in some page numbers as we go through there. In terms of the project itself, and the area surrounding it, again the Pukalani community, the urban community is in here. The commercial corridor along Makawao Avenue, Pukalani Square, there's a

First Hawaiian Bank over here, church, urban/residential development up along this area, the fire station. So you

basically have urban development here on both sides of the project.

Across the highway is the agricultural land. This is the land that was separated when the bypass was constructed in '94 to create the 41-acre orphaned parcel here, the remnant piece and actually somewhat less than 41 acres, actually used here in the project area.

I'm going to walk you through just some of the basic components of the project. This is not one single composite shopping center as was alluded to by some of the public testimony. This is a rural character country development that has a shopping center component and has some other component pieces to it.

This was all conceived, really, in reaction to much of the community's wishes and desires. We went through over a dozen community meetings in a period of two years, most actively with the Pukalani Community Association, large group meetings where 70, 80 people attended and they basically looked at the property with us. And we spoke about concepts that might be appropriate on this project.

Some of the things people bought group in the Pukalani community are: We're having this problem with spot zoning in our community. We'd like to see commercial/

retail development consolidated to a location that's efficient, within walking distance so we can all use it and yet not break up our existing community with these pieces of commericial spot zoning.

That's part of the reflection and why we have seen a plan here that's consolidated the commercial development at one location to bring the goods and services to the residents of Pukalani and the residents of Upcountry.

The other pieces of the project that come into play -- and I can also -- I need a little water as we go along here. Excuse me. It's approximately 112,000 square feet of commercial. So we're about 112,000 square feet of commercial floor area in the shopping center. It's much less than half of what's been portrayed as this 250,000 square foot shopping center. That's not the case here.

It's divided up basically into a linear section in here, broken up by storefronts. The architectural character that will show in some of these images, and included in Section 3 of the EIS -- there's some graphics in there -- basically more in character of what a rural community shopping experience would be.

We're talking about if you drive through Makawao and you see the kind of low rise country style shopping design in there, that's more in keeping with the character in here.

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We also have office and civic space at a total of about 80,000 square feet of space in there. There are nine cottage industry lots in here. Those are roughly 15,000 square feet in the lot size, not the development of the buildings themselves.

Overall, the whole project more than 25 percent of this property is open space. You can see that we have a large buffer area that extends along the Pukalani bypass. This too is in reflection to what the community residents of not only Pukalani, but Kula and Makawao have come to the meetings and said: We don't want this to impose on our

community in terms of a visual change. What we're used to is the open space, the green, and the beautiful Upcountry vistas.

So with the Pukalani bypass basically unaffected by the project with this large open space bands in here, again, over 10 acres of open space in the project, lots of landscaping.

So this cottage industry is, again, with the business commercial and the project district zoning that's going to be applied for with the county, this will really appeal to more artisan, wood workers and the lower scale type of light industry uses that are consistent with Upcountry. They just don't have space for this Upcountry presently.

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Other components of the project, a centerpiece here is the Maui Fresh component. This is basically an opportunity for the agricultural products that Maui Pine represents, of course the pineapple products, but all the other diversified agricultural product that they're reaching into to be displayed here as a centerpiece for both education, information and a product venue site and demonstration gardens in here. So it's a multipurpose agriculture centerpiece of the project here.

The final component here is the senior or multi-family housing. That's another point of clarification that was requested. Through this planning process we've been telling the community, telling the agencies that the honest intent of the owners here is to pursue a senior housing project.

And basically Bob McNatt and Randy Endo have been having discussions with senior housing developers and soliciting proposals so that when the appropriate time comes here they would select the most appropriate vendor to go forward.

Right now it's finding out that it's also quite challenging for many of these senior housing projects to proceed on a financial basis. So this is a process that continues to evolve. There's continuing meetings. They're bringing in specialists from the mainland to look at the

Upcountry Marketplace as well as this particular site.

The intent is to proceed with a senior housing project. We have always talked about multi-family as another option for this property. So it's 120 units of senior housing here or 96 units of multi-family at this location. That's where it stands now in terms of the layout.

In terms of the EIS, for each of these elements whether it's a shopping center, the office, the cottage industry or the housing, we've used the highest potential impact area in terms of the highest number of units to study things like traffic, infrastructure demand and issues like that.

So there is some confusion, I believe, over the different numbers that exist in the report. And I can speak to some of those concerns directly but it's not as being portrayed that this is a 250,000 square foot shopping center that's being proposed here.

Let me just address some of those other points in here to show you a little bit about how the character of

this project is actually portrayed.

Coming along the bypass highway this would be a view across that buffer, landscape buffer area and pasture area looking over towards some of the light industrial. If you know, the water tank is the feature up there. This is a

landmark that stands out. You're basically driving up towards Kula direction. You can see the Maui Fresh facility here, and the horse grazing area in here.

Waiulu Farms is very much interested in utilizing one of the existing Corn Mill Camp buildings which are over in this area here and converting it. It's one of the buildings you would see driving by along the bypass highway, and utilizing this for feed and expanding their stables and paddocks. So we would have some horse activity associated with that.

Along Makawao Avenue, an area that many people are familiar with, if you drive past Pukalani Superette and approach Pukalani Square on your right side as you look mauka this is a future buildout perspective which shows the commercial buildings along the Makawao Avenue frontage, the broad setbacks and landscaping and then back to where there would be -- if I can refer back to these commercial buildings back in here. The principal anchor tenant by agreement here is Pukalani Superette.

So this shows the context of the building and the other stores in here. So it's very much a low impact consistent with the country town design guidelines that Maui County has established and in keeping with the character that Upcountry residents are very much comfortable with and appreciate.

Just another perspective. Looking past where that water tank is from the bypass highway you can see the back of what are the cottage industry lots in here. These 15,000 square foot lots, we would set design guidelines so that each of these structures that are constructed by people coming in and purchasing, leasing out the industrial lots cottage/industrial lots would be constructing buildings that are very much in keeping with the overall character of the project. This is color, design, roof types, heights. All these things are consistent with the overall character of the project and landscaping.

