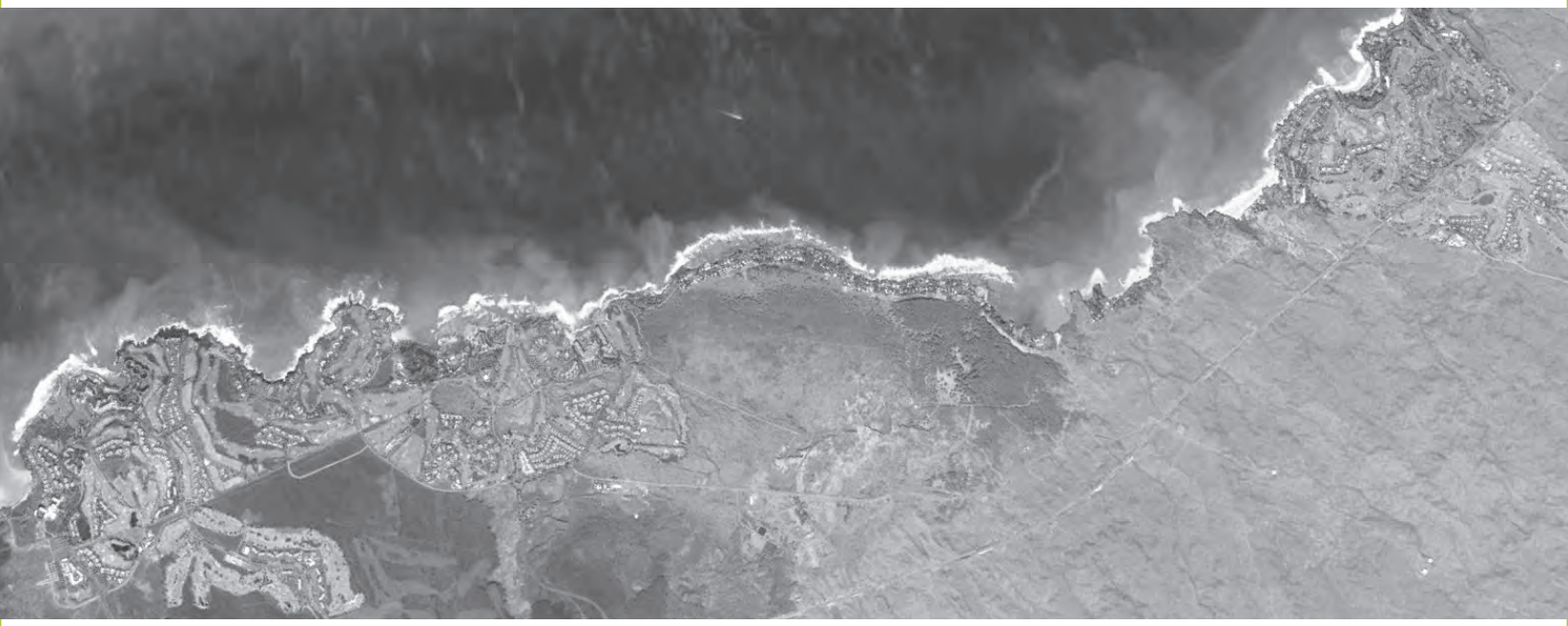
Puako, Hawaii
Community Feasibility Study & Preliminiary Engineering Report

December 2015



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PUAKŌ HAWAII COMMUNITY

FEASIBILITY STUDY AND

PRELIMINARY ENGINEERING REPORT

AMENDMENT #1

JANUARY 2017

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CHAPTER 1 - INTRODUCTION

1.1 Summary and Introduction

Coral Reef Alliance (Coral) has continued working with Aqua Engineering (AQUA) and various other entities to better define the actual costs and funding mechanisms during 2016. This work has identified some changes in the lot connections in Puakō and Waialea. Additionally, as part of the affordability of the project, the costs are being evaluated over a 40-year period. As such, this amendment to the PER has been prepared to update the connections, funding, and the cost evaluation included in the PER.

1.2 Lots and Connections

An in-depth review of Hawaii County tax map key (TMK) information using the online database, by Webb and Associates, revealed many of the actual parcels have been subdivided into master and condo parcels. The dividing of lots allows multiple dwellings to be constructed on what appeared to be single lots in the original PER evaluation of those lots. As such, the potential number of connections to the collection system and treatment system has been modified as follows:

Table 1. Updated Community Lot Information

Description	Puakō	Waialea	Total
Developed Lots	208	23	231
Undeveloped Lots	32	5	37
Exempt Lots	21	8	29
Total Lots	261	36	297

With the updated lot information, it is also necessary to update the table from the PER showing the individual wastewater systems (IWS) in the community. The number of known septic systems, ATUs, and cesspool have remained the same. These three categories along with the "unknown" category represent the total developed lots in the communities. With the increase in developed lots, the amount of unknown lots has increased. The amount of vacant lots (undeveloped) has decreased slightly because some of those included in this category are exempt lots. Table 2 shows the updated IWS information for the communities.

Table 2. Community IWSs by Type (Updated)

Description	Puakō	Waialea	Total Lots
Septic Systems	77	8	85
Aerobic Treatment Units	12	0	12
Cesspool	49	9	58
Unknown	70	6	76
Vacant/Undeveloped	32	5	37
Exempt	21	8	29
Total	**261**	**36**	**297**

It is anticipated that the exempt lots will not be developed and should not be included as lots to be connected to the sewer system in the future. Thus, in Puakō there are 240 lots and in Waialea there are 28 lots that could be connected to a sewer system, a total of 268 lots. Current developed lots in Puakō are 208 with 23 in Waialea, for a total of 231 lots.

As such, the cost estimates have been updated to include connections and service for the current developed lots (231 total).

1.3 Design Criteria

The design flow and loads also increase with the increase in overall lots. The estimated flow per connection was established as 225 gallons per day (gpd) in the PER, based on occupancy of 2.25 people per connection (100 gallons per person). Thus, the total design flow increases to 60,300 gpd for 268 lots. With the revised lot information, the design criteria summary table is updated as follows:

Table 3. Design Criteria Summary

Description	Current	Build-Out	With Waialea Bay Community	Units
Total Population	468	540	603	people
Average Daily Flow	46,800	54,000	60,300	gpd
	32.5	37.5	41.9	gpm
Peak Factor	2	2	2	-
Peak Flow	65.0	75.0	83.8	gpm
BOD	94	108	121	lbs/day
	240	240	240	mg/L
TSS	94	108	121	lbs/day
	240	240	240	mg/L
Total Nitrogen	15.6	18.0	20.1	lbs/day
	40	40	40	mg/L
Total Phosphorous	2.7	3.2	3.5	lbs/day
	7	7	7	mg/L

This increase impacts the costs associated with each of the alternatives and they are updated in the following sections of this amendment.

1.4 Updated Costs

Based on the updated lot information and the change from a 20 to 40-year funding scenario, the costs have been updated and are presented as part of this amendment. The capital and O&M costs changes will be addressed first and then the life cycle costs will be presented.

1.4.1 Capital and O&M Costs

The capital and O&M costs for each alternative have been updated based on the increase in lots and thus wastewater flow from the community. The costs are presented as totals for Puakō and then again for the combination of Puakō and Waialea. Please note that the actual connections are reduced from the quantity of lots due to the condo unit that contains 38 units (lots). This is considered as a single connection instead of 38, as that is how it will be connected to the system. However, it will be billed as 38 separate connections. There are other condo units within the community boundaries that may be connected jointly when the project is constructed but it is not feasible to determine which ones can be jointly connected

until the design phase. As such, a conservative approach has been used assuming all remaining lots will have their own connection.

The collection system estimates associated with Options 2 and 3 were originally calculated by assuming all lots with ATUs and septic tanks could be upgraded with the Orenco system, which is less expensive. With the increase in "unknown" IWS lots, it was decided that the lots upgraded with the E-One system and the Orenco system should be split evenly. This approach essentially requires all the new "unknown" IWS lots to use an E-One system, which costs more and thus is more conservative. So for these two options, the lots using E-One and Orenco pumping systems is estimated to be 50% for each.

The updated capital and O&M costs for each alternative, Puakō only, are as follows with the detailed estimates in the appendix to this document:

Table 4. Costs Puakō Only

Option	*Descriptions*	*Capital Cost*	*Annual O&M Cost*
1	ATU	**$7,105,300**	**$598,500**
2	Collection System Treatment Plant Total Cost	$7,515,200 $2,069,500 **$9,584,700**	**$263,180**
3	Connection Fee and Collection System Route A Connection Fee and Collection System Route B	**$9,556,900** **$10,312,800**	**$339,000**

Table 5. Costs Puakō and Waialea

Option	*Descriptions*	*Capital Cost*	*Annual O&M Cost*
1	ATU	**$8,039,800**	**$679,000**
2	Collection System Treatment Plant Total Cost	$9,359,200 $2,069,500 **$11,328,700**	**$279,230**
3	Connection Fee and Collection System Route A Connection Fee and Collection System Route B	**$12,615,900** **$13,343,600**	**$386,200**

1.4.2 Life Cycle Costs

Working with USDA Rural Water, Coral has identified the option of funding the project with a 40-year package. As such, the life cycle costs have been updated to cover a 40-year period, including inflation, repairs, equipment replacement, and operation and maintenance costs. It

should be noted that the equipment replacement costs for options 1 and 3 are included in the annual O&M costs. Major replacement costs for option 2 were calculated separately and are added to the life cycle cost. The life cycle evaluation is summarized as follows:

Table 6. Life Cycle Costs – Puakō Only

Option	*Descriptions*	*Capital Cost*	*40-Year O&M Present Value*	*40-Year Replacement Present Value*	*40-Year NPV*
1	ATU	**$7,105,300**	$12,631,200	*	$19,736,500
2	Collection System and New Treatment Plant	**$9,584,700**	$5,554,300	$577,000	$15,716,000
3	Connection Fee and Collection System Route A	**$9,556,900**	$7,154,500	*	$16,711,400

*Replacement costs included in O&M costs

Table 7. Life Cycle Costs – Puakō/Waialea

Option	*Descriptions*	*Capital Cost*	*40-Year O&M Present Value*	*40-Year Replacement Present Value*	*40-Year NPV*
1	ATU	**$8,039,800**	$14,330,100	*	$22,369,900
2	Collection System and New Treatment Plant	**$11,428,700**	$5,893,100	$583,000	$17,904,800
3	Connection Fee and Collection System Route A	**$12,615,900**	$8,150,600	*	$20,766,500

*Replacement costs included in O&M costs

The overall cost evaluation has changed slightly, but it is relatively the same as was previously presented in the PER.

