

# **APPENDIX B**

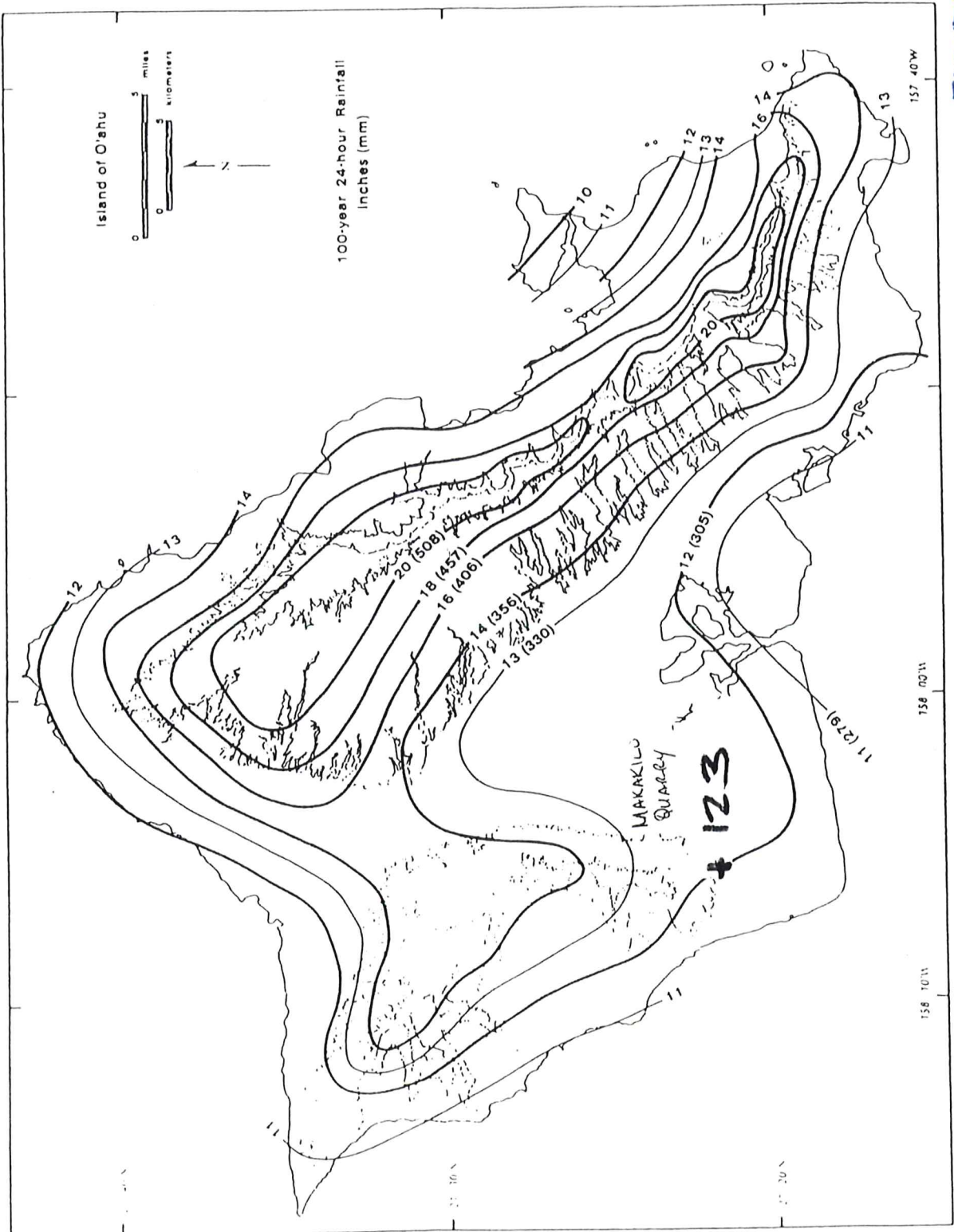
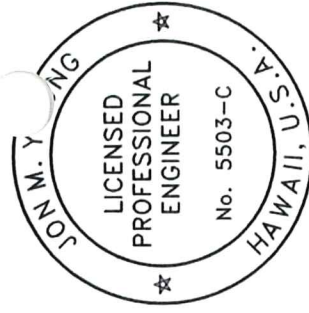
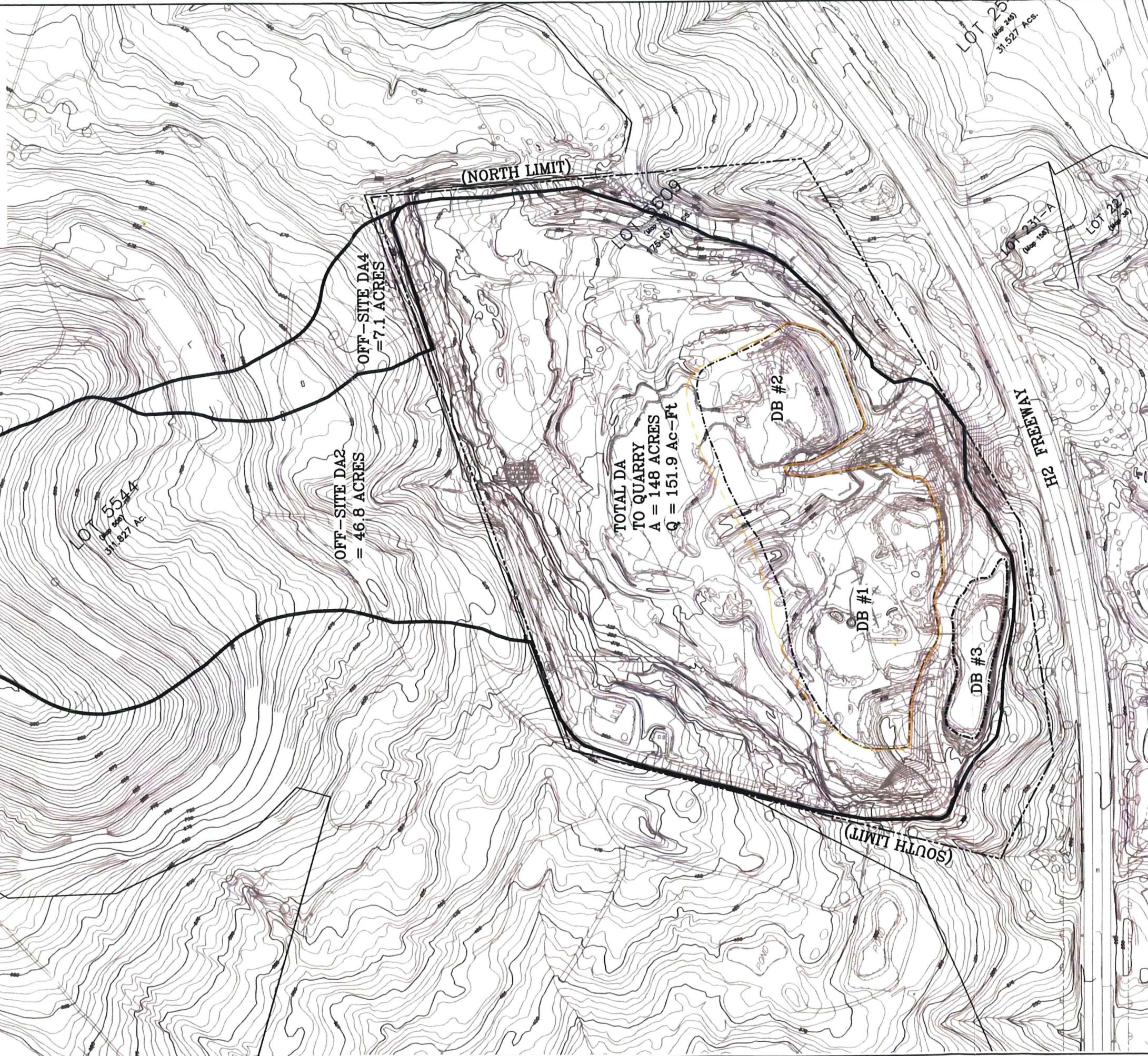


FIGURE 1

Figure 18. Map of 100-yr 24-hr rainfall, O'ahu, Hawai'i



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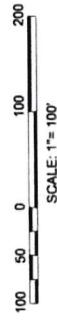


EXISTING DRAINAGE

FIGURE 2

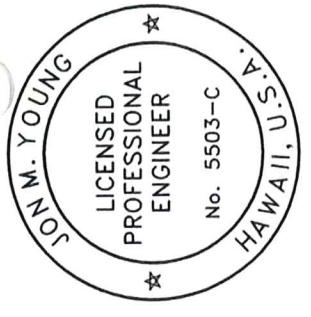


MAKIKILO UPPER QUARRY  
DRAINAGE MAP

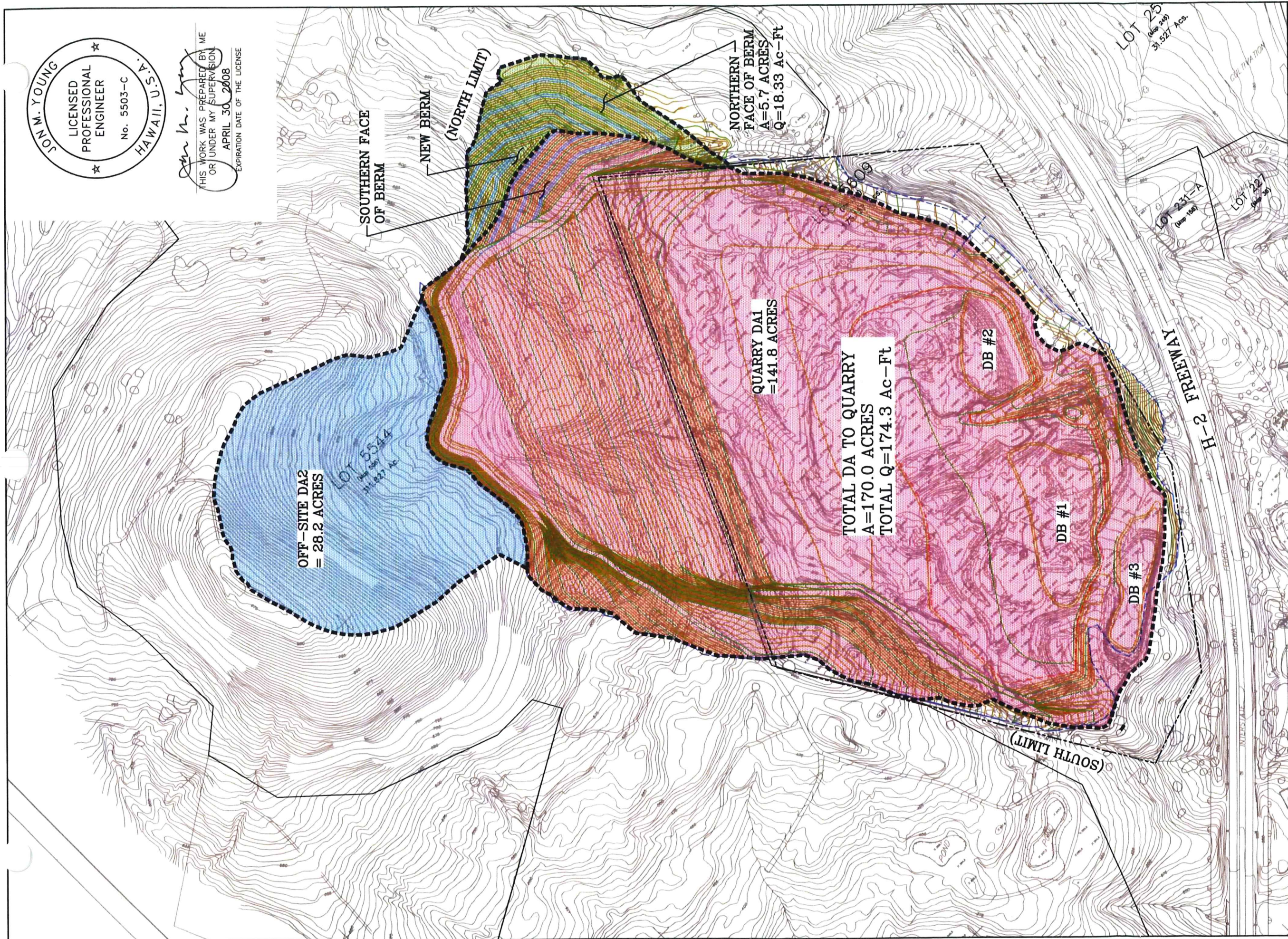


Prepared for:  
GRACE PACIFIC CORPORATION  
P.O. Box 78  
Honolulu, Hawaii 96810

Prepared by:  
BELT COLLINS HAWAII, LTD.  
2153 North King Street  
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Honolulu, Hawaii 96819  
October 26, 2006



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OFF-SITE DA2  
= 28.2 ACRES

LOT 25  
31.527 AC

SOUTHERN FACE  
OF BERM

NEW BERM

(NORTH LIMIT)

NORTHERN  
FACE OF BERM  
A=5.7 ACRES  
Q=18.33 AC-Ft

QUARRY DAI  
=141.8 ACRES

TOTAL DA TO QUARRY  
A=170.0 ACRES  
TOTAL Q=174.3 Ac-Ft

DB #2

DB #1

DB #3

(SOUTH LIMIT)

H-2 FREEWAY

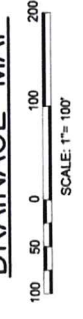
LOT 25  
(Map 249)  
31.527 AC

LOT 231-A  
(Map 156)

LOT 227  
(Map 156)



MAKIKILO UPPER QUARRY  
DRAINAGE MAP

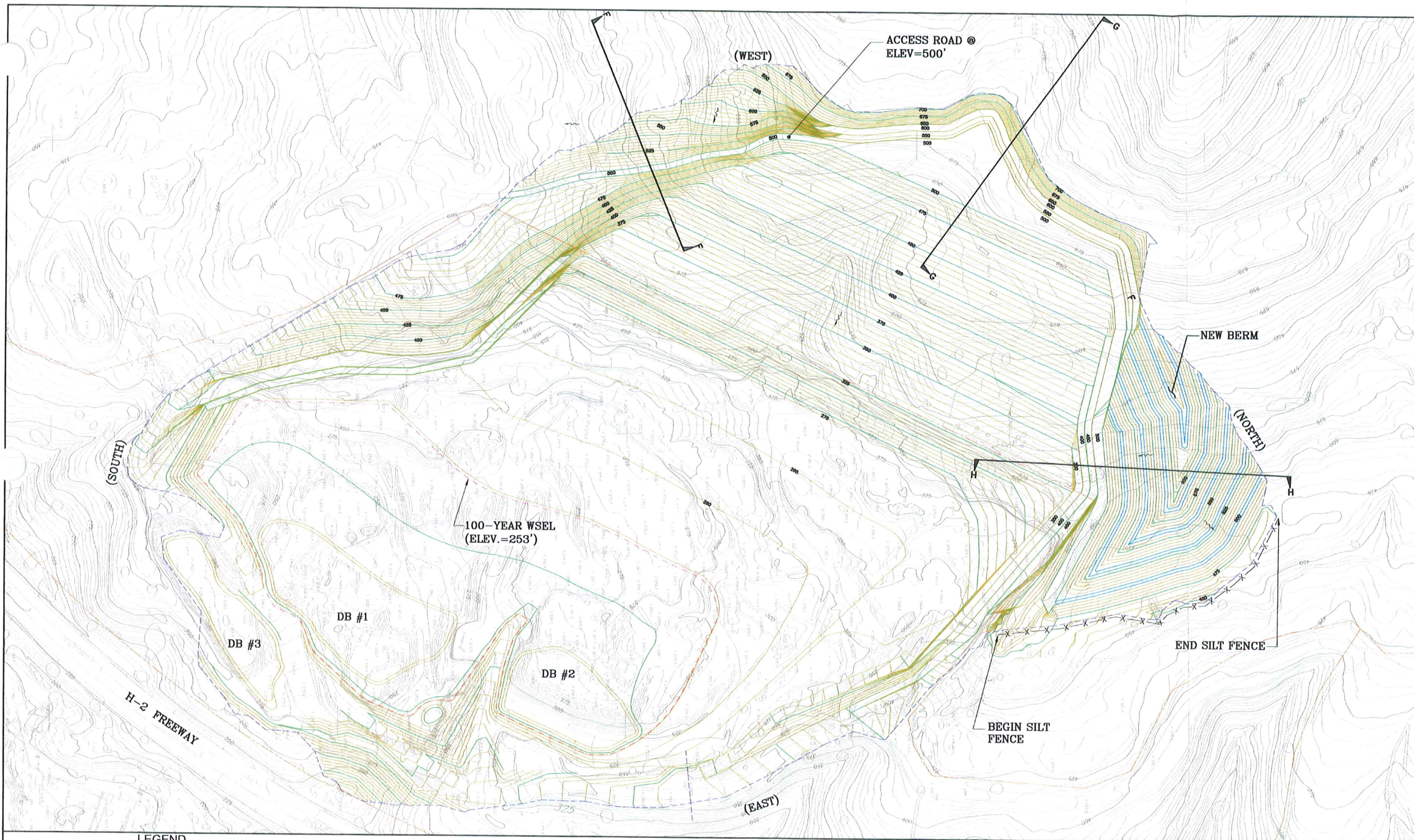


DEVELOPED DRAINAGE

FIGURE 3

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October 26, 2006



**LEGEND**

	STATE R.O.W./PROPERTY LINE		325 25 FT. EXPANSION CONTOUR
	LIMITS OF GRADING		205 5 FT. EXPANSION CONTOUR
	EXISTING INDEX CONTOUR		500 25 FT. BENCH ELEVATION
	EXISTING INDEX DEPRESSION		BERM BENCH LOCATION
	EXISTING INTERMEDIATE CONTOUR		SECTION LINE
	EXISTING INTERMEDIATE DEPRESSION		



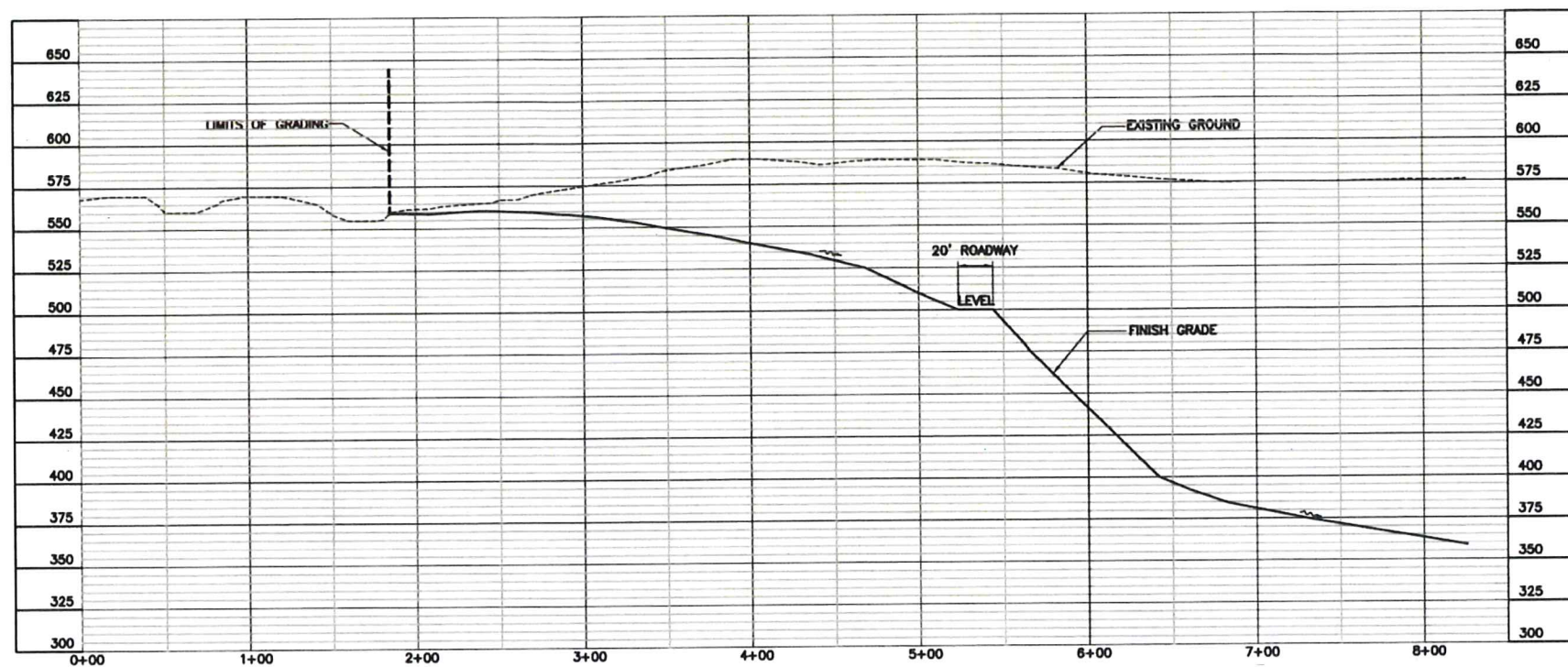
**OVERALL SITE PLAN**  
**MAKAKILO QUARRY**  
**QUARRY EXPANSION**  
 Tax Map Key 9-2-03 74 & 82



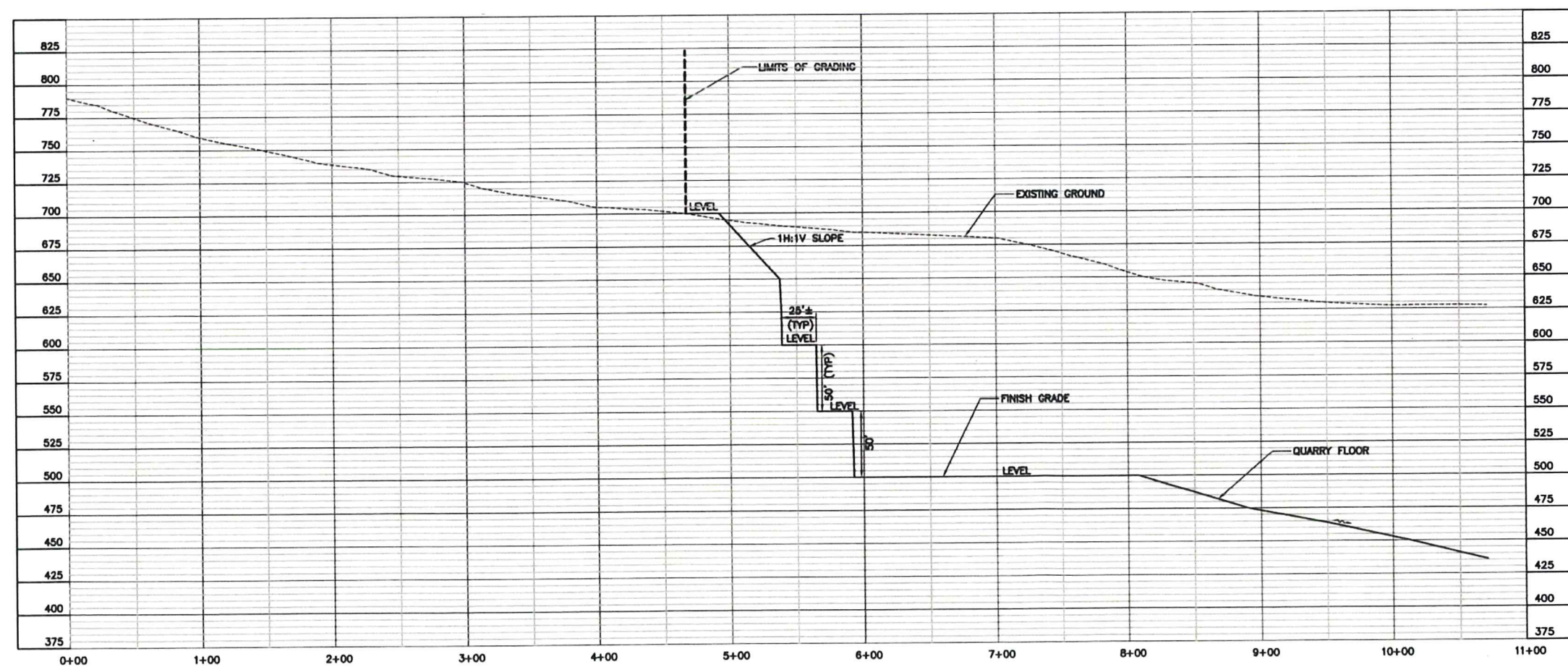
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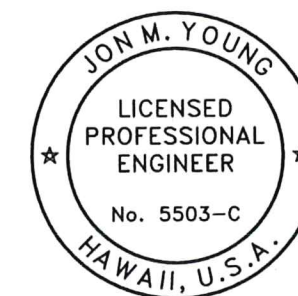
**FIGURE - 4**



SECTION-FF  
SCALE: 1"=50'

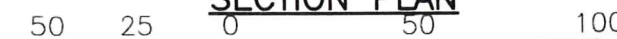


SECTION-GG  
SCALE: 1"=50'



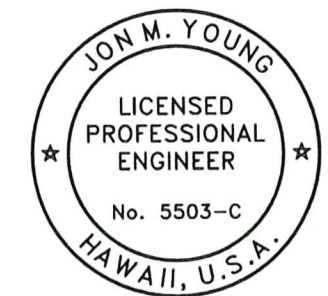
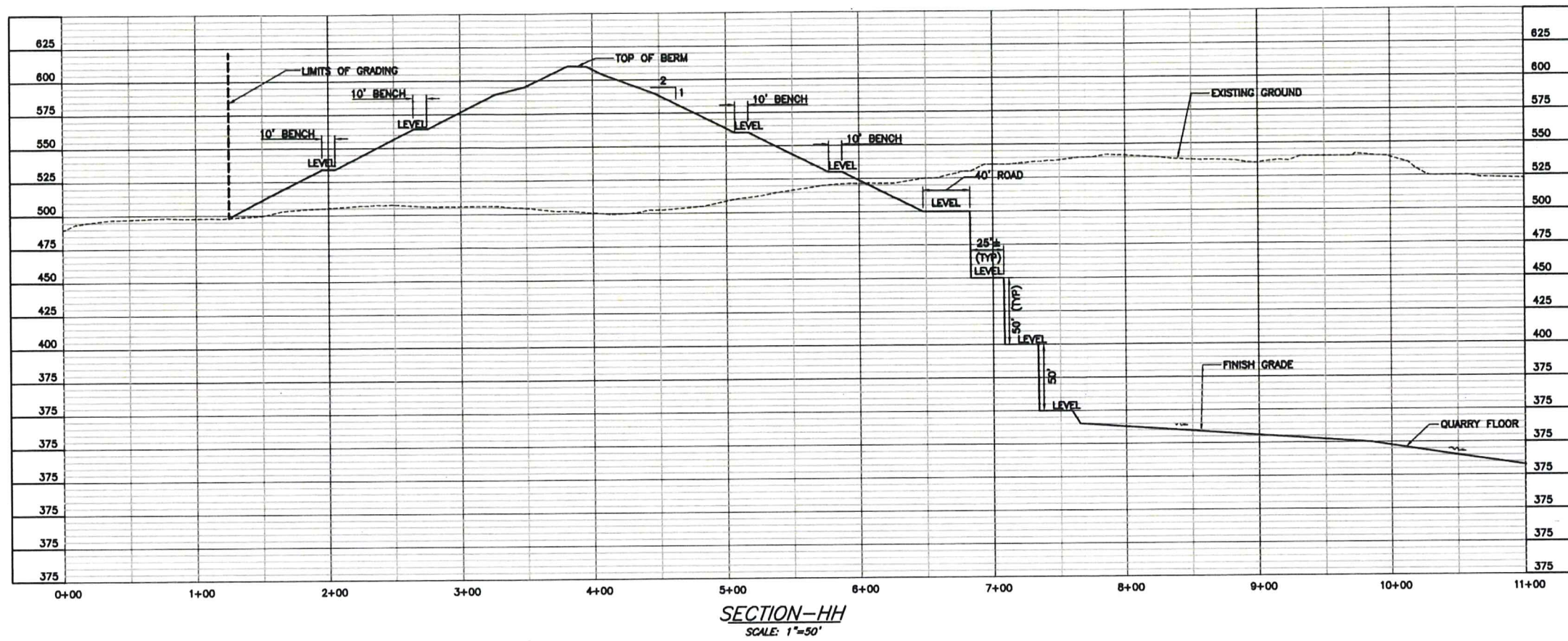
*Jon M. Young*  
THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION.  
APRIL 30, 2008  
EXPIRATION DATE OF THE LICENSE

FIGURE 5A  
MAKIKILO UPPER QUARRY  
SECTION PLAN



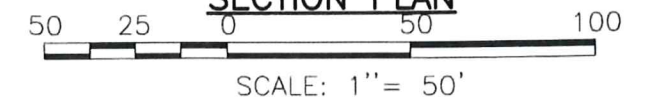
SCALE: 1" = 50'

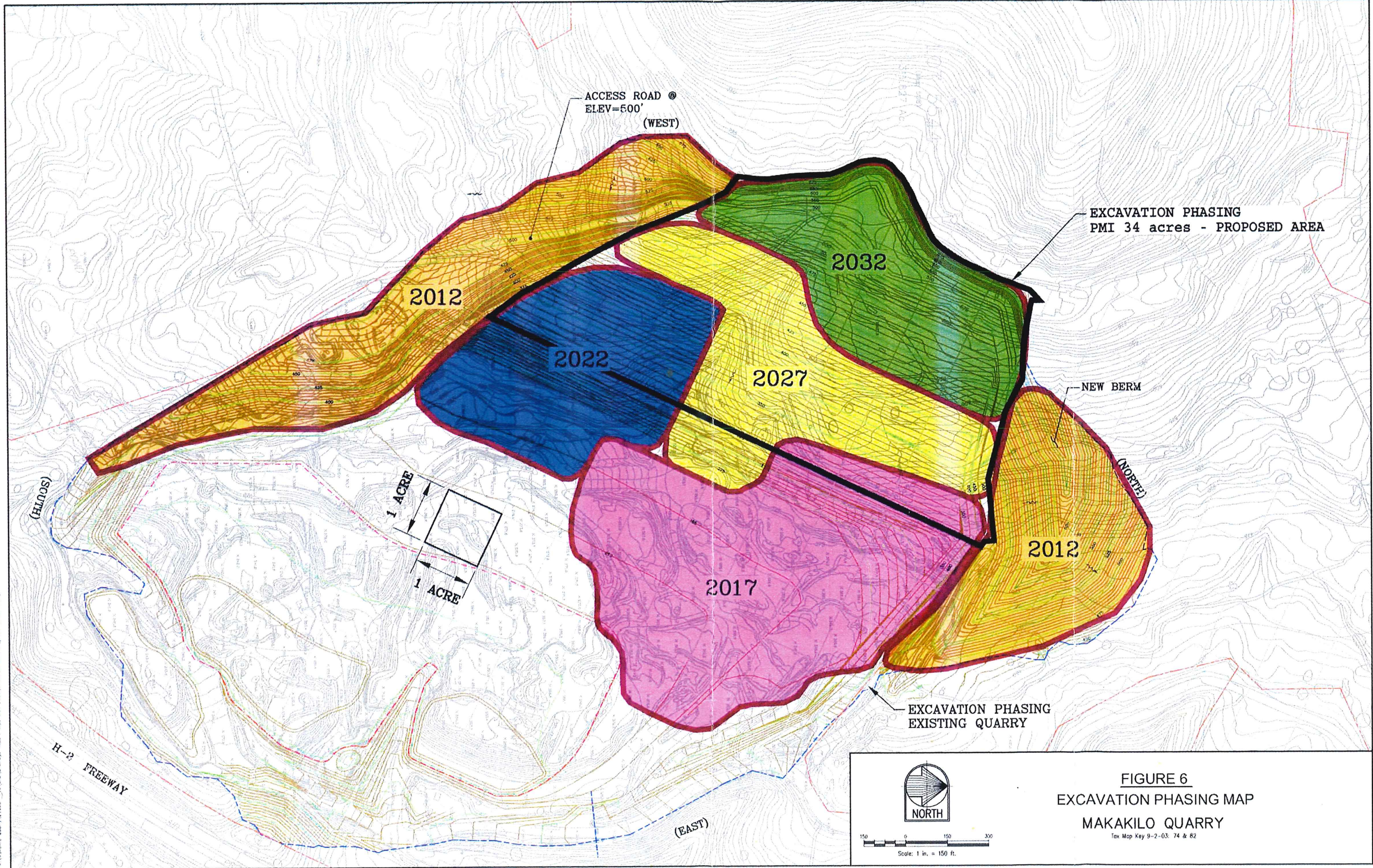
PREPARED BY BELT COLLINS-HAWAII, LTD. DATED: APRIL 2007



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 OR UNDER MY SUPERVISION  
 APRIL 30, 2008  
 EXPIRATION DATE OF THE LICENSE

**FIGURE 5B**  
**MAKIKILO UPPER QUARRY**  
**SECTION PLAN**





**FIGURE 6**  
**EXCAVATION PHASING MAP**  
**MAKAKILO QUARRY**  
 Tax Map Key 9-2-03: 74 & 82

W:\Projects\Quarry\3.032 -\D\Drawings\Sheet\Expansions\2006\topofwork\entire\10\pdr-entire-1-c.dwg  
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# **APPENDIX C**

APPENDIX C-1  
EXISTING RUNOFF AND RAINFALL STORAGE CALCULATIONS

Existing Conditions:

Find: required retention basin volume to fully contain a 100-yr, 24 -hour storm.

Given:

- (1) Total drainage area to Makakilo Quarry is 148.0 acres.
- (2) There are three smaller drainage basins that will act as one above the elevation of 245 feet. Total available storage is approximately 175 AC-ft as tabulated in Appendix C-2, Storage Elevation Tables.

Assumptions:

High percolation rates have been observed but not formally analyzed by an engineer. Since no accurate data is available, no percolation discharge is deducted from the following calculations.

Reference:

State of Hawaii Department of Land and Natural Resources Division of Water and Land Development, "*Rainfall Frequency Study for Oahu, Report R-73*", 1984

Solution:

Attached exhibit from the above reference shows 100-year, 24-hour storm rainfall atlas.  
Rainfall in Makakilo area = 12.0 inches

Required Basin Volume

$$\begin{aligned} &= 12.3 \text{ in} * (1 \text{ ft}/12 \text{ in}) * 148.0 \text{ acres} \\ &= 151.7 \text{ AC-ft} \end{aligned}$$

The available Storage of 175 AC-ft is Adequate to hold a 100-yr, 24-hr. storm.

Note: The adequacy of the retention basin storage is further reinforced by the fact that no percolation discharge was used to reduce the required volume. In reality relatively high percolation rates have been observed in the order of 10 minutes per inch.