In the shopping area itself this is a perspective of Pukalani Superette in here and some of the adjoining buildings. One of the centerpieces of the plan that I neglected to mention is this village green area in here. You can see the roadway network as it's established. This is kind of a gathering space that's to be a focal point for the entire project.

This is an open space area that's rimmed with Norfolk Pines or other vertical elevation plantings in here so that the community actually would have an opportunity to come enjoy the property.

Different types of events could happen on the property. Community gatherings, concerts, fairs, things like that. It's a gathering, a focal point. This will be

adjacent to buildings that will have civic uses in there.

For instance we have been in conversations --

Owners have been in conversations with Department of Education King Kekaulike High School where they're actually looking at having an off-campus classroom here for some of the different special programs that they're looking at.

Been in touch also with various government and private interests that would come in and utilize some of these civic spaces in here. That gives you kind of an overview of the character.

Just another perspective. The 2-story office buildings in here, and how you can see the roof forms, the details and the architecture and the style. Very much reminiscent of the character of Upcountry Maui rural community character and opening up true vistas to the mauka areas, not obscuring those areas.

That's kind of a quick presentation on the plan. Now I can address some of the specifics on the EIS.

CHAIRPERSON ING: Jeff, just for the record, all of those things you have shown us are part of the EIS.

MR. OVERTON: That's correct. The Chapter Section 3 in the plan in the EIS has each of these renderings included in there. So this has been available in both the earlier round of the EIS in 2002 and this round. We have supplemented it with an 11 by 17 foldout in specific

response to, I believe, Mr. Hall's comments that he wanted additional detailed information on the shopping center elevations and other elements of the project.

So we very much have been responsive to the comments throughout the process, both agency and the community in providing, really, the greatest level of information we have possible.

We don't have design plans for this yet. We are at the State Land Use and community plan levels. We are reaching out and trying to depict as best we can, really, what the buildings will look like in the future.

Some of the other aspects of the plan that I maybe didn't highlight enough is this parcel is surrounded by three major roadways in here: Makawao Avenue, Old Haleakala Highway and the Pukalani Bypass Highway. It's all been circumscribed, and cut off here from the adjoining agricultural areas.

CHAIRPERSON ING: Jeff, before you get any further, sometimes we forgot the questions. Sometimes the Commissioners would like to, while it's still fresh in their mind, if we may ask you a question or two.

MR. OVERTON: Are there specific questions about the plan or the images? I'd be glad to respond.

COMMISSIONER CATALANI: I just have one question about this. I guess you're going on and talk about some of

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the impacts. I just want to be clear that when you're talking about these impacts you're talking about it based upon basically that figure 3.1 from the EIS, based upon that conceptual plan and also I think the numbers you recited earlier would be -- I don't think anybody was speaking in reference to how much the retail space was.

I think we were trying to add up the commercial space. You're talking about in terms of impacts that you're going to address as being 112,000 commercial space; 80,000 square feet of office/civic space; 15,000 square foot cottage industry lots. I guess that's 140,000 square feet?

MR. OVERTON: Well, just a clarification on the cottage industrial. The number that's used in the market assessment, we're obligated to set some numbers as a best estimate.

COMMISSIONER CATALANI: Right.

MR. OVERTON: Just so we can quantify dollars in case of a market study or traffic, or wastewater, water use, those kinds of things. In reality the actual uses on the cottage industry lots are going to vary by which types of businesses come in. Some will probably want more space than others, depending on the type of use. Some may need large spaces for some of their activities and storage. So we can't truly quantify the size of each of those lots. That's why we're a little bit nebulous.

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COMMISSIONER CATALANI: Okay. That's basically -- the numbers you're using to assess your impact, these are what you're expecting to be the maximum numbers. Therefore, that's what you're using to assess your impacts?

MR. OVERTON: That is correct.

COMMISSIONER CATALANI: You also mentioned two different numbers for what they will be -- maybe I just read it -- I can't recall -- for the dwelling units for senior versus multi-family.

Are those considered two equivalent numbers? I think you mentioned, or I read somewhere, that it was 120 senior housing units or 96 multi-family units. Are those equivalent in terms of impacts? How do you get those two numbers?

MR. OVERTON: A couple different points. What we've reflected as a graphic and a footprint on the site.

You're going to have less square foot requirement per unit for a senior project. So that's why the numbers 120 senior could be higher on the same footprint than, say, 96. Is that understandable?

COMMISSIONER CATALANI: Okay. Yes. So my question was are those the equivalent for impact purposes?

MR. OVERTON: They actually aren't.

COMMISSIONER CATALANI: They aren't.

MR. OVERTON: Because when you look at 96 senior

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couples or senior solo units -- it's going to be a mix -- versus -- I mean 120 senior versus 96 multi-family, I would guess that you're going to have a bunch more traffic associated with a 96-unit multi-family versus 120 senior. That's just my guess. So two cars per unit at 96 versus one or less for the seniors.

What we did was actually the traffic engineer ran with an even higher number. 150 is what the traffic engineer used for the 2006 projections.

COMMISSIONER CATALANI: I see that.

MR. OVERTON: So it's actually beyond either of those scenarios just for safety sake.

COMMISSIONER CATALANI: Okay. So when you're addressing the impact in the remainder of your presentation are using those essentially as maximum numbers?

MR. OVERTON: That's correct.

COMMISSIONER CATALANI: Okay. Thank you.

CHAIRPERSON ING: Thank you.

MR. OVERTON: Further questions on the plan?

CHAIRPERSON ING: No. Please proceed.

MR. OVERTON: Okay. What I'd like to do is address point one on Russell's list on here. It is the first page what I wrongly entitled Supplements to the Revised Final EIS. Because it's actually additional information as well as some draft supplements that we have

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been working with Russell on to try to address LUC staff questions.

We hastily assembled this to help as a presentation made and for your guidance today.