1.5 Selected Alternative

The life cycle construction and O&M cost evaluation is slightly modified based on the increase of developed lots, mainly due to the addition of the condo lots and the extension of the evaluation period to 40 years. The financial evaluation still indicates option 2, to build a

collection system and a new treatment facility, is the least expensive option with respect to life cycle cost.

1.6 Overall Project Costs

Capital construction costs are important but the overall project costs have also been identified and included as they will also have to be included in the overall funding package. Project costs include engineering design and construction services, administrative costs, legal fees, land purchase for the treatment plant site and environmental investigation costs. The sum of these items is the overall project cost as shown in tables 8 and 9 for Option 2 including Puakō only and then Puakō /Waialea, respectively.

Table 8. Total Project Costs – Puakō Only

Onsite Facility Cost Summary - Puakō	
Subtotal Capital Cost	$7,372,824
Contingency	$2,211,876
Engineering Design/Construction (15% of Subtotal)	$1,105,924
Administration	$50,000
Legal	$75,000
Land Purchase	$500,000
Environmental	$80,000
Total Project Cost	**$11,395,624**

Table 9. Total Project Costs – Puakō/Waialea

Onsite Facility Cost Summary - Puakō/Waialea	
Subtotal Capital Cost	$8,791,324
Contingency	$2,637,376
Engineering Design/Construction (15% of Subtotal)	$1,318,699
Administration	$50,000
Legal	$75,000
Land Purchase	$500,000
Environmental	$80,000
Total Project Cost	**$13,452,399**

The projected project costs are intended to include all known components of the project, including a 30% contingency. The contingency is included because the project is still in the

planning phase and design work has not commenced. Once the design work commences, a better understanding of the project details will be obtained and the contingency will be decreased as appropriate. Its intent is to account for potential unknown items to be detailed as part of the design and construction work.

1.7 Other Alternatives

AQUA has become aware of and done a cursory investigation of an alternative collection system. This collection system is still a low-pressure system that would be effective for the Puakō area. Instead of having pumped pressure system it would be a vacuum system. This system could be installed with a valve station at the lot sites and the main vacuum pumps at the treatment plant site. It would have lower maintenance at the homes and could be powered during power outages with standby power generation.

When it was first identified, it appeared to only be marginally better from a cost standpoint. However, with the increase in connections, it appears to be a less expensive collection system option, approximately $500,000 lower with respect to capital cost. As the project moves into the design phase this is an option that should be considered. Please note that the system is typically designed to have a valve station for at least two if not four lots. The cost comparison that was done used one valve station for every two lots.

APPENDIX A

Table 10. Option 1 ATU – Capital Costs (Puakō only)

Description	*Qty*	*Units*	*Unit Cost*	*Total*
CBT 1.0KFO ATU	171	ea	$10,000	$1,710,000
ATU Installation (on sites with existing septic tanks)	77	ea	$5,000	$385,000
ATU Installation (on sites without septic tanks)	94	ea	$22,000	$2,068,000
Electrical Installation	171	ea	$3,000	$513,000
Drainage Field (70 lots)	280	sq ft/lot	$30	$789,600
Contingency	30%	%	$5,465,600	$1,639,700
Total Cost				**$7,105,300**

*Preliminary Estimates

Table 11. Option 1 ATU – O&M Costs (Puakō only)

Description	*Qty*	*Units*	*Unit Cost*	*Annual Cost*
Scheduled Maintenance**	1	per year	$650	$650
Septage Pumping	1	per year	$550	$550
Pump/Blowers	15	kWhr/day	$0.42	$2,300
Annual Cost per Lot				**$3,500**
Monthly Cost per Lot				**$292**
Total Annual Cost (171 lots)				**$598,500**

**Updated from vendor, including equipment replacement

Table 12. Option 2 – Collection System Capital Costs (Puakō only)

Description	*Quantity*	*Units*	*Unit Cost*	*Total Cost*
ARVs and Cleanouts	3	ea	$6,200	$18,600
DH-071-61 E-One Pumps	85	ea	$6,100	$518,500
E-One Pump Installation	85	ea	$7,000	$595,000
Orenco Drop-In Pumps	86	ea	$2,300	$197,800
Orenco Pump Installation	86	ea	$1,000	$86,000
Electrical Installation	171	ea	$3,000	$513,000
Furnish and Install HDPE Laterals	8,550	lf	$160	$1,368,000
Furnish and Install HDPE Sewer Main	11,500	lf	$180	$2,070,000
Asphalt Cutting and Patching	69,000	sq. ft	$6.00	$414,000
Contingency	30%	-	$5,780,900	$1,734,300
Capital Cost				**$7,515,200**

Table 13. Option 2 – Treatment Facility Capital Costs (Puakō only)

Description	*Qty*	*Units*	*Unit Cost*	*Total*
Influent Screening	1	ea	$75,600	$75,600
Anoxic Basin	1	ea	$30,000	$30,000
Anoxic Mixing System	1	ea	$15,000	$15,000
Treatment Tank and Clarifier	2	ea	$400,000	$800,000
Alum Pumps	2	ea	$10,000	$20,000
Alum Storage Tank	1	ea	$20,000	$20,000
Sand Filters	2	ea	$130,000	$260,000
Backwash Pump	2	ea	$3,000	$6,000
Disinfection System	1	ea	$75,000	$75,000
Reuse Irrigation System	1	ls	$30,000	$30,000
Electrical	20%	%	$1,301,600	$260,320
Contingency	30%	%	$1,591,920	$477,576
Capital Cost				**$2,069,500**

Table 14. Option 2 – Annual Power Costs (Puakō only)

Description	*Quantity*	*HP*	*hrs/day*	*Annual Cost*
Individual Pump Stations	171	1	0.42	$8,300
Headworks Screen	1	1	24	$2,600
STM Aerotor	1	5	24	$12,800
Alum Pumps	1	0.33	24	$900
RAS Pump	1	1.00	24	$2,600
Aerobic Blowers	1	1.50	24	$3,900
Air Compressor (Sand Filters)	1	5.00	12	$6,400
Filter Backwash Pump	1	0.25	1	$100
UV Pumps	1	3.00	12	$3,900
UV Modules	14	0.23	24	$8,400
Annual Power Costs				***$49,900***
Description	*Annual Amount*	*Units*	*Unit Cost*	*Annual Cost*
Operator Salary	780	hours	$80	$62,400
Alum	2,350	gallons	$5	$11,750
Sludge Disposal	76,000	gallons	$0.30	$22,800
Screenings Disposal	2	tons	$100	$180
Parts/Equipment Replacement	1	ls	$5,000	$5,000
Individual Pump Station Service	171	lots	$650	$111,150
Annual Maintenance Costs				**$213,280**
Total Annual O&M Costs				**$263,180**
Total Monthly Cost per Developed Lot (208)				**$105**

Table 15. Option 3 – Capital Costs – Route A (Puakō only)

Description	*Quantity*	*Units*	*Unit Cost*	*Total Cost*
ARVs and Cleanouts	3	ea	$6,200	$18,600
DH-071-61 E-One Pump Stations	85	ea	$6,100	$518,500
E-One Pump Station Installation	85	ea	$7,000	$595,000
Orenco Drop-In Pumps	86	ea	$2,300	$197,800
Orenco Pump Installation	86	ea	$1,000	$86,000
Electrical Installation	171	ea	$3,000	$513,000
Furnish and Install HDPE Laterals	8,550	ft	$158.00	$1,350,900
Furnish and Install HDPE Sewer Main	8,500	ft	$180.00	$1,530,000
Asphalt Cutting and Patching	51,000	sq. ft	$6.00	$306,000
Lift Station Construction	1	ls	$25,000	$25,000
Submersible Lift Pumps	2	ea	$10,000	$20,000
4" HDPE to Ex. Force Main	4,800	ft	$180.00	$864,000
Asphalt Cutting and Patching	28,800	sq. ft	$6.00	$172,800
Contingency	30%	%	$6,197,600	$1,859,300
Connection Fee/Expansion of Reuse	1	ls	$1,500,000	$1,500,000
Capital Cost				**$9,556,900**

Table 16. Option 3 – Capital Costs – Route B (Puakō only)

Description	*Quantity*	*Units*	*Unit Cost*	*Total Cost*
ARVs and Cleanouts	3	ea	$6,200	$18,600
DH-071-61 E-One Pump Stations	85	ea	$6,100	$518,500
E-One Pump Station Installation	85	ea	$5,000	$425,000
Orenco Drop-In Pumps	86	ea	$2,300	$197,800
Orenco Pump Installation	86	ea	$1,000	$86,000
Electrical Installation	171	ea	$3,000	$513,000
Furnish and Install HDPE Laterals	8,550	ft	$160.00	$1,368,000
Furnish and Install HDPE Sewer Main	8,500	ft	$180.00	$1,530,000
Asphalt Cutting and Patching	51,000	sq. ft	$6.00	$306,000
Lift Station Construction	1	ls	$25,000	$25,000
Submersible Lift Pumps	2	ea	$10,000	$20,000
4" HDPE to Ex. Facility	10,800	ft	$160.00	$1,728,000
Asphalt Cutting and Patching	7,200	sq. ft	$6.00	$43,200
Contingency	30%	%	$6,779,100	$2,033,700
Connection Fee/Expansion of Reuse	1	ls	$1,500,000	$1,500,000
Capital Cost				**$10,312,800**

Table 17. Option 3 – Annual O&M Costs (Puakō only)

Description	*Annual Amount*	*Units*	*Unit Cost*	*Annual Cost*
Lift Station Pumps (20 HP each)	36,600	kWhr	$0.39	$14,300
Individual Pump Stations (1 HP each)	19,600	kWhr	$0.42	$8,300
Individual Pump Stations Service	171	lots	$650	$111,200
Monthly User Fee	171	lots	$1,200	$205,200
Total Annual O&M Cost				**$339,000**
Monthly Cost per Developed Lot (208)				**$136**

Table 18. Option 1 ATU – Capital Costs (Puakō/Waialea)

Description	*Qty*	*Units*	*Unit Cost*	*Total*
CBT 1.0KFO ATU	194	ea	$10,000	$1,940,000
ATU Installation (on sites with existing septic tanks)	88	ea	$5,000	$440,000
ATU Installation (on sites without septic tanks)	106	ea	$22,000	$2,332,000
Electrical Installation	194	ea	$3,000	$582,000
Drainage Field (12 lots)	280	sq ft/lot	$30	$890,400
Contingency	30%	%	$6,184,400	$1,855,400
Total Cost				**$8,039,800**

*Preliminary Estimates

Table 19. Option 1 ATU – O&M Costs (Puakō/Waialea)