APPENDIX C-2  
DEVELOPED RUNOFF AND RAINFALL STORAGE CALCULATIONS

Developed Conditions:

Find: required retention basin volume to fully contain a 100-yr, 24 -hour storm.

Given:

- (1) Total drainage area to Makakilo Quarry is 170.0 acres.
- (2) There are three smaller drainage basins that will act as one above the elevation of 245 feet. Total available storage is approximately 175 AC-ft as tabulated in Appendix C-2, Storage Elevation Tables.

Assumptions:

High percolation rates have been observed but not formally analyzed by an engineer. Since no accurate data is available, no percolation discharge is deducted from the following calculations.

Reference:

State of Hawaii Department of Land and Natural Resources Division of Water and Land Development, "*Rainfall Frequency Study for Oahu, Report R-73*", 1984

Solution:

Attached exhibit from the above reference shows 100-year, 24-hour storm rainfall atlas. Rainfall in Makakilo area = 12.3 inches

Required Basin Volume

$$\begin{aligned} &= 12.3 \text{ in} * (1 \text{ ft}/12 \text{ in}) * 170.0 \text{ acres} \\ &= 174.3 \text{ AC-ft} \end{aligned}$$

The available Storage of 175 AC-ft is Adequate to hold a 100-yr, 24-hr. storm.

Note: The adequacy of the retention basin storage is further reinforced by the fact that no percolation discharge was used to reduce the required volume. In reality relatively high percolation rates have been observed in the order of 10 minutes per inch.

APPENDIX C-3  
BERM SURFACE WATER CALCULATIONS

Find: Flows for Quarry using Rational Method and Recurrence Interval of 10-years  
Reference: City and County of Honolulu, "Rules Relating to Storm Drainage Standards",  
January 2000.

Solution:

$$Q = CIA$$

Q = Design flow rate (cfs)

C = Runoff coefficient

I = Rainfall intensity (inches/hr)

A = Drainage area (acres)

From Plate 2:

$$T_m = 10 \text{ years}$$

$$I_R = 1.9 \text{ inches}$$

Correction Factor (CF) from plate 4 for TC = 10 min.

CF = 2.26 (slopes in the area in question are relatively steep and similar in value)

$$\text{Therefore, } I = I_R * CF = 1.9 * 2.26 = 4.29 \text{ in/hr}$$

From Table 1, Coefficient of Runoff, C

C = 2/3 Band

C = 2/3 (0.55 to 8.0)

C = 0.75

Drainage Areas (A)

(See enclosed Drainage Maps for delineation of drainage areas.)

Existing Condition: Drain area = 5.7 acres

Solve for Q:

$$\text{Exist. Area (within berm face limits)} = 0.75 * 4.29 \text{ in/hr} * 5.7 \text{ acres} = \mathbf{18.33 \text{ cfs}}$$

Developed Condition: Drain area = 5.7 acres

Solve for Q:

$$\text{Northern berm face} = 0.75 * 4.29 \text{ in/hr} * 5.7 \text{ acres} = \mathbf{18.33 \text{ cfs}}$$

Capacity of Check Dam (conservative) : see figure for typical section

Check Dam length: 1150'; depth of water=1'; Based (wetted surface); 5'

$$\text{Volume} = \frac{1}{2} * 1150' * 9' * 1' = 5290 \text{ cfs}$$

APPENDIX C-4  
STORAGE-ELEVATION TABLES  
FOR DRAIN BASINS (DB)

**DB#1**

Elev (ft)	Area (sf)	Incr Vol (cf)	Accum Vol (cf)	Storage (AC-ft)
240	140,000	0	0	0
245	152,500	731,250	731,250	16.8

**DB#2**

Elev (ft)	Area (sf)	Incr Vol (cf)	Accum Vol (cf)	Storage (AC-ft)
240	102,000	0	0	0
245	112,000	535,000	535,000	12.3

**DB#3**

Elev (ft)	Area (sf)	Incr Vol (cf)	Accum Vol (cf)	Storage (AC-ft)
240	112,800	0	0	0
245	124,800	475,200	475,200	10.9

Combined storage above elevation 245-feet:

**DB#1 + DB#2 +DB#3**

Elev (ft)	Area (sf)	Incr Vol (cf)	Accum Vol (cf)	Storage (AC-ft)
245	389,300	0	1,741,450	40.0
250	762,200	2,878,750	4,620,000	406.1
253	1,218,300	2,970,750	7,590,750	<b>174.3</b>
255	1,338,900	5,252,750	9,872,750	226.6

Available storage volume = approx. **175 AC-ft**

Required Volume < Available volume

174.3 < 175                                      Adequate storage is provided

Elevation at required Volume of 174.3 AC-ft = 253.0

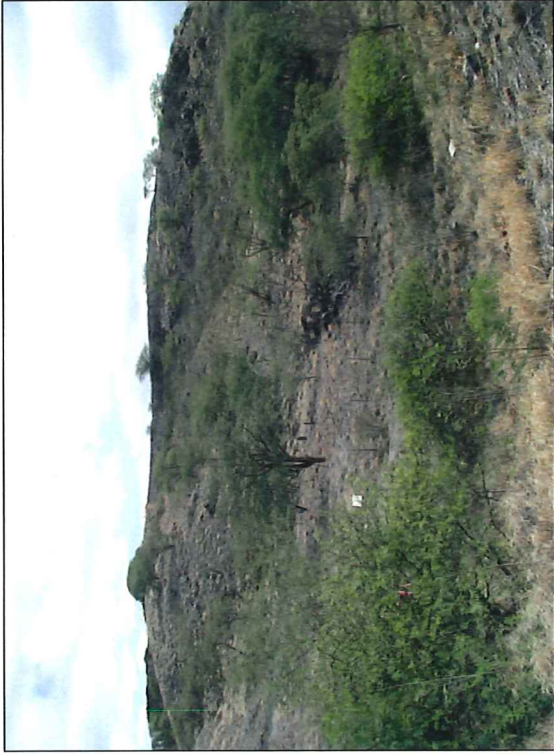
Freeboard at berm surrounding 96" culvert = 255.0 - 253.0 = 2.0 ft of free board

# **APPENDIX D**

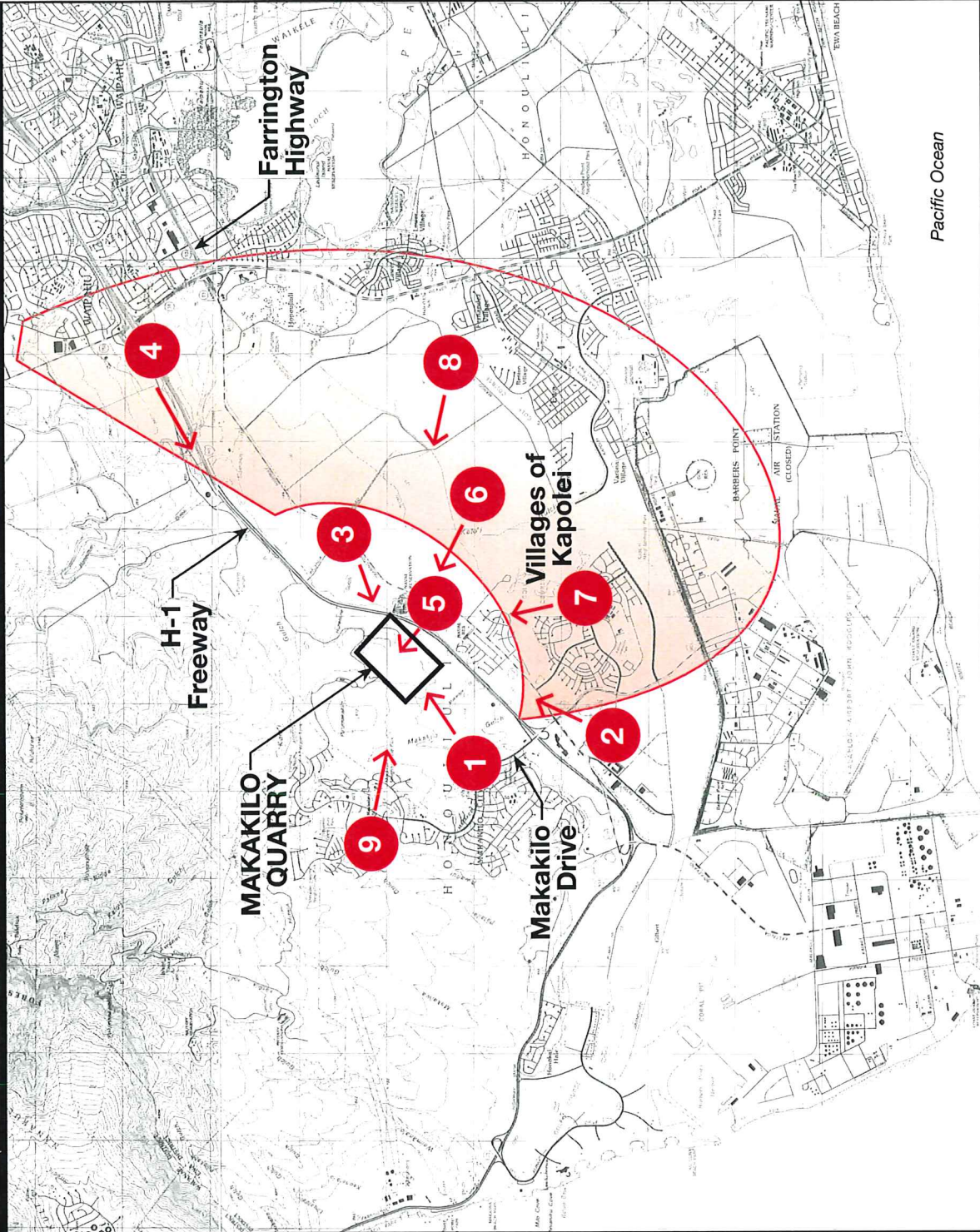
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# **APPENDIX E**





**Exhibit 1-0**  
**TYPICAL PU'U LANDSCAPE**  
Upper Mitigation Plan 03  
Makakilo Quarry—Grace Pacific Corporation  
April 2007





Pacific Ocean

**Visual Modeling of Makakilo Quarry Future Excavation Stages**

Public domain City and County of Honolulu topographical data, existing aerial photographs and proposed grading plans from Belt Collins Hawaii were used to create a 3D surface model of the Makakilo Quarry area. ESRI® ArcGIS™/ArcView with a 3D Analyst™ extension was used to create a Triangulated Irregular Network (TIN) surface model of every 5-year increment of the future rock excavation activity in the quarry. Computer simulated visualizations of the proposed excavation and grading plans were produced for nine view points that corresponded to previously-selected photo locations.

Belt Collins received digital photos and photo locations from Grace Pacific Corporation and prepared photo renderings of the proposed quarry. Adobe®Photoshop® was used to overlay the proposed quarry model images onto the digital photos. By matching reference points (e.g., roads and topographical features) on both the computer-modeled images and the digital photos, the computer-modeled quarry was overlain on the digital photos. Photoshop® tools were used to highlight the interior quarry areas of each image and add appropriate colors and labels.

- LEGEND**
-  Viewpoint  
Refer to Exhibits 2-1 to 2-9
  -  Viewshed



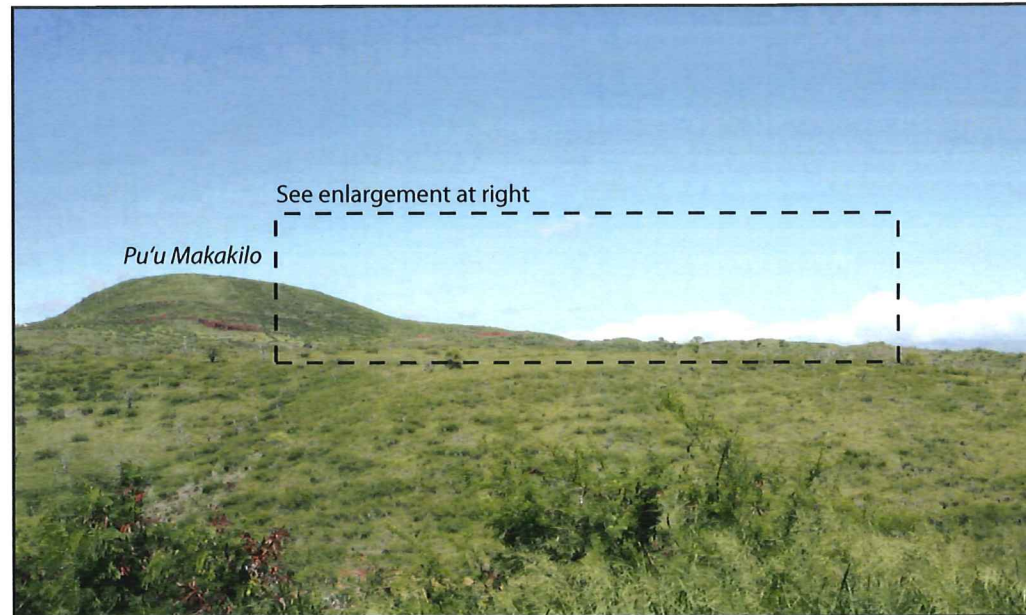

NORTH



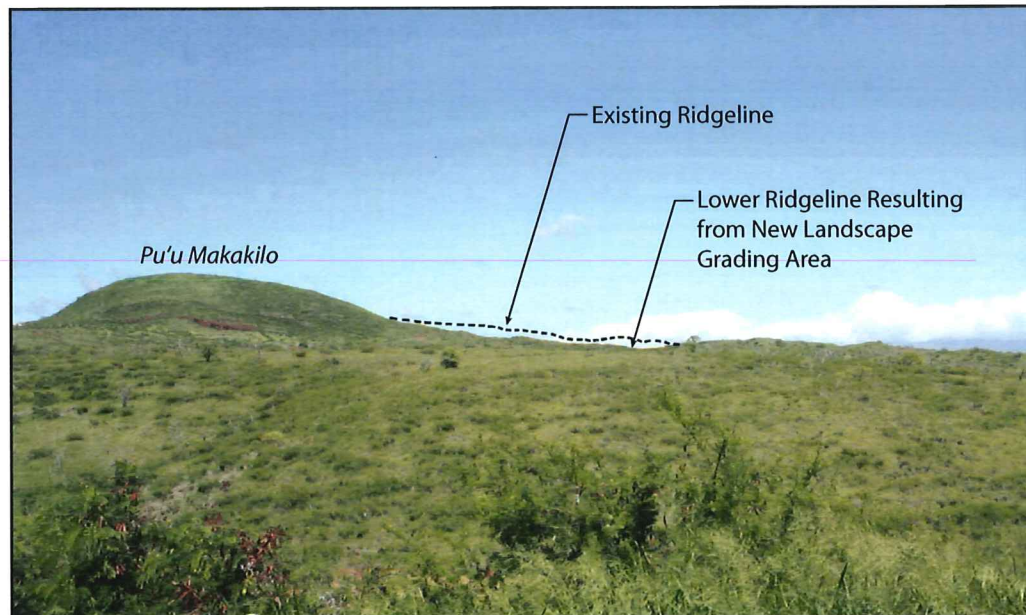
SCALE IN FEET

**Exhibit 2-0**  
**LOCATION OF VIEWPOINTS**  
 Visual Analysis—Makakilo Quarry  
 Grace Pacific Corporation  
 July 2007

### Visual Model of Quarry Activity in 5-Year Stages

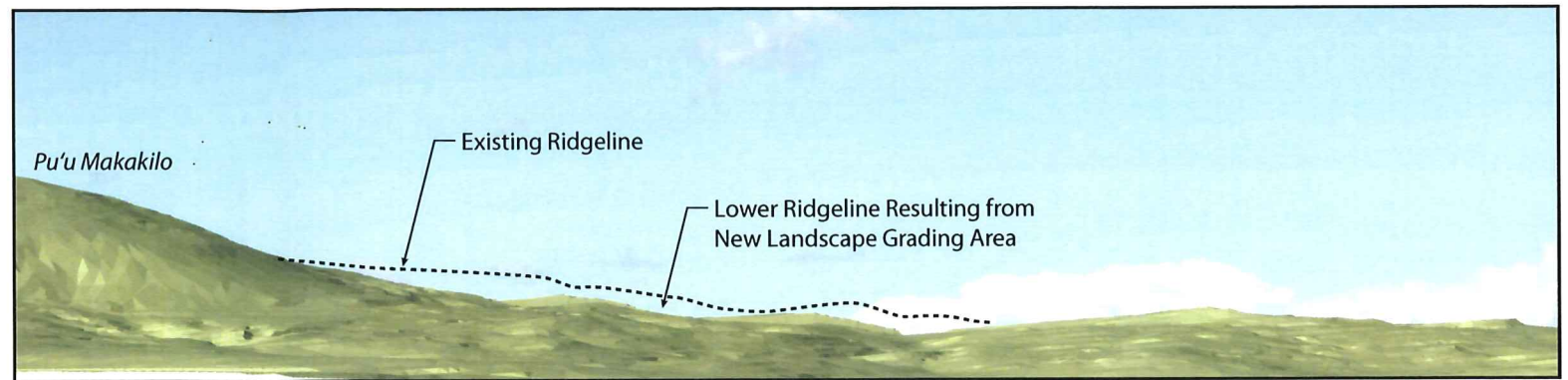


Existing

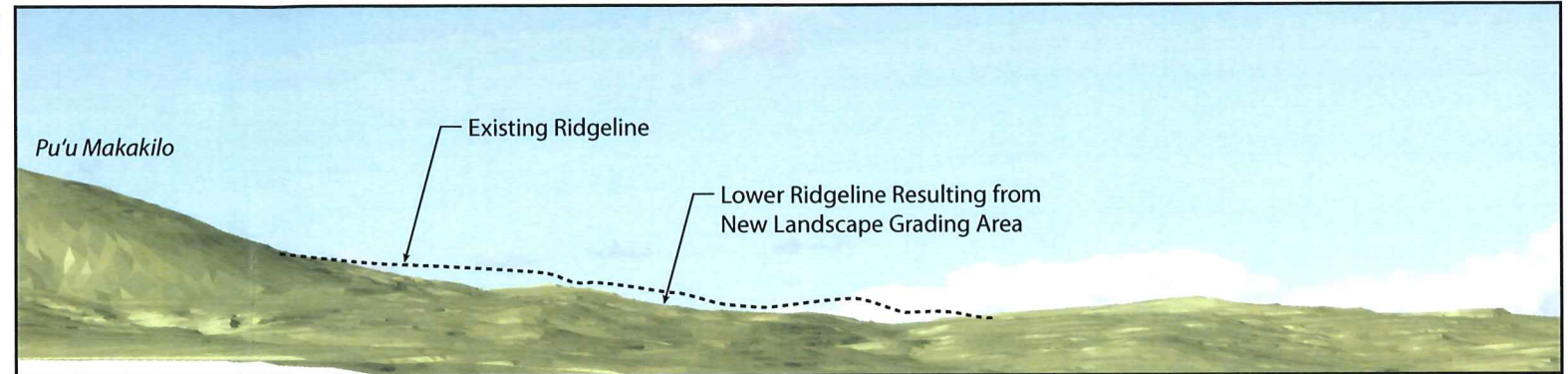


Final Quarry Phase—Year 2032

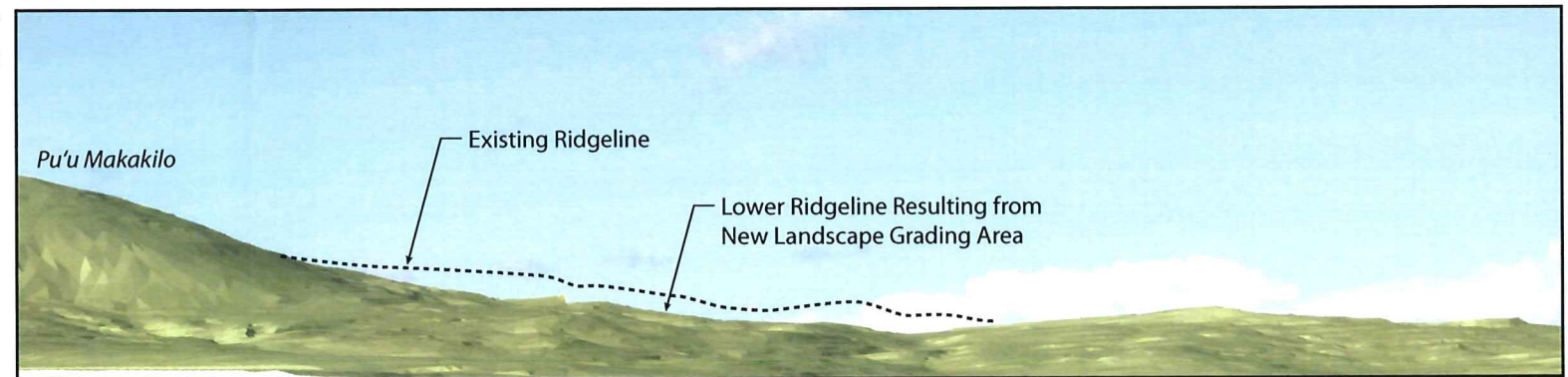
Year 2012



Year 2017



Year 2022



Year 2027

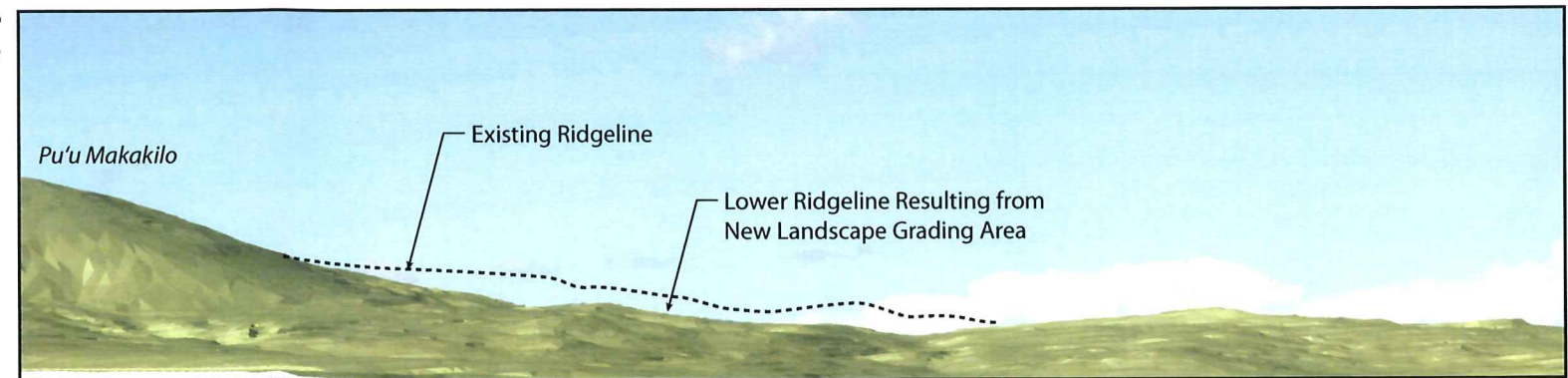
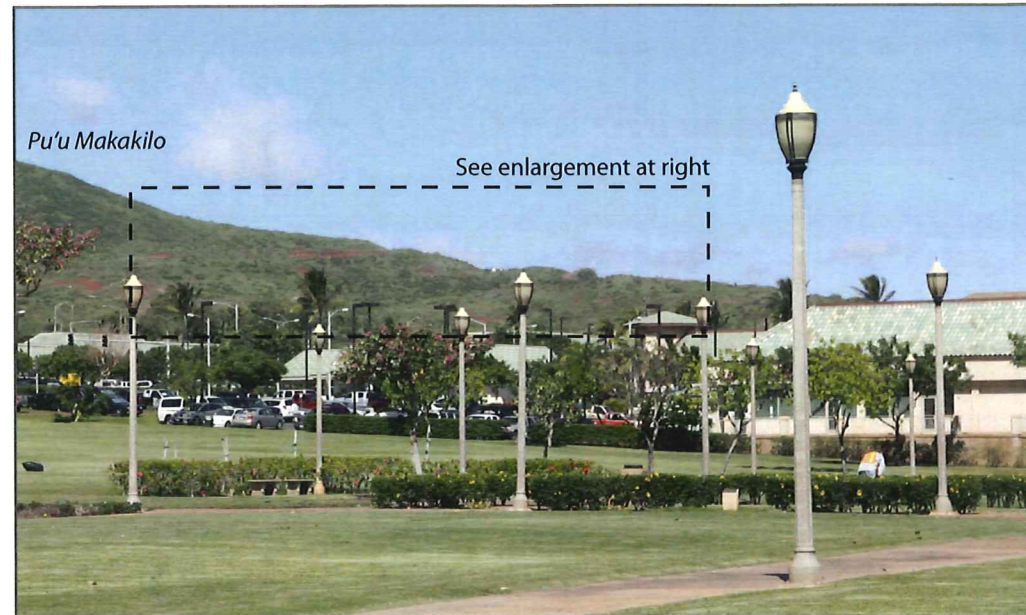
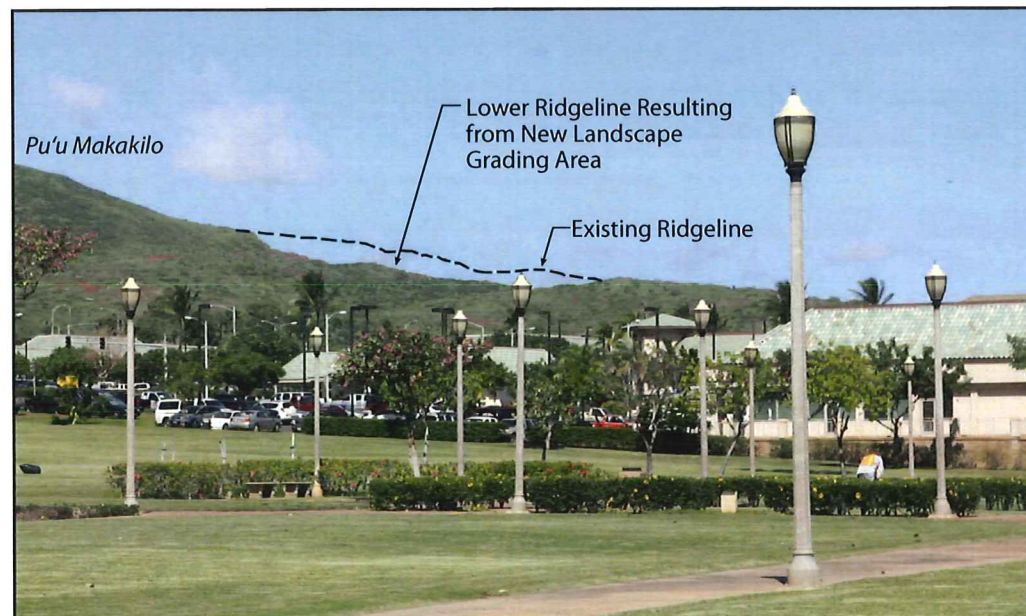


Exhibit 2-1  
VIEW FROM LOWER MAKAKILO DRIVE

### Visual Model of Quarry Activity in 5-Year Stages

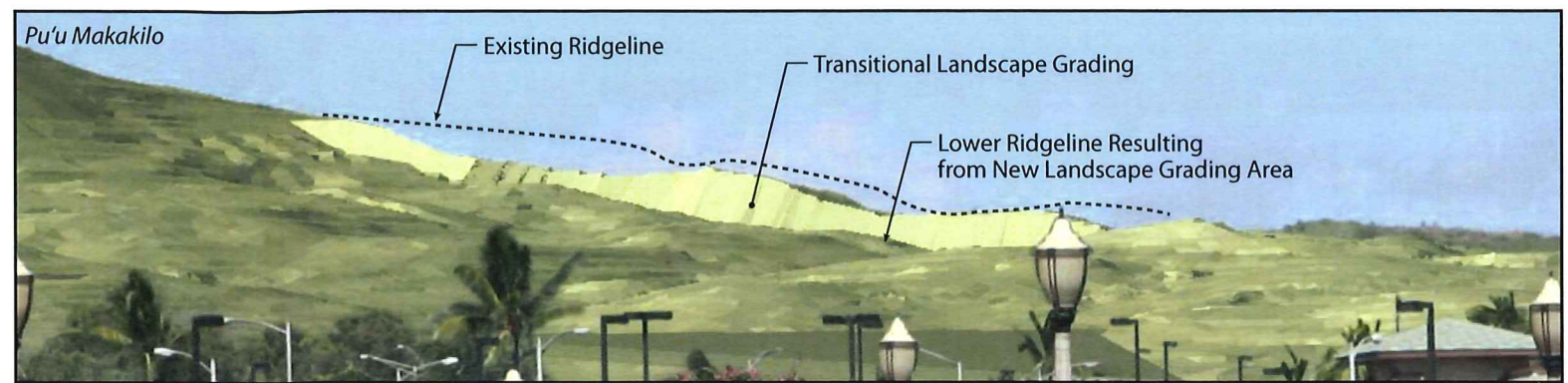


Existing

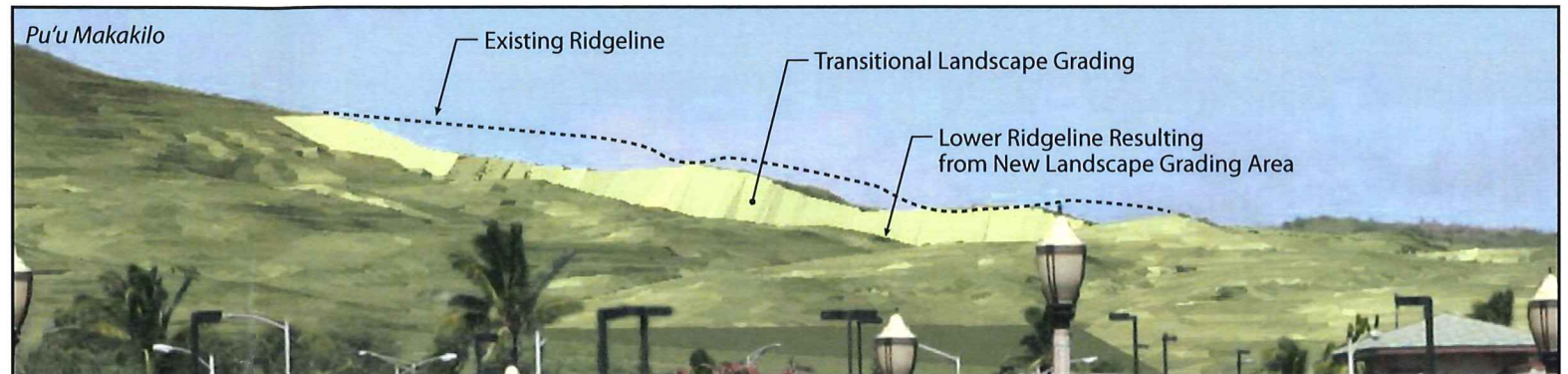


Final Quarry Phase—Year 2032

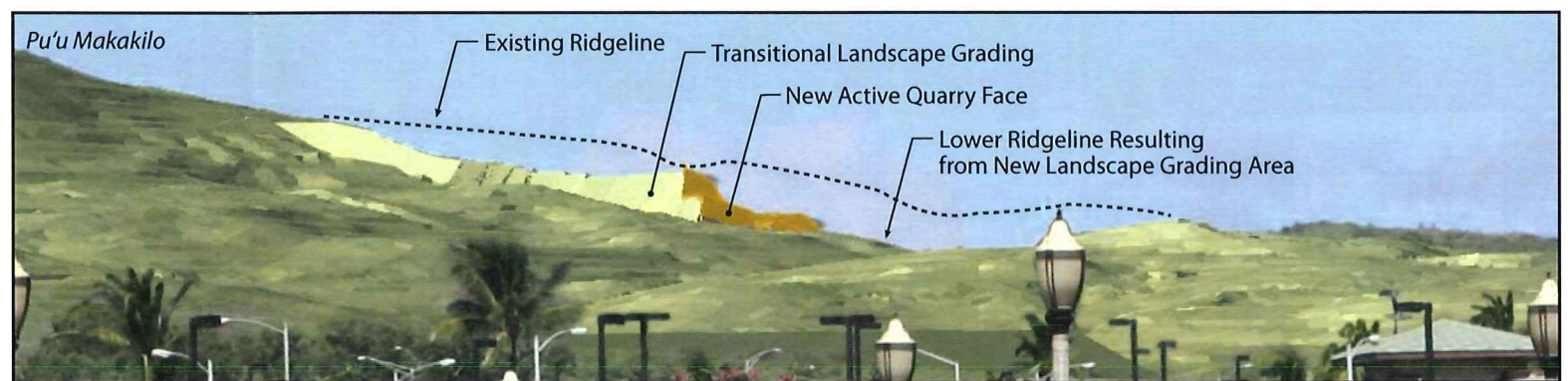
Year 2012



Year 2017



Year 2022



Year 2027

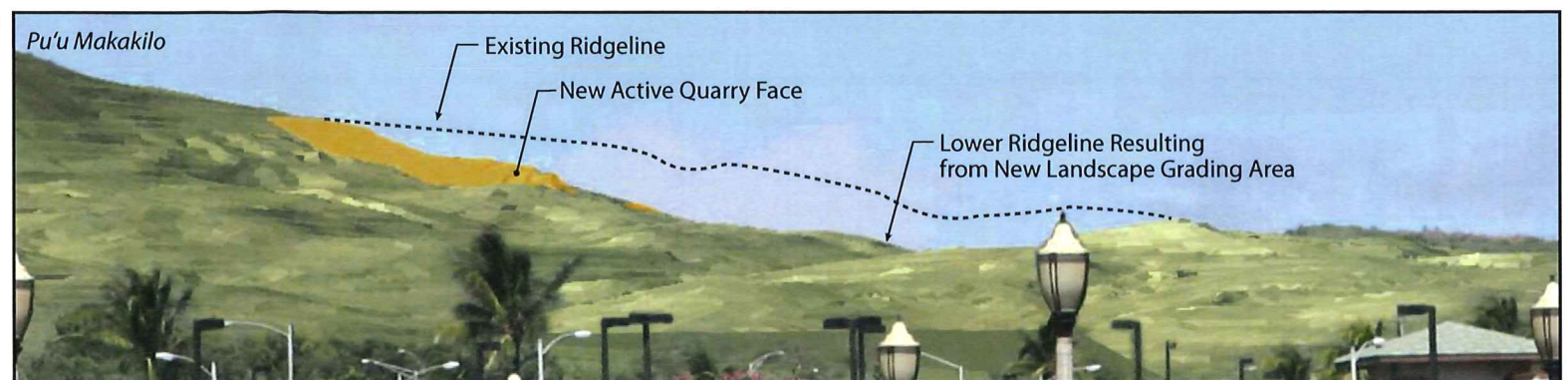
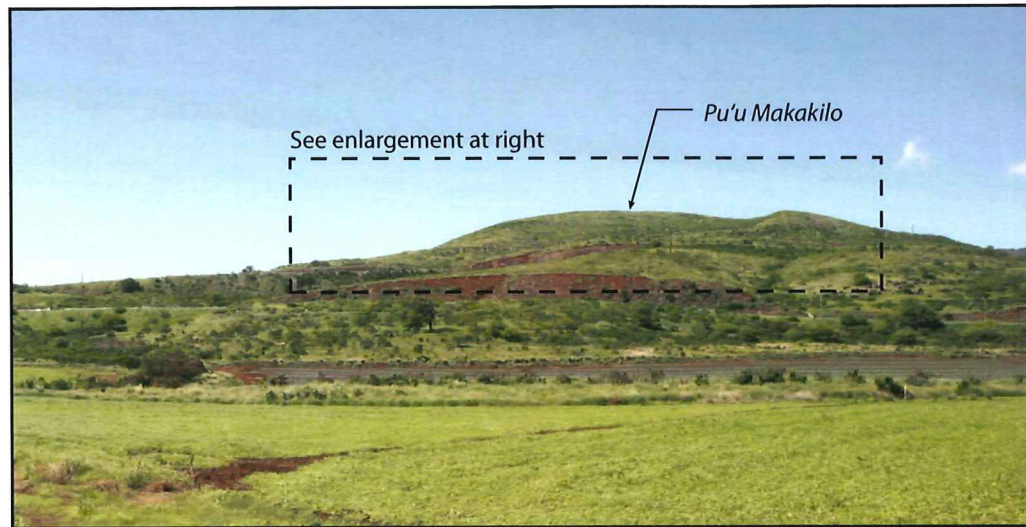
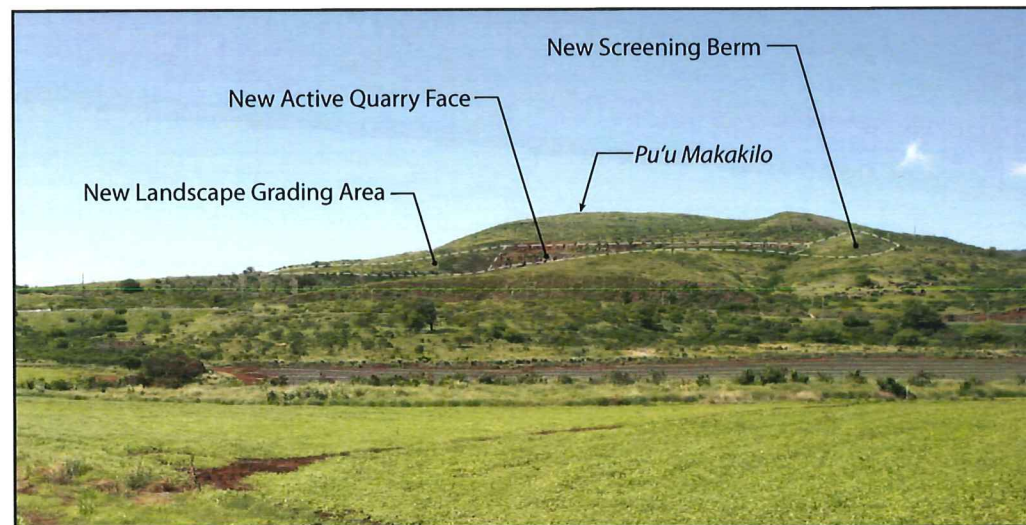