So we've keyed it in with page references to the current revised final EIS that you've got in your hand. Page 2-2 is the market analysis section. For some good bedtime reading would be appendix A. of the large volume attached which Tom Holliday and the Hallstrom Group presented.

There's two parts to that study. There's a 2001 July study that was done for the first draft environmental impact statement, and the final environmental impact statement which was accepted by the county of Maui planning department last year. So this document has been through, now, its second full year of review almost.

It was fully scrutinized and reviewed by the county and all the agencies and community groups that have participated in this review last year and reached an acceptance by the Maui County Planning Department who is not always easy to satisfy on these. So that was one gauge of thoroughness.

We have since had to make some revisions for the revised EIS. You now have this pre-final you might call it before you which has underlined text where we are required to bring to the reader's attention areas where we have made changes to the report, additions or deletions to the text.

The market section has a very sizable addition to it. Page 2-3, page 2-4 are some of the larger additions in here.

If I could, again, give just a brief summary on the market analysis. A very large portion of the economic activity in Upcountry Maui is actually draining down into the Kahului and Wailuku big box and other large retail areas that exist down there.

When we look at market demand for Upcountry there is not the services and goods that exist in Upcountry Maui to supply what is the growing demand.

There is a growing residential population in Upcountry Maui and they have needs for basic goods and services as well as more expanded shopping needs. In the Upcountry area there are not the outlets for these goods and services. The demand is being satisfied by the Costcos and K-Marts, and Borders, things, these outlets that exist in the Kahului/Wailuku area.

And a big part of the market demand that we've gone through is basically accounting for what the current demand would be and also looking at the other project in the region which is the Kulamalu Center and how that project will have an effect on projected demand and what the surplus

demand will be at the time that Upcountry Town Center comes to the marketplace.

And the short story is there's tremendous demand that will not be satisfied by both projects. I'll get into some of the details in here. This property is actually an excellent location for expanding a community commercial center.

We're at the crossroads of Upcountry Maui. All the residents of Upcountry Maui that go down the hill have to pass by this location whether their home is in Kula or their home is in Makawao. They're passing by this location. So it is an optimal location from a community commercial center.

And there is significant demand for this neighborhood commercial retail service and office as shown in the Hallstrom studies. They did a July 2003 update to their market study that's at the very back end of the appendix.

CHAIRPERSON ING: Jeff, I'm going to interrupt you. I'm going to call for a break pretty soon. I think Isaac Hall had a comment about you telling us about the project. A lot of the things you're talking to us about we've read. But I think we're concerned with some of the specific details on the adequacy of this EIS report. And the Office of Planning attorney, I don't know if he always

uses that word, but he said this report met minimal standards. So they approved -- in their recommendation they recommended approval. But that kind of stuck, I think, in some of our minds. What is minimal?

"Are we hiding something? Are we not revealing all because we don't trust the public so, therefore, we are going to give the least amount of information or confuse them?"

Rather than maybe going through the marketing in great details, specific, I would say hit those things more specifically that Russell felt that more clarification was needed.

MR. LIM: Jeff, you want to go down basically the list and go bullet point.

MR. OVERTON: I will go just go straight to those items in there.

CHAIRPERSON ING: Let's take a 10-minute break and you can talk with your counsel. Thank you.

(Recess 3:00 to 3:10)

CHAIRPERSON ING: Let's reconvene the Land Use Commission meeting. This is on agenda item A03-740 Maui Land & Pineapple Company, Inc. Jeff, I wasn't, hopefully, rude to you. But more we are not here to discuss the merits of the proposal but the technicalities of the EIS statutory requirements have been met.

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So if you could proceed.

MR. OVERTON: Very good. Let's go straight to Russell's summary of staff comments which is the first page in the supplement that we provided and address the market issue and one of the various specific questions here.

One of the questions that was in Barbara Long's comments as well here: the amount of space provided by Kulamalu.

Page 11 of Russell's report basically summarizes this. It's in our market study as well: 70,000 square feet of business/commercial, 102-bed elder care facility which

I'm not sure is a go but they've talked about it. And then various other uses like Institute for Astronomy, a petting zoo, fitness club. They're basically selling 19 lots in there. Most of them are sold. This is a good indication of demand in Upcountry from the start.

To answer the question of amount of business and civic space and at the Upcountry Town Center our Section 3 does present it, actually, very clearly. On page 3-3, 112,000 square feet various retail and service related components. Bottom of the page office and civic 80,000 square feet office/civic.

Cottage industry. Again, I explained why we don't have an exact number there. I believe it came out that in the estimate, the market study at roughly 43,000

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square feet floor area. Then the senior housing multi-family in there the unit counts of 96 to 120 in there. 10 acres of open space.

In terms of the demand and how the project satisfies this, if you could refer to page 2-4 of the revised final EIS, second paragraph, market consultant provided this new information for us -- if I can just quickly read.

"The currently envisioned use at Kulamalu will not address all sectors of commercial land use demands in Upcountry. The project will have no meaningful retail or light cottage industrial uses for which there's an acute demand in the community. By year 2005 the unmet demand for retail service floor space in the study area will total some 76,000 square feet."

For light industry that number is over 140,000 square feet. So some very specific detailed calculations in the projection done with now, as of, I guess it was October of this year, this month we had the latest up-to-date figures from Kulamalu which, as an aside, it's been an evolving project. It's gone in different directions.

We now have what is the presale numbers from the lot sale has been very -- a good indication of strength of the market up there.

The types of civic uses. I think I addressed that

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briefly. Randy, do you want to offer any specifics on the civic uses?

MR. ENDO: Sure. Just very briefly. We've had discussions with various county officials as well as the Department of Education. Some of the concepts, they're very preliminary at this stage. But we are just discussing it and trying to get moving forward. Some of the concepts would be a satellite city hall as one of the uses.

Another would be community meeting rooms. Another one we discussed with the Department of Education would be an alternative learning center which is currently located at King Kekaulike but which they're trying to move it offsite because that's the way they usually try to do those programs.