Description	*Qty*	*Units*	*Unit Cost*	*Annual Cost*
Scheduled Maintenance	1	per year	$650	$650
Septage Pumping	1	per year	$550	$550
Pump/Blowers	15	kWhr/day	$0.42	$2,300
Annual Cost per Lot				**$3,500**
Monthly Cost per Lot				**$292**
Total Annual Cost (194 lots)				**$679,000**

**Updated from vendor, including equipment replacement

Table 20. Option 2 – Collection System Capital Costs (Puakō/Waialea)

Description	*Quantity*	*Units*	*Unit Cost*	*Total Cost*
ARVs and Cleanouts	3	ea	$6,200	$18,600
DH-071-61 E-One Pumps	97	ea	$6,100	$591,700
E-One Pump Installation	97	ea	$7,000	$679,000
Orenco Drop-In Pumps	97	ea	$2,300	$223,100
Orenco Pump Installation	97	ea	$1,000	$97,000
Electrical Installation	194	ea	$3,000	$582,000
Furnish and Install HDPE Laterals	9,700	lf	$160	$1,552,000
Furnish and Install HDPE Sewer Main	16,000	lf	$180	$2,880,000
Asphalt Cutting and Patching	96,000	sq. ft	$6.00	$576,000
Contingency	30%	-	$7,199,400.00	$2,159,800
Capital Cost				**$9,359,200**

Table 21. Option 2 – Treatment Facility Capital Costs (Puakō/Waialea)

Description	*Qty*	*Units*	*Unit Cost*	*Total*
Influent Screening	1	ea	$75,600	$75,600
Anoxic Basin	1	ea	$30,000	$30,000
Anoxic Mixing System	1	ea	$15,000	$15,000
Treatment Tank and Clarifier	2	ea	$400,000	$800,000
Alum Pumps	2	ea	$10,000	$20,000
Alum Storage Tank	1	ea	$20,000	$20,000
Sand Filters	2	ea	$130,000	$260,000
Backwash Pump	2	ea	$3,000	$6,000
Disinfection System	1	ea	$75,000	$75,000
Reuse Irrigation System	1	ls	$30,000	$30,000
Electrical	20%	%	$1,301,600	$260,320
Contingency	30%	%	$1,591,920	$477,576
Capital Cost				**$2,069,500**

Table 22. Option 2 – Annual Power Costs (Puakō/Waialea)

Description	*Quantity*	*HP*	*hrs/day*	*Annual Cost*
Individual Pump Stations	194	1	0.42	$9,400
Headworks Screen	1	1	24	$2,600
STM Aerotor	1	5	24	$12,800
Alum Pumps	1	0.33	24	$900
RAS Pump	1	1.00	24	$2,600
Aerobic Blowers	1	1.50	24	$3,900
Air Compressor (Sand Filters)	1	5.00	12	$6,400
Filter Backwash Pump	1	0.25	1	$100
UV Pumps	1	3.00	12	$3,900
UV Modules	14	0.23	24	$8,400
Annual Power Costs				**$51,000**
Description	*Annual Amount*	*Units*	*Unit Cost*	*Annual Cost*
Operator Salary	780	hours	$80	$62,400
Alum	2,350	gallons	$5	$11,750
Sludge Disposal	76,000	gallons	$0.30	$22,800
Screenings Disposal	2	tons	$100	$180
Parts/Equipment Replacement	1	ls	$5,000	$5,000
Individual Pump Station Service	194	lots	$650	$126,100
Annual Maintenance Costs				**$228,230**
Total Annual O&M Costs				**$279,230**
Total Monthly Cost per Developed Lot (231)				**$101**

Table 23. Option 3 – Capital Costs – Route A (Puakō/Waialea)

Description	*Quantity*	*Units*	*Unit Cost*	*Total Cost*
ARVs and Cleanouts	4	ea	$6,200	$24,800
DH-071-61 E-One Pump Stations	97	ea	$6,100	$591,700
E-One Pump Station Installation	97	ea	$7,000	$679,000
Orenco Drop-In Pumps	97	ea	$2,300	$223,100
Orenco Pump Installation	97	ea	$1,000	$97,000
Electrical Installation	194	ea	$3,000	$582,000
Furnish and Install HDPE Laterals	9700	ft	$158.00	$1,532,600
Furnish and Install HDPE Sewer Main	16000	ft	$180.00	$2,880,000
Asphalt Cutting and Patching	96,000	sq. ft	$6.00	$576,000
Lift Station Construction	2	ls	$25,000	$50,000
Submersible Lift Pumps	4	ea	$10,000	$40,000
4" HDPE to Ex. Force Main	4,800	ft	$180.00	$864,000
Asphalt Cutting and Patching	28,800	sq. ft	$6.00	$172,800
Contingency	30%	%	$8,313,000	$2,493,900
Connection Fee/Expansion of Reuse	1	ls	$1,809,000	$1,809,000
Capital Cost				**$12,615,900**

Table 24. Option 3 – Capital Costs – Route B (Puakō/Waialea)

Description	*Quantity*	*Units*	*Unit Cost*	*Total Cost*
ARVs and Cleanouts	4	ea	$6,200	$24,800
DH-071-61 E-One Pump Stations	97	ea	$6,100	$591,700
E-One Pump Station Installation	97	ea	$5,000	$485,000
Orenco Drop-In Pumps	97	ea	$2,300	$223,100
Orenco Pump Installation	97	ea	$1,000	$97,000
Electrical Installation	194	ea	$3,000	$582,000
Furnish and Install HDPE Laterals	9,700	ft	$160.00	$1,552,000
Furnish and Install HDPE Sewer Main	16000	ft	$180.00	$2,880,000
Asphalt Cutting and Patching	96,000	sq. ft	$6.00	$576,000
Lift Station Construction	2	ls	$25,000	$50,000
Submersible Lift Pumps	4	ea	$10,000	$40,000
4" HDPE to Ex. Facility	10,800	ft	$160.00	$1,728,000
Asphalt Cutting and Patching	7,200	sq. ft	$6.00	$43,200
Contingency	30%	%	$8,872,800	$2,661,800
Connection Fee/Expansion of Reuse	1	ls	$1,809,000	$1,809,000
Capital Cost				**$13,343,600**

Table 25. Option 3 – Annual O&M Costs (Puakō/Waialea)

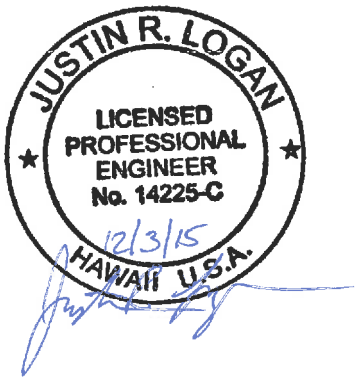
Description	*Annual Amount*	*Units*	*Unit Cost*	*Annual Cost*
Lift Station Pumps (2 stations)	45,800	kWhr	$0.39	$17,800
Individual Pump Stations (1 HP each)	22,300	kWhr	$0.42	$9,500
Individual Pump Stations Service	194	lots	$650	$126,100
Monthly User Fee	194	lots	$1,200	$232,800
Total Annual O&M Cost				**$386,200**
Monthly Cost per Developed Lot (231)				**$139**

PUAKŌ HAWAII COMMUNITY

FEASIBILITY STUDY AND

PRELIMINARY ENGINEERING REPORT

DECEMBER 2015



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CHAPTER 1 - INTRODUCTION

1.1 Project Background and Purpose of Report

Coral Reef Alliance has partnered with Aqua Engineering (AQUA) to identify solutions for improving the health of the Puakō-Mauna Lani coral reefs. The Puakō-Mauna Lani reefs are located on the west side of the Island of Hawaii, just offshore from the small community of Puakō. In the past several years, studies of the Puakō-Mauna Lani reefs have been conducted to evaluate the health of the coral reefs and identify issues that may be causing poor reef health. These studies have concluded that the coral cover has been reduced by 50% between 1970 and 2010, and have suggested that a likely cause of this reduction is partly due to wastewater generated and discharged from the Puakō community into the ocean (Minton, 2012, Kim, 2014).

The *Enterococcus* bacteria is often used to identify sewage pollution and one study (Kim, 2014) identified multiple sites along the Puakō shoreline with amounts above the Hawaii State and EPA recommended levels of 104 colony-forming units per 100 mL of water. This study also identified abnormal growth on corals on the dominant *Porites* coral, with between 20% and 40% of the colonies exhibiting this abnormal growth. Nitrogen levels that may correlate with sewage pollution were also measured and found to be somewhat higher than average in some areas. These observations led to the conclusion that human sewage pollution may be contributing to the decline in the coral reef health.

The Puakō Hawaii community is located on the west side of the Island of Hawaii, near Waimea. The community consists of 202 lots, with the majority of them zoned as residential (approximately 19 of them are zoned as either “miscellaneous”, “commercial” or “hotel”), along a 3 mile stretch of the coast (see Figure 1). An additional small community to the north of the Puakō community is also included in this report. This community is located at Waialea Bay and consists of 20 lots. Because these lots are not considered part of the Puakō community, they are not considered in the base evaluation. Instead, these lots are evaluated as an addition.

Figure 1. General Proposed Project Area.

Each lot uses some type of individual wastewater system (IWS) to dispose of wastewater generated. The treatment systems used in the communities are aerobic treatment units, septic systems, or cesspools. The quantity of each type of system was provided from a 2010 report (Schott, 2010), online survey and voluntary information provided by the community members. Table 1 shows the distribution of IWSs among the community.

Table 1. Community IWSs by Type.

Description	*Puakō Community*	*Waialea Bay Community*	*Total Lots*
Septic Systems	77	8	85
Aerobic Treatment Units	12	0	12
Cesspool	49	9	58
Unknown	21	3	24
Vacant	43	0	43
Total	**202**	**20**	**222**

The discharge from each IWS either directly infiltrates into the groundwater (as with cesspools), or after some treatment is discharged into the groundwater through a drain field (as with the septic systems). Because the community is near sea level, and because of the porous lava rock in the area, the groundwater quickly flows into the ocean. Tracer studies have been conducted at various cesspools that have measured the travel time to the ocean as 3 days (Wienger, 2014). This rapid transportation of groundwater to the ocean indicates there is little time for biological contaminants or nutrients to be taken up in the soil, and likely pass through to the ocean.

This report considers the feasibility of three options to more effectively treat wastewater from the community and potentially improve the water quality of the Puakō-Mauna Lani Reef. These options use the following selection criteria to determine benefits and liabilities of each option: timeline of implementation, required permitting, environmental impacts, capital costs and operations costs. The three options considered are as follows:

1) Upgrade of IWSs to more efficient systems capable of treating and removing nutrients that have a negative impact on the reef. The proposed systems are aerobic treatment

systems (ATUs), which are capable of both removing biological contaminants and reducing nutrient levels.