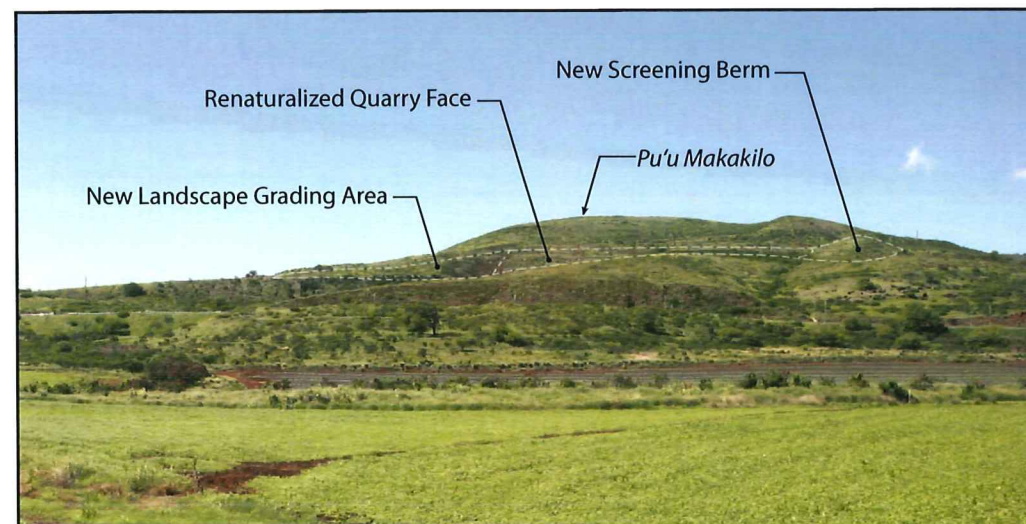
Exhibit 2-2  
VIEW FROM KAPOLEI REGIONAL PARK



**Existing**



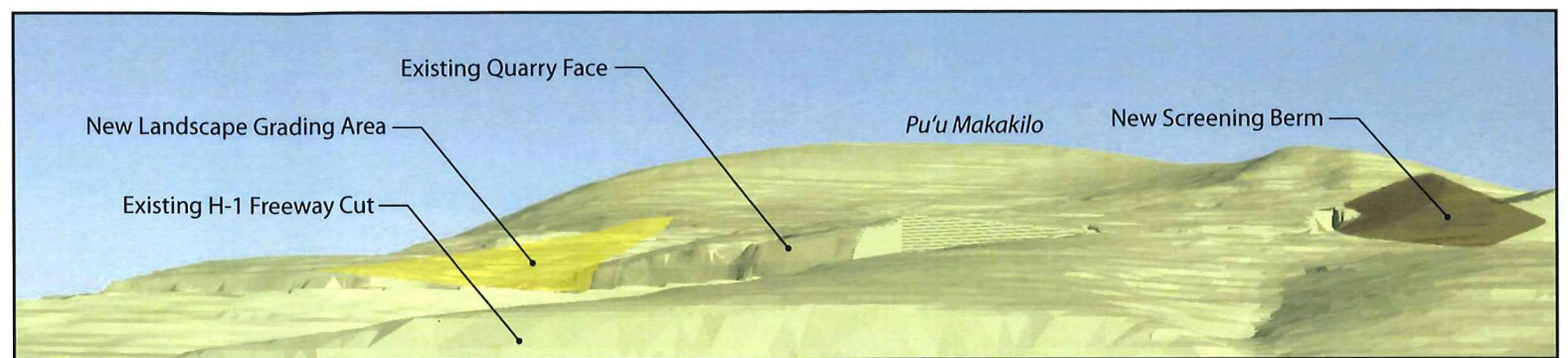
**Final Quarry Phase—Year 2032**



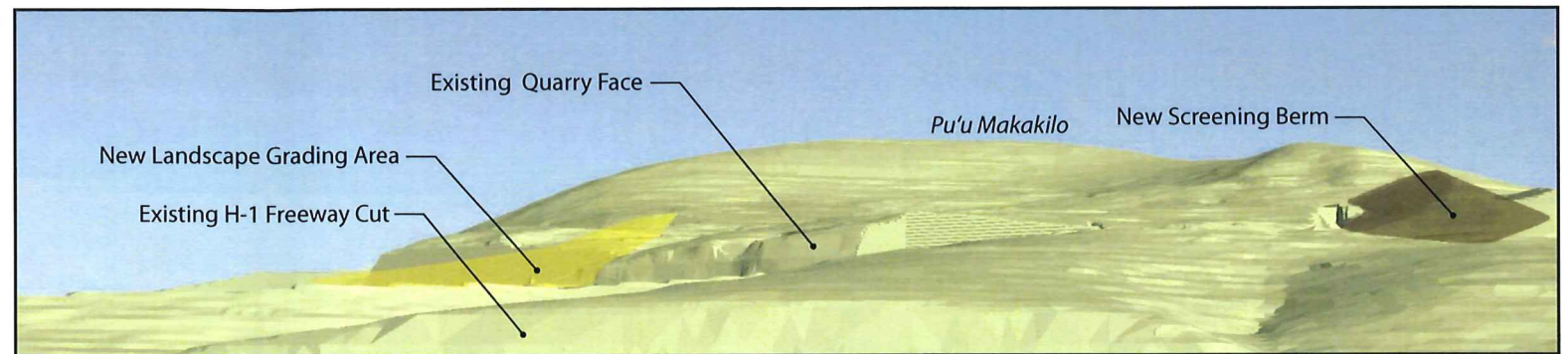
**Final Renaturalization—Year 2038**

### Visual Model of Quarry Activity in 5-Year Stages

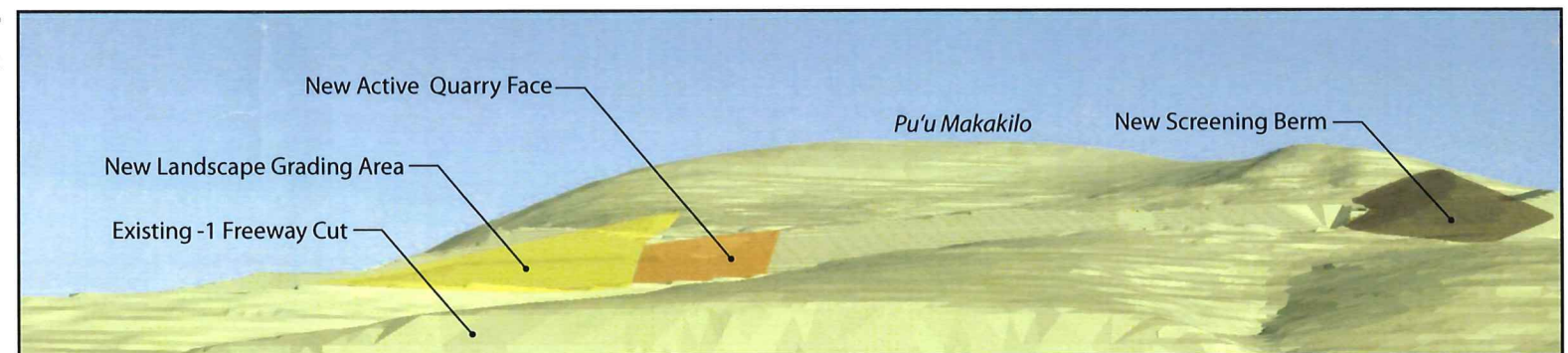
**Year 2012**



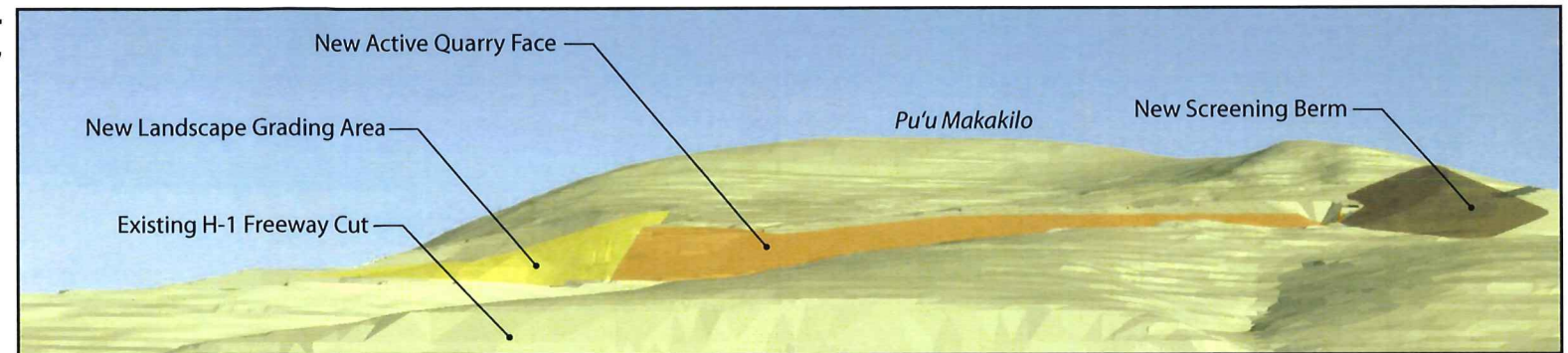
**Year 2017**



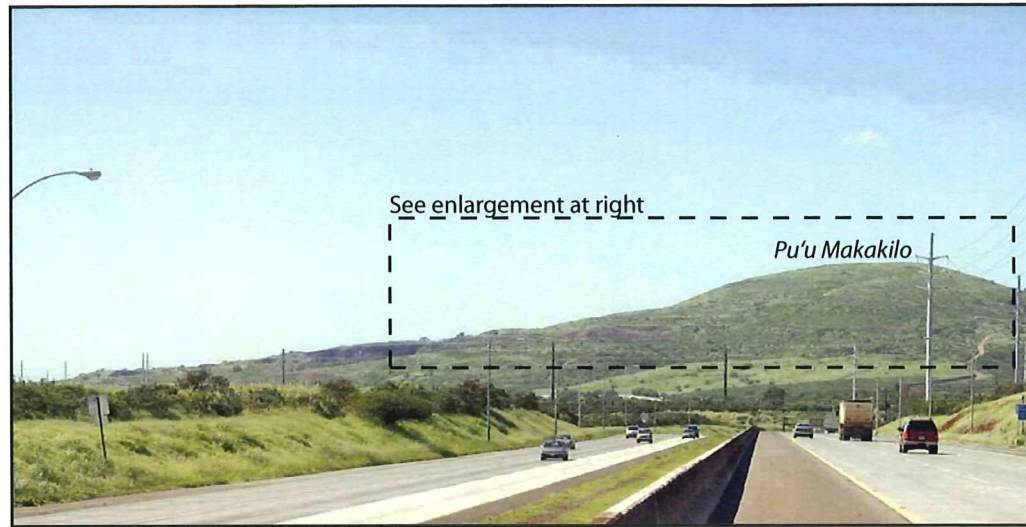
**Year 2022**



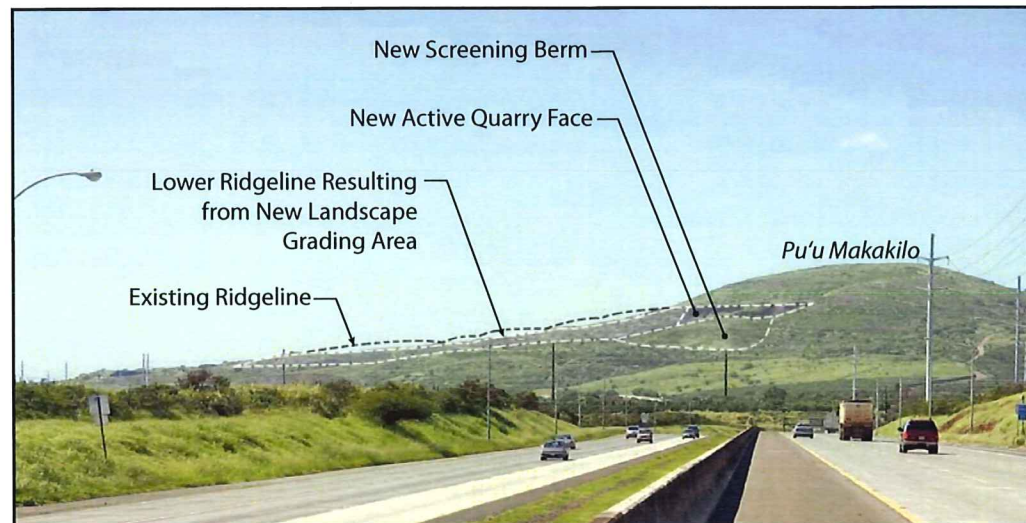
**Year 2027**



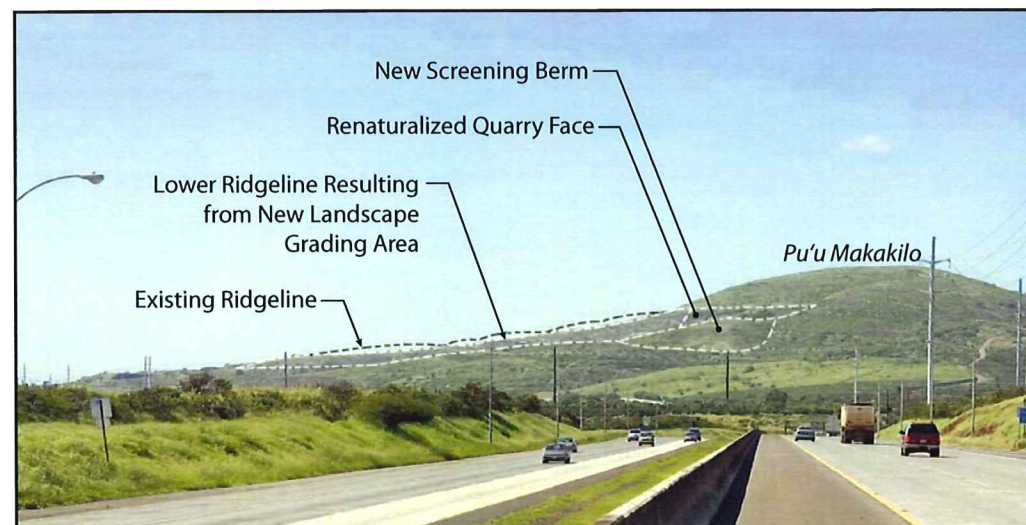
**Exhibit 2-3  
VIEW FROM FARRINGTON AND OLD PALEHUA**



Existing



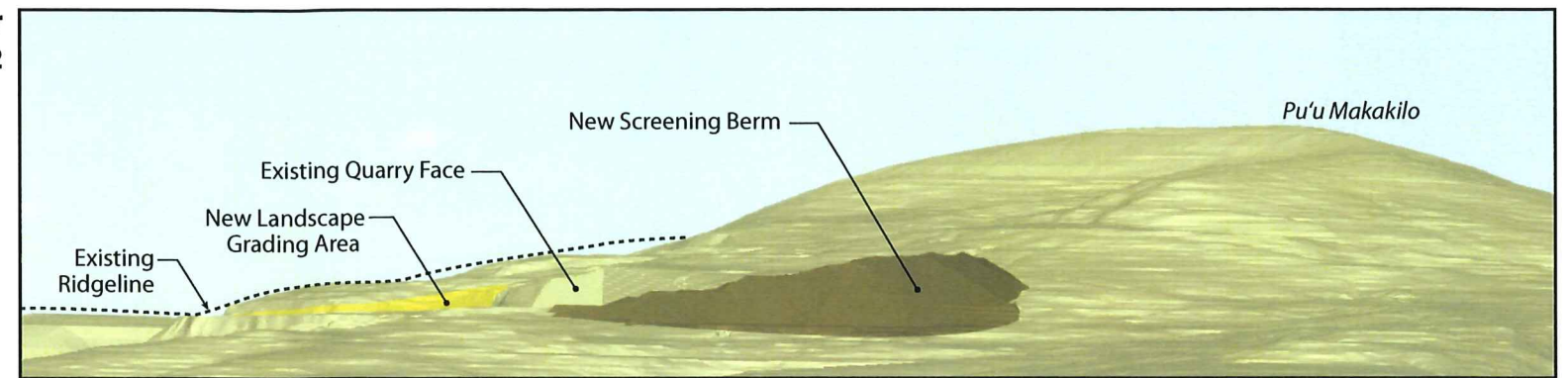
Final Quarry Phase—Year 2032



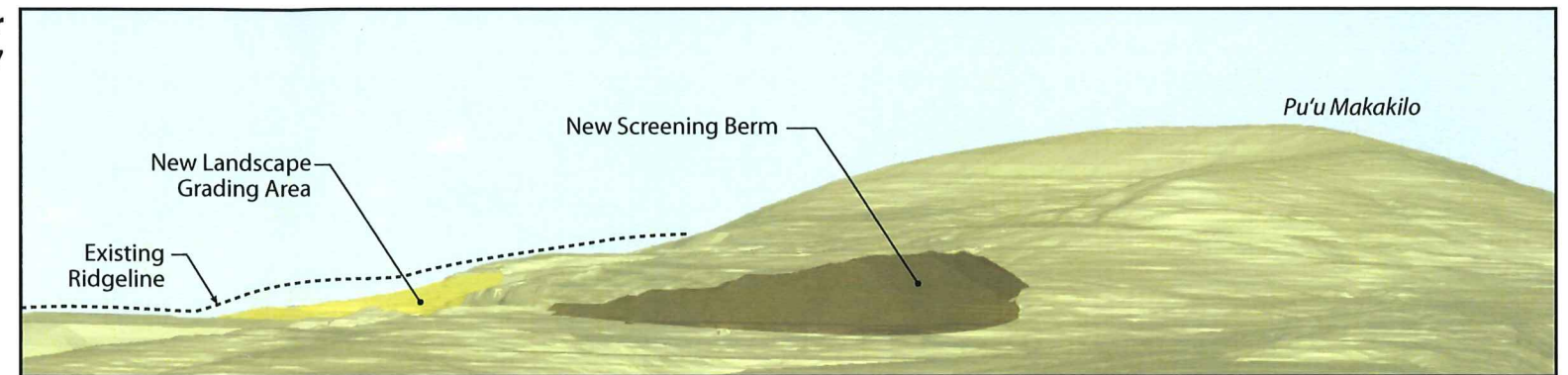
Final Renaturalization—Year 2038

### Visual Model of Quarry Activity in 5-Year Stages

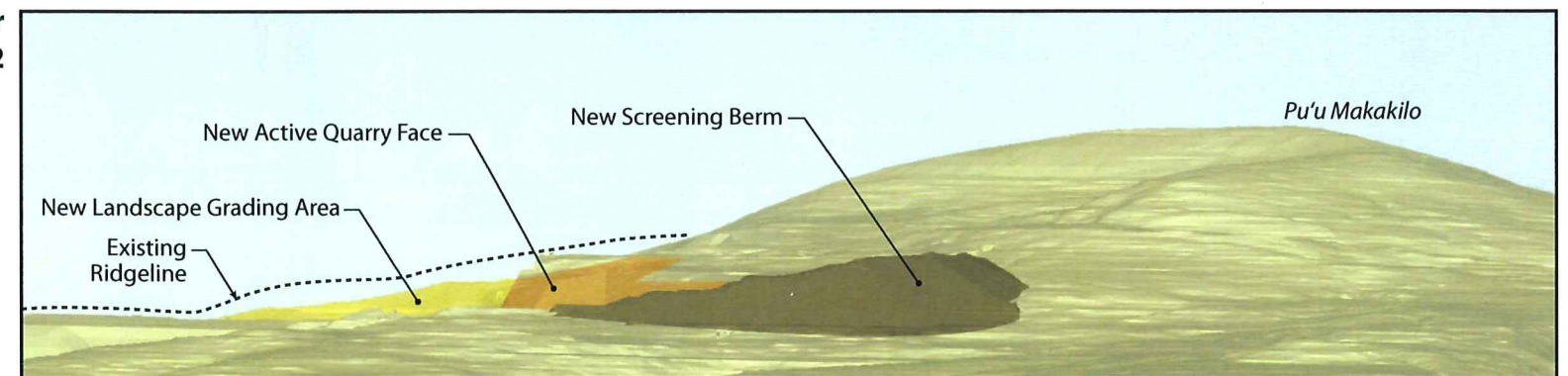
Year 2012



Year 2017



Year 2022



Year 2027

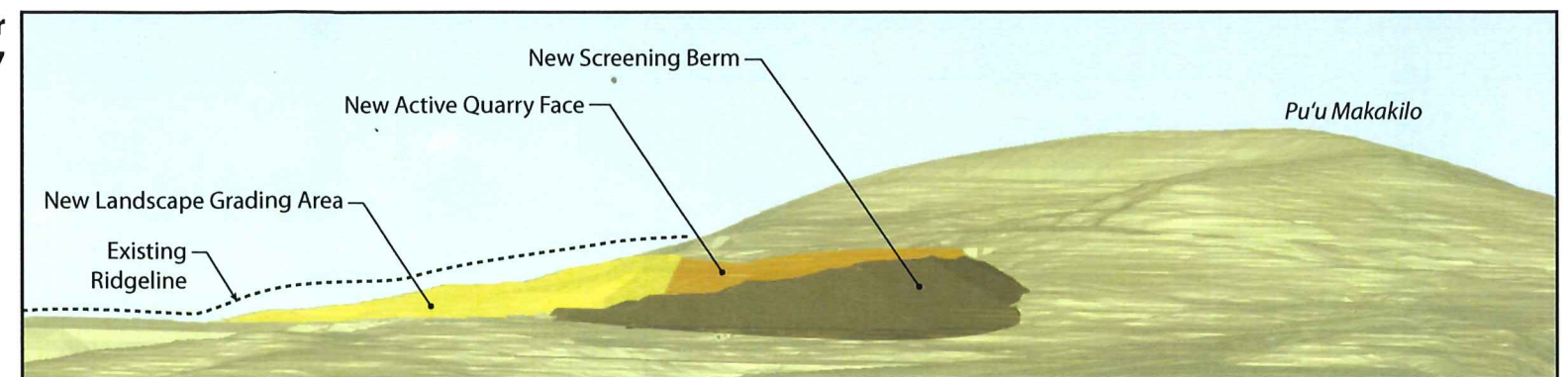
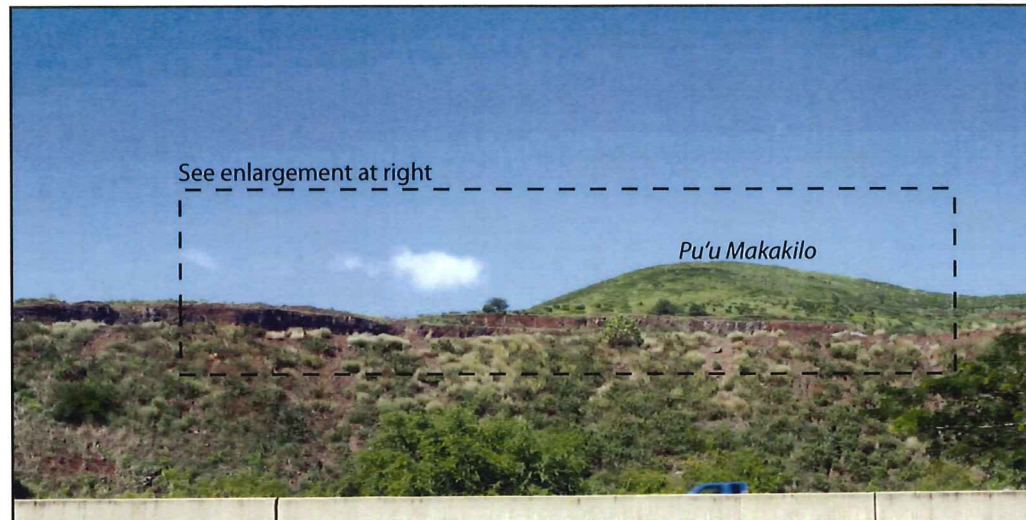