Our site right next to King K makes it an ideal situation. They can still go back to school, get equipment, lunch, or whatever and still be offcampus. Those are the types of civic uses we have preliminarily envisioned at this point.

MR. OVERTON: Thanks, Randy. If there's any

further issues on the market questions we'd be glad to respond, otherwise we'll move into the housing. Yes, Commissioner Montgomery.

COMMISSIONER MONTGOMERY: On the market have you given any thought to competition between nearby shopping

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centers keeping the rental prices low for, the lease rates low in case in fee the cost a shopkeeper would have to pay his overhead, how that might reflect in lower prices for consumers?

I haven't seen any of that sort. I know that's been an issue in the past with the days of the Big 5, just a company store, no competition allowed in some communities.

MR. OVERTON: You raise a good point. When we had the community meetings, this came out several times about the concern about local vendors and whether they could, No. 1, afford to come into Upcountry Town Center to operate their shop there and expand possibly.

And we have had very successful talks with a number of different people in the community.

There's also this maybe unfounded fear that competition is going to stifle or diminish the other businesses in the neighborhood in the Pukalani services core. Actually the market study has found that the increase in business activity and traffic as a result of Upcountry Town Center is actually going to have a net positive effect on the businesses in the direct community there in Pukalani. In terms of lease rates I'm, I don't have that specific information. I'm not sure if the owners can address that at this time because we're so early.

I'd like to say we've expressed to the community

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as well as the commercial interests that we are trying to achieve rates that are affordable to them in the community to be able to occupy and become apart of this center.

Pukalani Superette is a principal anchor of the project. And that's a tremendous upside to the project. That's really a local store. And it's something the community appreciates. I hope that addresses your concern.

COMMISSIONER MONTGOMERY: Thank you.

MR. OVERTON: The next issue on Russell's list is a discussion on the senior/multi-family residential. Just to clarify, page 3-4 in our project description on the middle of the page we've got a couple paragraphs in there that basically talk about the residential project.

And I've not talked about this much but it is really a smart growth type of project in that we're clustering near the existing urban community rather than sprawling out away from and separate from the existing urban areas. That's what this residential center is. We have six to eight acres parceled that's dedicated up in this area here set back from the highway. We are looking at 96 multi-family or 120 senior in here.

Again, the commitment that I've been directed to express from the owners is that they're very much committed to making a senior project happen here if it can pencil out. So we're working with the big senior housing developers to

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come up with a project that fits in Upcountry here.

In terms of subtypes, Bob has had the most direct

experience with who might be coming in, whether it's senior independent living or assisted living or skilled. I don't think we have made a real decision there on how that's going to go. It's going to depend on what the vendor comes in with.

Do you want to express any comments in that area?

MR. MCNATT: Mr. Chairman, members of the Commission, we have had detailed discussions with a company called Regency Pacific. They've toured the site and had -- we're very close to entering into a deal -- not a deal but at least a detailed discussion to proceed with something once we had entitlements about a year or so ago. Then the market softened. It became very difficult for them to obtain financing.

They're doing a very similar project right now on Kauai at Grove Farm. We were trying to model our project after that, very low key, very residential looking. We're still hoping to do that on this site either with Regency Pacific or some other senior development company.

CHAIRPERSON ING: Is the fact Mr. Case is involved in both companies play a factor?

MR. MCNATT: I'm sorry, I couldn't quite hear you.

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CHAIRPERSON ING: I'm not sure if Steve Case being the --

MR. MCNATT: Oh, no. There was no relationship at that, between the two as far as Steve Case owning that company and 43 percent of our company. There wasn't really a connection. It was a coincidence but a very nice coincidence. Fortuitous.

MR. OVERTON: Any further questions on the senior housing? Okay. Moving along with Russell's list here. We'd like to discuss the water supply and water-related issues.

If you could refer to page 3-11 of the EIS we have an expanded discussion that is a result of some evolution in this issue since the 2002 EIS came out where Maui Land & Pine is working with the Maui County Department of Water Supply to look at this requirement for the Pi'iholo well site.

The project will need to develop a new water source to supply its needs for the commercial and residential and cottage industry uses here.

The woman who gave the testimony here is correct in that there is a huge unmet demand for new well meters -- water meters in the Upcountry region. That has a certain amount to do with -- it's a little bit complicated. This water issue in that water supply Upcountry is met by a

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combination of well sources and surface water. During dry periods the surface water reduces the overall reliability of the system.

I think, to a certain extent, the Department of Water Supply has been unwilling to proceed with new meters in that regard because the system doesn't have enough buffer in it. And they have to play it very cautiously in terms of water supply.

So one of the great things that a new well will offer here is not only water supply for this new community commercial and mixed use project here, it's also going to

provide some more supply into the system, reliability for a new well, very dependable source that can be tapped upon.

Now, the actual needs are not so great that this well needs to be pumped 24 hours a day. I think the initial projections here are about 16 hours a day for pumping requirements.

Application's yet to be filed. They're still in discussions on this. Not only will the county be involved but the state Commission on Water Resource Management is going to be involved in the permitting for this new well.

So one of the true benefits that will result is that the project will get water, the community is going to get more water. We can't quantify a certain GPD allocation here. But what it will do is afford this buffer, this extra

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layer of source in the system and the county. And this is undoubtedly going to allow for some of these pending meter requests to be filled, the additional reliability.

The source -- the requirements of the project, 150,000 gallons per day roughly on a average daily demand. This well is going to have more than double that capacity in terms of production. So this is going to be a real plus for the Upcountry community in terms of meeting the needs that exist today for new meters.

There is a groundwater study that was done specifically for this Pi'iholo well project. And we did this study to comply with the Office of Environmental Quality Control guidelines for new water well development. It's a requirement that an EIS and cultural assessment, botanical wildlife assessment, it's a portion of this overall EIS addressing the new well.

I didn't talk too much about it before. But there is a full report in appendix H which is about midway through the phonebook-sized Volume II. This is prepared by Tom Nance, Water Resource Engineering. It's the latter part. The original part was prepared for the earlier EIS. The Tom Nance report from July '03 highlights the development of this Pi'iholo well site and its relationship to the Po'okela well.