2) Construct a low-pressure sewer collection system throughout the community and install a treatment facility capable of treating the sewage to acceptable levels and discharging the effluent through either crop irrigation or subsurface discharge.
3) Constructing a low-pressure sewer collection system throughout the community to deliver wastewater to the Kalahuipua'a Lagoons Facility (shown on Figure 1).

The following sections of this report identify expected design criteria for the site, evaluate the feasibility of each option and provide a recommended option based on the selection criteria discussed above.

CHAPTER 2 - DESIGN CRITERIA

2.1 Proposed Design Criteria

2.1.1 Demographics

The Puakō community consists of 202 lots, with 159 currently occupied. The 2010 US census projected the Puakō area to have an average household size of 1.96, which equates to an estimated population of 312 people (U.S. Census Bureau, 2010). Taking into account the fact that a certain number of these lots are used as rental or vacation homes, and were not included in the census information, and adjusting for the 2015 population, a total population of 350 is used for this report.

2.1.2 Design Flow

Where existing data is not available, the Hawaii Administrative Rules (HAR) provide design flow guidelines (Haw, 2014). Table 1 in Appendix F of Chapter 11-62 of the HAR requires a design flow of 100 gallons per person per day for single family dwellings. This equates to a total community flow of 35,000 gallons per day (gpd), or a flow of 225 gpd per residence. Using this value, the total community flow, once vacant lots have been put into use, is 45,500 gpd. With the additional lots from the Waialea Bay Community, a total flow of 50,000 gpd is given.

2.1.3 Peak Flow

Based on similarly sized communities, a peak hourly factor of 2.0 is used to account for fluctuations in the average daily flows. In some communities, larger peak factors are used, but with this being a contained system with no gravity sewer lines or manholes, a peak factor of 2.0 is appropriate.

2.1.4 Wastewater Characteristics

Guidelines for wastewater quality are provided, in part, by the Hawaii State Department of Health Wastewater Branch in the "Guidelines for the Treatment and Use of Recycled Water." This document requires design loading for BOD_5 and TSS to be no less than 0.2 pounds per capita per day (equivalent to 240 mg/L). Concentrations for nutrients are estimated using typical

values given in "Wastewater Engineering Treatment and Reuse," (Metcalf & Eddy), as 40 mg/L of total nitrogen and 7 mg/L of total phosphorous. Table 2 summarizes the wastewater characteristics.

Table 2. Design Criteria Summary

Description	Current	Build-Out	With Waialea Bay Community	Units
Total Population	350	455	500	people
Average Daily Flow	35,000	45,500	50,000	gpd
	24.3	31.6	34.7	gpm
Peak Factor	2	2	2	-
Peak Flow	48.6	63.2	69.4	gpm
BOD	70	91	100	lbs/day
	240	240	240	mg/L
TSS	70	91	100	lbs/day
	240	240	240	mg/L
Total Nitrogen	11.7	15.2	16.7	lbs/day
	40	40	40	mg/L
Total Phosphorous	2.0	2.7	2.9	lbs/day
	7	7	7	mg/L

While biological contaminants, such as BOD (biochemical oxygen demand) and TSS (total suspended solids) have an impact on the health of the reef, particular attention should be given to the nutrients (nitrogen and phosphorous) found in the wastewater, as these can promote phytoplankton and algal growth, which may result in negative impacts on coral.

CHAPTER 3 - WASTEWATER TREATMENT OPTIONS

The three options evaluated in this report for treating wastewater are 1) installation of aerobic treatment units (ATUs) on each lot that are capable of treating wastewater to adequate levels to be discharged into groundwater, 2) construction of a low pressure sewer collection system and a new treatment facility near the community and 3) construction of a low pressure sewer collection system to deliver wastewater to the Kalahuipua'a Lagoons Facility. Each of these options is evaluated based on the following selection criteria:

- Timeline for design and construction
- Permitting requirements
- Environmental benefits, including effluent water quality
- Total project capital cost
- Annual maintenance and operations cost

Following the analysis of each option based on the selection criteria, an evaluation matrix is generated. The highest ranked option in the evaluation matrix is discussed in greater detail.

3.1 No Action Alternative

The no action alternative would allow each residence to continue discharging wastewater in the manner currently being utilized. This would result in a certain volume of untreated wastewater to continue flowing to the ocean. As a result, coral growth may continue to decline, bacteria and *e. coliform* concentrations may continue to exceed recommended levels, and the potential for human health impacts may continue to exist and potentially increase. The potential results of not doing anything to mitigate these issues were deemed by AQUA and the Advisory Committee as unfeasible. The Advisory Committee is composed of the following individuals:

- Mike O'Toole – Puakō Community Member/Pacific Isle Homes Owner and Construction Manager
- Robby Robertson – Puakō Community Association/Community Member
- Sierra Tobiason – South Kohala Coastal Partnership

- Chad Wiggins – The Nature Conservancy
- Dennis Tulang – Hawaii Department of Health Wastewater Branch, Environmental Management Division, State Department of Health, currently with AECOM
- Mahana Gomes – Hawaii Rural Water Association
- Steven Colbert – University of Hawaii at Hilo
- Tracy Wiegner – University of Hawaii at Hilo
- James Beets – University of Hawaii at Hilo
- Erica Perez – Coral Reef Alliance
- Wes Crile – Coral Reef Alliance

3.2 Option 1: Individual Wastewater Systems (IWSs)

Individual wastewater systems are small units that treat wastewater generated from one or two single family residences. When operated correctly, certain IWSs are capable of removing both organic constituents (BOD and TSS) and nutrients, such as nitrogen and phosphorus. One such IWS is the aerobic treatment unit (ATU), which is used as the basis of design for this report. Two manufacturers of ATUs were contacted to provide product information and pricing: International Wastewater Technologies of Waipahu, HI and Environmental Waste Management Systems, Inc. of Honolulu, HI. Following a comparison of the two manufacturers, it was determined that International Wastewater Technologies had more competitive pricing and is used in estimating project costs.

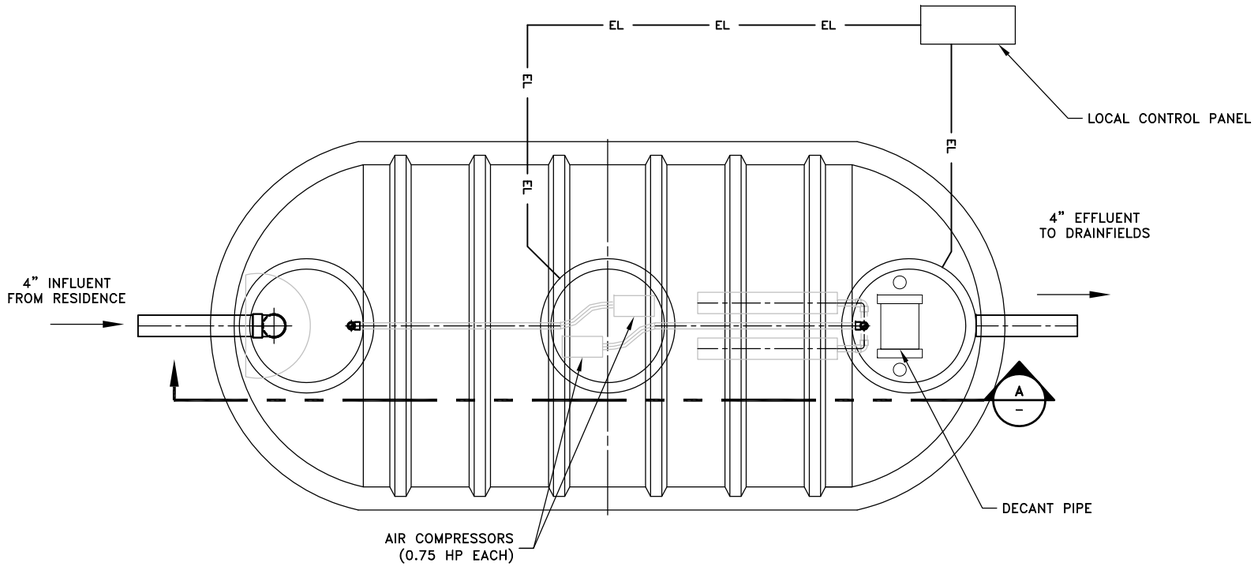
The International Wastewater Technologies ATU operates by collecting raw wastewater from the residence through the typical 4" sewer line into a single tank. This tank cycles between aerobic, anoxic, anaerobic and decanting stages. The aerobic cycle introduces air into the treatment tank through a small blower. The oxygen in the air promotes the growth of aerobic microbes that consume the organic pollutants (measured as BOD_5) in the wastewater. The air compressors then shut off for a pre-determined period of time and the lack of oxygen causes the tank to enter the anoxic stage. This stage encourages the growth of nitrogen-consuming bacteria that convert nitrates and nitrites to inert nitrogen gas. With the air compressors still off, and as more of the nitrogen is consumed, the tank begins to enter an anaerobic stage, which can enhance

the uptake of phosphorous by other microbes. During both the anoxic and anaerobic stages, a mechanical mixer is used to maintain a homogenous mixture in the tank.

Finally, in order to settle out the solids created by the various stages, the mechanical mixer is turned off and the solids collect at the bottom of the tank. These solids must be pumped periodically by a septage servicing company. The treated water is discharged from the ATU through a decant pump. Figure 2 shows the flow diagram and general arrangement drawing of the system.

The decant pump discharges the effluent into the soil subsurface through a drainage field. This drainage field consists of buried distribution piping with openings drilled at certain intervals to evenly drain the treated wastewater into the soil. The size of the drainage fields depends on the percolation rate of the soil. These percolation rates can be determined with field tests. While site specific data is not available, it is clear from the tracer studies previously conducted that water drains quickly to the ocean and a relatively quick percolation rate can be assumed.

For this report, this rate is assumed to be 30 minutes per inch. Using this value, Table III of Appendix F of Section 11-62 of the HAR, requires a drain field absorption area of 250 square feet per 200 gallons, or an average of 280 square feet per lot. Note that this drain field area is based on the assumption of percolation rate and may vary significantly with field percolation tests. Some lots may not have enough open area to install a drain field. In these cases other disposal options must be considered. With the maximum allowed trench width of three feet, a total of 95 feet of distribution piping will be required. It is important to note that the majority of the sites have some type of septic system which includes a drainage field. Therefore, it is assumed that only the lots with cesspools, unknown systems, or no treatment systems at all will need new drainage fields.