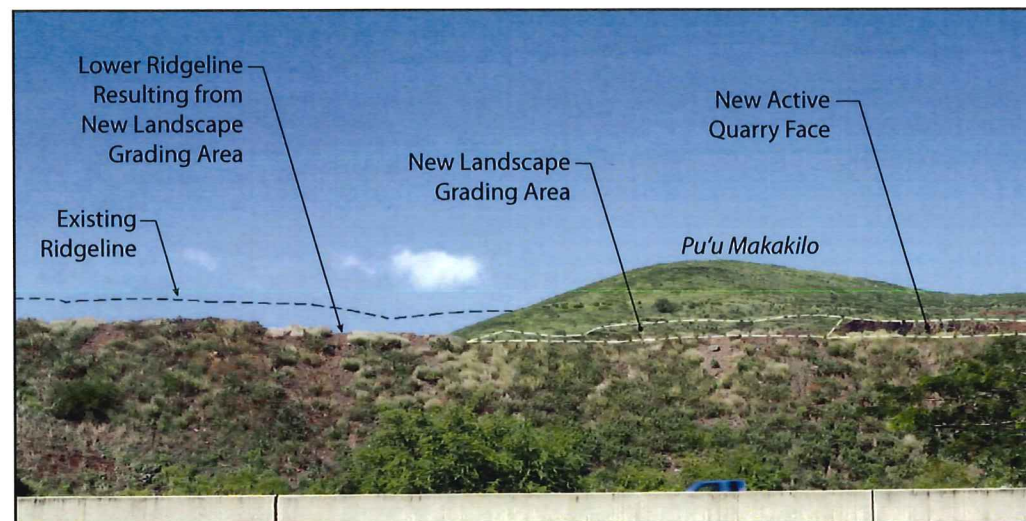
Exhibit 2-4  
VIEW FROM KUNIA APPROACH



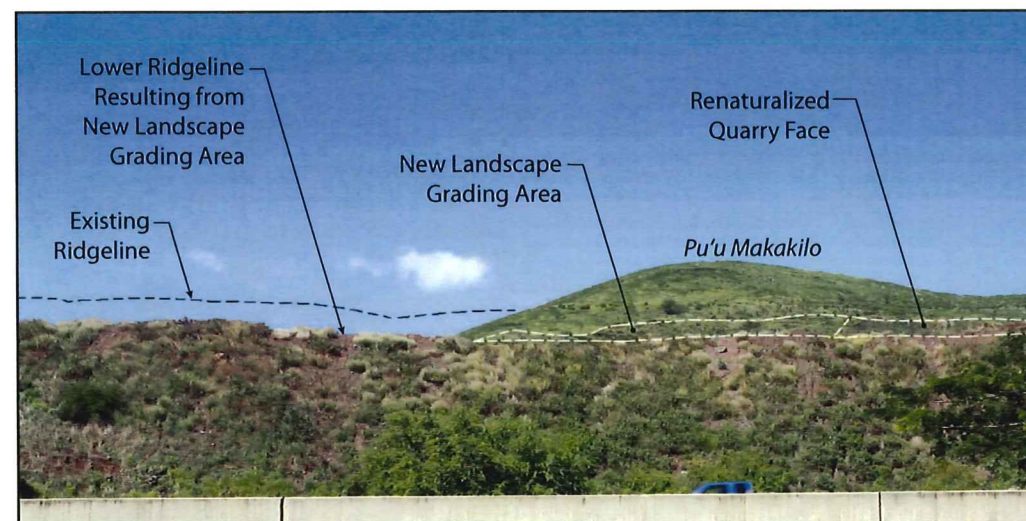
See enlargement at right

Pu'u Makakilo

Existing



Final Quarry Phase—Year 2032



Final Renaturalization—Year 2038

### Visual Model of Quarry Activity in 5-Year Stages

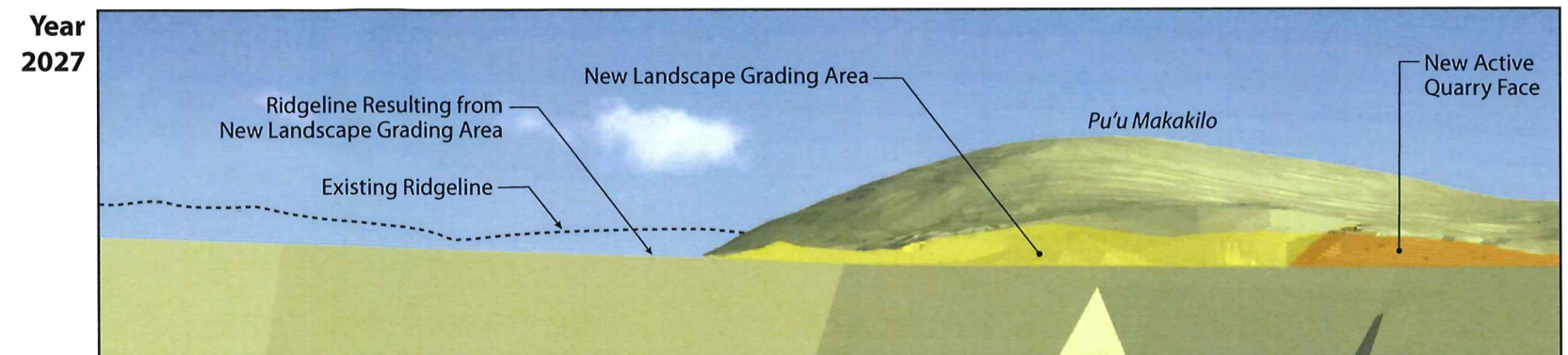
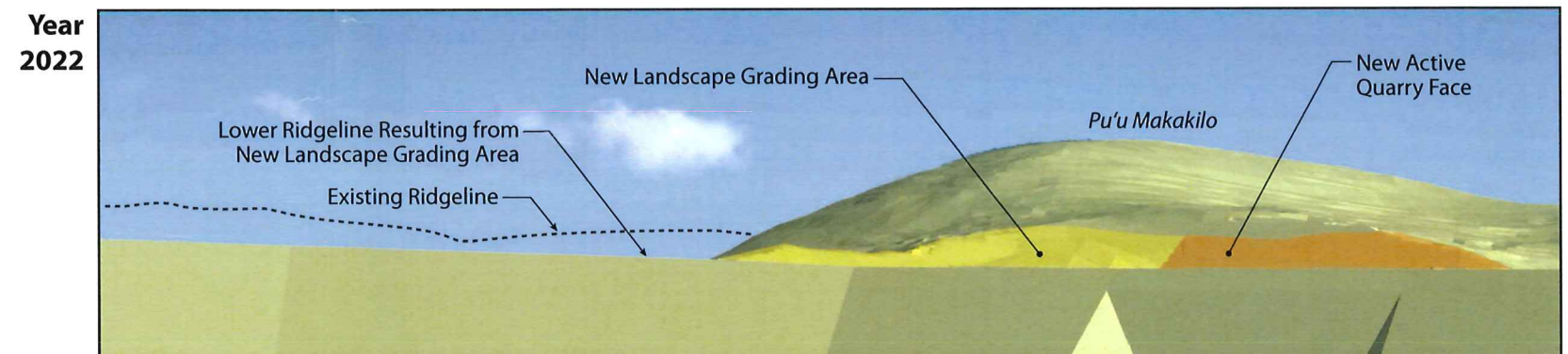
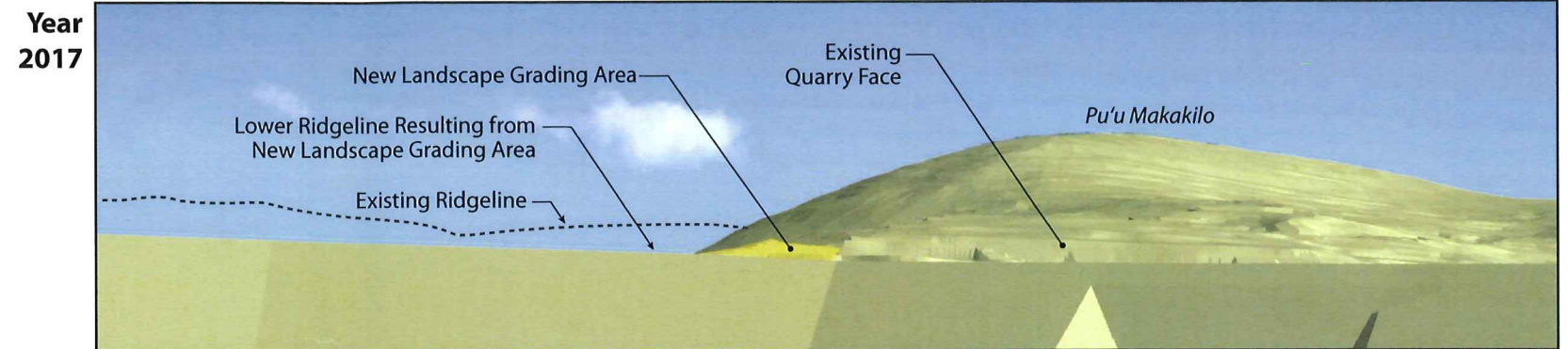
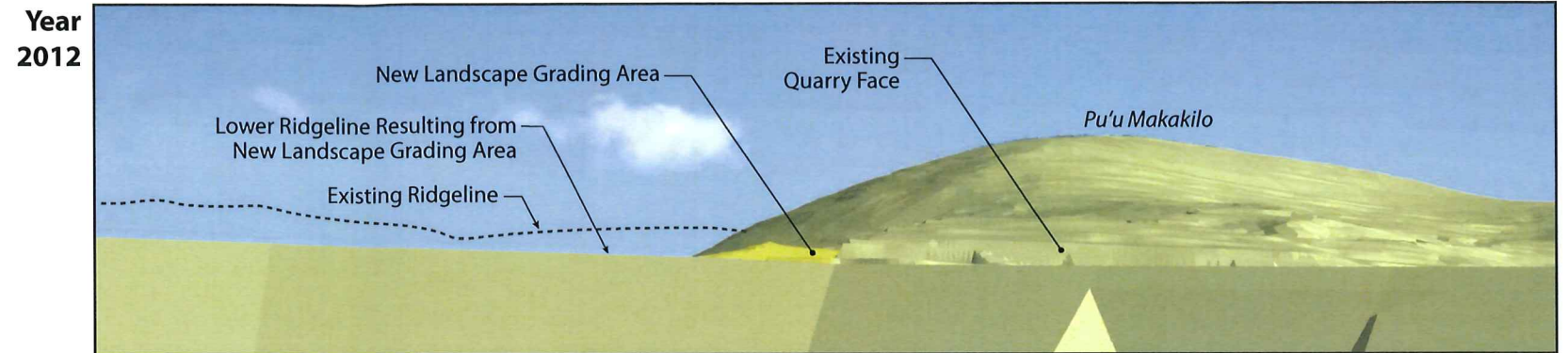
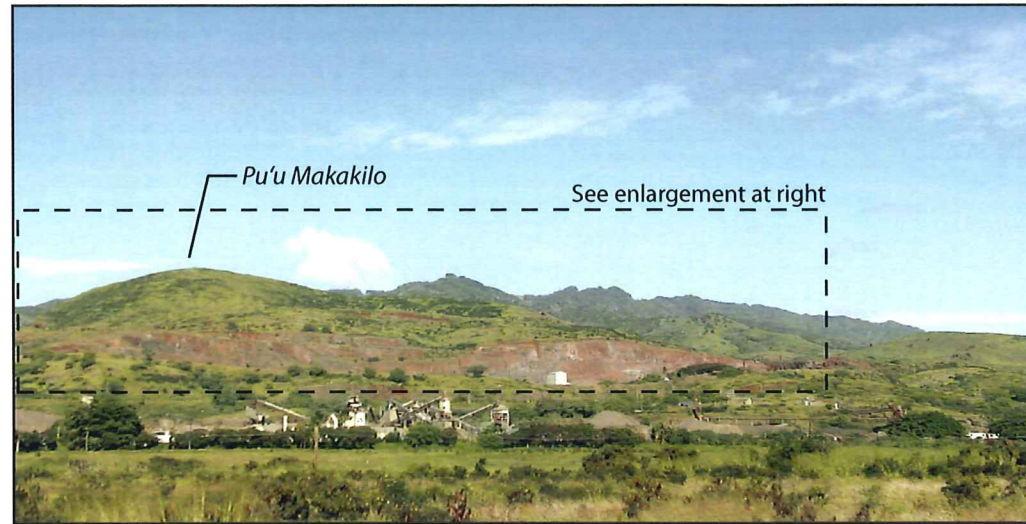
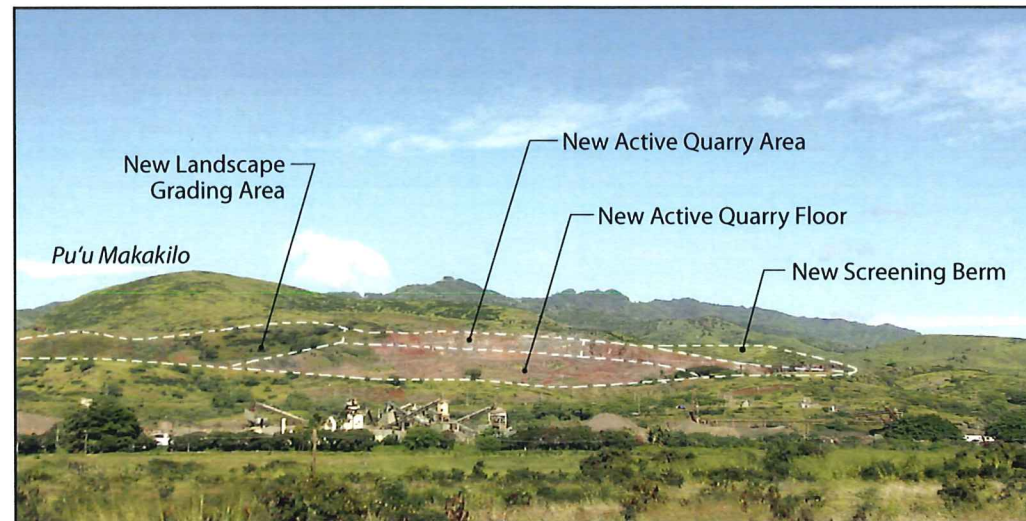


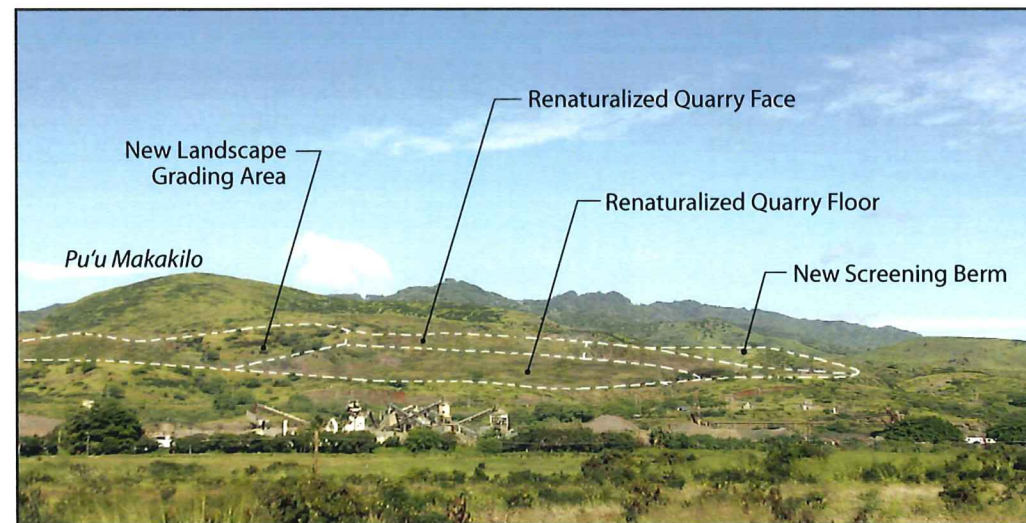
Exhibit 2-5  
VIEW FROM H-1 CLOSE-IN



Existing



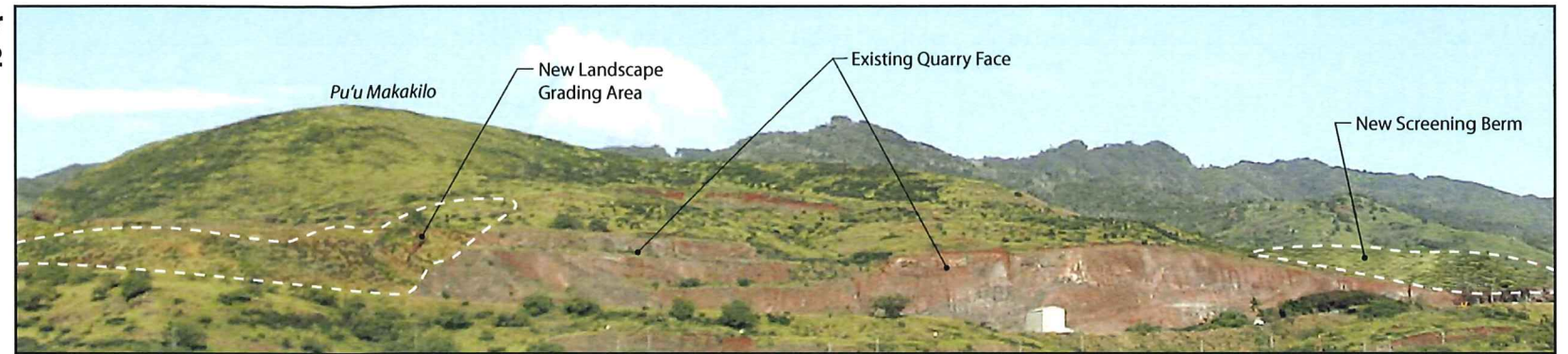
Final Quarry Phase—Year 2032



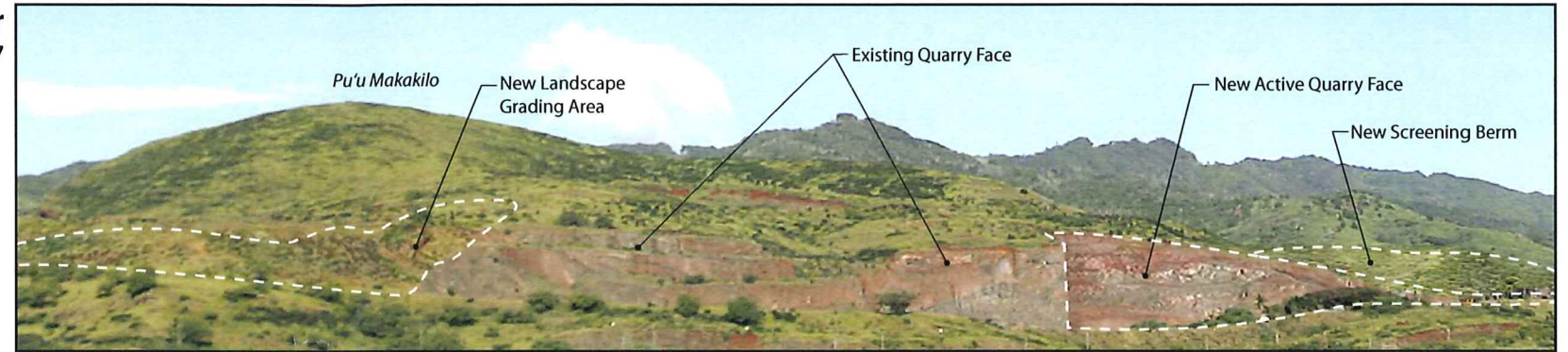
Final Renaturalization—Year 2038

### Visual Model of Quarry Activity in 5-Year Stages

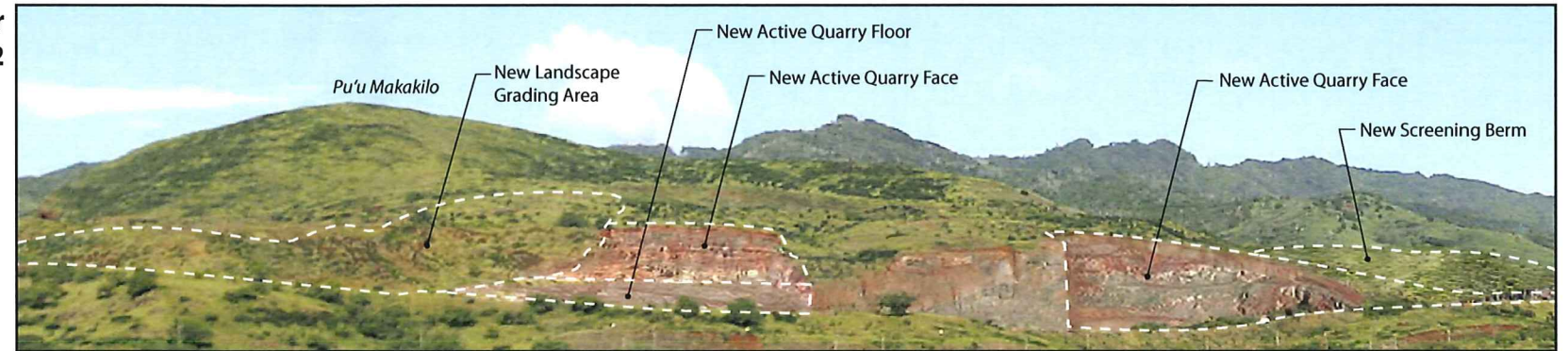
Year 2012



Year 2017



Year 2022



Year 2027

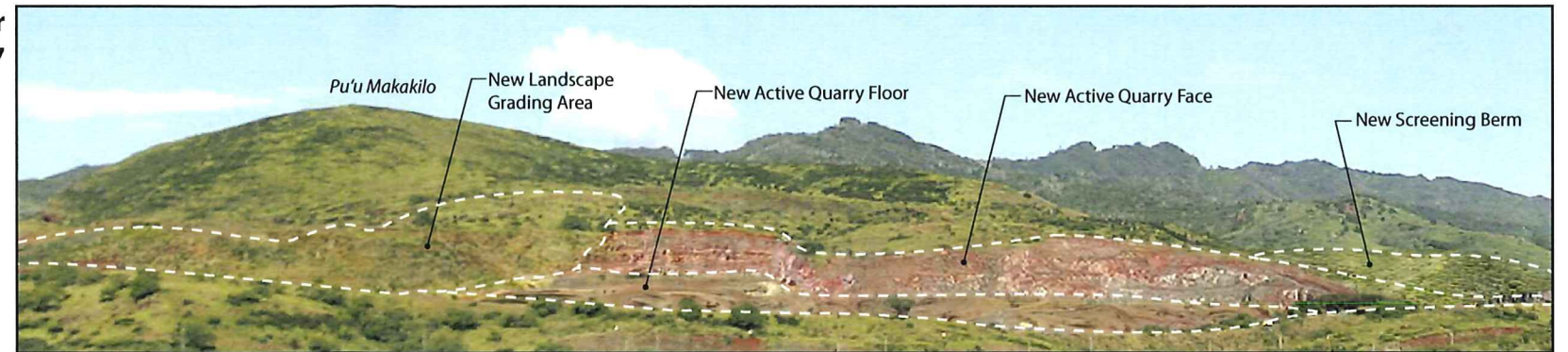
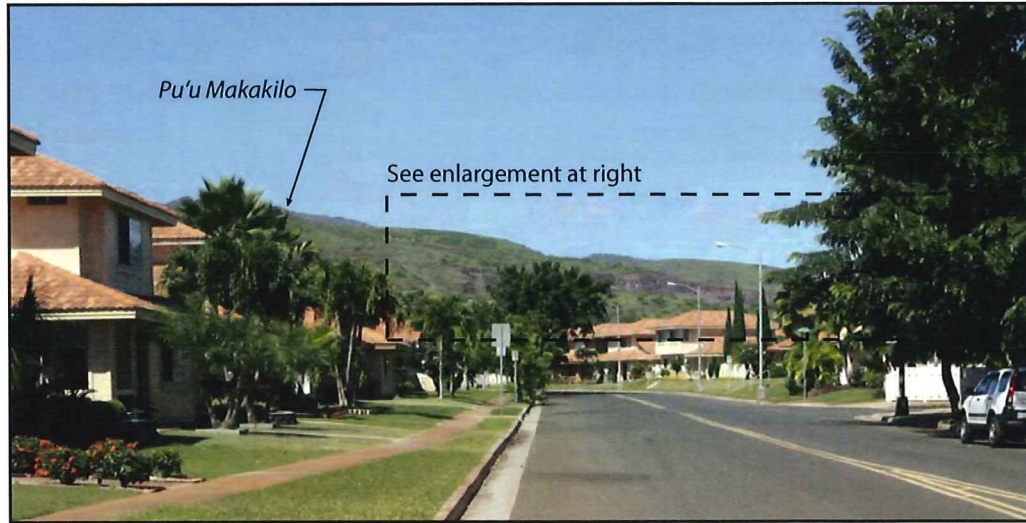
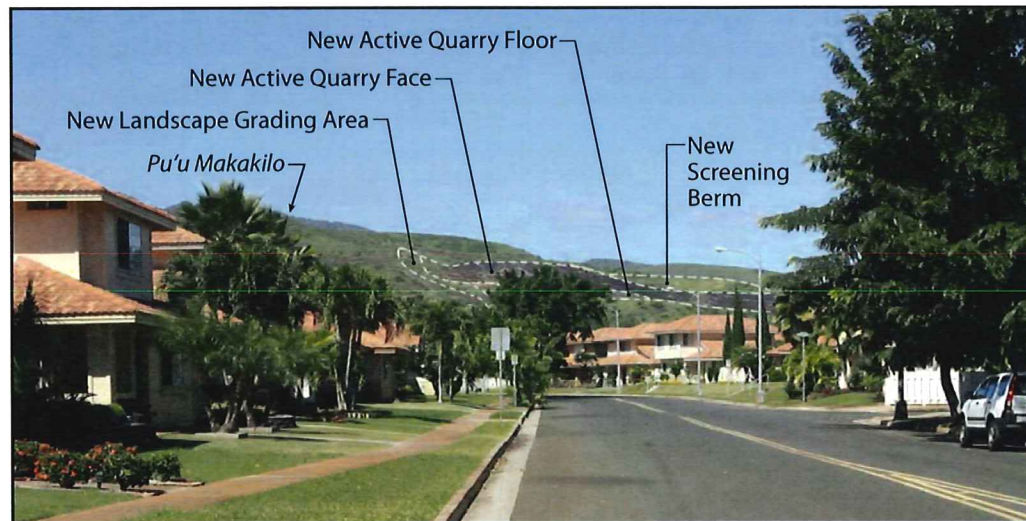


Exhibit 2-6  
VIEW FROM KAPOLEI GOLF COURSE

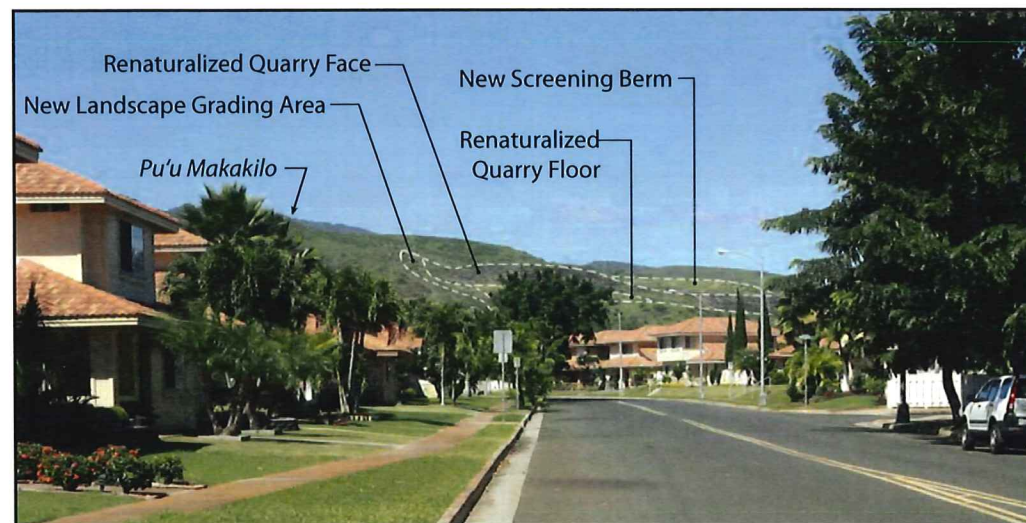




Existing



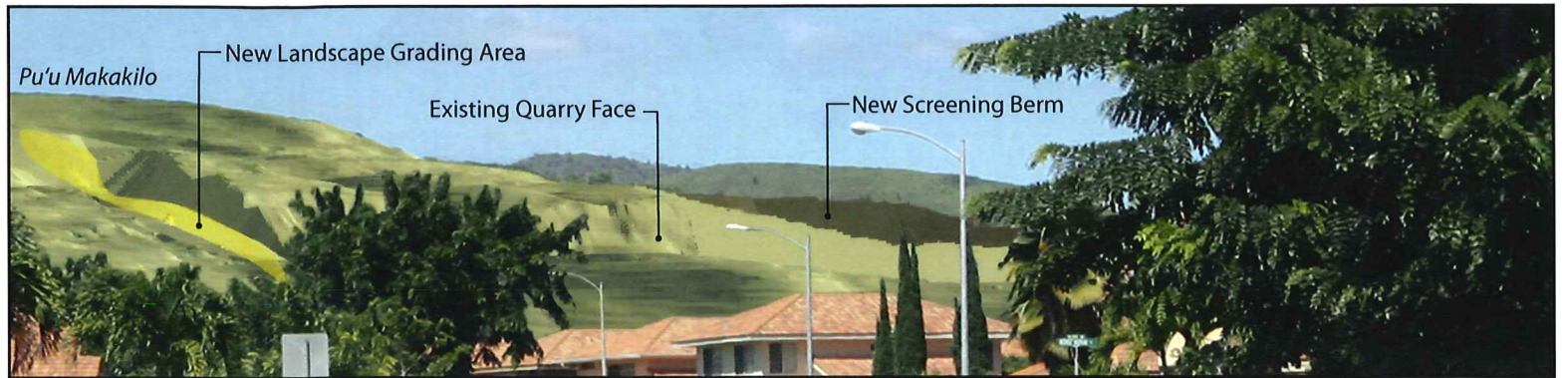
Final Quarry Phase—Year 2032



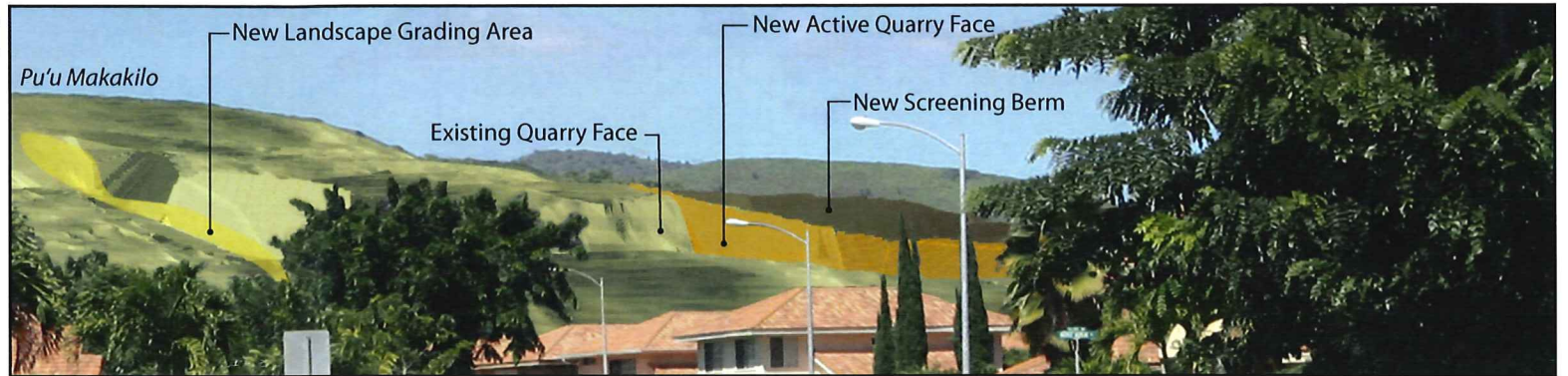
Final Renaturalization—Year 2038

### Visual Model of Quarry Activity in 5-Year Stages

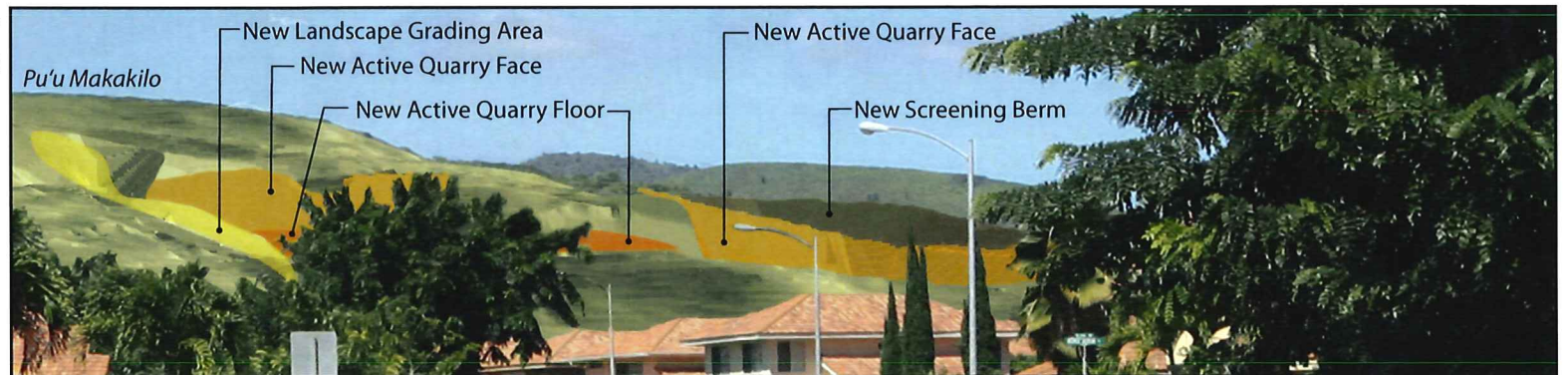
Year 2012



Year 2017



Year 2022



Year 2027

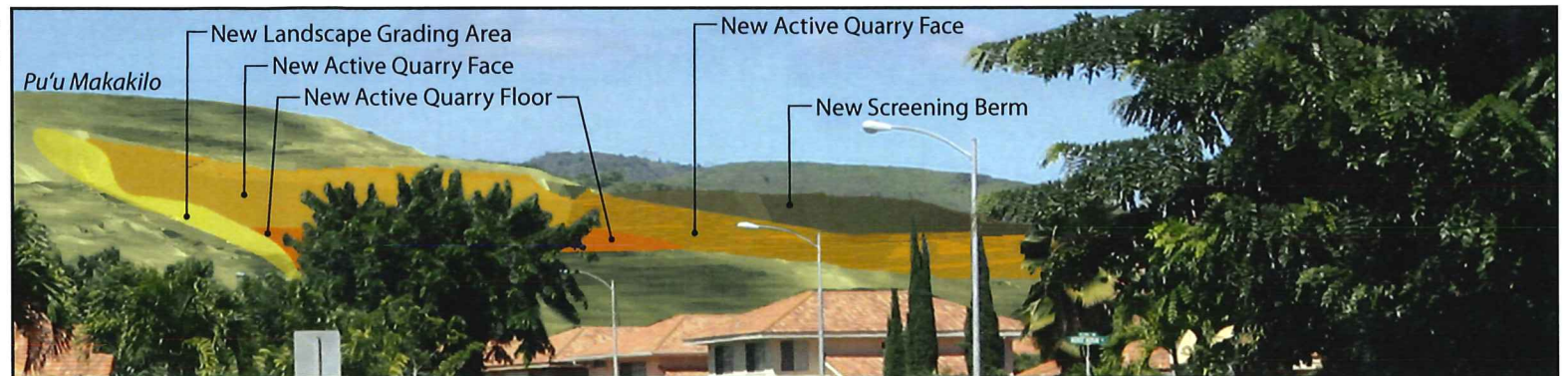
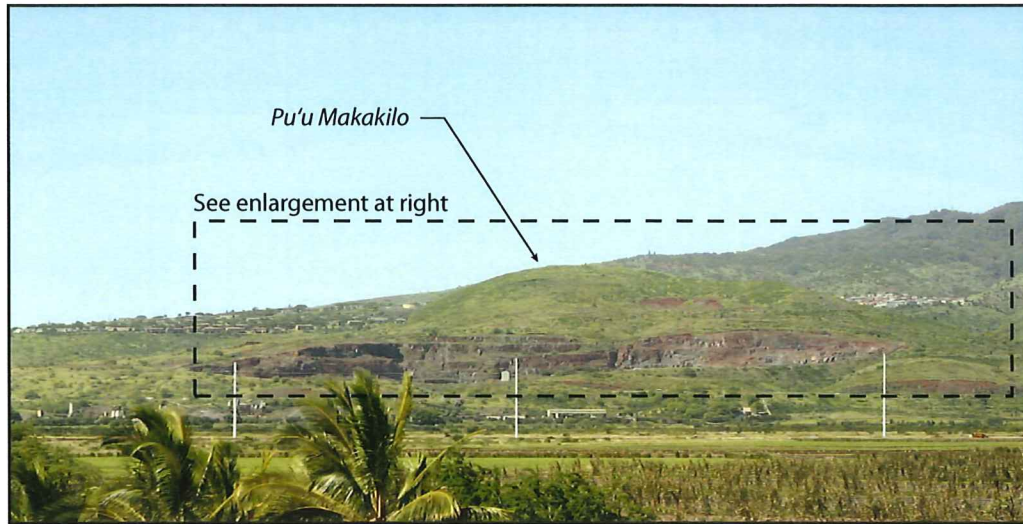
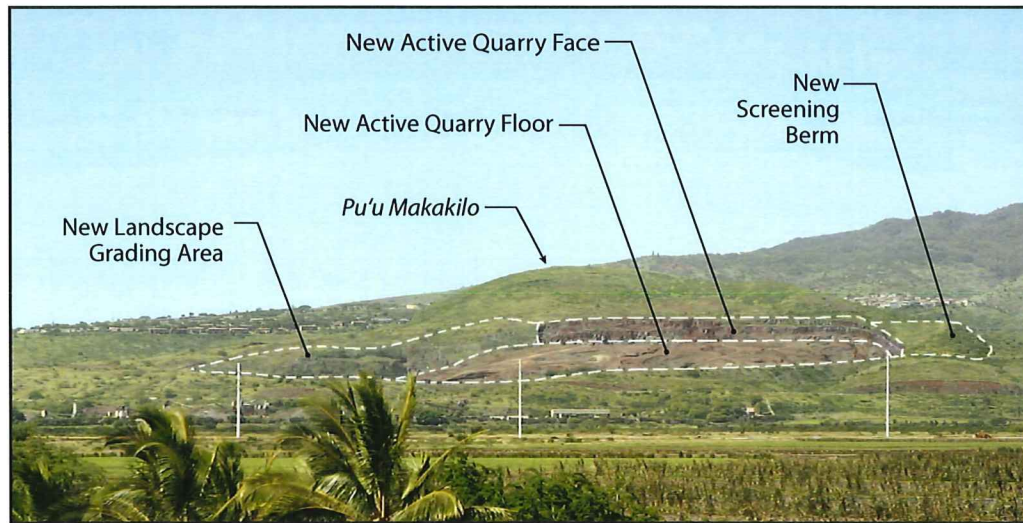


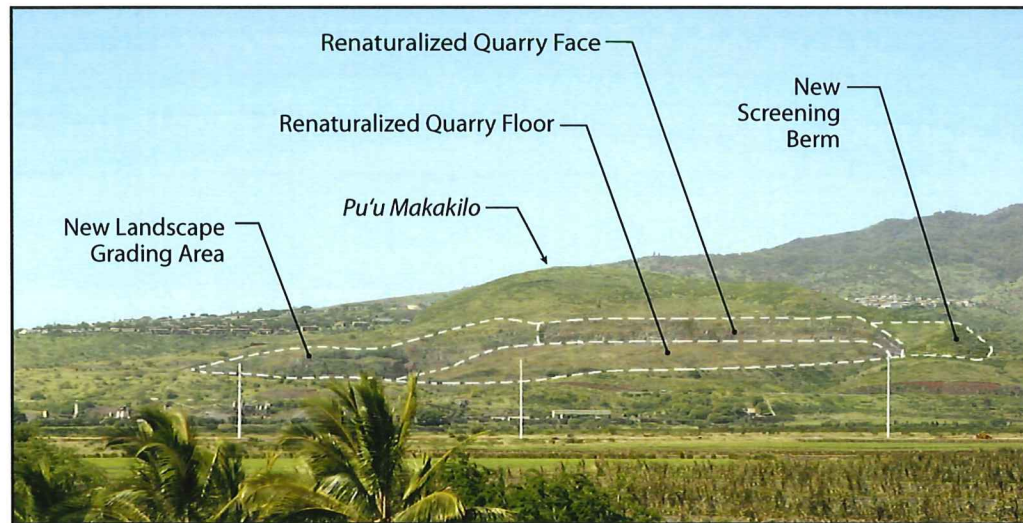
Exhibit 2-7  
VIEW FROM VILLAGES OF KAPOLEI