As the woman testified earlier there would be a

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concern possibly that these wells because they're both in Upcountry, would have a potential interrelationship of some impact. Actually, the Nance report concludes that this new well will have no affect on the production capacity of the existing Po'okela wells that the county has there. So that's good news in terms of full information there.

In terms of the cost of the water, logically we don't have a full analysis of that in the economics of it in here. These two wells are at the same elevation. So that when the Pi'iholo well, the new well that Maui Land & Pine will be developing is put into production, dedicated over to the county, the cost for drawing the water from the new well is going to be roughly equivalent to the Po'okela well. They are at the same elevation. They have to drill and lift water from the same dike. So same same. There's just more of it, more reliability.

Any other questions on water? Yes, Commissioner Montgomery.

COMMISSIONER MONTGOMERY: I'm glad to hear you address the cost factor which Ms. Raisbeck had brought up

and expected to increase the cost of water portioned out among the other users in the community.

Because it gets wetter and wetter as you move in that windward direction, are there alternatives that you could consider such as horizontal wells, directional

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drilling that would go in more of a windward direction to avoid the energy cost of lifting water from 2,000 feet below the well site?

MR. OVERTON: I'm afraid I don't have the technical expertise to address that question. I would say during the petition review process we will have Tom Nance here to testify fully. They can address that aspect. I think if there was a less expensive and more reliable way to produce the water, Tom is the best in the water business. He would have prescribed that.

COMMISSIONER MONTGOMERY: Thank you.

MR. OVERTON: Let's move on to the roadways, parking and circulation comment. You know, this area of the project down here at Makawao Avenue has raised some attention in that it fronts directly on Makawao Avenue. It's proposed that diagonal parking be set up in here so that if you're coming in the Makawao direction you would be pulling right into a diagonal space parking frontage in here with adequate spacing so that the reversing in and out of the stalls would not conflict with Makawao Avenue traffic.

There's actually a problem with that at Pukalani Superette right here. Occasionally there's conflicts because there are actually perpendicular parking. And I believe they're actually going to be transitioning to diagonal parking in there.

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Again, this is a concept. A big part of the concept is that we're not trying to create a super highway commercial frontage here. We're actually trying to slow down traffic so that the Upcountry character and feeling of the community is pedestrian friendly; that it has this low key Upcountry atmosphere retained.

So, if anything, we'd encourage slowing traffic along this stretch so the people can come back forth, in and out of the community, safe travel for this. Thank you.

And one of the issues here is going to be dealing directly with the County Department of Public Works and Environmental Management. Because what we will need to address is the safety standards here.

And how the parking is designed, whether there's a physical separation with some kind of a curb, landscaped curbing or something like that it's a little early in the process. As we go into the rezoning project district and design phase of the project we can actually address that more specifically.

There's about 50 parking spaces that front these commercial spaces in here. They're also accessed from the higher, upper elevation parking in this side. So there's two ways to get to these stores.

Whether or not this one element of the project design survives, I think it will come out in the design

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review. But foremost we're interested in traffic and pedestrian safety there. That would be the foremost

concern.

CHAIRPERSON ING: Jeff, several times you've mentioned project district zoning concepts. I think for the Commissioners who are not from Maui maybe you can explain a little bit of that. To me it's a method of providing more control over the development and more input from the public. Maybe you could expand more briefly on that.

MR. OVERTON: Thank you, Commissioner Ing. Maui County has special category zoning which is called project district zoning which allows an entire development area rather than be parceled up into just commercial here, just light industry here, just business here, open space there, they view the entire overall composite of the project.

This does allow for you to basically specify we will have 12 acres of commercial in this project, 8 acres of housing in this project. And then look at flexibility in the design and the standard so it can be a little more creative, higher quality and offer some flexibility and it's not rigid in just zoning blocks.

Where, in Honolulu we draw a line and that's a surveyed metes and bounds line. You can't vary across that line. So it does, as you mentioned, Mr. Chairman, offer some flexibility. Maui County is kind of ahead of the curve

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there in that aspect. It's been implemented well throughout the county. We will be applying for this. It's a multi-step type of zoning.

CHAIRPERSON ING: Explain the multi-step part.

MR. OVERTON: We're in the project district Phase I, you would call it. That's applied for concurrently with the community plan amendment and the zoning. So there's actually three county approvals pending.

The applications were filed last fall and put on hold when the EIS snafu came up. Project district I deals with the concept and the rough areas and sets forth on the ordinance what the specific areas and uses will be.

So there's actually a draft project district ordinance that was submitted with the project district Phase I submittal. Goes along with the zoning.

Phase II the applicant has to submit much more detailed plans for the types of structures and how the infrastructure is going to go in. It's almost like design level cost information, gets into the very specifics of it.

Bob has an even better working knowledge of this. I don't know if you want to chime in. It allows this multi-tier type of review that allows an applicant and developer to take it in logical steps. So you approve the concept, then you go into some of the details and you approve it in separate steps. Eventually it comes up with

a --

CHAIRPERSON ING: I think if I may add in Phase II requires Planning Commission approval. Phase III when you get to the final thing requires planning director approval. It's just one of many steps that the developer, I guess to get his project district zoning, sacrifices where there's more overview by government agencies.

MR. OVERTON: Correct.

CHAIRPERSON ING: So far it's worked out well in Maui County. Sorry for the interruption.

MR. OVERTON: That's fine. If I could flip this

graphic up and show you a -- speaking of Maui, Chris Hart is the landscape architect working on the project. He helped us prepare this conceptual landscape plan for the project. And this shows some of the trees. The reason I bring this up is really on Russell's next point which is the pedestrian and bicycle access.

The size of the pathways; relationship -- well, the size of the pathways will probably be a design issue whether they're 6 feet, 8 feet. I think that will probably come out -- size is going to relate to safety and the capacity.