TANK PLAN

SCALE: 3/4"= 1'-0"

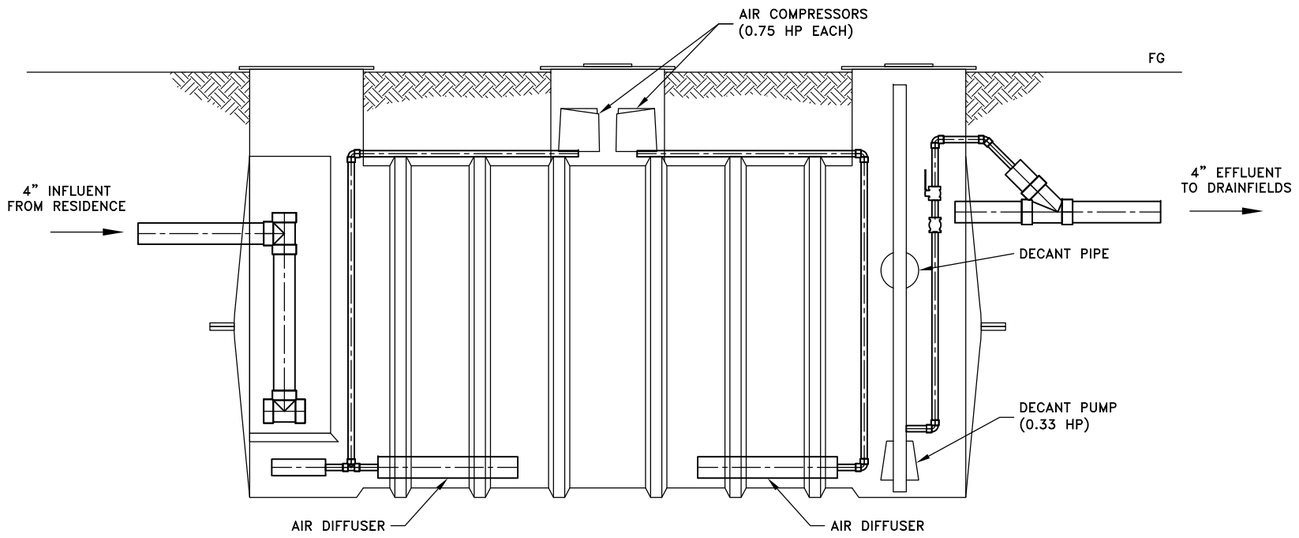
NOTES:

STAGE 1: AEROBIC TREATMENT
- MIXING AND OXYGEN PROVIDED FROM AIR COMPRESSORS THROUGH DIFFUSERS.
- REDUCTION OF BOD_5 AND NITRIFICATION OF AMMONIA.

STAGE 2: ANOXIC TREATMENT
- MECHANICAL MIXING
- DE-NITRIFICATION OF NITRATES

STAGE 3: ANAEROBIC TREATMENT
- MECHANICAL MIXING
- BIOLOGICAL REDUCTION OF PHOSPHOROUS

STAGE 4: DECANTING
- NO MIXING
- SETTLING OF SOLIDS AND DECANTING OF LIQUID



TANK SECTION (A)

SCALE: 3/4"= 1'-0"

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REVISIONS

PUAKŌ HAWAII COMMUNITY

PRELIMINARY ENGINEERING REPORT

ATU FLOW DIAGRAM

AQUA ENGINEERING
533 W. 2600 S., SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 299-1327 FAX (801) 299-0153

0 1/2 1

DRAWING IS TO SCALE
IF BAR MEASURES:
1" = FULL SCALE
1/2" = HALF SCALE

FIGURE

2

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SB

3.2.1 Permitting

The entirety of the Puakō community lies within what has been designated by the State as a Special Management Area (SMA). Any development occurring in SMAs requires a permit application, authorized through the County. In general, small single family residence improvements, such as adding a new IWS, require a SMA permit application. This application may be filed for each individual residence, or if all ATUs were installed under a single project, it may be possible to file a single SMA application.

The SMA permit application includes, among other items, an environmental assessment (EA) based on the construction of the treatment systems. Following the issuance of the SMA permit, the treatment system itself must also be approved by the State through an Individual Wastewater System Application. In addition to the basic lot information required, this application requires the involvement of a licensed engineer for percolation testing. The application also requires that a service contract for maintaining the ATU is established. Once the permit is approved and the system has been installed, a final inspection report is submitted and approval to operate the system is given. Samples of both the SMA application and the Individual Wastewater System Application forms are provided in Appendix B.

3.2.2 Environmental Impact

The ATUs considered here are reported as being capable of reducing BOD and TSS to 10 mg/L and total nitrogen to 10 mg/L. According to one report on the evaluation of the ATU supplied by International Wastewater Technologies, up to 61% of phosphorous may be removed (Babcock, 2006). If the ATUs perform similarly in this project, this would result in an effluent phosphorous concentration of 3 mg/L. Unlike the other options discussed in later sections, however, the ATUs will still have a direct discharge into the groundwater through the drain fields, which then flows quickly into the ocean and around the reef, due to the geology described in Section 1.1. The likelihood of the remaining nutrients in the treated wastewater reaching the ocean is high. It is also worth noting that if ATUs are not maintained and serviced regularly, the ability to treat wastewater to the quality described above is significantly reduced, resulting in even more nutrients and biological contaminants reaching the ocean. It is worth noting that

while reuse with certain wastewater treatment systems is possible, we have not identified any ATU systems in Hawaii that have been used in recycled water applications.

3.2.3 Capital Cost

The cost of the ATU system consists of the purchasing of equipment, mechanical installation, and plumbing and electrical connections. The purchase and installation of drainage fields are included in the total capital cost. As each existing septic system likely has a drainage field, purchase and installation of new drainage fields are assumed to only be needed on the lots using cesspools, unknown systems, or that are vacant. Also, lots that have existing septic tanks will not need as extensive excavation as those that do not, as the new units can be installed in the void created when the old tanks are removed. The lots without septic tanks will have significantly higher costs, as a large portion of the soil consists of lava rock and will have high groundwater, complicating the excavation. Table 3 details the estimated capital cost of installing ATUs on all lots. Developing the remaining vacant lots and providing treatment would add another $2.43 million. Providing treatment for the Waialea Bay would add another $833,100. These costs are detailed in Appendix A.

Table 3. Option 1 – Capital Costs

Description	*Qty*	*Units*	*Unit Cost*	*Total*
CBT 1.0KFO ATU	147	ea	$10,000	$1,470,000
ATU Installation (on sites with existing septic tanks)	77	ea	$5,000	$385,000
ATU Installation (on sites without septic tanks)	70	ea	$22,000	$1,540,000
Electrical Installation	147	ea	$3,000*	$441,000
Drainage Field (70 lots)	280	sq ft/lot	$30*	$588,000
Contingency	30%	%	$4,220,800	$1,327,300
Total Cost				**$5,751,200**

*Preliminary Estimates

3.2.4 Operations and Maintenance Cost

The primary maintenance costs for each ATU consists of pumping solids, general equipment maintenance and replacement, and electrical cost to operate blowers and pumps. The scheduled and emergency service should be contracted locally. It is anticipated that the ATUs will need to be pumped annually. Table 4 details the annual cost for maintenance of each ATU. Electrical

power costs are taken from the 2013 estimates given from Hawaii Electric Light Company, with residential and commercial rates as $0.4217 and $0.3883 per kWhr, respectively.

Table 4. Option 1 – Annual O&M Costs

Description	*Qty*	*Units*	*Unit Cost*	*Annual Cost*
Scheduled Maintenance	1	per year	$750	$750
Septage Pumping	1	per year	$550	$550
Pump/Blowers	15	kWhr/day	$0.42	$2,300
Annual Cost per Lot				**$3,600**
Monthly Cost per Lot				**$300**
Total Annual Cost (159 lots)				**$572,400**

3.2.5 Timeline

The timeline for installation of ATUs is relatively short. The tasks that must be completed include submitting and receiving approval for the various permits required, purchasing and installing the new units and installing drain fields where required. It is anticipated that the permitting process may take 6-12 months. Construction and installation of the 147 new ATUs may take an additional 12-18 months.

3.3 Option 2: Low-Pressure Collection System and New Treatment Facility

The remaining two options evaluate delivering untreated wastewater from each residence to a centralized treatment facility via a low pressure collection system. Option 2 considers a new treatment facility located near the community. The nearby location of this facility would reduce the cost of pipeline installation and pumping costs.

3.3.1 Collection System

Because the community is near sea level, which may cause issues with dewatering during pipeline installation, and because there is a high likelihood of lava rock in the area, shallow pipelines are most economical. As a gravity collection system cannot maintain a shallow depth, a low-pressure collection system must be used. A low-pressure system would require a small pump station at each residence with one or two pumps installed that deliver raw sewage from the house into the low-pressure main. The second pump provides redundancy in case the first pump fails. However, the cost of the entire pump station increases by approximately $6,000 by adding

the second pump. If a single pump system is used, an adequately sized pump station, as well as a local service company that can respond quickly will be needed to prevent the pump station from overflowing in case of a pump failure.

The manufacturer used for the evaluation in this report is Environmental One Corporation (E-One). An E-One grinder pump station would be used in locations where existing septic tanks did not exist, such as lots with cesspools, vacant lots, or lots with unknown treatment systems. A drawing of a typical E-One grinder pump station is shown in Figure 3.