Existing

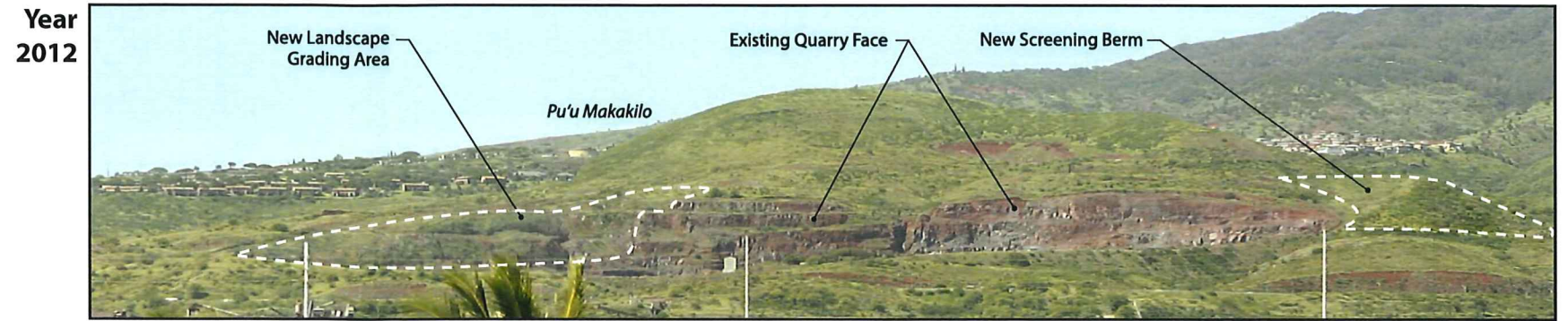


Final Quarry Phase—Year 2032

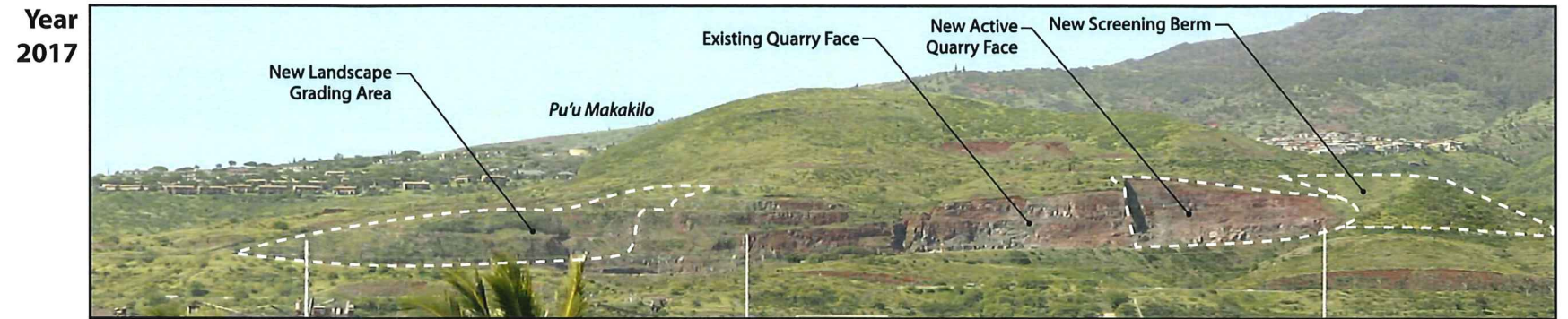


Final Renaturalization—Year 2038

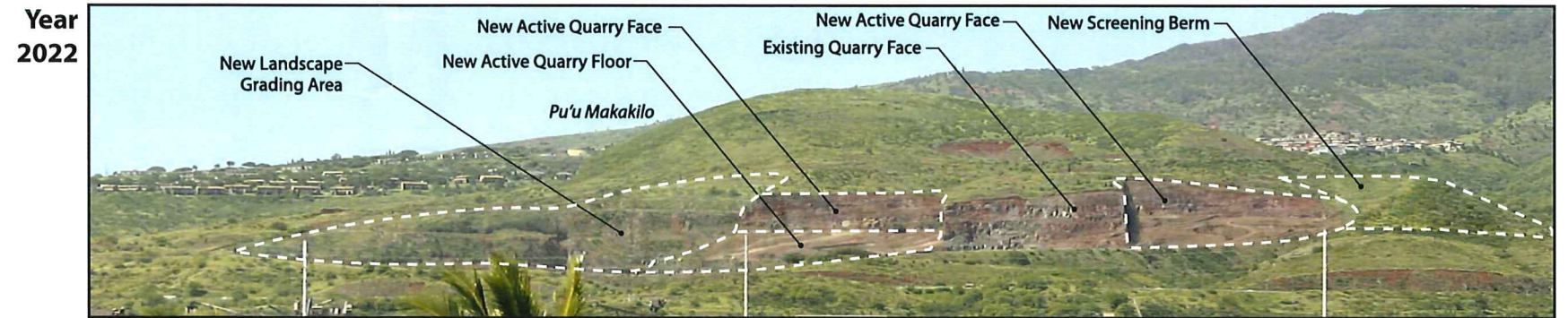
### Visual Model of Quarry Activity in 5-Year Stages



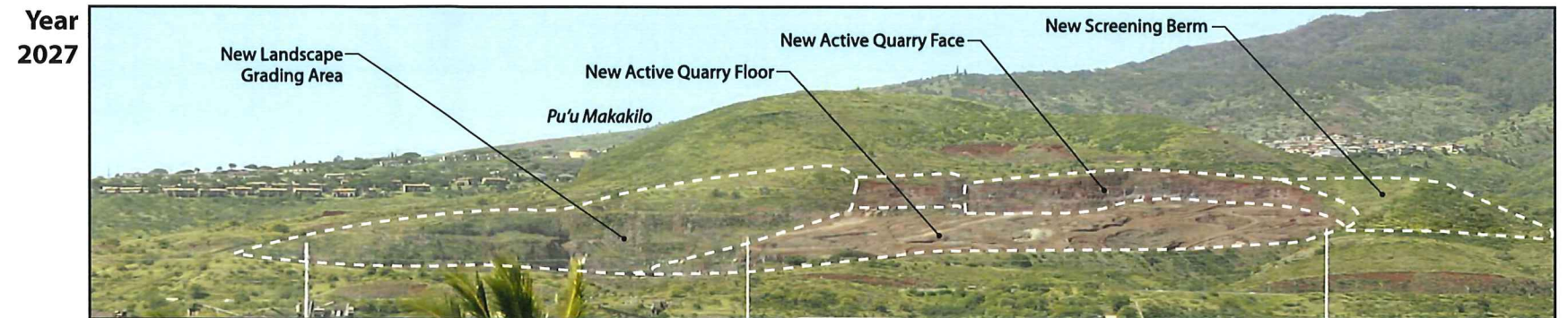
Year 2012



Year 2017



Year 2022

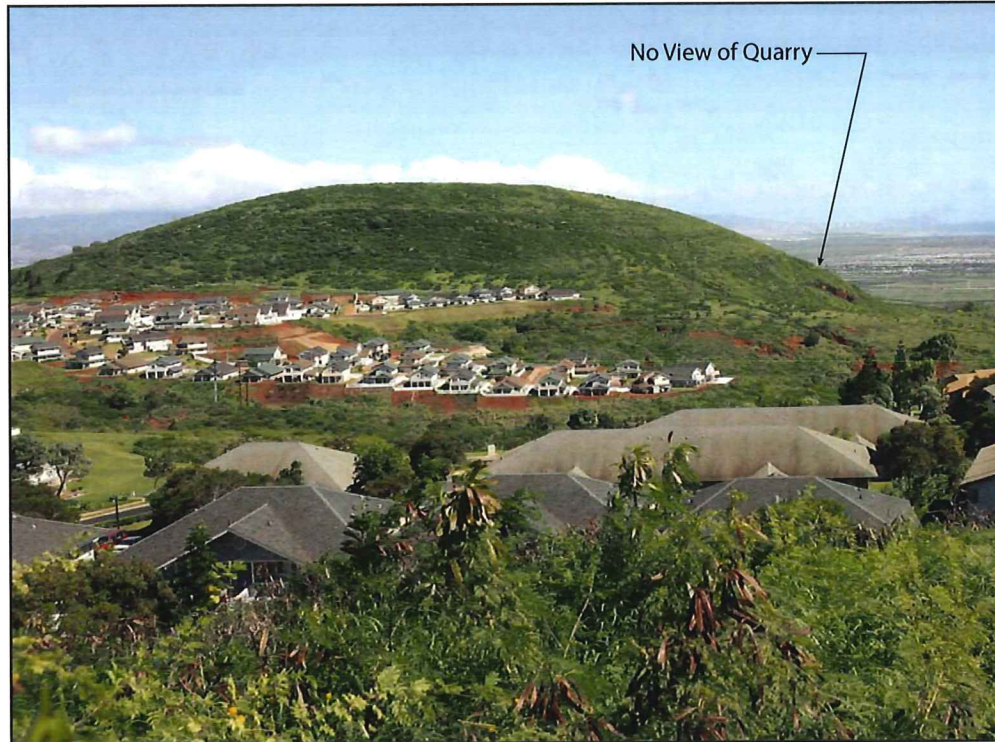


Year 2027

Exhibit 2-8  
VIEW FROM EWA GOLF COURSE



**Existing**

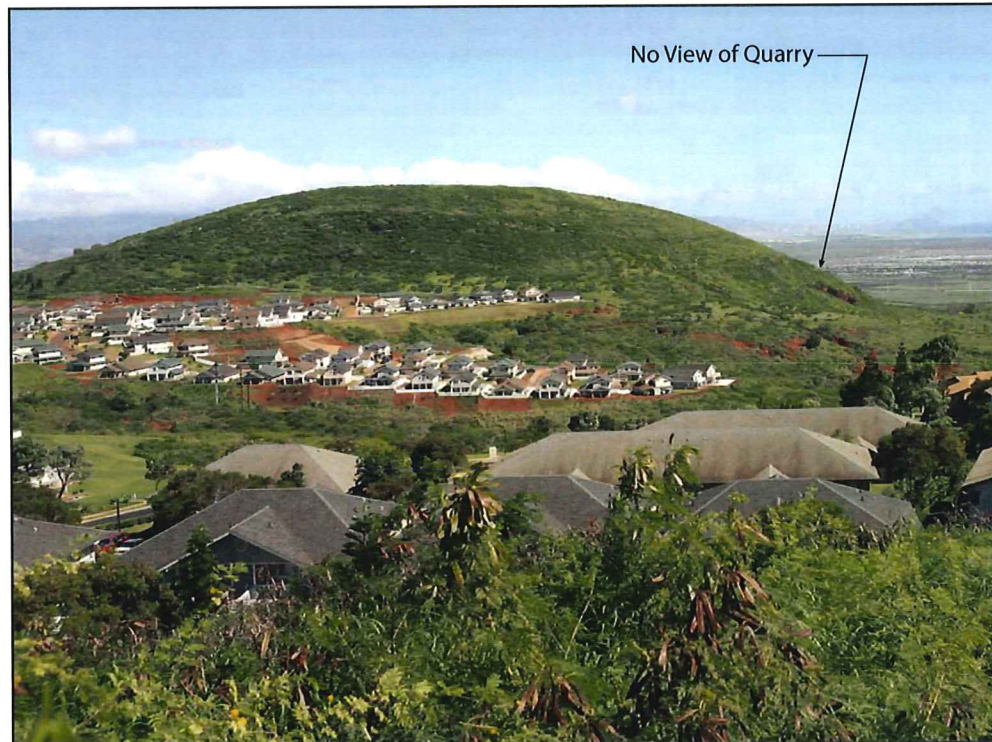


**Final Quarry Phase**

**Exhibit 2-9  
VIEW FROM UPPER MAKAKILO DRIVE**



**Existing**

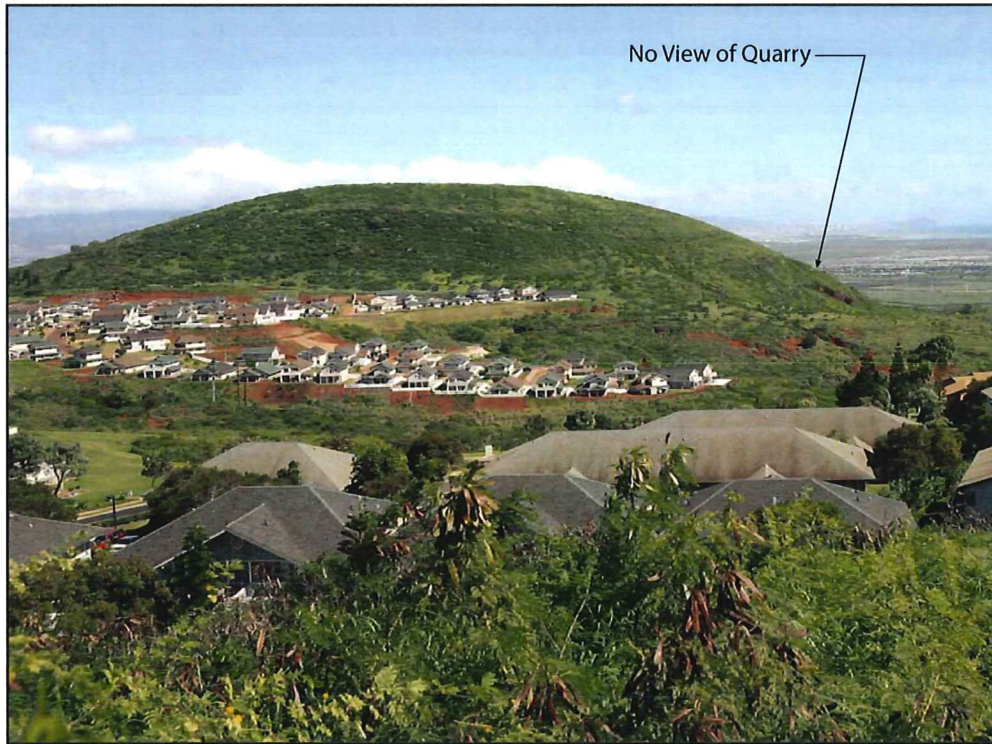


**Final Quarry Phase**

**Exhibit 2-9  
VIEW FROM UPPER MAKAKILO DRIVE**



**Existing**



**Final Quarry Phase**

**Exhibit 2-9  
VIEW FROM UPPER MAKAKILO DRIVE**



Buffel Grass



Buffel Grass



Buffel Grass



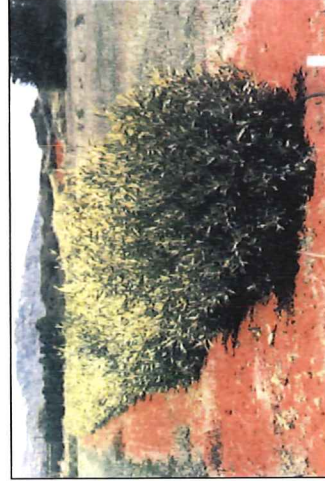
Sun Hemp



Redtop Grass



Opiuma



A'alii



Kiawe



Wili-Wili



### Exhibit 3-0 PLANT PALETTE

Upper Mitigation Plan 03  
Makakilo Quarry—Grace Pacific Corporation  
April 2007

REVEGETATION PLAN																				
Area		Schedule				Cost Estimates - current \$							Irrigation System (sq. ft.)				Water Usage			
start date	end date	total acres	acres per year	Grassing (sq. ft.)	Unit Cost	Sub-Total Grassing	Trees	Unit Cost	Sub-Total Trees	Shrubs	Unit Cost	Sub-Total Shrubs	Irrigation System (sq. ft.)	Unit Cost	Sub-Total Irrigation System	Total Cost	Water Use Year 1 (gal/day)	Water Use Year 2 (gal/day)		
Processing Site																				
Processing Area	2028	20	5	871,200	\$ 0.12	\$ 104,544										\$ 165,528	135,762	67,881		
Plant Site	2034	12	12	522,720	\$ 0.12	\$ 62,726										\$ 99,317	81,457	40,729		
Southwest Grading		32		1,393,920		\$ 167,270										\$ 264,845	217,219	108,610		
Northeast Berm																				
PMI 34 acres	2008	8	4	348,480	\$ 0.12	\$ 41,818	100	\$ 90	\$ 9,000	200	\$ 15	\$ 3,000	348,480	\$ 0.07	\$ 24,394	\$ 78,211	54,305	27,152		
	2008	12	4	479,160	\$ 0.12	\$ 57,499	100	\$ 90	\$ 9,000	300	\$ 15	\$ 4,500	479,160	\$ 0.07	\$ 33,541	\$ 104,540	74,669	37,335		
PMI Floor, Mauka	2034	34	8.5	1,481,040	\$ 0.12	\$ 177,725										\$ 281,398	230,795	115,398		
Existing Quarry		54		2,308,680		\$ 277,042										\$ 464,149	359,769	179,895		
Quarry Floor	2012	86	4.3	3,746,160	\$ 0.12	\$ 449,539										\$ 711,770	583,777	291,888		
Quarry Floor	2034	8	8	348,480	\$ 0.12	\$ 41,818										\$ 66,211	54,305	27,152		
		94		4,094,640		\$ 491,357										\$ 777,982	638,081	319,041		
GROW-IN WATER USAGE (GPD)																				
year	Processing Site	Southwest Grading	Northeast Berm	Existing Floor	PMI Floor, Mauka face	total GPD														
2008		13	20			33														
2009		20	30			50														
2010		20	30			50														
2011		20	30			50														
2012		7	10	27		44														
2013				43		43														
2014				43		43														
2015				43		43														
2016				43		43														
2017				43		43														
2018				43		43														
2019				43		43														
2020				43		43														
2021				43		43														
2022				43		43														
2023				43		43														
2024				43		43														
2025				43		43														
2026				43		43														
2027				43		43														
2028	33			43		76														
2029	50			43		93														
2030	50			43		93														
2031	50			43		93														
2032	17			16		33														
2033	80			53		133														
2034	40			27		124														
2035						85														
2036						85														
2037						85														
2038						28														
	320	80	120	940	340	1,800														

M:\Makakilo Quarry\2003335800\_CAD\Drainage Report Expansion 2006\earthwork exhibit\vegetation exhibit.dwg

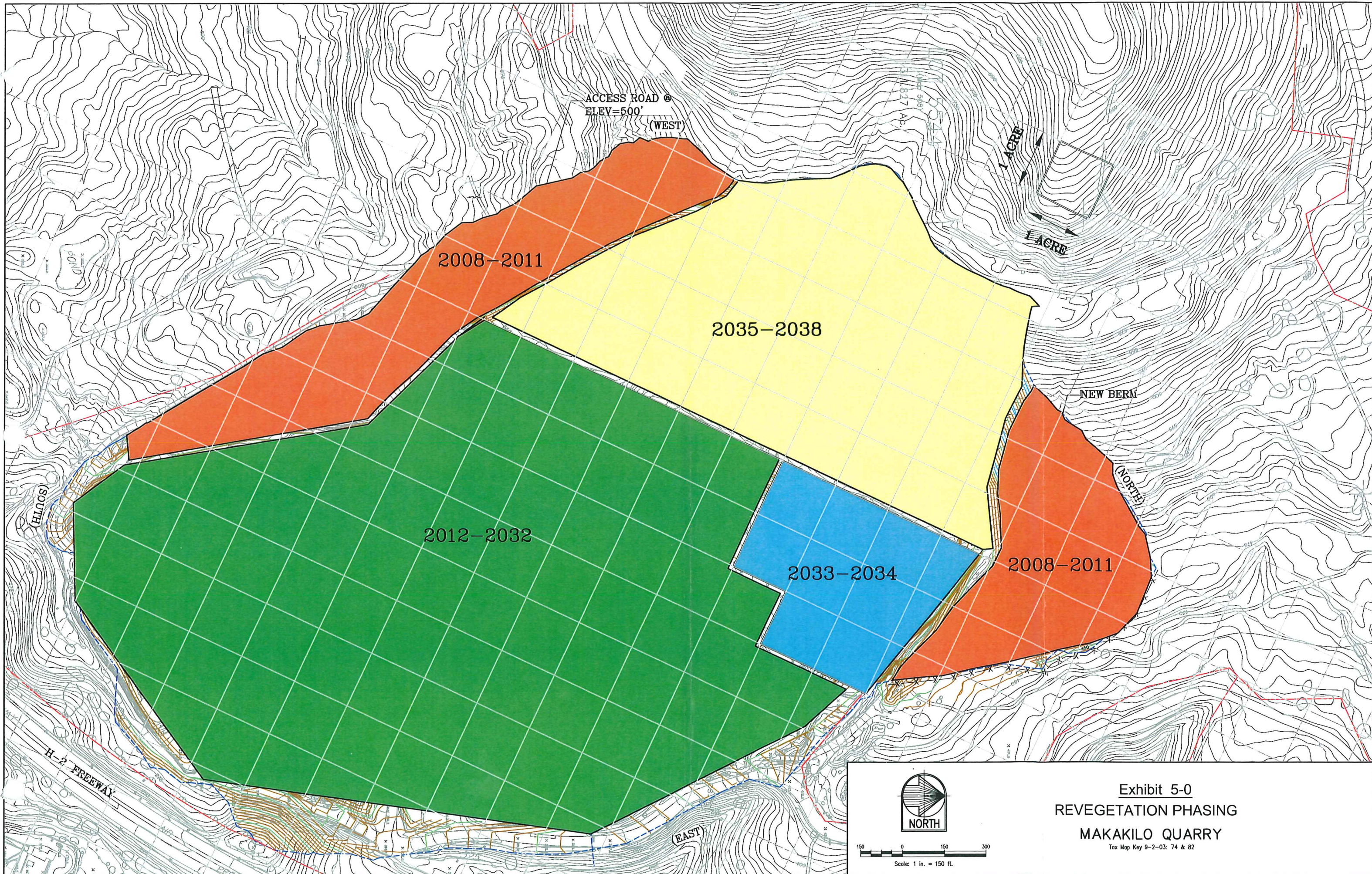
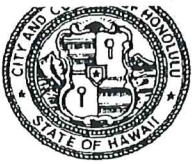


Exhibit 5-0  
REVEGETATION PHASING  
MAKAKILO QUARRY  
Tax Map Key 9-2-03: 74 & 82



# **APPENDIX F**

**This section intentionally left blank.**



# CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET \* HONOLULU, HAWAII 96813  
PHONE: (808) 523-4921 \* FAX: (808) 527-6743  
DEPT. WEB SITE: [www.honolulu.gov](http://www.honolulu.gov) \* CITY WEB SITE: [www.honolulu.gov](http://www.honolulu.gov)

PAID RECEIPT

BUSINESS ACTUAL TIME DRW  
3/08/2007 3/07/2007 11:05:22 3D  
REG DT01 WALKIN PA PA  
RECEIPT # 207148 3/07/2007 OFLN  
D# 9019 4244 GRADING EXCAVATION & FILL  
FISCAL YR: 2007 FUND: 120 HIGHWAY FUND  
Recpt Tot \$2,574.00  
\$2,574.00 OK \$ .00 CA

# GRADING PERMIT

PERMIT NUMBER  
**GP2007-02-0112**

Permission is hereby given to do grading work in conformity with Chapter 14, R.O.H. 1990, As Amended, as follows:

TAX MAP KEY				LAND USE	EST. QUANTITY	PERMIT FEE
Zone	Section	Plat	Parcel(s)		Excavation (Cu. Yd.)	\$2,574.00
9	2	003	074	AG-2 GENERAL AGRICULTURAL DIST	8,000	
					Fill (Cu. Yd.)	
					25,500	

Project Name: **Makakilo Golf Course**  
Located at: **1130 Pueonani - Makakilo Golf Course**  
Category: **5**

Related Job: **GP2003-12-0864**  
**Grading without a permit**

TECP on file

BORROW (Source of Material)

DISPOSAL

Surety: **Bond** Date: **September 25, 1995**  
Amt.: **\$2,480,000.00** Filed with: **GP-94-0799**

Site: **Makakilo Quarry**

**Onsite**

Co.: **Seaboard Surety Company**

Material: **Silty clay**

**Soil**

No.: **33058595**

Total Lot Area: **13,583,184 sq. ft.**

Work Area: **7,932,276 sq. ft.**

To be inspected by: **Site Development Division**  
(Call 523-4881 for inspection)

Est. Starting Date: **Feb 20, 2007**

Est. Completion Date: **Feb 19, 2008**

Purpose of Work: **Site grading per appd plan**

OWNER

ENGINEER/PLAN MAKER

CONTRACTOR

**F. Makakilo Inc**  
**PO Box 78**  
**Honolulu, HI 96810**  
**(808) 487-7916**

**CHUNG JOHN C H**  
**Belt Collins Hawaii Ltd.**  
**2153 N KING ST #200**  
**HONOLULU, HI 96819**  
**(808) 521-5361, (808) 538-7819**

**GRACE PACIFIC CORPORATION**  
**949 Kamokila Blvd**  
**Kapolei, HI 96707**  
**(808) 674-5201, (808) 674-8383**

**674-5201 (ROBERT CREPS)**

Contractor shall notify this office two working days before commencing any work and arrange for necessary inspectional services. Grading work which involves contaminated and/or hazardous materials shall be done in conformance with applicable State and Federal requirements. Contact the Solid & Hazardous Waste Branch, State Department of Health for more information at 586-4226.

Authorization from Permittee to act for Owner on file?: **Yes**  
Permittee: **Puu Makakilo Inc, Robert Creps (808) 487-7916**

*Robert Creps* 3/7/07  
Signature of Owner/Developer/Authorized Rep. Date

Permission is hereby given to do the above work according to the conditions hereon and according to the approved plans and specifications pertaining thereto, subject to compliance with Chapter 14, R.O.H. 1990, As Amended.

Remarks: **Cont. GP2003-12-0864, 2002-10-0629,**  
**2001100491, 1999100514, 983818, 973164, 962483,**  
**951755, 940799, 939755, 8718, 7791, 6861**

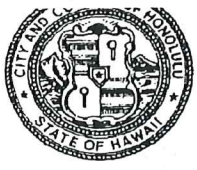
Issued By:  
*[Signature]* March 07, 2007  
For Director, DPP Date

**THIS PERMIT WILL EXPIRE UNLESS WORK IS STARTED WITHIN 90 DAYS FROM DATE OF ISSUE; OR IF WORK IS SUSPENDED OR ABANDONED FOR 60 DAYS OR MORE AFTER WORK IS BEGUN; OR ONE YEAR FROM DATE OF ISSUE. REPORT AFTER GRADING IS REQUIRED FOR PERMIT CLOSURE UNLESS OTHERWISE NOTIFIED.**

I hereby certify that all work as requested above has been completed in conformity with Chapter 14, R.O.H. 1990, As Amended, and in accordance with the approved plans and specifications.

Permittee: \_\_\_\_\_ Approved By: \_\_\_\_\_  
Signature of Owner/Developer/Authorized Rep. Date Authorized Signature Date

Report After Grading required for permit closure?: **Yes** Date Report Filed: \_\_\_\_\_ 25769706 009659211-013



# CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET \* HONOLULU, HAWAII 96813  
PHONE: (808) 523-4921 \* FAX: (808) 527-6743  
DEPT. WEB SITE: [www.honolulu.gov](http://www.honolulu.gov) \* CITY WEB SITE: [www.honolulu.gov](http://www.honolulu.gov)

PAID RECEIPT

BUSINESS ACTUAL TIME DRW  
3/08/2007 3/07/2007 11:04:44 30  
REG DT01 WALKIN PA PA  
RECEIPT # 207167 3/07/2007 OFLN  
De # 9019 6244 GRADING EXCAVATION & FILL  
FISCAL YR: 2007 FUND: 120 HIGHWAY FUND  
Rcpt Tot \$3,600.00  
\$3,600.00 OK \$ .00 DA

# GRADING PERMIT

PERMIT NUMBER  
**GP2007-02-0111**



Permission is hereby given to do grading work in conformity with Chapter 14, R.O.H. 1990, As Amended, as follows:

TAX MAP KEY				LAND USE	EST. QUANTITY	PERMIT FEE
Zone	Section	Plat	Parcel(s)			
9	2	003	074	AG-2 GENERAL AGRICULTURAL DIST	Excavation (Cu. Yd.) <b>3,680</b>	<b>\$3,600.00</b>
					Fill (Cu. Yd.) <b>44,490</b>	

Project Name: **MAKAKILO G/C - IRRIGATION PUMP STA.BLDG**  
Located at: **MAKAKILO G/C - ( 92-1130 Pueo Nani)**  
Category: **4**

Related Job: **GP2003-12-0865**  
**Grading without a permit**  
Plan approved: **TECP on file**  
Surety: **Bond** Date: **January 16, 1996**  
Amt.: **\$177,960.00** Filed with: **GP-96-1975**  
Co.: **Seaboard Surety Company**  
No.: **33813996**  
To be inspected by: **Site Development Division**  
(Call 523-4881 for inspection)

BORROW (Source of Material)      DISPOSAL  
Site: **Onsite**      **Onsite**  
Material: **Soil**      **Soil**  
Total Lot Area: **13,583,184 sq. ft.**      Work Area: **82,764 sq. ft.**  
Est. Starting Date: **Feb 20, 2007**      Est. Completion Date: **Feb 19, 2008**  
Purpose of Work: **Site Grading per appd plan**

<u>OWNER</u>	<u>ENGINEER/PLAN MAKER</u>	<u>CONTRACTOR</u>
<b>F Makakilo Inc</b>	<b>CHUNG JOHN C H</b>	<b>GRACE PACIFIC CORPORATION</b>
<b>PO Box 78</b>	<b>Belt Collins Hawaii Ltd.</b>	<b>949 Kamokila Blvd</b>
<b>Honolulu, HI 96810</b>	<b>2153 N KING ST #200</b>	<b>Kapolei, HI 96707</b>
<b>(808) 487-7916</b>	<b>HONOLULU, HI 96819</b>	<b>(808) 674-5201, (808) 674-8383</b>
	<b>(808) 521-5361, (808) 538-7819</b>	

Contractor shall notify this office **two working days** before commencing any work and arrange for necessary inspectional services. Grading work which involves contaminated and/or hazardous materials shall be done in conformance with applicable State and Federal requirements. Contact the Solid & Hazardous Waste Branch, State Department of Health for more information at 586-4226.

Authorization from Permittee to act for Owner on file?: **Yes**  
Permittee: **Puu Makakilo Inc, ROBERT CREPS (808) 487-7916** *Robert Creps* 3/7/07  
Signature of Owner/Developer/Authorized Rep. Date

Permission is hereby given to do the above work according to the conditions hereon and according to the approved plans and specifications pertaining thereto, subject to compliance with Chapter 14, R.O.H. 1990, As Amended.  
Remarks: **Cont of GP2003-12-0865, GP2002-10-0630, 2000-10-0488, 990017, 983371, 972711, 961975, 9916, 8872.**  
Issued By: *[Signature]* March 07, 2007  
Fof Director, DPP Date

**THIS PERMIT WILL EXPIRE UNLESS WORK IS STARTED WITHIN 90 DAYS FROM DATE OF ISSUE; OR IF WORK IS SUSPENDED OR ABANDONED FOR 60 DAYS OR MORE AFTER WORK IS BEGUN; OR ONE YEAR FROM DATE OF ISSUE. REPORT AFTER GRADING IS REQUIRED FOR PERMIT CLOSURE UNLESS OTHERWISE NOTIFIED.**

I hereby certify that all work as requested above **has been completed** in conformity with Chapter 14, R.O.H. 1990, As Amended, and in accordance with the approved plans and specifications.  
Permittee: \_\_\_\_\_ Approved By: \_\_\_\_\_  
Signature of Owner/Developer/Authorized Rep. Date Authorized Signature Date  
Report After Grading required for permit closure?: \_\_\_\_\_ Date Report Filed: \_\_\_\_\_ 25769338 009659654-009



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 9

75 Hawthorne Street

San Francisco, California 94105-3901

Mail Code: WTR-9

March 9, 2006

Grace Pacific Corporation  
Christopher Steele, Environmental Compliance Manager  
P.O. Box 78  
Honolulu, HI 96810

Re: Closure of Large Capacity Cesspool at Grace Makakilo Lower Quarry, 91-920 Farrington Highway; TMK 1-9-1-016-004

Dear Mr. Steele:

This is in response to the letter dated May 23, 2005, regarding closure of the large capacity cesspool at the above referenced address. Thank you for your closure information. Based on the information you have submitted, and information received from the Hawaii Department of Health, it appears that the cesspool has been closed in accordance with federal regulations and state guidelines. We recognize your efforts, and we will update our records to reflect that your facility is in compliance with the Safe Drinking Water Act's Underground Injection Control Program's large capacity cesspool closure requirements. If there are any changes or any additional information that would be relevant to this determination, you are required to advise EPA of the information.

Your efforts to comply with the Safe Drinking Water Act UIC regulations will help to ensure the protection of water resources in Hawaii. If you have any further questions, you may contact me at (415) 972-3538 or my colleague, Shannon FitzGerald at (415) 972-3525, or via email at [bose.laura@epa.gov](mailto:bose.laura@epa.gov) and [fitzgerald.shannon@epa.gov](mailto:fitzgerald.shannon@epa.gov).

Sincerely,

A handwritten signature in cursive script that reads "Laura Bose".

Laura Tom Bose  
Senior Policy Advisor

Exhibit M

LINDA LINGLE  
GOVERNOR OF HAWAII



RECEIVED

CHIYOME LEINAALA FUKINO, M.D.  
DIRECTOR OF HEALTH

2005 MAR 25 PM 2:07

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

March 22, 2005

Mr. Walter Billingsley, P.E.  
Belt Collins  
2153 North King St., Suite 200  
Honolulu, Hawaii 96819

Dear Mr. Billingsley:

Subject: Individual Wastewater System (IWS) Plans for  
**Grace Pacific Corp.**  
Project Site: 91-920 Farrington Hwy., Kapolei, Oahu  
TMK: (1) 9-1-16: 4  
IWS File No.: 4050

IWS plans consisting of three septic tanks and a converted seepage pit serving restrooms for a main office, truck scale station and batch plant located at the above site have been reviewed by the Wastewater Branch for conformance to applicable provisions of Hawaii Administrative Rules, Title 11, Chapter 62, entitled "Wastewater Systems." The IWS plan conforms to applicable provisions of Chapter 11-62.

The Department of Health will sign an applicable county building permit application provided that all information submitted as part of the IWS plan and county building permit application are consistent with each other and meet applicable provisions of Chapter 11-62 at the time of permit signature.

As the professional engineer responsible for the design of the above wastewater plan, it is your responsibility to inform the owner/lessee of the property that a) the IWS plans must be attached to each set of permit construction plans, b) the IWS must be installed by a licensed contractor, c) inspected by the engineer, and d) authorized in writing by the Department before use.

Should you have any questions, please feel free to contact Johnny Ong of the Wastewater Branch at 586-4294.

Sincerely,

A handwritten signature in black ink, appearing to read "Harold K. Yee".