We're dealing with a couple things here that are sensitive. King Kekaulike High School up here, the kids live down here. So those that are taking bikes or walking

to school have been transiting the edge of this pineapple field over the years. There's actually a ditch that follows Old Haleakala Highway here. The project will be culverting the ditch, covering it over. Of course we are going to be providing the trails and sidewalks on the project. The connection with the school here is going to be critical.

We are also going to be working with the Department of Transportation at the state level as well as the county for Old Haleakala Highway to satisfy safety design for the crosswalks and signals and signage to make sure this is an absolutely safe crossing for the children as they're coming through this area and using it.

We're encouraging bicycle and pedestrian use of the project and tying it in with these transportation issues.

It's probably pretty hard to see, but in these jacaranda and koa trees in here it's kind of a winding, meandering path. This is not going to be a hard urban sidewalk up-against-the-curb kind of design. We are intending to pull it back from the sidewalk as you saw in the renderings, back from the curb, kind of have this meander through the vegetation.

But it would still be wide enough so that a couple of bicycles could pass by. And it will be safe for the kids to transit. There's also an Upcountry greenways

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project that has horse riding trails and mountain biking that can connect all through here. This is all part of implementation of the Upcountry, the Makawao Community Plan for up in this area.

So we have trails that extend in through here. I talked about the horses with Waiula Farms and pasture. So trails are a big part of it as are these pathways. And they link up with all these adjoining communities.

And safety too in terms of the pedestrian access out of the community. We expect people from Pukalani to be able to walk to this place and not be vehicle dependent to come up and shop or enjoy the village green and other amenities there.

I hope that answers, clarifies the question on the pedestrian access. Okay.

Section 5. Russell was very thorough in working with us in evaluating the Chapter 205 and Chapter 205A responses in the EIS. If we could turn to Section 5 of this pre-final, page 5-1 and page 5-2 are kind of the subject areas here that we are talking about.

On page 5-1 you see Section 521 State Land Use Districts Chapter 205. When we submitted this on October 13th to the Land Use Commission staff, they basically said: You guys really need to flesh this out a bit. You need to put some more attention on what is the

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Urban District standards under the Land Use Commission rules. What are the standards that need to be met by a parcel that's proposed for redesignation to urban out of agriculture?

So in your supplement here -- I have a lot of handouts for you. Sorry. It's past the letter from King Kekaulike High School, which is worth reading. We included this from last fall. They basically raised some of the same issues on safety and use of the project for their classroom idea.

First insert is this page 5-1, Section 521 State Land Use Districts Chapter 205. You did get a little bit of a report from Russell during his presentation or during one of the questions, I believe, that addressed whether this was an adequate fleshing out of a response to the objectives and standards of the reclassification standards here.

Russell is the ultimate gauge of that and Tony. We have gone through a couple of iterations of this with staff. I believe we've met the test in terms of adequacy here, very substantial fleshout here.

This is a 3-page insert that will go into the final EIS in this section right here, all underlined, unfortunately. So it's going to be a little hard to read. Basically it spells out the fact that the standards are such that you need to be a site that's adjacent to an existing urban area. That's one of the key aspects of this.

I hope that in the presentation that it was apparent that we're next to a commercial area along Makawao Avenue, really the urban developed portion of Pukalani community along the two sides of the projects.

Some of the other details -- I don't want to read this to you or go through the details. But essentially I believe we have met the test here, the standards in terms of satisfaction for Urban District on this property.

And I'm open to questions here if you would like.

Q. (By Mr. Lim) You've also done a similar submittal for the Coastal Zone Management discussion in HRS Chapter 205A, correct?

A. Correct.

Q. That's the insert 5.24 that you have in the supplement presented.

A. That's correct.

Q. Okay.

A. Three pages ahead. The whole state is officially in this Coastal Zone, so we need to address relevant policies of coastal zone management objectives and policies. We have responded to these.

Russell and Tony have had a chance to take a look at these, second round here. So I think we're in pretty good shape on these. This is another six pages or so that

will go into the final EIS here in terms of meeting the consistency with the objectives and policies under 205, and

205A. Any questions on the policies and plans here?

CHAIRPERSON ING: No. Continue.

MR. OVERTON: Great. Going down Russell's list further is the solid waste question. This is page 6-16 Section 6.2.13. It's a small section of the EIS. Basically we were taken to task in terms of our study on solid waste impacts of the project. What will be the impact of the project on the Central Maui landfill essentially?

We scrambled and talked to John Hurd's office in the solid waste and got some additional information here as well as looked at some of the recycling potential for the project and how we can actually reduce that waste stream from the project.

So this page here, next to the last page in the supplement is basically our input on this solid waste question. It gives you up-to-date information on what is the capacity of the landfill under the Phase I segment and the proposed Phase II segment which will add between 5 to 10 years of life to the landfill and another 250 million cubic yards. That's a lot.

Basically in terms of the project itself we were very specific here. We quantified the waste stream from the residential component and the retail commercial component.

There's quite a range, as high as 1500 cubic yards of waste each year contributed.

But one of the things that's been proven really successful is that 30 to 40 percent or more of this waste stream can be diverted by just taking care of the cardboard. These places have so much packaging that comes through. You see these large containers that are next to the big box stores and all.

They segregate the cardboard from the waste stream, and collect that separately for recycling. That can have an impact of 40 percent. Some are saying even more. So that has a huge impact. On the high side we're looking at more like 900 cubic yards per year from the retail commercial center.

That's the biggest component of recycling here. Maui Land & Pine will most likely have to put that into the lease conditions and such for the vendors so that they implement this system-wide across the whole project.

In terms of residential component it will vary depending on whether it's a senior or multi-family project. Kind of a sad story is that these collection bins you see in residential projects have a very small overall impact on the waste stream, something like 1 percent for the bottle bins, and papers and plastics.

Where they make the best impact on the waste

stream is actually collecting and segregating the green waste. This has been promoted a lot in recent years. Around 20 percent of the waste stream can be diverted by segregating separate collection.