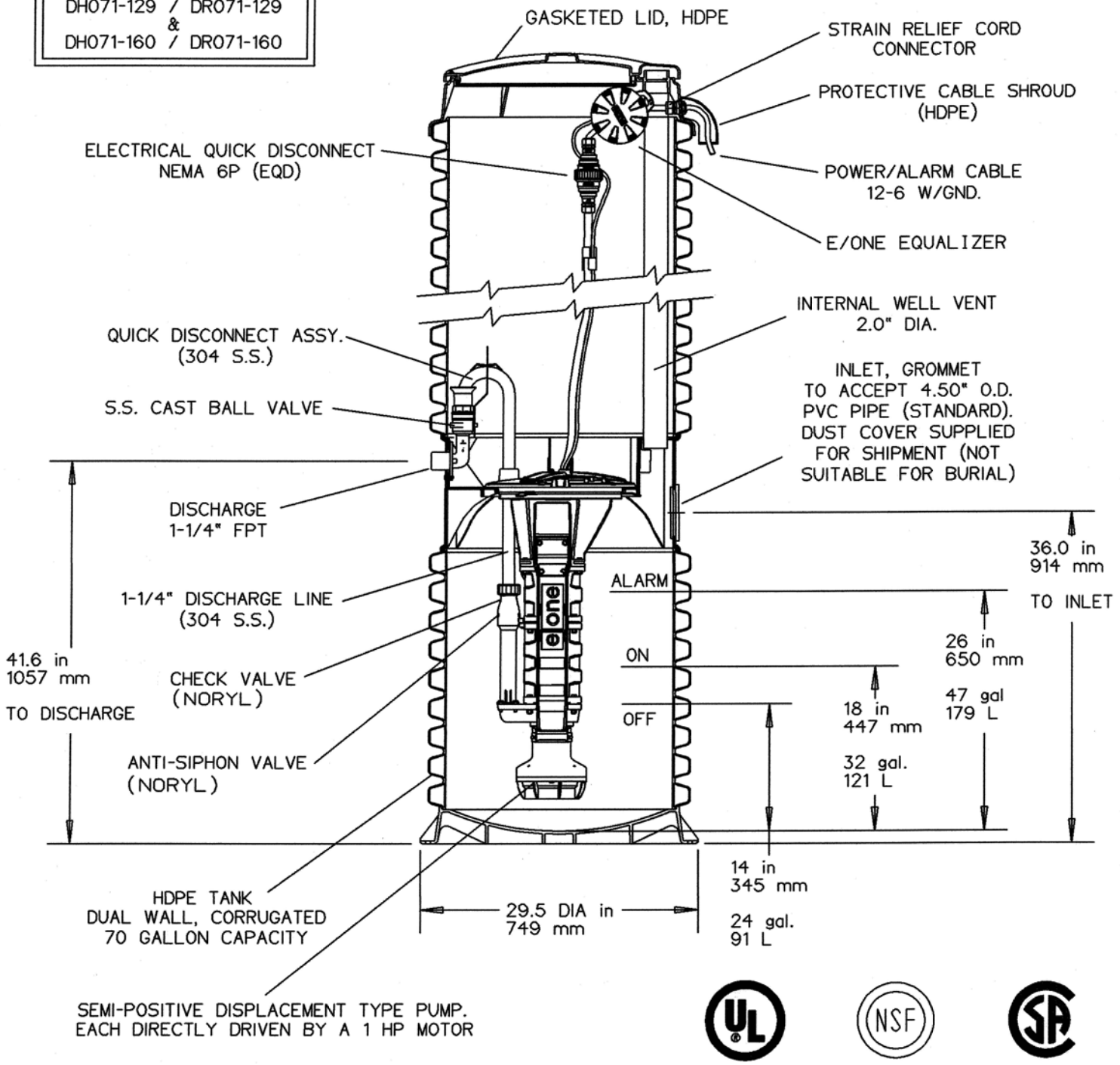
On lots where septic tanks are currently being used, the excavation costs can be greatly reduced by installing a pump system directly in the septic tank. Certain manufacturers provide a "drop-in" pump system that can easily be installed in the existing septic tank without any modifications.

Orenco Systems, Inc. is one manufacturer that produces this type of drop in system, and as such is used as a basis of design for the sites with existing septic tanks. A drawing of this Orenco system is shown in Figure 4.

Each lot would have a 1-1/4" lateral from the pump station or septic tank (located near the residence) to the low pressure collection main in the street. This collection main would range in size from 3" to 4" and would be buried approximately 3 feet, based on the County of Hawaii requirements. The general alignment of the pressure main is shown on Figure 5.

OPTIONS : ☐ DH071 (HARD WIRED LEVEL CONTROLS)
☐ DR071 (WIRELESS LEVEL CONTROLS)

FIELD JOINT REQUIRED
FOR MODELS
DH071-129 / DR071-129
&
DH071-160 / DR071-160



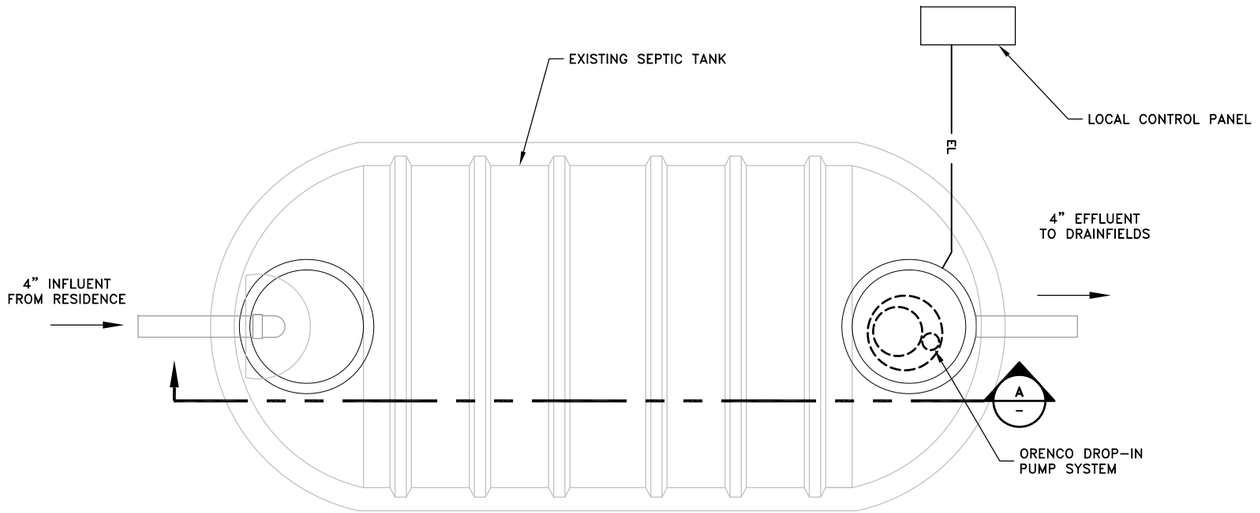
CONCRETE BALLAST MAY BE REQUIRED
SEE INSTALLATION INSTRUCTION
FOR DETAILS

AD	CH	10/20/10	C	
DR BY	CHK'D	DATE	ISSUE	SCALE

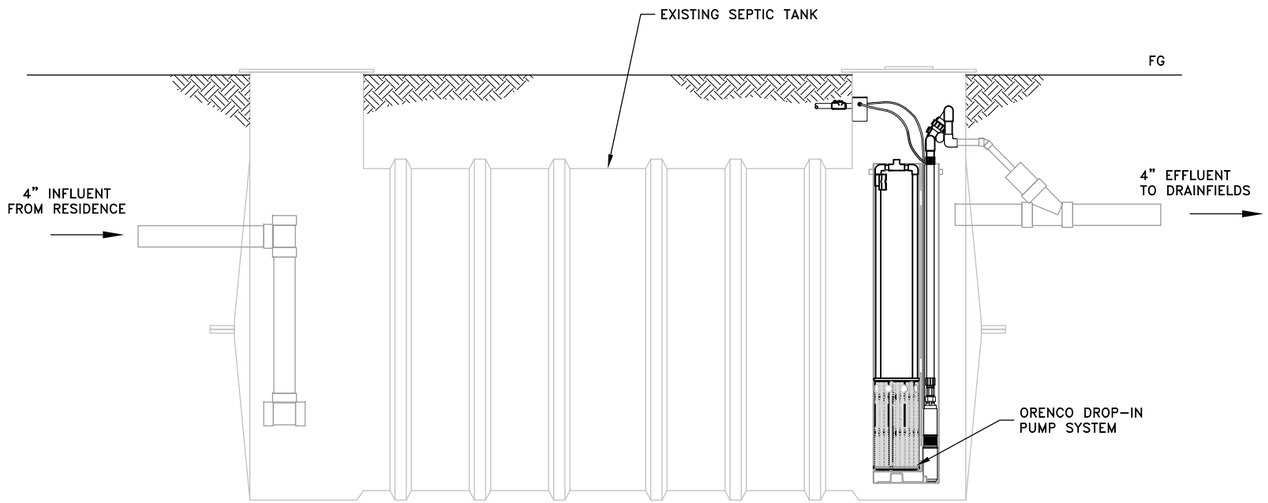
SEWER SYSTEMS

MODEL DH071 / DR071
DETAIL SHEET

NA0050P02



TANK PLAN
SCALE: 3/4"= 1'–0"



TANK SECTION A –
SCALE: 3/4"= 1'–0"

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REVISIONS

PUAKŌ HAWAII COMMUNITY

PRELIMINARY ENGINEERING REPORT

ORENCO PUMP STATION DRAWINGS

AQUA ENGINEERING
533 W. 2600 S. SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 299–1327 FAX (801) 299–0153

0 1/2 1

DRAWING IS TO SCALE
IF BAR MEASURES:
1" = FULL SCALE
1/2" = HALF SCALE

FIGURE
4

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OPTION #2 - SITE LAYOUT

SCALE: 1"= 800'

0 800 1600

Scale In Feet

LEGEND

- PROPOSED LOW PRESSURE COLLECTION MAIN
- POTENTIAL REUSE/DISPOSAL IRRIGATION SITES
- FUTURE UNIVERSITY OF HAWAII RESEARCH FACILITY

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1" = FULL SCALE
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REVISIONS

PUAKŌ HAWAII COMMUNITY

PRELIMINARY ENGINEERING REPORT

OPTION #2 - SITE LAYOUT

AQUA ENGINEERING
533 W 2600 S, SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 299-1327 FAX (801) 299-0153

FIGURE

5

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3.3.2 Centralized Treatment Facility

The new treatment facility would be located outdoors in an area to avoid future climate change and weather events and would consist of a screening system, secondary treatment tanks and clarifiers, sand filters and a UV disinfection system. A solids holding tank would be included to aerate and store sludge which would then need to be pumped periodically by a septic pumping service company. The aeration of the solids during storage helps to minimize odors and reduce the solids. Figure 6 shows the general flow diagram of the facility. The facility would have the ability to treat the water to R-1 reuse quality, which would then be used for irrigating crops that could uptake the water and nutrients that would otherwise discharge into the groundwater and eventually the ocean.

Land where both the new treatment facility and the irrigation site could be located would need to be identified. The treatment facility will likely require less than a ½ acre of land. However, the irrigation site may need up to 6 ½ acres, as discussed in greater detail in Section 3.2.3. In addition to the land needed for the irrigation site, Hawaii reuse guidelines require that a fully redundant disposal system must be installed if the irrigation system cannot be used. An example of such a situation would be during a large precipitation event, where the crop cannot uptake additional water, or where the irrigation system is shut down for maintenance. This redundant disposal option would use subsurface disposal and would use the same design guidelines as those used for the drainage fields in Option 1. Assuming similar percolation rates, a little more than 1 acre of land would be needed for subsurface disposal.

One potential location for the new treatment facility and a portion of the irrigation system is the site where the University of Hawaii is planning a marine research facility, as shown on Figure 5. This option has benefit for both the community and the University, as the research facility would also need a wastewater treatment system. If an agreement can be made with the University, a common treatment facility may be able to be constructed onsite to serve both the community and the research facility.