HAROLD K. YEE, P.E.  
Chief, Wastewater Branch

JO:erm

Attachment

Exhibit M

LINDA LINGLE  
OFFICER OF HAWAII

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT  
P O BOX 621  
HONOLULU, HAWAII 96809

PETER T. YOUNG  
CHAIRPERSONMEREDITH J. CHING  
CLAYTON W. DELA CRUZ  
JAMES A. FRAZIER  
CHIYOME L. FUKINO, M.D.  
STEPHANIE A. WYHALENERNEST Y.W. LAU  
DEPUTY DIRECTOR

October 31, 2003

Ref:664.wup

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

Mr. Robert Singlehurst  
Grace Pacific Corporation  
P.O. Box 78  
Honolulu, HI 96810

Dear Mr. Singlehurst:

Approval of Water Use Permit for Well No. 2104-01  
Ewa-Kunia Ground-Water Management Area, Oahu

This letter transmits your water use permit for Lower Makakilo Well (Well No.2104-01) for additional use of 0.044 million gallons per day (mgd) of water on a 12-month moving average basis that was approved by the Commission on Water Resource Management (Commission) on October 29, 2003. As part of the Commission's approval, the following special conditions were added and are part of your permit under Standard Permit Condition 19:

Special Conditions

1. Should an alternate permanent source of water be found for this use, the Commission reserves the right to revoke this permit, after a hearing.
2. The water use permit shall be an interim permit. The duration of the interim permit shall be until treated wastewater is available and acceptable for use. The permittee shall continue discussions with Honolulu Board of Water Supply regarding the use of reclaimed water.
3. The permittee is put on notice that this is a qualified approval in that this permit may be modified or revoked prior to the expiration of the interim permit if the Commission decides that the use of additional basal ground water for dust control and landscape irrigation is not a reasonable-beneficial use.
4. In the event that the tax map key at the location of the water use is changed, the permittee shall notify the Commission in writing of the tax map key change within thirty (30) days after the permittee receives notice of the tax map key change.
5. The permittee is encouraged to use drought-tolerant landscaping to conserve water.

Mr. Robert Singlehurst  
Page 2  
October 31, 2003

Enclosed with this letter of approval are the following:

1. Your water use permit
2. Your official monthly water use report form

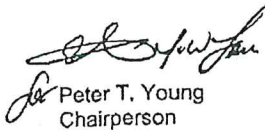
Please be sure to read the conditions of your approved permit.

We draw your attention to two key conditions of your permit that require your response. First, you are required to keep a record of your monthly total pumpage, water level, salinity, and water temperature. This information must be submitted to the Commission on a regular monthly basis using the enclosed water use report form. You should make copies of the enclosed report form as needed.

Second, you are required to submit a water shortage plan to the Commission within thirty (30) days of the issuance date of this permit. Your water shortage plan simply identifies what you are willing to do should the Commission declare a water shortage situation in the Ewa-Kunia Ground-Water Management Area and can be as short as a one page letter. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which should accommodate, include, and be consistent with your plans. Therefore, your help, by submitting your water shortage plan, is greatly needed in formulating the Commission's overall Water Shortage Plan.

If you have any questions, please call Lenore Y. Nakama of the Commission staff at 587-0218.

Sincerely,



Peter T. Young  
Chairperson

Attachments

c: The Estate of James Campbell



LINDA LINGLE  
GOVERNOR OF HAWAII



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

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

In reply, please refer to:  
File:

November 9, 2004

**CERTIFIED MAIL**  
**RETURN RECEIPT REQUESTED**  
(7003 2260 0006 9848 0238)

04-996E CAB  
File No. 0045-02

Mr. Robert Creps  
Senior Vice President  
Grace Pacific Corporation  
P. O. Box 78  
Honolulu, Hawaii 96810

Dear Mr. Creps:

**Subject: Renewal of Temporary Covered Source Permit (CSP) No. 0045-02-CT**  
**Renewal Application No. 0045-14**  
**Grace Pacific Corporation**  
**334 TPH Hot Mix Asphalt Facility**  
**Located at: 91-920 Farrington Highway, Kapolei, Oahu**  
**Date of Expiration: November 8, 2009**

The subject Temporary Covered Source Permit is issued in accordance with Hawaii Administrative Rules, Title 11, Chapter 60.1. The permit allows the continued operation of the existing hot mix asphalt plant with drum-mixer, diesel engine generator, and Reclaimed Asphalt Paving and aggregate processing plants.

Changes were made to update the permit condition language and/or to clarify existing conditions and Attachment II - INSIG: Special Conditions - Insignificant Activities was added to reflect the latest Hawaii Administrative Rule changes regarding insignificant activities.

This Temporary Covered Source Permit No. 0045-02-CT supersedes CSP No. 0045-02-CT, issued May 3, 2000, and amended March 5, 2002, May 10, 2002, and January 26, 2004, in its entirety.

The issuance of this permit is based on the plans, specifications, and information you submitted as part of your application received April 15, 2004, and additional information received on May 24 and 25, 2004, and June 14, 2004.

The Covered Source Permit renewal is issued subject to the conditions/requirements set forth in the following Attachments:

Mr. Robert Creps  
November 9, 2004  
Page 2

Attachment I: Standard Conditions  
Attachment II: Special Conditions  
Attachment II - INSIG: Special Conditions - Insignificant Activities  
Attachment III: Annual Fee Requirements  
Attachment IV: Annual Emissions Reporting Requirements  
Attachment V: Compliance Certification

The forms for submission are as follows:

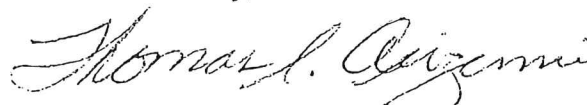
Monitoring/Annual Emissions Report Form: Fuel Consumption, Certification, and Operating Hours - Diesel Engine Generator  
Monitoring/Annual Emissions Report Form: Production, Fuel Consumption, Certification, and Operating Hours - Asphalt Plant  
Monitoring/Annual Emissions Report Form: Reclaimed Asphalt Paving  
Monitoring Report Form: Visible Emissions with the following enclosures:

- a. Visible Emissions Observation Form Requirements
- b. Visible Emissions Observation Form
- c. The Ringelmann Chart

Change of Location Request for a Temporary Source

This permit: (a) shall not in any manner affect the title of the premises upon which the equipment is to be located; (b) does not release the permittee from any liability for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment; and (c) in no manner implies or suggests that the Hawaii Department of Health, or its officers, agents, or employees, assumes any liability, directly or indirectly, for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment.

Sincerely,



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

MR:lk

Enclosures

c: CAB Enforcement Section  
Ronald Ho - CIP Coordinator

Exhibit O

LINDA LINGLE  
GOVERNOR OF HAWAII



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

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

In reply, please refer to:  
File:

September 20, 2005

**CERTIFIED MAIL**  
**RETURN RECEIPT REQUESTED**  
**(7002 0460 0002 3632 5002)**

05-936E CAB  
File No. 0045

Mr. Robert P. Singlehurst  
Vice President  
Grace Pacific Corporation  
P. O. Box 78  
Honolulu, Hawaii 96810

Dear Mr. Singlehurst:

**Subject: Covered Source Permit (CSP) No. 0045-01-C  
Application for Renewal No. 0045-15 and  
Significant Modification Nos. 0045-16 and 0045-17  
Grace Pacific Corporation  
400 TPH Non-Portable Plant, 150 TPH Screening Plant,  
600 TPH Screening Plant and 600 TPH Recycled Aggregate Plant  
with 1,000 kW Diesel Engine Generator  
Located at: 91-920 Farrington Highway, Kapolei, Oahu  
Date of Expiration: September 19, 2010**

The subject Covered Source Permit is issued in accordance with Hawaii Administrative Rules, Title 11, Chapter 60.1. The issuance of this permit renewal is based on the plans and specifications submitted as part of your April 29, 2004 renewal application, and significant modification applications submitted May 3 and 31, 2005. A receipt for the renewal filing fee of \$3,000.00 was mailed on November 22, 2004. A receipt for the significant modification filing fee of \$1,000.00 is enclosed. Also enclosed is a check that is being returned for one of the modification applications; only one \$1,000.00 is being charged because the two modification applications were processed together with the permit renewal.

This Covered Source Permit renewal supersedes CSP No. 0045-01-C, initially issued on May 2, 2000, and subsequent permit amendments issued on January 29, 2001, November 13, 2001, May 21, 2002, April 28, 2003, October 29, 2003, and July 6, 2004.

The Covered Source Permit renewal is issued subject to the conditions/requirements set forth in the following attachments:

- Attachment I: Standard Conditions
- Attachment II: Special Conditions
- Attachment II - INSIG: Special Conditions - Insignificant Activities
- Attachment III: Annual Fee Requirements
- Attachment IV: Annual Emissions Reporting Requirements

**Exhibit O**

Mr. Robert P. Singlehurst  
September 20, 2005  
Page 2

The forms for submission are as follows:

Compliance Certification Form  
Monitoring Report Form: Visible Emissions  
Monitoring Report Form: Operating Hours & Sulfur Content - 1,000 kW Diesel Engine Generator  
Monitoring Report Form: Production - 400 TPH Non-Portable Plant  
Monitoring Report Form: Operating Hours - 150 TPH Screening Plant  
Monitoring Report Form: Operating Hours - 600 TPH Screening Plant  
Annual Emissions Report Form: Stone Quarrying and Processing - 600 TPH Recycled Aggregate Plant  
Annual Emissions Report Form: 1,000 KW Diesel Engine Generator  
Annual Emissions Report Form: Stone Quarrying and Processing - 400 TPH Non-Portable Plant  
Annual Emissions Report Form: Stone Quarrying and Processing - 150 TPH Screening Plant  
Annual Emissions Report Form: Stone Quarrying and Processing - 600 TPH Screening Plant

This permit: (a) shall not in any manner affect the title of the premises upon which the equipment is to be located; (b) does not release the permittee from any liability for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment, and (c) in no manner implies or suggests that the Hawaii Department of Health, or its officers, agents, or employees, assumes any liability, directly or indirectly, for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment.

Sincerely,



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

Cl:lk

Enclosures

c: CAB Monitoring Section

LINDA LINGLE  
GOVERNOR OF HAWAII



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

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

In reply, please refer to:  
File:

April 5, 2004

**CERTIFIED MAIL**  
**RETURN RECEIPT REQUESTED**  
(7002 0460 0002 3631 3443)

04-316E CAB  
File No. 0445-01

Mr. Robert P. Singlehurst  
Vice President  
Grace Pacific Corporation  
dba Puu Makakilo, Inc.  
P. O. Box 78  
Honolulu, Hawaii 96810

Dear Mr. Singlehurst:

**Subject: Temporary Noncovered Source Permit (NSP) No. 0445-01-NT  
Renewal Application No. 0445-02  
Grace Pacific Corporation, dba Puu Makakilo, Inc.  
377 hp Caterpillar Diesel Engine Generator  
Located at: Various Temporary Sites, State of Hawaii  
Initial Location: Makakilo Golf Course, Makakilo, Oahu  
Date of Expiration: April 4, 2009**

The subject noncovered source permit is issued in accordance with Hawaii Administrative Rules (HAR), Title 11, Chapter 60.1. The issuance of this permit is based on the plans, specifications, and information that you submitted as part of your application dated January 6, 2004, and the additional information received on March 22, 23, and 31, 2004.

The noncovered source permit is issued subject to the conditions/requirements set forth in the following Attachments:

Attachment I: Standard Conditions  
Attachment II: Special Conditions  
Attachment III: Annual Fee Requirements

The forms for submission are as follows:

Annual Fee Form  
Monitoring Report Form: Operating Hours/ Fuel Certification  
Change of Location Request for a Temporary Source Form

**Exhibit O**

Mr. Robert P. Singlehurst  
April 5, 2004  
Page 2

This permit: (a) shall not in any manner affect the title of the premises upon which the equipment is to be located; (b) does not release the permittee from any liability for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment; and (c) in no manner implies or suggests that the Department of Health, or its officers, agents, or employees, assumes any liability, directly or indirectly, for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment.

Sincerely,



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

WK:lk

Enclosures

c: CAB Enforcement Section

LINDA LINGLE  
GOVERNOR OF HAWAII



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

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

In reply, please refer to:  
File:

March 9, 2004

**CERTIFIED MAIL**  
**RETURN RECEIPT REQUESTED**  
(7002 0460 0002 3631 4174)

04-205E CAB  
File No. 0555-01

Mr. Robert Creps  
Senior Vice President  
Grace Pacific Corporation  
P. O. Box 78  
Honolulu, Hawaii 96810

Dear Mr. Creps:

**Subject: Temporary Noncovered Source Permit (NSP) No. 0555-01-NT**  
**Grace Pacific Corporation**  
**125 TPH RAP Crushing Plant with 275 HP Diesel Engine Generator**  
**Located at: Various Temporary Sites, State of Hawaii**  
**Initial Location: Camp 10, Puunene, Maui**  
**Date of Expiration: March 8, 2009**

The subject Noncovered Source Permit is issued in accordance with Hawaii Administrative Rules, Title 11, Chapter 60.1. The issuance of this permit is based on the plans, specifications, and information that you submitted as part of your application received on February 12, 2004.

The temporary Noncovered Source Permit is issued subject to the conditions/requirements set forth in the following Attachments:

Attachment I: Standard Conditions  
Attachment II: Special Conditions  
Attachment III: Annual Fee Requirements

The forms for submission are as follows:

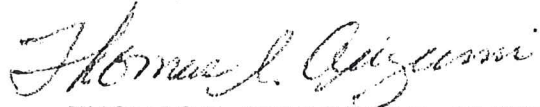
Annual Fee Form  
Monitoring Report Form: Diesel Engine Generator Operating Hours  
& Fuel Certification  
Change of Location Request for a Temporary Source

**Exhibit O**

Mr. Robert Creps  
March 9, 2004  
Page 2

This permit: (a) shall not in any manner affect the title of the premises upon which the equipment is to be located; (b) does not release the permittee from any liability for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment; and (c) in no manner implies or suggests that the Department of Health, or its officers, agents, or employees, assumes any liability, directly or indirectly, for any loss due to personal injury or property damage caused by, resulting from, or arising out of the design, installation, maintenance, or operation of the equipment.

Sincerely,



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

AM:lk

Enclosures

c: Blake Shiigi, EHS - Maui  
CAB Enforcement Section



OFFICE OF THE  
ASSISTANT REGISTRAR, LAND COURT  
STATE OF HAWAII  
(Bureau of Conveyances)

The return of this document was  
as follows:

LCO

NO. 15319.6

OCT 7 2003

TIME 1:00

LAND COURT

REGULAR SYSTEM

Return By Mail  Pick-Up  To:

CARLSMITH BALL LLP  
Kapolei Building, Suite 318  
1001 Kamokila Boulevard  
Kapolei, Hawaii 96707  
Attention: Rodd H. Yano  
Telephone: 808.523.2500

TITLE OF DOCUMENT:

PETITION AND ORDER

PARTIES TO DOCUMENT:

PETITIONER: C.R. CHURCHILL, D.A. HEENAN, RICHARD W. GUSHMAN, II  
and RONALD J. ZLATOPER, the duly appointed, qualified and acting  
TRUSTEES UNDER THE WILL AND OF THE ESTATE OF  
JAMES CAMPBELL, DECEASED, acting in their fiduciary and not in  
their individual capacities

TAX MAP KEY(S): (Oahu) 9-2-003-082  
Certificate of Title No. 473,478

(This document consists of 30 pages.)

Exhibit P

IN THE LAND COURT OF THE STATE OF HAWAII

In the Matter of the Application of )  
 )  
 THE TRUSTEES UNDER THE WILL AND )  
 OF THE ESTATE OF JAMES CAMPBELL, )  
 DECEASED, )  
 )  
 to register and confirm title to land situated )  
 at Honouliuli, District of Ewa, )  
 City and County of Honolulu, State of Hawaii )

LAND COURT APPLICATION NO. 1069  
 PETITION TO AMEND AND COURT ORDER

LAND COURT  
 STATE OF HAWAII  
 FILED  
 2003 OCT - 1 AM 9:05  
 HOWARD A. MATSUYURA  
 REGISTRAR

PETITION TO AMEND LAND COURT ORDER

COMES NOW, C.R. CHURCHILL, D.A. HEENAN, RICHARD W. GUSHMAN, II and RONALD J. ZLATOPER, the duly appointed, qualified and acting TRUSTEES UNDER THE WILL AND OF THE ESTATE OF JAMES CAMPBELL, DECEASED, acting in their fiduciary and not in their individual capacities ("Petitioner"), whose address is James Campbell Building, 1001 Kamokila Boulevard, Kapolei, Hawaii 96707, and petitions the Court as follows:

Petitioner is the owner in fee simple of the following property, all maps referenced hereinbelow being filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii with Land Court Application No. 1069:

Lot	Map	Certificate of Title
Lot 11727	Map 842	473,478

1. Among other things, Land Court Order No. 124071, filed April 19, 1996 created Lot 11727. A certified copy of Land Court Order 124071, filed April 19, 1996 is attached as **Exhibit A** and incorporated herein by this reference.

Exhibit P

2. Through inadvertent error, the statement of encumbrances for Lot 11727 set forth in Exhibit A to Land Court Order 124071, filed April 19, 1996 did not contain a reference to that certain Declaration of Conditions dated June 22, 1973, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii as Document No. 647233. Lot 11727 is subject to the Declaration of Conditions dated June 22, 1973, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii as Document No. 647233.

3. Petitioner, as owner of Lot 11727, and the only party in interest herein, desires to amend Land Court Order 124071 to correctly reflect that Lot 11727 is subject to the Declaration of Conditions dated June 22, 1973, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii as Document No. 647233, and to have a notation of that certain Declaration of Conditions dated June 22, 1973, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii as Document No. 647233 made on **Certificate of Title No. 473,478.**

4. There are no other parties in interest with respect to the lot being affected by the amendment referenced above.

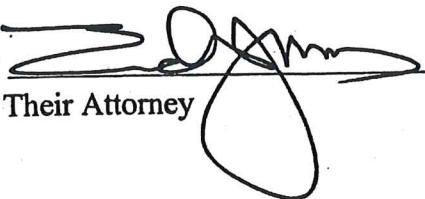
WHEREFORE, the Petitioner prays that an order issue approving and authorizing: (i) the amendment of Land Court Order 124071 to correct the statement of encumbrances for Lot 11727 as set forth in paragraph 3 above, and (ii) directing the Assistant Registrar of this Court to endorse on **Certificate of Title No. 473,478** a notation of that certain Declaration of Conditions dated June 22, 1973, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii as Document No. 647233,

Exhibit P

all in accordance with Chapter 501, Hawaii Revised Statutes, or any amendments thereto.

DATED: Honolulu, Hawaii, September 15, 2003.

TRUSTEES UNDER THE WILL AND OF  
THE ESTATE OF JAMES CAMPBELL,  
DECEASED

By   
Their Attorney

Subscribed and sworn to before  
me this 15<sup>th</sup> day of September, 2003.

*Jody L. Thomas*  
Name: Jody L. Thomas  
Notary Public, State of Hawaii  
My commission expires: 2-17-2006

Upon the record and the evidence herein, the prayer of the petition is  
hereby granted and the Assistant Registrar of this Court is so ordered.

DATED: Honolulu, Hawaii, OCT - 1 2003

HOWARD A. MATSUURA

REGISTRAR for the Judge of the Land Court



Exhibit P

---

Return by Mail ( ) Pickup ( ) To:

(insert address here)

This document contains \_\_\_ pages.

---

Tax Map Key Nos. (1) 9-2-3: 074; 082

**AGREEMENT FOR ISSUANCE OF CONDITIONAL USE PERMIT  
UNDER SECTION 21-5.380 OF THE LAND USE ORDINANCE (LUO)**

THIS INDENTURE, made this \_\_\_\_ day of \_\_\_\_\_, 2007, by **Puu Makakilo, Inc.** as fee simple owner of that certain parcel of land more particularly described in Exhibit A (T.M.K. No. 9-2-3: 074), **Grace Pacific Corporation** as licensee of that certain parcel of land more particularly described in Exhibit B (T.M.K. 9-2-3: 082), and **James Campbell Company LLC** as the fee owner of that certain parcel of land more particularly described in Exhibit B attached hereto and made a part hereof, being hereinafter collectively referred to as “**Declarants.**”

**A. RECITALS**

1. Section 21-5.380 of the Land Use Ordinance (LUO) provides that if an owner or owners of adjacent lots believe that joint development of their lands would result in more efficient use of their lands, they may apply for a Conditional Use Permit to allow such development and to treat the adjacent lots as one (1) lot for zoning purposes; and
2. LUO Section 21-5.380 requires an applicant for a Conditional Use Permit to submit to the City and County of Honolulu (“**City**”) an agreement binding the applicant and the applicant’s successors in title to maintain a proposed development so that conformity with applicable zoning regulations will be assured; and
3. Declarants propose to develop all of those parcels of land described in Exhibits A and B attached hereto (the “**Subject Parcels**”), in accordance with the zoning regulations,

in the belief that said proposed development would result in a more efficient use of the Subject Parcels; and

4. Declarants desire to avail themselves of the benefits of LUO Section 21-5.380, and hereby make application for the issuance of a Conditional Use Permit pursuant thereto.

## **B. AGREEMENTS**

NOW, THEREFORE, Declarants hereby covenant and make the following declarations:

1. This Agreement is made pursuant to and in compliance with the provisions of LUO Section 21-5.380, relating to joint development of two (2) or more adjacent lots, the terms of which Section shall be effective when the Director of Planning and Permitting of the City approves development of the Subject Parcels and issues a Conditional Use Permit therefor.
2. Declarants agree to develop the Subject Parcels in accord with all other provisions of the zoning regulations.
3. Declarants agree to file copies of this Agreement each time Declarants or their successors in trust, or permitted assigns or agents, file an application for a building permit for any structure within the Subject Parcels.
4. Declarants agree that all of the Subject Parcels shall at all times remain an integral part of said development.
5. Failure to develop substantially in accordance with this Agreement and the zoning regulations shall constitute grounds for the City to revoke or suspend any building permits issued hereunder.
6. Failure to maintain the development in accordance with this Agreement shall constitute grounds for the City to revoke or suspend the Conditional Use Permit issued pursuant to this Agreement.
7. This Agreement shall not be amended, terminated, extinguished, or canceled without the express written approval of the Director of Planning and Permitting of the City.
8. The City shall have the right to enforce this Agreement and the conditions contained in this Agreement by appropriate action at law or suit in equity against Declarants and any person or persons claiming an interest in the Subject Parcels.

9. This Agreement shall run with the land and shall bind, inure to the benefit of, and constitute notice to the respective successors in trust, grantees, assignees, mortgagees, lienors, and any other person who claims an interest in Subject Parcels. This Agreement shall be noted on Declarant's Certificates of Title Nos. \_\_\_\_\_  
\_\_\_\_\_.

IN WITNESS WHEREOF, Declarant has caused this Agreement to be executed the day and date first above written.

DECLARANT

JAMES CAMPBELL COMPANY LLC

By \_\_\_\_\_

Its \_\_\_\_\_

DECLARANT

PUU MAKAKILO, INC.

By \_\_\_\_\_

Its \_\_\_\_\_

DECLARANT

GRACE PACIFIC CORPORATION

By \_\_\_\_\_

Its \_\_\_\_\_

385649.1



**Makakilo Primary Quarry**  
**Blast Site: Eastpit Corner Middle Bench**  
**Blast Pattern: 8' x 12' x 40' 44 holes**  
**MS-1 Located near Scalehouse**  
**MS-2 Located near Westridge of Quarry**

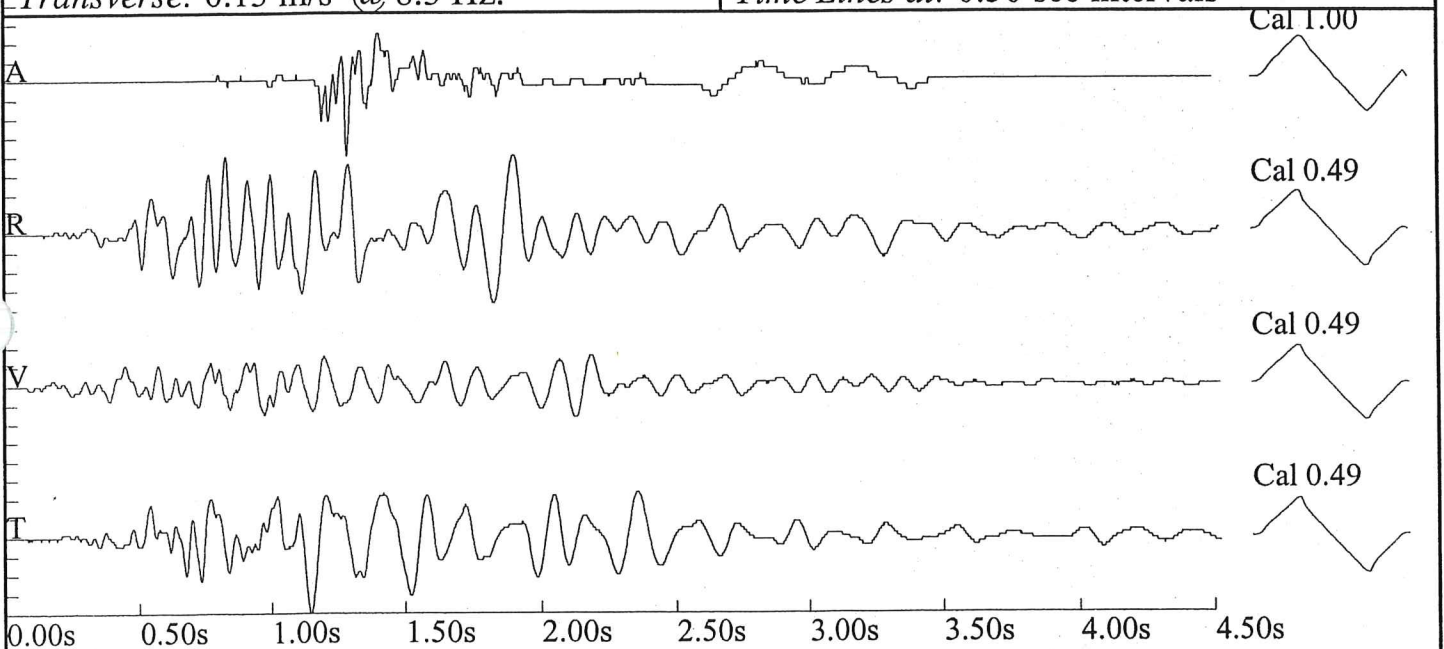
Event Number: 018 Date: 3/15/1907 Time: 10:39  
 Acoustic Trigger: 142 dB Seismic Trigger: 0.04 in/s Serial Number: 797

**Amplitudes and Frequencies**

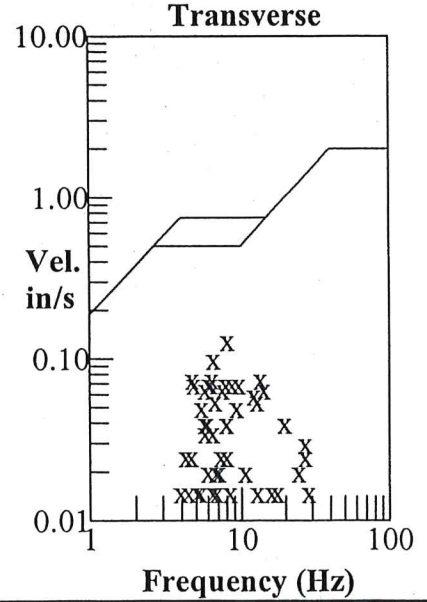
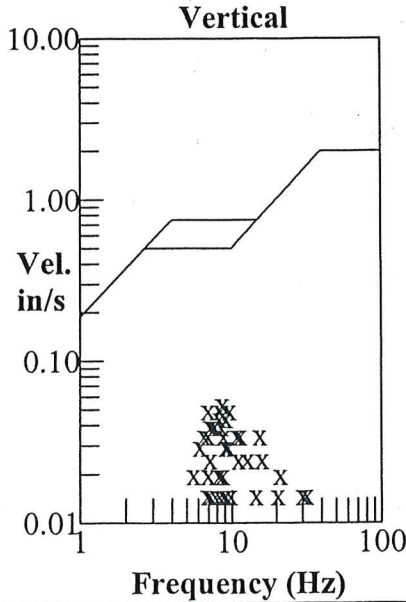
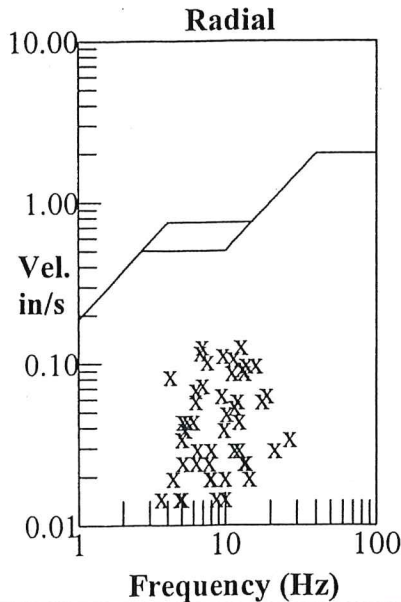
*Acoustic: 122 dB @ 20.4 Hz.*  
*Radial: 0.13 in/s @ 13.1 Hz.*  
*Vertical: 0.055 in/s @ 8.9 Hz.*  
*Transverse: 0.13 in/s @ 8.3 Hz.*

**Graph Information**

*Duration: 0.000 sec To: 4.500 sec*  
*Acoustic: 0.26 Mb (0.06 Mb/div)*  
*Seismic: 0.13 in/s (0.0325 in/s/div)*  
*Time Lines at: 0.50 sec intervals*



**Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)**



**Makakilo Primary Quarry**  
**Blast Site: Eastpit Corner Middle Bench**  
**Blast Pattern: 8' x 12' x 40' 44 holes**  
**MS-1 Located near Scalehouse**  
**MS-2 Located near Westridge of Quarry**

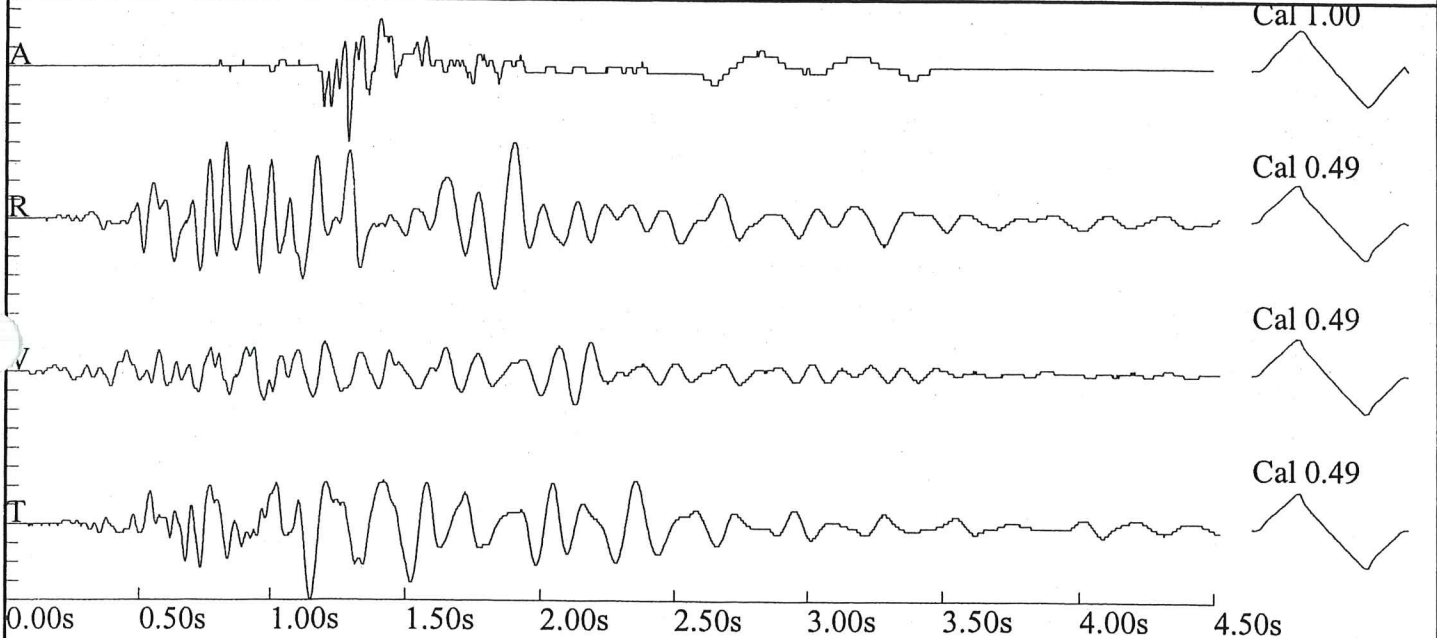
Event Number: 018    Date: 3/15/1907    Time: 10:39  
 Acoustic Trigger: 142 dB    Seismic Trigger: 0.04 in/s    Serial Number: 797

**Amplitudes and Frequencies**

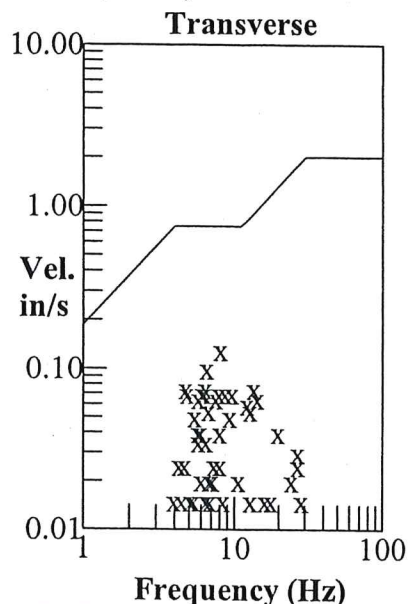
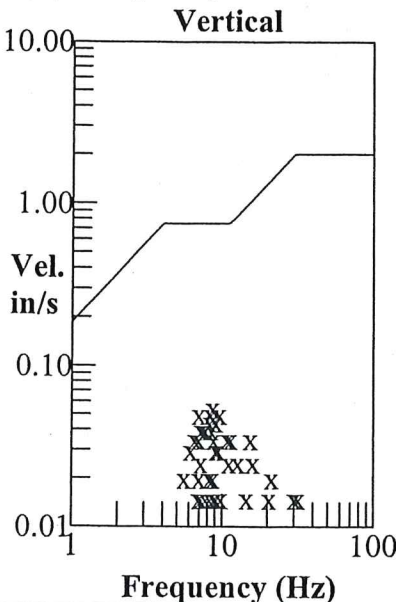
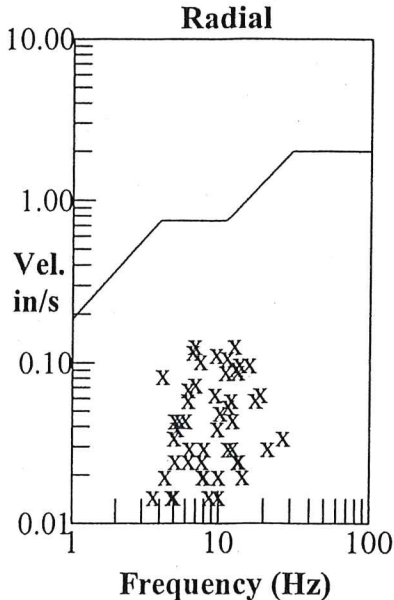
*Acoustic: 122 dB @ 20.4 Hz.*  
*Radial: 0.13 in/s @ 13.1 Hz.*  
*Vertical: 0.055 in/s @ 8.9 Hz.*  
*Transverse: 0.13 in/s @ 8.3 Hz.*

**Graph Information**

*Duration: 0.000 sec To: 4.500 sec*  
*Acoustic: 0.26 Mb (0.06 Mb/div)*  
*Seismic: 0.13 in/s (0.0325 in/s/div)*  
*Time Lines at: 0.50 sec intervals*



**Particle Velocity Versus Frequency - OSM Limits (CFR 30, 1987)**



**GEOLOGIC DESCRIPTION OF QUARRIES  
ON OAHU, HAWAII**

by  
**Harold T. Stearns**

**Circular C67**

**Division of Water and Land Development  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
Honolulu, Hawaii**

**Exhibit S**

State of Hawaii  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
DIVISION OF WATER AND LAND DEVELOPMENT

Circular C67

GEOLOGIC DESCRIPTION OF QUARRIES  
ON OAHU, HAWAII

By

Harold T. Stearns

Honolulu, Hawaii  
June 1974

FOREWORD

Dr. Harold T. Stearns, former District Geologist of the U.S. Geological Survey in Honolulu, has written extensively on the geology of Hawaii. The information presented in this Circular makes a valuable contribution to Hawaii's geology and the Division of Water and Land Development is pleased to play a role in making it readily available through publication.