Here it's going to be a little different. Because if it's a multi-family type of project it's likely to be a single maintenance operator in here that comes and takes care of the yards.

So that -- all the people that are managing the landscaped areas here on the project are going to be following pretty strict guidelines in terms of recycling of

green waste material.

Whether we do other things to reach out into kind of a community recycling, I think that's another area where we can actually help the Upcountry community in terms of a collection point for some of these other recyclables. It's a great opportunity here.

In terms of the overall number Russell made me go all the way down to the bottom and get a percentage number. It's something like five parts in 100,000 in terms of the annual impact on landfill capacity. It's not zero. But it's relatively small in the overall picture here.

And the impact of recycling, as I mentioned, can be significant. I hope we fleshed that out enough to kind of do that justice.

Any questions on solid waste? Okay. The last point on Russell's list that was brought up is the adequacy of the alternatives section. You know, even going back to the first round of this EIS in 2002 we're actually pretty sensitive to this concern.

This alternatives section is now about 8 or 9 pages long. 8 pages, soon to be 9. What we're going to be adding to this alternatives analysis to make it more robust and thorough is this matrix sheet which is the last page in this supplement handout. And if I could just pop it up here. Probably easier to see it straight away there. This is kind of the --

CHAIRPERSON ING: We can read it. You don't have to read it to us.

MR. OVERTON: I'll give you a quick overview.

CHAIRPERSON ING: No. Any questions? Okay.

You're done?

MR. OVERTON: There were a couple other points that Russell raised but I don't need to go into them if it's not necessary.

CHAIRPERSON ING: Steve, next witness, if any?

Q. (By Mr. Lim) I'll just touch those issues since it was an OEQC comment. These were comments submitted very late, probably yesterday. OEQC staff inquired on the plans for the, how you're going to address the DOE fair share

requirements was the first one.

Could you explain to the Commission how that usually comes about and the relationship of that requirement to the project as proposed?

A. Okay. With the senior housing project I don't think we're going to have any school-aged children generated by the project. I would doubt there's going to be a DOE fair share requirement on a senior project.

If it becomes a multi-family project in the event the senior project just didn't come together, then the developer would have to satisfy a fair share requirement because there would be school-age children generated by a project such as that. And the developer would have to comply with the formula standards on the per unit cost for that.

So in addressing OEQC's comment: Senior we're not anticipating it. Multi-family, yes, we would comply.

Q. Last issue raised by OEQC is the status of the State Historic Preservation Division confirmation of the archaeological clearance of the property.

A. Okay. There are several letters that are in the final EIS in the back. I don't know if we want to go and read Historic Preservation letters. But essentially, the property has been fully assessed in terms of an inventory, archaeological survey as well as the cultural assessment

that's now a requirement for all of these EISs.

And both of those studies were reviewed in this process. And we did receive some comments during the initial EIS go 'round. And we satisfied them in terms of the State Historic Preservation Division.

There was a cultural, an archaeological survey done for the well site. That's in their hands now. They're saying that they're going to hold their formal review response until the application is -- for the well has been submitted. So the well application is being submitted and that will be reviewed concurrently.

So we have met the requirements in terms of archaeological and cultural. There were no findings, by the way, in this survey of the well site, both archaeological and cultural. So we're not anticipating any problems. We have been working closely with the State Historic Preservation Division on this.

Q. Thank you. So I guess last question is in your opinion has the final EIS presented to the Land Use Commission today, plus the supplements and expanded discussions you've just discussed, meet the test for sufficiency for a final an EIS?

A. Yes, they do.

CHAIRPERSON ING: That's a self-serving question.

THE WITNESS: Go another one?

MR. LIM: I always like those. No further questions.

CHAIRPERSON ING: Questions by the Commissioners to any of the Petitioner's witnesses? Okay. Seeing none, I'm going to ask Tony as our executive, in reading over the staff report I had noted there was no recommendation made for approval or rejection. We've had Russell's report and request for clarification.

Based upon the public testimony, based upon the input and responses from the Petitioner, do you now have a recommendation?

MR. CHING: Chair, the reason there was no recommendation was, again, as we had raised issues for clarification and had raised the need for more detailed discussion and/or added items in 5 and 7 we did not provide a recommendation.

However, at this time having heard the testimony plus the presentations by the Petitioner's representatives I could go down and itemize what I thought. But the bottom line is subject to the clarification that was provided and is before us today, the staff would recommend that from a quantity of information with a standard of completeness and technical adequacy that the EIS does meet that standard.

CHAIRPERSON ING: Thank you. Any questions by the Commissioners to staff or to Tony? I'm going to ask for

the pleasure of the Commission for a motion either way. However, before I do I would like to ask staff that whatever

we have in our file that it be readily made available to members of the general public who make requests of such material.

MR. CHING: Chair, with respect to that, if any member of the public ever makes a request for information that is in the public record we're obliged to provide same with a reasonable photocopying costs that might be associated.

Given the discussion this morning it's my suggestion that, perhaps, to enhance, to further enhance our efforts in that area to disseminate information that I make a request of the Petitioner or any party to proceedings such as this requesting wherever possible PDF files or portable document format files from the same. And that at the appropriate time ensuring that they are posted at our website.

This would give opportunity for interested parties who can follow at our website individual dockets that they would have access without having to come to the Commission and within their own confines and subject to their capacities that they would have access to that same information.

But direct answer is certainly information should

be provided or access to public record at all times and we'll do our best to meet that challenge.

COMMISSIONER COPPA: Great.

CHAIRPERSON ING: Thank you. Then for the record, after consultation with our Deputy Attorney General we were advised that the procedure that we had followed did comply with the laws.

Okay. Again, what is the pleasure of the Commission? Steve.

COMMISSIONER MONTGOMERY: I have one more question about agriculture. But I'm also wondering since we have so few members who live on Maui, Maui County on our Commission, I wonder if it might be better for Vice Chairman to Chair this so you can more fully participate in the discussion.