INFLUENT FLOW
BOD_{IN} = 240 MG/L (100 LBS/DAY)
TSS_{IN} = 240 MG/L (100 LBS/DAY)
TKN_{IN} = 40 MG/L (17 LBS/DAY)
P_{IN} = 7 MG/L (3 LBS/DAY)

A – CURRENT DAILY FLOW
B – BUILD-OUT FLOW
C – BUILD-OUT + WAIALEA BAY

FROM COLLECTION SYSTEM
A – 35,000 GPD
B – 45,500 GPD
C – 50,000 GPD

1/4" SCREEN
(1 HP)
CAPACITY = 121 GPM

10 LBS/DAY

TO LANDFILL

ALUM CONTACT TANK

LIQUID ALUM STORAGE TANK
(500 GALLONS)

PUMP #1
ALUM PUMPS
(120 VAC)
PUMP #2

DOSING RATE
6 GPD

DOSING RATE
4 GPD

17.8 SCFM
125 PSIG

AIR COMPRESSOR
(5 HP)

STM AEROTOR BASIN #1
(5 HP)

MLSS = 3,500 MG/L
BIOMASS YIELD = 0.75
FIXED FILM YIELD = 0.30
FIXED FILM = 36 MG/L
CONCENTRATION YIELD
15,500 GALLONS (EACH)

CLARIFIER #1
(13,800 GALLONS)

SURFACE OVERFLOW
A = 218 GPD/FT^2
B = 284 GPD/FT^2
C = 312 GPD/FT^2

ALUM CONTACT TANK
(1,500 GALLONS)

SAND FILTER

SAND FILTER
LOADING RATE
= 2.2 GPM/FT^2

BACKWASH FLOW
A = 1,050 GPD
B = 1,355 GPD
C = 1,500 GPD

UV WET WELL
#1
#2

UV DISINFECTION
SYSTEM (14 UNITS)
175 WATTS EACH

PLANT EFFLUENT METERING

TO REUSE IRRIGATION SYSTEM

ANOXIC BASIN
(8,000 GALLONS)

STM AEROTOR BASIN #2
(5 HP)

CLARIFIER #2
(13,800 GALLONS)

BACKWASH SUMP
(120 VAC)
(100 GALLONS)

RAS/WAS SLUDGE TANK
(1,500 GALLONS)

RAS FLOW = 50,000 GPD

RAS/WAS SLUDGE PUMP
(1 HP)

WAS VOLUME
A = 520 GPD
B = 676 GPD
C = 743 GPD

DECANTER FLOW
A = 312 GPD
B = 406 GPD
C = 450 GPD

BLOWER #1
AEROBIC DIGESTER BLOWERS
(1.5 HP EACH)
BLOWER #2

7.66 SCFM

AEROBIC DIGESTER TANK
(6,900 GALLONS)
STORAGE = 23–33 DAYS

RETURN FLOW
A = 1,362 GPD
B = 1,771 GPD
C = 1,946 GPD

SEPTIC PUMPING

UV WET WELL
(0.5 HP EA)
(2,000 GALLONS)

EFFLUENT FLOW
BOD_{OUT} = 20 MG/L
TSS_{OUT} = 20 MG/L
TKN_{OUT} = 10 MG/L
P_{OUT} = 1 MG/L

FLOW DIAGRAM LEGEND

- RAW INFLUENT
- SECONDARY EFFLUENT
- FILTERED/DISINFECTED WATER
- RETURN ACTIVATED SLUDGE
- WASTE ACTIVATED SLUDE
- PLANT DRAIN
- PROCESS AIR
- LIQUID ALUM

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REVISIONS

PUAKŌ HAWAII COMMUNITY

PRELIMINARY ENGINEERING REPORT

MASS BALANCE

AQUA ENGINEERING
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0 1/2 1
DRAWING IS TO SCALE
IF BAR MEASURES:
1" = FULL SCALE
1/2" = HALF SCALE

FIGURE
6

07/29/2015 X:\Puako\PUAK150119 – Feasibility Study\Drafting\General\FIG 6.dwg
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Land across Puakō Beach Drive, and to the southeast of the U of H site, also shown on Figure 5, may be available for the irrigation system and subsurface disposal site requirements. This land, leased by the Puakō Community Association, was established as a firebreak for the community and consists of approximately 4-6 acres of land.

A third site that may be used, for both the treatment facility and the irrigation/subsurface disposal systems is located near the middle of the community, behind the Ascension Mission Church, also shown on Figure 5. This site is also owned by the State of Hawaii.

3.3.3 Permitting

As is the case with Option 1, the first step in the permitting process begins with an SMA permit, with an accompanying environmental assessment. This assessment will also need to include the impact of the new treatment facility. Based on the findings of the assessment, either an Environmental Impact Statement (EIS) must be prepared, or the SMA permit application can then be filed. Because this option will exceed $500,000 in total cost, a major SMA permit will be required.

Following the issuance of an SMA permit, a Basis of Design Engineering Report must be submitted to the State. This report will detail the design of both collection system and the treatment facility. The State will also require an Owner Certification that includes operations procedures in the form of an O&M Manual. Once construction is completed, final inspection will take place after which the State will give approval to operate.

Other permits required for the construction of the collection system and the treatment facility include: a Work Within the Right-of-Way permit, an NPDES permit, a Grading Permit and potentially a building permit. Other matters that must be addressed include acquiring easements for the collection main and a flood plain assessment, as the majority of the community is within a flood plain. Relevant permit application forms are included in Appendix B.

3.3.4 Environmental Impact

Based on the process flow diagram in Figure 6, the treatment facility is designed to be capable of reducing BOD and TSS to less than 20 mg/L, total nitrogen to 10 mg/L and phosphorous to 1 mg/L and producing R-1 quality reuse water. HAR reuse guidelines have three classes of reuse water, with R-1 being the highest quality water that can be used in surface irrigation. Therefore, a centralized treatment facility that produces R-1 water has the potential of reducing the amount of water discharged into the groundwater by using the treated water to irrigate vegetation on or near the site of the facility. The vegetation uptakes water, along with the nutrients that are of interest in this study. Table 5 shows the amount of nutrients taken up per acre when irrigating Kentucky Bluegrass. The crop uptake values are based on guidelines given in the Hawaii State Department of Health Wastewater Branch "Guidelines for the Treatment and Use of Recycled Water."

Table 5. Kentucky Bluegrass Nutrient Uptake

Description	Effluent from Treatment Facility	Crop Uptake (per Acre)	Acres Required
Effluent Flow, gpd	50,000	6,409	7.8
Nitrogen, lbs/day	3.34	0.66	6.3
Phosphorus, lbs/day	0.33	0.11	3.8

The maximum amount of land required is based on the amount of water the crops can uptake and is equal to 7.8 acres. Note that other crops are able to uptake differing amounts of water and nutrients and the Department of Health document mentioned above should be referenced if other crops are to be used.

3.3.5 Capital Cost

The cost of this option includes materials and installation of the pump stations, the low pressure sewer main, and the treatment facility. Table 6 shows the costs of the pumping and collection system and Table 7 shows the cost of the treatment facility. The total capital cost is estimated to be $9.0 million. Developing the remaining vacant lots and providing treatment would add another $1.02 million. Providing treatment for the Waialea Bay Community would add another $1.79 million. These costs are detailed in Appendix A.

Table 6. Option 2 – Collection System Capital Costs

Description	*Quantity*	*Units*	*Unit Cost*	*Total Cost*
ARVs and Cleanouts	3	ea	$6,200	$18,600
DH-071-61 E-One Pumps	70	ea	$6,100	$427,000
E-One Pump Installation	70	ea	$7,000	$490,000
Orenco Drop-In Pumps	89	ea	$2,300	$204,700
Orenco Pump Installation	89	ea	$1,000	$89,000
Electrical Installation	159	ea	$3,000	$477,000
Furnish and Install HDPE Laterals	7,950	lf	$160	$1,272,000
Furnish and Install HDPE Sewer Main	11,500	lf	$180	$2,070,000
Asphalt Cutting and Patching	69,000	sq. ft	$6.00	$414,000
Contingency	30%	-	$5,462,300	$1,638,700
Capital Cost				**$7,101,000**

Table 7. Option 2 – Treatment Facility Capital Costs

Description	*Qty*	*Units*	*Unit Cost*	*Total*
Influent Screening	1	ea	$75,600	$75,600
Anoxic Basin	1	ea	$28,000	$28,000
Anoxic Mixing System	1	ea	$10,000	$10,000
Treatment Tank and Clarifier	2	ea	$379,200	$758,400
Alum Pumps	2	ea	$10,000	$20,000
Alum Storage Tank	1	ea	$20,000	$20,000
Sand Filters	2	ea	$110,000	$220,000
Backwash Pump	2	ea	$3,000	$6,000
Disinfection System	1	ea	$65,000	$65,000
Reuse Irrigation System	1	ls	$30,000	$30,000
Electrical	20%	%	$1,203,000	$240,600
Contingency	30%	%	$1,473,600	$442,100
Capital Cost				**$1,915,700**

The facility, as described, has enough capacity to handle the additional flows from the build-out of the Puakō Community and the addition of the Waialea Bay Community. No additional capital costs would be required if these lots were to be developed and connected to the system. Note that the estimates above do not include the cost of land purchase or leasing for the treatment and disposal systems.

3.3.6 Operations and Maintenance Cost

Based on the complexity of the facility and the required tasks to be completed, the treatment facility will need a part-time Class III operator to check on the facility daily. The operator's responsibilities would consist of maintaining equipment, refilling chemical storage, taking water samples, coordinating the disposal of solids and general housekeeping of the site. It is expected that the operator would spend approximately 10-15 hours per week at the site. Other maintenance expenses include the power costs associated with equipment and pump motors, and UV ballasts, chemical costs, disposal costs and general parts replacement. The individual pump stations at each residence must be maintained also, either by the facility operator or by a local service company. The total costs are given in Table 8, with a total annual cost of $254,800.

Table 8. Option 2 – Annual Power Costs.