DOWALD

## CONTENTS

	<u>Page</u>
Introduction and Acknowledgments . . . . .	1
Palolo Basalt Quarry . . . . .	3
Mauumae Cinder Quarry . . . . .	3
Kapahulu Basalt Quarry . . . . .	4
Moiliili Basalt Quarry . . . . .	4
Punchbowl Tuff Quarry . . . . .	5
Moanalua Basalt Quarries . . . . .	5
Halawa Basalt Quarry . . . . .	6
Waikele Basalt Quarry . . . . .	6
Barbers Point Navy Limestone Quarry . . . . .	8
PC&R Basalt Quarry . . . . .	8
Hawaiian Cement Co. Limestone Quarry . . . . .	10
Nanakuli Boulder Quarry . . . . .	10
PCA Limestone Quarry . . . . .	11
Testa Limestone Quarry . . . . .	11
Kaiser Limestone Quarry . . . . .	13
Gaspro Limestone Quarry . . . . .	13
Mauna Kuwale Rhyodacite Quarry . . . . .	14
Dillingham Basalt Quarry . . . . .	14

	<u>Page</u>
Schofield Barracks Basalt Quarry . . . . .	17
Waimea Basalt Quarry . . . . .	17
Kahuku Limestone Quarry . . . . .	18
Artex Limestone Quarry . . . . .	18
Waikane Basalt Quarry . . . . .	18
Kaneohe Basalt Quarry . . . . .	20
Kapaa Basalt Quarry . . . . .	20
City and County Basalt Quarry . . . . .	22
Radio Station Basalt Quarry . . . . .	22
Kailua Limestone Quarry . . . . .	22
Ready Mix Basalt Quarry . . . . .	23
Coral Hill Limestone Quarry . . . . .	23
Summary . . . . .	24
Bibliography . . . . .	25

## LIST OF ILLUSTRATIONS

<u>Figure</u>		<u>Page</u>
1	Map of Oahu showing location of quarries . . . . .	2
2	Airview of Pacific Concrete and Rock Company quarry at Makakilo . . . . .	9
3	Section in PCA quarry in Lualualei Valley . . . . .	12
4	Wall in the northeast end of the PCA quarry showing diverse sediments exposed in the pit . . . . .	12
5	Airview of Dillingham quarry in 1972 showing ash layer capping massive lava used for aggregate . . . . .	16
6	Solution pits in ancient calcareous dune filled with slopewash, exposed in the Dillingham quarry . . . . .	16
7	View of Kahuku limestone quarry in 1942 . . . . .	19
8	Airview of Kapaa quarries looking toward Kailua . . . . .	21



## INTRODUCTION AND ACKNOWLEDGMENTS

Rock production for aggregate for concrete, asphaltic concrete, the manufacture of sand and for the base course of roads is one of the great natural resource industries in Hawaii. Mineral production in Hawaii during 1972 was valued at 28.8 million dollars up 2.6 percent from 28.1 million dollars in 1971. Most of the production is on Oahu. Shipments of cement made on Oahu increased to 393,000 short tons in 1972 from 386,000 short tons in 1971. As will be shown in this paper, very diverse rocks have been used but rock suitable for aggregate has always been scarce on Oahu. It is becoming increasingly difficult to locate quarry sites now because of urban sprawl covering most ~~usable~~ rock deposits and because of ecological impact. Rock crushers are noisy and dusty. Dynamiting rock requires considerable distance from homes to avoid noise pollution. Abandoned quarries are now valuable for solid waste disposal pits. The numbers preceding the quarry names in the following text indicate their location in Figure 1. A quarry producing rock from Koolau basalt formerly was located 0.2 mile inland from Waialae Avenue on the east side of 19th Avenue in Kaimuki but it is now so covered with houses that its former location is uncertain. Its location is not shown in Figure 1. Another not shown was located behind the City & County Corporation Yard 4,000 feet north of Laie at 56-020 Kamehameha Highway. It formerly produced crushed limestone from lithified dunes and is now overgrown with brush.

The writer acknowledges the help of Mr. Granville Cheeley, retired Group Vice President of the Dillingham Corp.; Robert Muller, President of HC&D Ltd.; LeRoy Bush, retired President of HC&D, Ltd.; and Charles Humme, retired Director of Hawaiian Bitumuls and Paving Co.

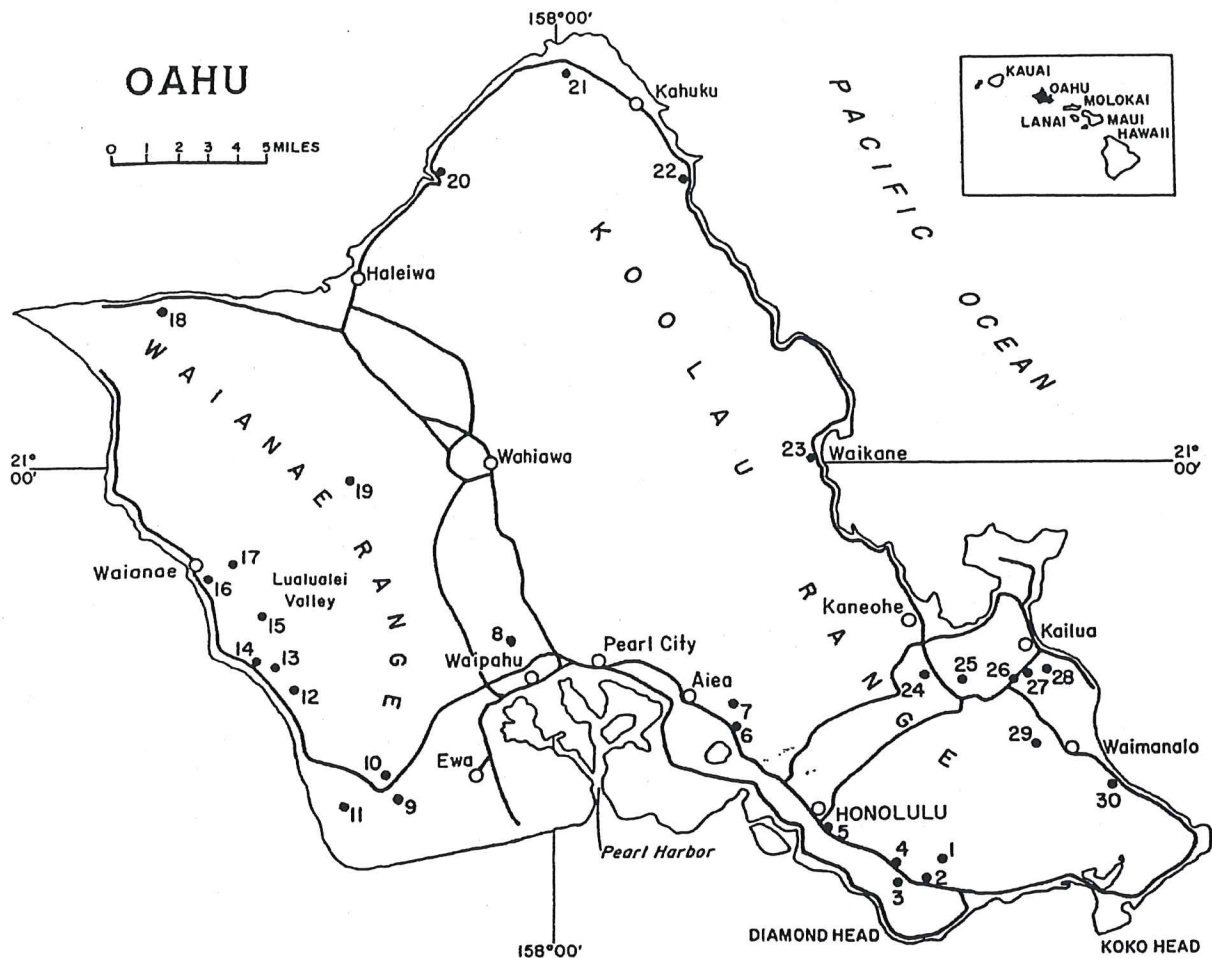


Fig. 1. LOCATION OF QUARRIES ON OAHU

- |                               |                               |
|-------------------------------|-------------------------------|
| 1. Palolo Basalt              | 16. GASPRO Limestone          |
| 2. Mauumae Cinder             | 17. Mauna Kuwale Rhyodacite   |
| 3. Kapahulu Basalt            | 18. Dillingham Basalt         |
| 4. Moiliili Basalt            | 19. Schofield Barracks Basalt |
| 5. Punchbowl Tuff             | 20. Waimea Basalt             |
| 6. Moanalua Basalt            | 21. Kahuku Limestone          |
| 7. Halawa Basalt              | 22. Artex Limestone           |
| 8. Waikele Basalt             | 23. Waikane Basalt            |
| 9. Barbers Point Limestone    | 24. Kaneohe Basalt            |
| 10. PC&R Basalt               | 25. Kapaa Basalt              |
| 11. Hawaiian Cement Limestone | 26. City & County Basalt      |
| 12. Nanakuli Boulder          | 27. Radio Station Basalt      |
| 13. PCA Limestone             | 28. Kailua Limestone          |
| 14. Testa Limestone           | 29. Ready Mix Basalt          |
| 15. Kaiser Limestone          | 30. Coral Hill Limestone      |

SURFACE ROCK EXPLORATION REPORT  
MAKAKILO QUARRY  
HONOLULU, OAHU, HAWAII

W.O. 1624-00

AUGUST 12, 1987

PREPARED FOR  
GRACE PACIFIC CORPORATION

C.W. ASSOCIATES INC.  
dba GEOLABS-HAWAII  
2006 KALIHI STREET  
HONOLULU, HAWAII 96819



CW ASSOCIATES, INC. dba  
**GEOLABS - HAWAII**  
Geology Soils and Foundation Engineering

August 12, 1987  
W.O. 1624-00  
(Dk. No. 37)

Grace Pacific Corporation  
P.O. Box 78  
Honolulu, Hawaii 96810

Attention: Mr. Ron Obrey

Gentlemen:

Submitted herewith is our report entitled "Subsurface Rock Exploration Report, Makakilo Quarry, Honouliuli, Oahu, Hawaii".

Our work was performed in general accordance with the scope of services outlined in our proposal of December 13, 1985.

Detailed discussions and recommendations are contained in the body of the report. If there is any point that is not clear, please feel free to contact our office.

Very truly yours,

C.W. ASSOCIATES, INC.  
dba GEOLABS-HAWAII

Bob Y.K. Wong, P.E.  
President

BYKW:lf

SUBSURFACE ROCK EXPLORATION REPORT

MAKAKILO QUARRY

HONOLULU, OAHU, HAWAII

W.O. 1624-00

AUGUST 12, 1987

INTRODUCTION

The purpose of this study was to explore the subsurface conditions at the proposed quarry extension site to provide information on the quality of the basalt rock and to evaluate the nature and thickness of deleterious materials, such as overburden, highly weathered basalt, clinker, soil or volcanic ash deposits.

The scope of our exploration included:

1. research of existing information and field reconnaissance of existing quarry walls and adjoining hillside to determine subsequent boring locations and depths; and
2. drilling a total of ten (10) borings by utilizing diamond core drilling equipment to depths ranging from approximately 83 to 245 feet at ten selected locations to further establish the quality and occurrence of the basaltic rock.

As requested by Grace Pacific Corporation, the originally planned track drilling was replaced by the drilling of six (6) borings in addition to the four (4) borings initially proposed.

The results of our field exploration, which we used as the basis of the geologic interpretation to develop our findings, are presented in the appendices of this report.

This report summarizes our field works and observations.

PROJECT CONSIDERATION

The existing Makakilo Quarry is operating near the limits of the current permit boundary and application for a new permit is required if the present operation is to be maintained for another decade.

Therefore, potential expansion areas must be explored; and pertinent characteristics of the subsurface, such as overburden thickness, the location and amount of basalt reserves and unfavorable volcanic ash and cinder deposits need to be evaluated.

SITE DESCRIPTION

The Grace Pacific Makakilo Quarry is located on the lower southeastern slope of the Waianae Range on the makai (east) side of Puu Makakilo, and just mauka of the H-1 Freeway.

The general areas explored included:

- a. a 2000 by 500 feet area to the west of and above the existing quarry face, approximately at elevations 425 to 575 feet;
- b. a 900 by 200 feet area at the bottom of the existing quarry, approximately between elevations 240 to 260 feet; and
- c. an area at the northern tip of the quarry, between two explosive storage magazines at about elevation 552 feet.

## GEOLOGIC CONDITIONS

### Field Reconnaissance

A field reconnaissance mapping of rock exposures and outcrops in the general project area was performed in January 1986. The summary report (dated January 7, 1986) is appended as Appendix B of this report.

The preliminary findings indicated that the site consists of a varied mixture of basaltic lava flows, volcanic tuff (consolidated ash), cinders and spatter deposits.

Based on the surface geologic observations, drilling exploration was recommended for two areas northwest and westward of the main existing quarry face, including the lower levels of the existing quarry floor.

### Subsurface Conditions

The subsurface rock exploration consisted of ten (10) drilled borings to depths ranging from 83 to 245 feet below the existing ground surface at the approximate locations shown on the Site Plan, Plate 2.

Detailed descriptions of the soils and rock encountered in the borings are shown on the Boring Logs, Appendix A.

Based on the field reconnaissance and boring data, the general geologic conditions in the planned quarry extension may be subdivided into four main areas (Plate 2).

#### Area 1

The exposed pit face consists mainly of dense basalt with a lens of intermixed volcanic tuff and spatter deposits, approximately 25 feet thick, occurring at the top of the face. Borings 3 and 4 drilled mauka of the pit face encountered additional layers of tuff and spatter interbedded with generally severely fractured dense basalt.

The top layer of volcanic tuff/overburden appears to extend uphill, where the deposit is about 13 to 15 feet thick, as encountered in Borings 3 and 4, respectively (Plates 2 and 3).

The middle volcanic tuff and spatter deposit is approximately 50 feet thick at Boring 3, and appears to pinch out between Borings 3 and 4.

The lower volcanic tuff deposit is approximately 14 and 30 feet thick in Borings 3 and 4, respectively. Both the middle and lower tuff deposits are probably makai extensions of the thick subsurface tuff and spatter deposits encountered in Area 2 (Borings 1 and 2).

Beneath the lower tuff deposit, an approximately 30-foot thick zone of dense basalt was encountered by Borings 3 and 4. Beneath a 30-foot thick zone of this dense basalt, the basalt contained frequent zones of highly to moderately weathered clinker. It is possible that the clinker/basalt flow units encountered at lower elevations may be older basalt flows of the Middle Member of the Waianae Volcanic Series.

#### Area 2

Volcanic tuff and spatter deposits, approximately 80 feet thick, are exposed in the existing quarry face. Borings 1 and 2 encountered deposits, over 90 feet thick, of volcanic tuff, cinder and spatter, about 500 and 250 feet west of the quarry face (Plates 2 and 4).

#### Area 3

This portion of the quarry consists mainly of jointed basalt flow. Tuff interbeds are exposed only in local areas near the top of the pit face. In some localized areas, the exposed rocks are brownish gray slightly weathered basalt, possibly altered by hydrothermal processes.



At the northern corner of this area, Boring 7 encountered approximately 38 feet of overburden, volcanic tuff and spatter from the ground surface. Below these deposits, 154 feet of dense basalt was encountered at this location. This stratum of dense basalt was underlain by clinker to the maximum depths drilled.

At the northwestern corner of this area, interpolation of geologic data obtained by Borings 1 and 6 indicate that the thickness of the volcanic tuff deposits encountered in the adjoining Area 2 appears to substantially reduce towards the north. Boring 6 encountered about 125 feet of dense basalt in less than 200 feet away from Boring 1.

Basalt flows with interbedded clinker zones were encountered in the bottom 10 to 50 feet of Borings 1 and 6, respectively.

Three borings drilled at the bottom of the quarry floor (below elevation 260 feet) generally encountered 12 to 20 feet of dense basalt below the existing ground surface. Below this top unit of dense basalt, the underlying basalt is dense to vesicular and commonly contains clinker zones that vary from 6 inches to about 8 feet thick and is believed to be the Middle Member of the Waianae Volcanic Series.

#### Area 4

Boring 5 was drilled approximately 300 feet north of the existing quarry face to determine if the exposed thick overburden (volcanic tuff) extends behind the pit face. The boring encountered about 35 feet of highly weathered cinder and spatter deposits which became well cemented (or welded) and hard from 35 to 60 feet below the existing ground surface. Dense basalt was encountered from the 60-foot depth to the bottom of the boring at 112 feet.

#### DISCUSSION AND RECOMMENDATIONS

Based upon the field exploration performed, a substantial amount of dense basaltic rock resource may exist in the northwestern and southwestern proposed quarry expansion areas (Area 1 and mauka portion of Area 3).

In general, the basaltic rocks encountered were slightly weathered to unweathered, hard to very hard, moderately to severely fractured, and are considered to be favorable aggregate sources.

Basalt lava flows which contain moderately to slightly weathered clinker layers (such as below the existing quarry floor) could possibly be considered favorable aggregate sources as the clinkers may be primarily hard basaltic rock fragments. Clinker zones which are highly weathered and contain friable to low hardness fragments are potentially unfavorable materials for aggregate. However, these lower quality materials may still have commercial value as select borrow or borrow, if properly quarried and segregated from the higher quality rock.

The volcanic tuff (consolidated ash), cinder and spatter deposits are generally highly weathered, friable and have low hardness. Therefore, these are considered unfavorable for use as aggregate, but may have used for other purposes. However, areas where the slightly weathered to unweathered volcanic tuff is welded (well cemented) or contains a predominance of unweathered, welded spatter, may be considered for use as aggregate. Locally, hard welded tuffs or spatters were encountered in some borings, such as Boring 5 (35 to 60 feet depth). If substantial deposits of these hard, less weathered volcanics are encountered during further quarry operations, appropriate laboratory testing could be conducted to determine their suitability for aggregate applications.

The actual subsurface rock conditions may differ from those indicated by the drilled borings. We recommend that provisions should be made for additional exploration work if unanticipated changes in rock conditions occur during future quarrying operations.

#### LIMITATIONS

Our services consist of professional opinions and recommendations made in accordance with generally accepted soil and geologic engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied.

The analysis and opinions submitted in this report are based on our site reconnaissance, and soil/rock information from borings obtained from this preliminary soil exploration.

Unanticipated soil/rock conditions are commonly encountered and cannot be fully determined by taking soil/rock samples. Unforeseen conditions, such as seepage, soft pockets, may occur in localized areas and require additional probings or borings in the field. Therefore, additional expenditures may be needed during construction to attain a properly constructed project. Some contingency fund is thus recommended to accommodate these possible costs.

This report has been prepared in order to assist Grace Pacific Corporation in evaluating the rock resources of this project site.

The following plates and appendices are attached and complete this report:


- Appendix A - Field Exploration
- Plates A-1.1 - Boring Logs  
thru A-10.4
- Appendix B - Summary Report on Field Reconnaissance

- Plate 1 - Project Location Map
- Plate 2 - Site Plan
- Plate 3 - Generalized Subsurface Cross Section A-A'
- Plate 4 - Generalized Subsurface Cross Section B-B'
- Plate 5 - Generalized Subsurface Cross Section C-C'

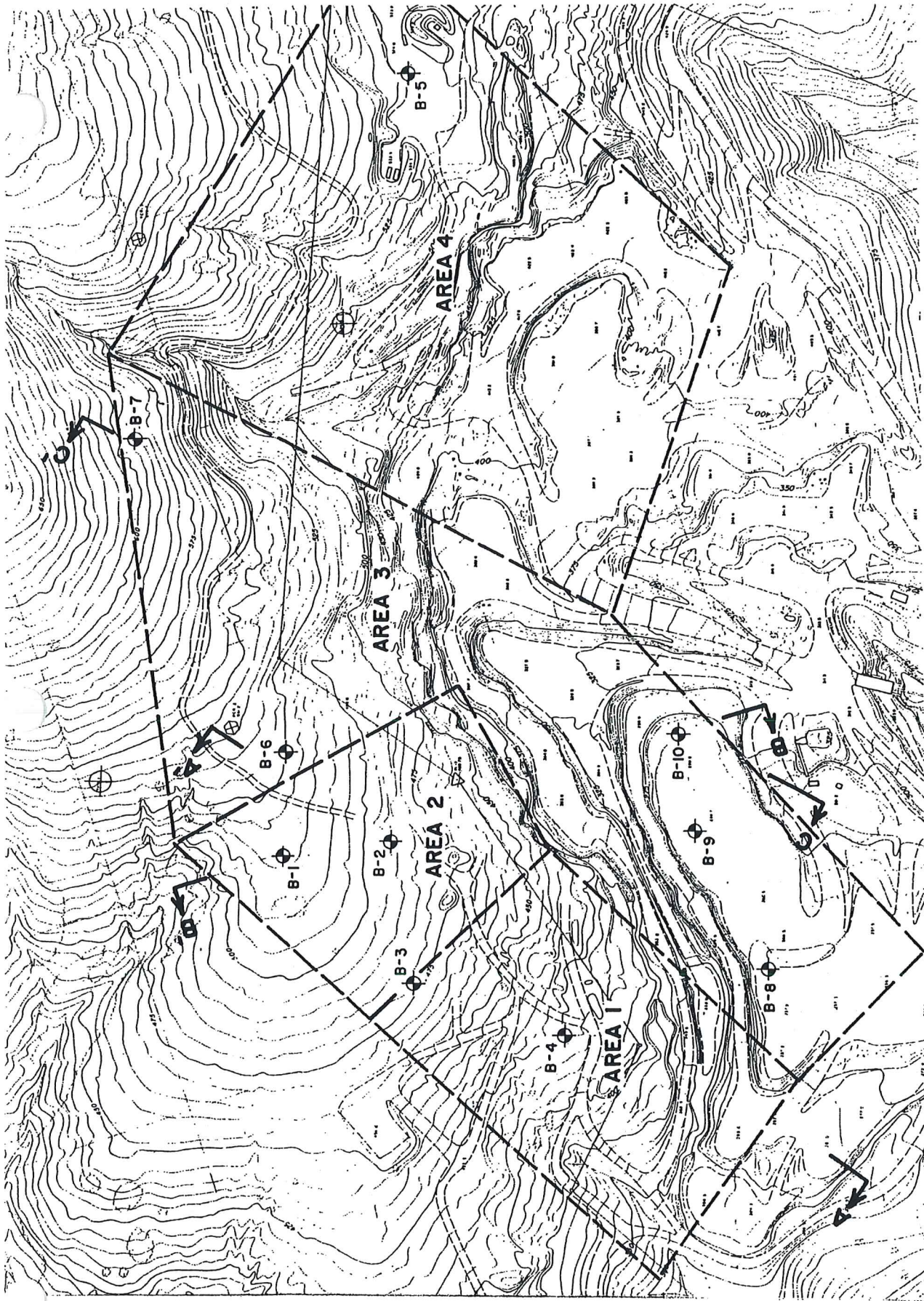
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Respectfully submitted,

C.W. ASSOCIATES INC.  
dba GEOLABS-HAWAII

By   
Dayton E. Fraim  
Senior Project Geologist

BYKW:DEF:lf



GEOLOGICAL RECONNAISSANCE  
PUU KAPUAI  
HONOULIULI, EWA, OAHU, HAWAII

W.O. 1931-00      FEBRUARY 15, 1989

FOR  
GRACE PACIFIC

C.W. ASSOCIATES INC.  
DBA GEOLABS-HAWAII  
2006 KALIHI STREET  
HONOLULU, HAWAII 96819



CW ASSOCIATES, INC. dba  
**GEOLABS-HAWAII**  
Geology Soils and Foundation Engineering

February 15, 1989  
W.O. 1931-00

Grace Pacific  
P.O. Box 78  
Honolulu, Hawaii 96810

Attention: Mr. Bob Singlehurst  
Projects Manager

Gentlemen:

Geological Reconnaissance  
Puu Kapuai  
Honouliuli, Ewa, Oahu, Hawaii

In accordance with your request, we have performed a geological reconnaissance of Puu Kapuai and selected areas in its vicinity. The general location of the site is shown on the Project Location Map, Plate 1. This work was performed in general accordance with our proposal dated October 7, 1987.

PROJECT CONSIDERATIONS

It is desired to locate a new quarry site to replace the existing Makakilo Quarry as a source of rock aggregate. General criteria for selecting a quarry site are the presence of sufficient quantities of good quality rock, a low overburden ratio and an accessible location.

Puu Kapuai and its vicinity was selected for exploration because of its relative proximity to existing facilities at Makakilo and because the morphology of the site looked favorable to the presence of good quality rock.

### PURPOSE AND SCOPE

The purpose of our work on the project was to make an on-ground reconnaissance of the site and its vicinity and to perform seismic refraction surveys to explore selected portions of the site geophysically for the potential occurrence of good rock at relatively shallow depths.

This was accomplished by a Project Geologist making detailed visual observations at the site and by performing a total of seventeen (17) seismic refraction surveys at the site.

### Seismic Exploration

The seismic refraction surveys were performed using an EG & G Geometrics ES-1225 12-channel signal enhancement seismograph. The seismic energy source was a 12-pound sledge hammer. Seismic data was stored on floppy disks for reduction and interpretation using an AT-compatible computer.

### DISCUSSION AND FINDINGS

Our seismic refraction surveys generally indicate that rock of potential quarry material quality underlies portions of the site at depths which are, for the most part, in excess of fifty (50) feet below the existing ground surface.

Based upon our geophysical surveys, visual observations at the site and previous experience with similar materials, we used the following range of seismic velocities in our interpretation:

<u>Velocity (feet/second)</u>	<u>Material</u>
0 - 2500	Topsoil
2000 - 5000	Cinder or Weathered Basalt
5000 - 8000	Marginal Quarry Rock
Over 8000	Quarry Rock



The results and interpretation of our seismic surveys are presented on Plates A-1.1 through A-17.2.<sup>f</sup> The approximate locations of the surveys are shown on Plate 2.

#### LIMITATIONS

The analyses and recommendations submitted in this report are based in part upon information obtained from field data points, such as seismic surveys. Variations of conditions between the field data points may occur; and the nature and extent of these variations may not become evident until more detailed exploration is performed. If variations then appear evident, it will be necessary to re-evaluate the interpretations given in this report.

The location of the field data points were approximately determined by estimation from U.S. Geological Survey Topographic Quadrangle Maps. The physical location of the field data points should be considered accurate only to the degree implied by the method used.

The stratification lines shown in graphic representations of the field data points depict the approximate boundaries between soil types, and, as such, may denote a gradual transition. The strata lines shown on profiles or cross-sections are based upon interpolation between field data points and may not represent actual subsurface conditions.

This report had been prepared for the exclusive use of Grace Pacific Corporation for specific application to development of a potential new quarry site in accordance with generally accepted geotechnical engineering principles and practices. No other warranty, expressed or implied, is made.

The following plates are attached and complete this report:

- Plates A-1.1 - Seismic Refraction Surveys  
thru A-17.2
- Plate 1 - Project Location Plan
- Plate 2 - Site Plan

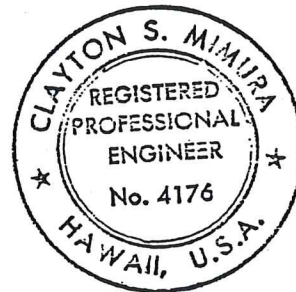
Respectfully submitted,

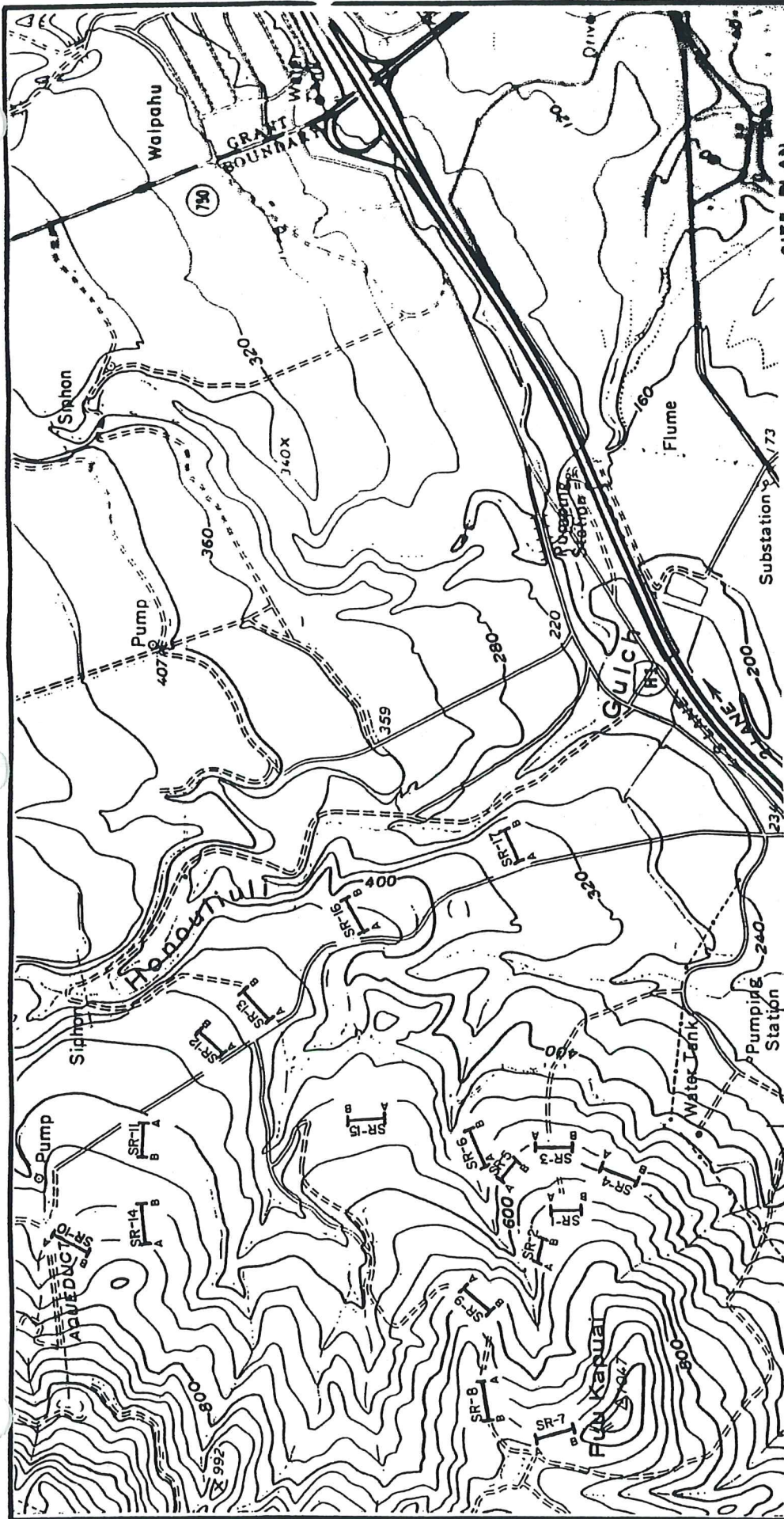
C.W. ASSOCIATES INC.  
dba GEOLABS-HAWAII

By Clayton S. Mimura  
Clayton S. Mimura, P.E.

CSM:DEF:as

(dk/514/as - 193100re)






**SITE PLAN**

PUN KAPUAI

HONOULIULI, EWA, OAHU, HAWAII

PLATE 1

	U.S. G.S. QUADRANGLE MAP SCHOFIELD BARRACKS, OAHU, HAWAII (1983)	
	DATE FEBRUARY 1983	SCALE 1" = 1,000'

**LEGEND:**

- SR-1 | A B
- APPROXIMATE SEISMIC REFRACTION
- SURVEY LOCATION

REFERENCE: U. S. G. S. QUADRANGLE MAP;  
SCHOFIELD BARRACKS, OAHU, HAWAII (1983)



**FEWELL  
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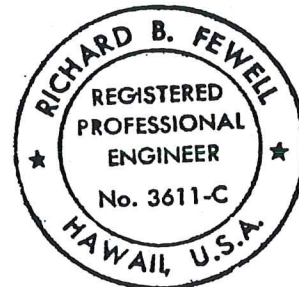
**EVALUATION OF BASALT  
QUARRY RESOURCES  
The Estate of James Campbell Property  
Ewa, Oahu, Hawaii**

**for**

**GRACE PACIFIC CORPORATION**

**by**

**FEWELL GEOTECHNICAL ENGINEERING, LTD.**



*Patricia A. Shapley*  
\_\_\_\_\_  
Patricia A. Shapley, Geologist

*Richard B. Fewell*  
\_\_\_\_\_  
Richard B. Fewell, P.E.