I've enjoyed hearing you laud the Maui County tiered review planning process and how well it's serving, and getting an explanation from Mr. Overton. I'd like to hear more from a Maui resident's perspective on what's happened. This is not really as simple an item as it might have appeared on the surface.

So I'm not requesting that you give up the Chairship right away. But I just want you to feel free to do that if you somehow feel constrained of giving your opinions. Because I for one would like to hear your

opinions about this docket item.

Now, having said that, while Mr. Overton is still sitting there, I recall some years ago reading in the press accounts when Castle & Cooke changed hands and the new owners said: On the island of Lanai there would be pineapples forever.

History hasn't borne out the steadfastness of that opinion.

But I'm a little concerned to read that due to lack of economic viability in farming for this site -- and you refer to the cutting off of this parcel by the bypass

road that was built nine years ago -- I wonder if representatives of Maui Land & Pineapple are prepared to say anything more about their commitment to pineapple and to agriculture even while they're cutting back here and a few other places on some of these smaller parcels?

Because there's going to be a cumulative effect on agricultural viability. You will notice that I'm wearing a shirt with a pineapple today. I'd like to hear a little bit more on that subject.

MR. MCNATT: Mr. Chairman, Bob McNatt again, if I may. We just had a new CEO start about a week and a half ago, David Cole. The first thing he did when he started he gave a speech to an agricultural conference in Honolulu last week.

Part of that was his history of agriculture, his own farms that he operates in Virginia, and his experience with diversified ag, organic ag, so forth and a very successful program in cross-breeding Kobe beef with Black Angus which seems to be very successful.

He has told us, and he's only been onboard about a week and a half, but he has told his staff that he is absolutely committed to agriculture on Maui and within our Company.

We're looking at various diversified ag crops we can do on the west side as we downsize pineapple on the west side for various reasons. We haven't even ruled out the possibility of expanding pine on the west side because of the trucking costs. But up until he came onboard we were considering that as one of our major strategies. Now we are not sure about that.

We're also looking at the possibility of cattle operations on West Maui. Upcountry we're still very committed to pine. And we have just recently completed a brand new fresh pine packing plant in Hali'imaile.

We intend to make that a profitable operation as we go from the champaka variety of pineapple into the hybrid, the very sweet, very marketable and very high margin pineapple crop.

So we're very committed to agriculture and to

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pine on Maui and hope to be in that business forever.

COMMISSIONER MONTGOMERY: Thank you very much. It's good to have that on the record to look forward to.

CHAIRPERSON ING: Thank you. Any other questions, Commissioners? Okay. The Chair entertains a motion.

COMMISSIONER CATALANI: Mr. Chair, I move to accept Maui Land & Pine's final environmental impact statement for reclassification of approximately 40.6 acres of land from the state Agriculture District to the Urban District in matter A03-740.

CHAIRPERSON ING: Thank you. Motion is made.

COMMISSIONER COPPA: Second.

CHAIRPERSON ING: Second by Commissioner Coppa. Discussion? Seeing none, I'll ask the executive officer to poll the Commissioners.

MR. CHING: Commissioners, on the motion to accept the revised final environmental impact statement submitted by the applicant: Commissioner Catalani?

COMMISSIONER CATALANI: Yes.

MR. CHING: Commissioner Coppa?

COMMISSIONER COPPA: Aye.

MR. CHING: Commissioner Montgomery?

COMMISSIONER MONTGOMERY: Aye.

MR. CHING: Commissioner Yukimura?

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COMMISSIONER YUKIMURA: Yes.

MR. CHING: Commissioner Fiesta?

COMMISSIONER FIESTA: Yes.

MR. CHING: Chair Ing?

CHAIRPERSON ING: Yes.

MR. CHING: Your motion passes. You have six yes and two absent. Chair, point of clarification. The motion to accept, does that, as revised and offered by the applicant?

COMMISSIONER CATALANI: Yes, thank you.

COMMISSIONER COPPA: Based on your recommendation.

CHAIRPERSON ING: Yes. Our understanding it takes into account every presentation in writing as well as verbal.

MR. CHING: Thank you.

CHAIRPERSON ING: Thank you all. Thank you for your participation. We will reconvene at 8:30 tomorrow morning for 5 minutes -- for 10 minutes. Our only agenda item was election of officers till tomorrow morning. That's the agenda item.

MR. CHING: The sole remaining agenda item.

CHAIRPERSON ING: And no proxies. We can postpone it. Randall and Pravin are not here. Randall asked we postpone it.

COMMISSIONER FIESTA: Mr. Chairman.

CHAIRPERSON ING: We're going back to agenda item III election of officers.

COMMISSIONER YUKIMURA: Mr. Chairman, I move that we retain the same slate of officers with the addition of Commissioner Coppa as a vice-chair.

COMMISSIONER FIESTA: Second the motion.

CHAIRPERSON ING: Motion been made by Commissioner Yukimura, second by Commissioner Fiesta to maintain the same slate with Bruce Coppa replacing Stan Roehrig as the second vice-chair and the other vice-chair is Roy Catalani. Discussion?

COMMISSIONER FIESTA: Question.

CHAIRPERSON ING: All those in favor of the motion signify by saying aye. (Aye.)

COMMISSIONER COPPA: Thank you.

CHAIRPERSON ING: Thank you for the vote of confidence.

(Proceedings concluded at 4:20 p.m.)

CERTIFICATE

I, HOLLY HACKETT, R.P.R., C.S.R. in and for the State of Hawai'i, do hereby certify;

That I was acting as shorthand reporter in the foregoing LUC matter on the 23rd day of October, 2003;

That the proceedings were taken down in computerized machine shorthand by me and were thereafter reduced to print by me;

That the foregoing represents, to the best of my ability, a correct transcript of the proceedings had in the foregoing matter.

I further certify that I am not counsel for any of the parties hereto, nor in any way interested in the outcome of the cause named in the caption.

DATED: This____day of______________2003

____
HOLLY M. HACKETT, R.P.R., C.S.R. #130
Certified Shorthand Reporter