**FEBRUARY 19, 1993**

## TABLE OF CONTENTS

	<u>Page</u>
Introduction.....	1
Executive Summary .....	1
General Geology.....	2
Summary of Site Geologic Conditions.....	3
Subsurface Investigation.....	4
Summary of Subsurface Conditions.....	5
Area 1.....	5
Area 2.....	6
Area 3.....	7
Area 4.....	7
Area 5.....	7
Area 6.....	8
Classification of Rock.....	8
Estimates of Quarryable Rock.....	9
Overburden.....	10
Grade A Rock.....	10
Grade B Rock.....	10
Conclusion.....	11

### Appendices

	<u>Figure</u>
<u>Appendix A</u>	
Project Location Map.....	1
Site and Boring Location Plan.....	2
Geologic Map.....	3
Cross Section Plan.....	4
Boring Logs.....	5 thru 22
Results of L. A. Abrasion Test.....	23
Definitions.....	24
References Cited.....	25

# EVALUATION OF BASALT QUARRY RESOURCES THE ESTATE OF JAMES CAMPBELL PROPERTY EWA, OAHU, HAWAII

## INTRODUCTION

Fewell Geotechnical Engineering, Ltd. (FGE, Ltd.) was retained by Grace Pacific Corporation to evaluate the potential basalt aggregate resources on The Estate of James Campbell's property in the northern portion of Ewa District, Oahu, Hawaii.

The study area, shown on Figure 1, is on the southeastern flank of the Waianae Mountain Range on the island of Oahu, Hawaii. It consists of property west of Honuliuli Gulch on the eastern slopes of Puu Kapuai and Puu Kuua volcanic cones below Elevation 640 feet. The study area has relatively moderate slopes and is separated by two shallow unnamed gullies into three parcels.

It is our understanding that approximately 300 acres of land would be needed for an adequate quarry site, with 50 acres for the actual plant and 240 to 250 acres to be quarried. Based upon the projected demands for the rock, a source of approximately 30 million tons of Grade A basalt rock is desirable. Grade A aggregate is classified for the purpose of this report as rock meeting the Standard Specifications for Concrete Aggregates, ASTM Designation C 33-(86). Grade A aggregate has been quarried from lava flows belonging to the Kolekole Volcanics in the southeast Waianae Range (e.g. Stearns, 1974).

## EXECUTIVE SUMMARY

The investigation commenced on October 22, 1993 and entailed both field mapping of outcrops and drilling of 18 borings to obtain rock samples. The formations encountered within the study area are the Waianae Volcanics, the Kolekole Volcanics, the Koolau Basalt, and Alluvium. Grade A rock was encountered in the volcanic cones Puu Kuua and Puu Kapuai within the Kolekole Volcanics. Puu Kapuai has the most Grade A rock which is a gray, very hard, slightly weathered, non-vesicular to slightly vesicular basalt with olivine crystals. The Grade A rock is overlain by soil overburden ranging from 15 to 79 feet thick.

The borings indicate that quarryable rock is only present in the Kolekole formation on Puu Kapuai between its makai outcrops and Elevation 575 where it is covered by about 50 feet of overburden. This is an area of about 174 acres. We estimate from the boring information that about 10,000,000 cubic yards (24,000,000 tons) of Grade A basalt can be removed from this area. About 16,000,000 cubic yards of overburden would have to be removed to reach this rock.

## **GENERAL GEOLOGY**

The Island of Oahu consists of two coalesced volcanoes; the Waianae Mountain Range (west), which is the older of the two, and the Koolau Range (east), are the eroded remnants of these volcanoes. Lava flows from the Koolau volcano banked against the already eroded slope of the older Waianae volcano to form the gently sloping surface of the Scholfield Plateau (Macdonald, 1990) (Figure 1).

The southeastern Waianae Range is comprised almost entirely of the geologic unit referred to as the Waianae Volcanics. The Waianae Volcanics are composed of over 6,000 feet of exposed basalt lava flows and associated volcanic ash deposits. This unit forms the predominant mass of the southeastern flank of the Waianae Range. After the Waianae Volcanics eruptive phase ended, the volcano surface was eroded considerably before the subsequent Kolekole Volcanics eruptive phase began.

The Kolekole Volcanics represent the youngest eruptive phase of the Waianae Volcano, and consist of cinder cones and associated lava flows deposited on an eroded surface of the older Palehua Member of the Waianae Volcanics (Sinton, 1986; MacDonald et al., 1983). Sinton (1986) revised the nomenclature of the Waianae Range, formerly delineating the Waianae Volcanics from the Kolekole Volcanics. The Kolekole Volcanics are distinct from the Waianae Volcanics on the basis of petrography and geochemistry (Sinton, 1986; MacDonald, 1940). Two volcanic cones of the Kolekole Volcanics, Puu Kapuai and Puu Kuua, are the focus of this investigation.

The Puu Kapuai and Puu Kuua volcanic cones comprise a total area of approximately 1,500 acres (approximately 750 acres each). Most of this acreage was previously planted

in sugar cane, but is not now under cultivation. In the area where the two volcanic cones appear to coalesce, stream channels which drain water from the cones obscure the geologic contacts. The midslopes of Puu Kapuai dip away from the former vent at angles averaging approximately 35°, whereas the midslopes of Puu Kuua dip away from the vent at a slightly steeper angle of approximately 40°.

Within the study area, lava flows of the Kolekole Volcanics can be distinguished from those of the Waianae Volcanics largely on the basis of visible physical characteristics. Kolekole flows typically are much less weathered and much less vesicular (having small cavities formed by the expansion of bubbles of gas or steam during the solidification of the rock.) than the Waianae flows. The high density of the Kolekole lavas makes them more desirable quarry rock. Malahoff and Palmer (1966) conducted a geologic reconnaissance of the Waianae Range and concluded that the "...majority of the Waianae Range is not suitable for dense rock quarrying operations due to deep weathering and thin bed flows plus high cinder, ash and vesicular basalt content."

Thick flows from the Kolekole Volcanics have been characterized as yielding the "best deposits" of Grade A rock in the Waianae Range (Pacific Concrete and Rock Company, 1972). Indeed, the Kolekole Volcanics have been the source of Grade A material at Puu Palailai and continue to provide favorable aggregate today at Grace Pacific Concrete and Rock Company's quarry at Puu Makakilo.

## SUMMARY OF SITE GEOLOGIC CONDITIONS

The formations mapped within the study area include the Palehua member of the Waianae Volcanics, the Kolekole Volcanics, the Koolau Basalt and Alluvium.

Within the study area, the Waianae Volcanics are represented mainly by its youngest Palehua Member. The Palehua Member is characterized in the borings as a distinctly Brown to Gray vesicular basalt with interbedded cinders and an absence of olivine crystals. The Palehua Member is not colored on the geologic map (Figure 3). It is overlain by the Kolekole volcanic cones, and in some of the lower areas by Koolau Basalt and alluvium.



The Kolekole Volcanics, represented on the geologic map by the colors yellow and pink, comprise volcanic cones Puu Kapuai and Puu Kuua. The investigation has targeted the Kolekole Volcanics because its massive basalts are generally Grade A quarryable rock. The lava flows are typically fractured, slightly weathered, non-vesicular to moderately vesicular basalt containing olivine crystals. Most of the massive Grade A quality basalt in the study area appears to be one lava flow which followed the existing topography of the land at the time of the eruption. Thick beds of cinder, clinker, and ash lie both above and below the Grade A basalt flow. In some places, the Grade A basalt contains pockets of cinder and ash which cannot be correlated between borings.

The Koolau Basalt overlies the Kolekole Volcanics at the base of Puu Kuua (Sinton 1986) and is shown by the color orange on the geologic map. The Koolau Basalt in the drill holes is a light gray olivine rich basalt. Most Koolau Basalt flows within the study area have been weathered to residual soil (soils weathered in-place from underlying rock). No rock suitable for quarrying was found in Koolau Basalts

The volcanic cones Puu Kapuai and Puu Kuua are separated by a gully filled with recent alluvium (water-deposited soils), as mapped by Sinton (1986). In this gully erosion has cut through the Kolekole Volcanics exposing the Waianae Volcanics beneath. After the erosional episode, the gully was filled with alluvium. The alluvium is represented by the color blue on the geologic map.

## **SUBSURFACE INVESTIGATION**

A total of 18 test borings were drilled between October 22, 1992 and December 24, 1992, to investigate the extent and quantity of quarryable Grade A rock. The locations of the initial borings were selected by observing and mapping the rock outcrops, reviewing the topography and by studying the available geologic maps and literature. As data from the first borings was obtained, subsequent borings were then placed to determine the orientation and extent of the basalt flows. The boring locations were also selected in consultation with Grade Pacific Corporation.

The boring locations are shown on the Site and Boring Location Plan, Figure 2. Upon completion of the investigation, a Geologic Map, Figure 3, was drawn showing the plan extent of the various rock formations and the estimated extent of the Grade A rock. Cross sections A-A' and B-B', Figure 4, show typical profiles of the geologic conditions.

The borings were drilled with truck-mounted Mobile B-53 and B-34 drilling rigs. The holes were advanced with augers through the soil overburden without any sampling to the rock surface. The rock cores were obtained with either NX (2-1/8" diameter) or HQ (3-1/16" diameter) diamond bits. The materials encountered within the borings are summarized within the Boring Logs, Figures 5 through 22.

### SUMMARY OF SUBSURFACE CONDITIONS

As additional information was obtained from each boring, a pattern developed that allows the grouping of borings into similar areas. Each area will be discussed as follows:

<u>Area</u>	<u>Borings</u>	<u>Rock Type, Formation</u>
1	1, 2, 5	Residual Soil, Puu Kuua
2	6, 10	Residual Soil, Puu Kapuai
3	12, 14	Grade A, Kolekole Volcanics Puu Kuua
4	3, 4, 7, 8, 11, 13, 15	Grade A Kolekole Volcanics Puu Kapuai
5	9, 16	Grade B, Kolekole Volcanics Puu Kapuai
6	17, 18	Grade B, Palehua Member, Waianae Volcanics

**Area 1** - The predominant material encountered in Borings 1, 2, and 5 was red residual soil. The data collected from Borings 1, 2 and 5 indicates that Grade A Kolekole Volcanics would be encountered at an elevation much higher than 640 feet on Puu Kuua.

At lower elevations on Puu Kuua, the Koolau Basalt possibly overlies the Kolekole Volcanics and Waianae Volcanics as typified in Boring 2.

Borings 1 and 2 were drilled to determine the possibility of encountering Grade A Basalt below Elevation 640 feet on the slopes of Puu Kuua. Boring 1 was drilled to a depth of 90 feet below ground surface elevation of 600 feet, with only residual soil encountered, most likely derived from the Koolau Basalt. Boring 2, drilled at Elevation 510 feet, encountered approximately 50 feet of residual soil possibly derived from the Koolau Basalt, underlain by a thin, 12-foot layer of light gray Koolau Basalt, further underlain by completely weathered basalt. The deep weathered zone probably represents an unconformity between the Koolau Basalt and the Waianae Volcanics.

Boring 5 was drilled at Elevation 545 feet in the un-named gully between Puu Kuua and Puu Kapuai to search for the Kolekole Volcanic flows along the south side of Puu Kuua. Residual soil extends to a depth of 65 feet below ground surface. No massive lavas of the Kolekole Volcanics were encountered in this boring.

Area 2 - The predominant material encountered in Borings 6 and 10 was red residual soil. Boring 10 disclosed that Grade A Kolekole Volcanics is not present on Puu Kapuai above Elevation 640 feet. Boring 6 served to locate the surface contact between the Kolekole Volcanics and the recent alluvial deposits.

Boring 10 was drilled at Elevation 640 feet to examine the quality of rock at a higher elevation on Puu Kapuai. Residual soil extended to a depth of 94 feet where a 1-foot layer of basalt from the Kolekole Volcanics was encountered. This thin layer of rock was underlain by soil and some highly weathered basalt. No Grade A rock was encountered in this boring.

Boring 6 was drilled on the south side of the un-named gully which dissects Puu Kapuai to determine the eastern extent of the Kolekole Volcanics. Residual soil was encountered to a depth of 90 feet. The geologic formation from which the soil was derived could not be determined from the boring data. No Grade A rock was encountered in the boring.

**Area 3** - At Puu Kuua, the boring results, outcrops and the shape of the cone suggested that massive lava flows were likely at elevations above 640 feet. The investigation revealed no Grade A rock below Elevation 640 feet on the slopes of Puu Kuua and the drilling was moved to higher elevations.

Boring 12 was drilled at a surface elevation of 900 feet and encountered 19 feet of residual soil which was directly underlain by 36 feet of massive Grade A Kolekole Basalt. Vesicular basalt with cinder and ash was then encountered to a depth of 99 feet. Residual soil of the Waianae Volcanics indicated the end of the Kolekole Volcanics and the drilling was terminated at a depth of 107 feet.

Boring 14 was also drilled on the slopes of Puu Kuua at Elevation 800 feet. Highly weathered rock of the Kolekole Volcanics was encountered beneath 45 feet of residual soil. A total of 46 feet of Grade A rock was present with some thin beds of cinder and ash. The boring continued into 34 feet of vesicular basalt of the Waianae Volcanics, beginning at a depth of 118 feet. The boring was terminated at a depth of 152 feet because the Waianae Rock was not suitable for quarrying.

**Area 4** - Puu Kapuai has the most Grade A basalt encountered in the study area. Borings 3, 4, 7, 8, 11, 13 and 15 have flows of Grade A quality basalt ranging in thickness from 3 feet to 68 feet. In most of these borings, the basalt flows contain relatively thin layers of cinder and vesicular basalt. The Grade A basalt in all of these borings is a gray slightly weathered non-vesicular to slightly vesicular basalt with olivine crystals that are mostly moderately to highly weathered. The basalt is very hard to extremely hard and is occasionally fractured to fractured. A white calcite precipitate (mineralized) is common on fractured surfaces. In all of the borings, the Grade A basalt grades with depth into a vesicular basalt which is interbedded with pockets of cinder and ash. No Grade A basalt was encountered in the borings beneath the vesicular basalt and cinder. Borings 7 and 8 appear to have penetrated through the Kolekole Volcanics and into the Waianae Volcanics.

**Area 5** - No Grade A rock was encountered above Elevation 550 feet on Puu Kapuai. Borings 9 and 16 were drilled on the southern side of Puu Kapuai at elevations of 635 feet

and 775 feet, respectively. Welded and loose cinder with interbedded ash comprised the total depth of each boring. The outcrop in the area and the occurrence of thick layers of cinder from Borings 7 and 8 suggest that the Kolekole lavas in this area were more explosive and produced a larger fraction of cinder and ash. This could be the backside of the Puu Kapuai cone opposite the vent from which the massive lava flows of Grade A basalt originated.

**Area 6** - The Waianae Volcanics were encountered in Borings 17 and 18 on the southern and eastern flanks of Puu Kapuai. Some of the Waianae Volcanics can be classified as Grade A. However, no massive lava flows free from cinder were encountered.

Boring 17 was drilled on the eastern flank of Puu Kapuai to delineate the edge of the Kolekole Volcanics. Only 16 feet of Kolekole lava was encountered beneath 50 feet of residual soil. Beneath the Kolekole Volcanics, the boring penetrated 76 feet of basalt of the Waianae Volcanics. The rock of the Waianae Volcanics in this boring is a hard, gray, slightly weathered, highly vesicular basalt with some pockets of cinder and clinker.

Boring 18 was also drilled to delineate the extent of the Kolekole Volcanics on the southern flanks of Puu Kapuai. No Kolekole Volcanics were encountered in this boring. The Waianae Volcanics were encountered beneath 55 feet of residual soil. The Waianae Volcanic rock in this boring is a hard, gray, slightly weathered, slightly vesicular basalt, with many pockets of cinder and clinker. Although Borings 17 and 18 had numerous pockets of cinder and vesicular zone, these zones could not be correlated between borings.

## **CLASSIFICATION OF ROCK**

Representative samples were taken of both vesicular and non-vesicular rock of the Kolekole and Waianae Volcanics to classify, by grade, all of the basalt encountered within the investigation area. All samples were classified by visual inspection as either Grade A or Grade B by examining the weathering, hardness, and density of vesicles. The Grade A rock was defined as slightly weathered to fresh, very hard to extremely hard and contains less than 10 percent vesicles. Each sample was then tested for Specific Gravity

(ASTM C-127) and L.A. Abrasion (ASTM C-131) to determine the correlation between these laboratory tests and the visual classification.

The Specific Gravity of aggregate rock is used in mixture proportioning calculations to find the absolute volume that a given weight of a material will occupy in the concrete mix. Aggregates having differing specific gravities will cause the yield or volume of concrete to increase or decrease if batch weights remain constant. Changes in the aggregate specific gravity will also cause the concrete unit weight to change. The test results shown in Figure 23 indicate that the non-vesicular Kolekole Volcanics Basalt has the highest specific gravity.

The L.A. Abrasion test is used to measure the abrasion resistance of an aggregate, that is, its ability to resist being worn away by rubbing and friction. It is a general measure of aggregate quality and resistance to degradation due to handling, stockpiling, and mixing. The L. A. Abrasion test combines the effects of impact and abrasion by tumbling aggregate particles together with steel balls in a slowly revolving steel drum. ASTM C-33 Concrete Aggregates specifies a maximum weight loss of 50 percent for gravel, crushed gravel or crushed stone. The results of the L.A. Abrasion test indicate that all of the rock tested had less than the maximum of 50 percent weight loss specified for concrete aggregate. The L. A. Abrasion test results are summarized in Figure 23.

## **ESTIMATES OF QUARRYABLE ROCK**

Grade A rock of the Kolekole Volcanics is present in largest quantity on Puu Kapuai below Elevation 550 feet. Grade A rock on Puu Kuua was encountered at elevations higher than 800 feet. Only two of the borings drilled on Puu Kuua (Borings 12 and 14) encountered Grade A rock and additional information would be needed to accurately estimate Grade A rock quantities from Puu Kuua. The estimates of Grade A rock are only from Puu Kapuai.

The quarryable Grade A rock boundaries on Puu Kapuai have been estimated from the borings, outcrops and by following the known contact between the Kolekole Volcanics and the Waianae Volcanics. The highest elevation at which the Grade A rock was

encountered in the borings is approximately 515 feet. The boundary of quarryable Grade A rock has been drawn to approximately Elevation 575 feet to allow for 50 feet of overburden over the Grade A rock. The lower boundaries follow the limits of the Kolekole Volcanics. The area to be estimated is Area 4 and is colored yellow on the geologic map, Figure 3. The estimated area of Area 4 is approximately 174 acres.

### **Overburden**

The Grade A rock can only be developed by removing the overburden. Within Area 4, the overburden estimate includes all soil, cinder, and Grade B rock overlying the Grade A rock. The overburden encountered in the borings varied from 15 to 79 feet in thickness. It is estimated that 16 million cubic yards of overburden must be removed within the 174 acres to recover the Grade A rock.

### **Grade A Rock**

The Grade A rock within Area 4 is mostly a continuous layer between 22 feet and 66 feet thick. Some pockets of cinder and Grade B rock are present but could not be correlated between the borings. The estimates assume that the total thickness of the Grade A rock has an average specific gravity of 2.85. Although specific gravity test results indicate a higher value for Grade A Kolekole rock, we feel that a specific gravity of 2.85 more accurately represents the overall formations. The estimate also assumes thicknesses of the rock layer between borings and toward the outer boundaries which are consistent with the topography and boring data. The estimate of Grade A rock within Area 4 is about 10 million cubic yards which, based upon a specific gravity of 2.85, results in 24 million tons of Grade A basalt.

### **Grade B Rock**

The Grade B rock encountered within the investigation area is mostly below the Grade A basalt of the Kolekole Volcanics and includes all Waianae Volcanics Basalt. Estimates of the quantity of Grade B rock have not been made because the quantities available depend

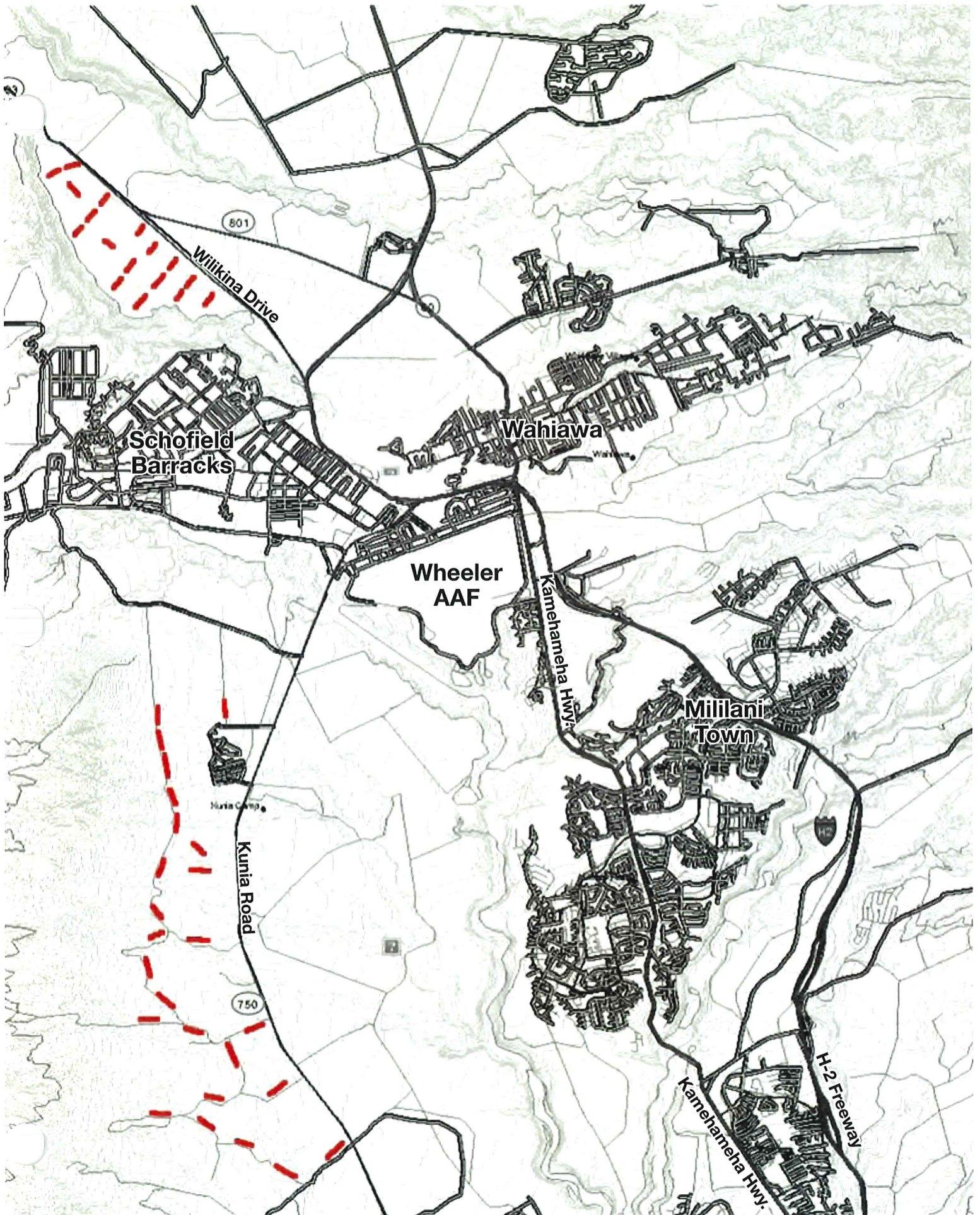
on the depth and extent of excavation. Some Grade B rock will be encountered during excavation throughout the overburden.

## CONCLUSION

The site designated as Area 4 has available for quarrying approximately 175 acres of land. The Grade A rock is found within the Kolekole Volcanics with estimated quantities of 10 million cubic yards. To develop the Grade A rock, the overburden including soil, cinder and Grade B rock of quantities up to 16,000,000 cubic yards must be removed. The Grade B rock present on the site is mostly below the Grade A rock and in the surrounding Waianae Volcanics. The Grade B rock quantities have not been estimated since an abundant supply is available and can be obtained by increasing the depth and extent of excavations.

We would be pleased to meet with you to discuss our findings and conclusions in more detail. In the meantime, if you have any questions, please do not hesitate to call us.





**SEISMIC REFRACTION SURVEYS, KUNIA TO WAHIAWA, 1998**

DEPARTMENT OF PLANNING AND PERMITTING  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET • HONOLULU, HAWAII 96813  
TELEPHONE: (808) 523-4414 • FAX: (808) 527-6743 • INTERNET: www.co.honolulu.hi.us

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BELT COLLINS HAWAII



JEREMY HARRIS  
MAYOR

ERIC G. CRISPIN, AIA  
DIRECTOR

BARBARA KIM STANTON  
DEPUTY DIRECTOR

KATHY SOKUGAWA  
ACTING DEPUTY DIRECTOR

April 23, 2004

2004/ELOG-637 (JP)

Mr. Jon M. Young  
Belt Collins Hawaii Ltd.  
2153 North King Street, Suite 200  
Honolulu, Hawaii 96819

Dear Mr. Young:


**Minor Modification of  
Conditional Use Permit No. 72/CUP-15  
Grace Pacific Corporation  
Puu Makakilo Quarry - Honouliuli  
Tax Map Key 9-2-3: 82**

This responds to your request (submitted on March 30, 2004) to modify the above conditional use permit No. 72/CUP-15, to allow specific revisions to the grading and revegetation plans associated with the engineering report accepted October 19, 1998 in compliance with Condition 2 of Resolution 95 (1973), which was adopted by the City Council on April 17, 1973.

We have reviewed your revisions and determined that the related changes would not adversely impact surrounding properties, and the request is reasonable. Therefore, the revised report dated March 2004, including related plans and maps dated March 2, 2004 (Makakilo Upper Quarry Drainage Map), March 19, 2004 (Makakilo Upper Quarry Section Plan) and April 15, 2004 (Makakilo Upper Quarry Grading Plan), are now a part of the approved plans, and have been so marked and placed in the file. The report and plans shall now be signed and stamped by a licensed engineer, and a copy of the signed and stamped report and plans submitted to our Civil Engineering Branch for its files.

Please note that other applicable conditions of the original approval remain in effect. Your receipt (No. 52333) for the minor modification filing fee is enclosed. If you have any questions, please contact Jamie Peirson of our staff at 527-5754.

Sincerely yours,

  
ERIC G. CRISPIN, AIA  
Director of Planning and Permitting

EGC:nt

Enclosure (Receipt No. 52333)

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**Exhibit T**

# APPLICATION FOR CONDITIONAL USE PERMIT

Fee \_\_\_\_\_

Conditional use permit no. \_\_\_\_\_

Receipt no. \_\_\_\_\_

Expiration date \_\_\_\_\_

## 1. APPLICANT

- a. Application is hereby made to the Planning Department of the City and County of Honolulu, pursuant to the provisions of Article 2 of the Comprehensive Zoning Code, for a conditional use permit in the zoning district of the property herein described.
- b. To insure the accurate and efficient processing of this application and to avoid errors and delay, supply all the required information. Fill out all blank spaces clearly, concisely, and completely, and sign the application.
- c. If you are not the recorded owner of the property, you are considered the authorized agent of the recorded owner. If you are filing as an authorized agent, supply the information for both the recorded owner and yourself, and a letter authorizing you to act as agent. See following letter.

Recorded Owner  
 Name: Campbell Estate  
 Mailing Address: Suite 500, 828 Fort St.  
Honolulu, Hawaii 96813  
 Phone Number: 536-1961

Authorized Agent  
 Name: Pacific Concrete and Rock Company, Limited  
 Mailing Address: 2344 Pahourui Drive  
Honolulu, Hawaii 96819  
 Phone Number: 845-6441

## 2. PROPERTY

- a. Street address: Puu Makakilo, Ewa, Oahu, Hawaii
- b. Tax map key: 9-2-03 c. Lot size: Irregular - approximately 260 acres
- d. Present use of property and /or buildings: Agriculture, grazing, cattle
- e. Zoning District: AG-1 f. General Plan land use: Residential - single family
- g. State land use district: Agriculture

## 3. PROPOSED USE

- a. The proposed conditional use is provided for in Section(s) 21-241, 21-242, 21-248, 21-401 of the Comprehensive Zoning Code.
- b. Outline concisely the conditional use proposed for the property: Under CZC Section 21-248, an extractive industry will be relocated which will quarry and crush basalt (blue hard) rock for concrete and miscellaneous fill uses. Approximately 25 million tons of rock will be crushed from approximately 72 acres over a 20 year period.

## 4. DRAWINGS AND DOCUMENTS

- a. Submit accurate scale drawing of the site, showing easements; shape and dimensions of the lot; existing and proposed locations of streets, property lines, uses, structures, building heights, floor area, access, pedestrian walks, refuse areas, off-street parking and loading spaces, landscaped areas, fences, and walls; topography; and any additional information required by the Planning Director.
- b. Certificates of Approval.--If Sections 21-245, 21-251 or 21-253 of the Comprehensive Zoning Code are applicable, submit the required certificates of approval.
- c. Joint Development.--If Section 21-255 of the Comprehensive Zoning Code is applicable, submit the agreement required.

## 5. STATEMENT

Indicate how the proposed use will have no more adverse effect on the health, safety, or comfort of persons living or working in the area, and will be no more injurious, economically or otherwise, to property or improvements in the surrounding area than any use generally permitted in the zoning district:

Please see attached statement.

2. PROPERTY

- a. Street address: Puu Makakilo, Ewa, Oahu, Hawaii
- b. Tax map key: 9-2-03 e. Lot size: Irregular - approximately 260 acres
- d. Present use of property and /or buildings: Agriculture, grazing, cattle
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Please see attached statement.

6. SIGNATURE

\_\_\_\_\_  
Recorded Owner or   
\_\_\_\_\_  
Authorized Agent

PLANNING DEPARTMENT USE

- A. This application is filed complete with the following:  Site plan  Certificates of approval  Agreements  Authorization of agent
- B. Application is returned for corrections: \_\_\_\_\_
- C. Action/Date: Planning Commission \_\_\_\_\_ Planning Department  
Public Hearing \_\_\_\_\_ City Council \_\_\_\_\_

STATE OF HAWAII  
LAND USE COMMISSION

426 Queen Street  
Honolulu, Hawaii

This space for official use  
Date Application and Fee  
received by LUC \_\_\_\_\_

APPLICATION FOR SPECIAL PERMIT

(I) (We) hereby request approval of a special permit to use certain property located in the County of Honolulu, Island of Oahu, Land Use Commission Temporary District Boundary Puu Makakilo map number and/or name Tax Map Key 9-2-03, for the following-

described purpose: Quarry and crush basalt (blue hard) rock for concrete and miscellaneous fill uses. Approximately 25 million tons of rock will be crushed from approximately 72 acres over a 20 year period.

Description of property: The area, including the green belt buffer, is a total of approximately 260 acres of hilly land mauka of the H-1 on the east slope of Puu Makakilo in the Ewa district (average slope of 30%) covered with kiawe and indigenous grasses. This land is presently used to graze approximately 15 cattle year round.

Petitioner's interest in subject property: Lessee under 20 year agreement with Campbell Estate for the specific purpose of quarrying and crushing rock with the land finished in flat level benches for final use as residential.

- Petitioner's reason(s) for requesting special permit:
1. Present quarry site at Puu Palalii near Makakilo City will be exhausted in approximately 1-1/2 years.
  2. A new quarry site is therefore required which will continue to supply aggregates for concrete for approximately 40% of Oahu needs.
  3. This particular site is the only one available within less than one hour's trucking of central Honolulu.

Signature(s) 

Address: 2344 Pahounui Drive

Telephone: 845-6441

This space for official use

The property is situated in a(n) \_\_\_\_\_ district, whose regulations adopted by the Land Use Commission prohibit

APPLICATION FOR SPECIAL PERMIT

(I) (We) hereby request approval of a special permit to use certain property located in the County of Honolulu, Island of Oahu, Land Use Commission Temporary District Boundary Puu Makakilo map number and/or name Tax Map Key 9-2-03, for the following-

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Lessee under 20 year agreement with Campbell Estate for the specific purpose of quarrying and crushing rock with the land finished in flat level benches for final use as residential.

- Petitioner's reason(s) for requesting special permit:
1. ~~Present quarry site at Puu Palialai near Makakilo City will be exhausted in approximately 1-1/2 years.~~
  2. A new quarry site is therefore required which will continue to supply aggregates for concrete for approximately 40% of Oahu needs.
  3. This particular site is the only one available within less than one hour's trucking of central Honolulu.

Signature(s) 

Address: 2344 Pahounui Drive

Telephone: 845-6441

This space for official use

The property is situated in a(n) \_\_\_\_\_ district, whose regulations adopted by the Land Use Commission prohibit the desired use.

Signature(s) \_\_\_\_\_

For (agency) \_\_\_\_\_

### 3. Description and Plan of Operations

The following is a step-by-step explanation of the operation of a quarry including pollution and safety control measures.

a. An existing access road into the quarry site from the Palehua Road will be widened and straightened (note Exhibit V).

(1) This road will be oiled as necessary.

(2) This road will be over 1-1/4 miles away from the nearest residence at its closest point. (H-1 is only 600 feet away from this same residential area).

(3) This road will also be the only access to the quarry site other than the tunnel under the H-1. It will be 15 feet wide and 5,300 feet long.

b. Opening the quarry.

(1) The boundaries of the quarry site will be surveyed and staked (see Exhibits V and VI).

(2) Berm (pollution barriers) locations for noise and visual pollution will be surveyed and staked (see Exhibit VII, locations outlined in red).

(3) Drainage swale locations for proper drainage of the quarry area will be surveyed and staked (see Exhibit VII,

(Exhibit VIII) into one of two surge piles (Exhibit VIII). Buried under each of these surge piles is a conveyor which withdraws and conveys the 3 inch minus material into a 42 inch wide conveyor which conveys the rock under H-1 to the processing site.

- (4) Water mixed with a wetting agent is sprayed onto the rock at all critical points throughout the entire system described in Items a, b, and c.
- e. Conveying of 3 inch material under the H-1 to processing site.
- (1) A tunnel will be built below the H-1 which will connect the stockpile of 3 inch and smaller material on the mauka side of the H-1 with the makai processing-finishing site.
  - (2) A 42 inch wide belt will run through this 10 foot square tunnel. The tunnel will run through solid rock and will surface over 100 feet away from the edges of the H-1. The belt conveyor will discharge



onto a conveyor which will stack the rock into three surge piles - one pile for high-grade rock usable in concrete ("A" rock), and two piles for low-grade rock (road rock and fill rock).

- (3) Exhibit V shows the location of the tunnel (purple line) and the three surge piles.

f. Processing-finishing.

- (1) Thirty-five acres immediately makai of the quarry will be devoted to reducing rock to final sizes for use in road fill and concrete.
- (2) Either "A" or "B" rock will be withdrawn by belt from beneath one of the surge piles and sized through a series of screens, conveyed, and thence either into finished stockpiles or into final reduction crushers for size reduction into sand size particles.
- (3) Water mixed with a wetting agent is sprayed onto the rock at all critical points throughout the entire system described above.
- (4) Primary crusher and screens will be totally housed to eliminate noise and stray dust.
- (5) The entire screening and crushing system will be processed wet and the resulting wash