Description	*Quantity*	*HP*	*hrs/day*	*Annual Cost*
Individual Pump Stations	159	1	0.42	$7,700
Headworks Screen	1	1	24	$2,600
STM Aerotor	1	5	24	$12,800
Alum Pumps	1	0.33	24	$900
RAS Pump	1	1.00	24	$2,600
Aerobic Blowers	1	1.50	24	$3,900
Air Compressor (Sand Filters)	1	5.00	12	$6,400
Filter Backwash Pump	1	0.25	1	$100
UV Pumps	1	3.00	12	$3,900
UV Modules	14	0.23	24	$8,400
Annual Power Costs				***$49,300***
Description	*Annual Amount*	*Units*	*Unit Cost*	*Annual Cost*
Operator Salary	780	hours	$80	$62,400
Alum	2,350	gallons	$5	$11,750
Sludge Disposal	76,000	gallons	$0.30	$22,800
Screenings Disposal	2	tons	$100	$180
Parts/Equipment Replacement	1	ls	$5,000	$5,000
Individual Pump Station Service	159	lots	$650	$103,350
Annual Maintenance Costs				***$205,500***
Total Annual O&M Costs				**$254,800**
Total Monthly Cost per Lot				**$134**

Developing the remaining vacant lots and providing treatment or adding the Waialea Bay Community to the system would not increase the power costs at the facility. Adding these lots

would increase O&M costs associated with pump station service, chemicals, and sludge disposal. Development of the remaining vacant lots would add $39,100 annually, and the inclusion of the Waialea Bay community would add $17,800 annually. Details of these costs can be found in Appendix A.

3.3.7 Timeline

The timeline for this option is somewhat extensive. The process begins with an environmental assessment and an SMA permit application. This stage is anticipated to take between six and twelve months. Following SMA permitting, the engineering report is prepared and submitted to the State for review. As this PER contains much of the information required for the State submitted engineering report, the preparation process can be shortened. Including time for State review and comments, this process is expected to take about least six months. Once the report has been approved, engineering design will take approximately eight months. After design is complete, the project would be bid to a qualified contractor, who would be responsible for obtaining necessary construction permits, procuring equipment and installing the sump pump stations, the collection sewer line and the construction of the treatment facility. This process should be expected to take at least one year. The total project timeline is between 24 to 48 months for completion.

3.4 Option 3: Low-Pressure Collection System to Kalahuipua'a Lagoons Facility

As previously mentioned, this third option would use the same type of collection system as Option 2. However, instead of delivering the wastewater to a new treatment facility, the collection line would ultimately deliver wastewater to the Kalahuipua'a Lagoons Facility. This option eliminates the challenges associated with permitting, funding, constructing and maintaining a new treatment facility.

3.4.1 Collection System

This option uses the same configuration for the pump station layout, with individual pump stations (either as new pump stations or as drop-ins to the existing septic tanks) on residential lots and a low pressure main in the road. Two routes are considered for delivering the wastewater to the treatment facility and are shown on Figure 7. Both routes have the collection

main running the length of Puakō Beach Drive, with different routes out of the community to reach the Kalahuipua'a Lagoons Facility.

Route A would run along Puakō Beach Drive to the southernmost part of the community where a lift station would be required, as the residential pumps do not provide enough head to deliver wastewater directly to the Lagoons Facility. From that point, the lift station would pump the wastewater for approximately 4,800 feet where it would connect to an existing 16" sewer main from the Mauna Lani resort area. This existing sewer main leads to the facility as described in the next section and as shown on Figure 7.

Route B would have the north and south ends of the pipeline converge at a point near the Ascension Mission Church, where the lift station would be located. The pipeline would then continue to the east, following a small access road leading to Ho'ohana Street. The pipeline would then connect directly to the Facility, without requiring any connection to the existing sewer force mains. As this route passes through State-owned land, easements would need to be obtained.

3.4.2 Kalahuipua'a Lagoon Facility

The Kalahuipua'a Lagoon Facility currently receives wastewater from the Fairmont Orchid, the KaMilo at Mauna Lani Resort, and the Fairways at Mauna Lani. The wastewater from each of these resorts feeds into various lift stations, as shown on Figure 7. These lift stations pump wastewater through approximately 3,000 feet of 16" ductile iron pipe, which then transitions to an 18" ductile iron pipe for the remaining 4,500 feet of the pipeline. The facility, operated by the Hawaii American Water Company, was originally designed in 1981 with a capacity of 0.75 MGD, with a build-out capacity of 2.1 MGD. The wastewater passes through bar screens and an aerated grit chamber before entering the aerated lagoons. Following treatment in the lagoons, the water flows out through an effluent pipe, in which chlorine is injected. The water then flows into an effluent wet well in the control building, which provides the time needed for the chlorine to interact with the wastewater. From this point, the water is pumped through effluent pumps to a small plot of land approximately ½ mile to the northeast, where it is used to irrigate a ground cover crop.

OPTION #3 - SITE LAYOUT

SCALE: 1"= 800'

0 800 1600

Scale in Feet

LEGEND

- PUAKŌ COMMUNITY
- EXISTING 16", 18" FORCE MAIN
- PROPOSED LOW PRESSURE COLLECTION MAIN
- PROPOSED ROUTE "A"
- PROPOSED ROUTE "B"
- COMMUNITY NOT IN SCOPE OF WORK

0 1/2 1

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

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REVISIONS

PUAKŌ HAWAII COMMUNITY

PRELIMINARY ENGINEERING REPORT

OPTION #3 - SITE LAYOUT

AQUA ENGINEERING
533 W. 2600 S., SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 299-1327 FAX (801) 299-0153

FIGURE 7

07/29/2015 X:\Puako\PUAK150119 – Feasibility Study\Drafting\Civil\FIG 5 7.dwg

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3.4.3 Permitting

A major SMA permit, with an accompanying EA or EIS, must be obtained with this option. The Engineering Report for the Kalahuipua'a Lagoon Facility will need to be updated to reflect impact of adding the flows from the Community. Other permits required for the construction of the collection system and the treatment facility includes: a Work Within the Right-of-Way permit, and an NPDES permit. Other matters that must be addressed include acquiring easements for the collection main and a flood plain assessment. Relevant permit application forms are included in Appendix B.

3.4.4 Environmental Impact

The lagoon facility was designed to reduce BOD and TSS to less than 30 mg/L. Disposal of the treated water is accomplished by crop irrigation, or by two injection wells, located near the facility. Based on communications with the facility operators, the irrigation land is at maximum capacity. If any additional water were to be treated at the facility, either more land would need to be acquired or the additional water would have to be disposed of by other means.

3.4.5 Coordination with Other Entities

The two routes proposed will require coordination with Hawaii American Water in order to deliver wastewater to the Lagoons Facility. This coordination includes when the connections will be made, what fees will be required of the Puakō Community, and any construction activities that may disrupt the regular operation of the facility. Route A will require coordination with other entities as well, as this route passes through property of several other entities. These include, but may not be limited to, the Fairmont Orchid, the Pauoa Bay Homeowners' Association, and the Fairways at Mauna Lani.

3.4.6 Capital Cost

The cost of this option includes materials and installation of the individual residential pump stations, the intermediate lift pump station, the low pressure sewer main, and the impact fee cost to connect to the Kalahuipua'a Facility. Table 9 shows the costs of the pumping and collection system and impact fee.

Developing the remaining vacant lots and providing treatment would add another $1.34 million for either Route A or Route B. Providing treatment for the Waialea Bay Community would add another $2.69 million. These costs are detailed in Appendix A.

Table 9. Option 3 – Capital Costs – Route A

Description	*Quantity*	*Units*	*Unit Cost*	*Total Cost*
ARVs and Cleanouts	3	ea	$6,200	$18,600
DH-071-61 E-One Pump Stations	70	ea	$6,100	$427,000
E-One Pump Station Installation	70	ea	$7,000	$490,000
Orenco Drop-In Pumps	89	ea	$2,300	$204,700
Orenco Pump Installation	89	ea	$1,000	$89,000
Electrical Installation	159	ea	$3,000	$477,000
Furnish and Install HDPE Laterals	7,950	ft	$158.00	$1,256,100
Furnish and Install HDPE Sewer Main	8,500	ft	$180.00	$1,530,000
Asphalt Cutting and Patching	51,000	sq. ft	$6.00	$306,000
Lift Station Construction	1	ls	$25,000	$25,000
Submersible Lift Pumps	2	ea	$10,000	$20,000
4" HDPE to Ex. Force Main	4,800	ft	$180.00	$864,000
Asphalt Cutting and Patching	28,800	sq. ft	$6.00	$172,800
Contingency	30%	%	$5,880,200	$1,764,100
Connection Fee/Expansion of Reuse	1	ls	$1,500,000	$1,500,000
Capital Cost				**$9,144,300**

Table 10. Option 3 – Capital Costs – Route B

Description	*Quantity*	*Units*	*Unit Cost*	*Total Cost*
ARVs and Cleanouts	3	ea	$6,200	$18,600
DH-071-61 E-One Pump Stations	70	ea	$6,100	$427,000
E-One Pump Station Installation	70	ea	$5,000	$350,000
Orenco Drop-In Pumps	89	ea	$2,300	$204,700
Orenco Pump Installation	89	ea	$1,000	$89,000
Electrical Installation	159	ea	$3,000	$477,000
Furnish and Install HDPE Laterals	7,950	ft	$160.00	$1,272,000
Furnish and Install HDPE Sewer Main	8,500	ft	$180.00	$1,530,000
Asphalt Cutting and Patching	51,000	sq. ft	$6.00	$306,000
Lift Station Construction	1	ls	$25,000	$25,000
Submersible Lift Pumps	2	ea	$10,000	$20,000
4" HDPE to Ex. Facility	10,800	ft	$160.00	$1,728,000
Asphalt Cutting and Patching	7,200	sq. ft	$6.00	$43,200
Contingency	30%	%	$6,490,500	$1,947,200
Connection Fee/Expansion of Reuse	1	ls	$1,500,000	$1,500,000
Capital Cost				**$9,937,700**

3.4.7 Operations and Maintenance Cost

The only maintenance required with this option is associated with the individual residential pump stations, the low pressure collection line and the lift station. The remainder of the existing force main and Lagoon Facility would continue to be maintained as it currently is, with an annual assessment fee and monthly user fee to the community to offset the additional maintenance that would be required at the facility. The estimated total annual cost is given in Table 11 below.

Table 11. Option 3 – Annual O&M Costs.

Description	*Annual Amount*	*Units*	*Unit Cost*	*Annual Cost*
Lift Station Pumps (20 HP each)	36,600	kWhr	$0.39	$14,300
Individual Pump Stations (1 HP each)	18,900	kWhr	$0.42	$8,000
Individual Pump Stations Service	159	lots	$650	$103,400
Monthly User Fee	159	lots	$1,200	$190,800
Total Annual O&M Cost				**$316,500**
Monthly Cost per Lot				**$166**

Developing the remaining vacant lots and providing treatment or adding the Waialea Bay Community to the system would increase O&M costs associated with pump station operation and service and monthly user fees. As the Waialea Bay Community addition would also require another lift station, the cost of pumping from this station is also included. Development of the remaining vacant lots would add $81,900 annually, and the inclusion of the Waialea Bay community would add $41,600 annually. Details of these costs can be found in Appendix A.

3.4.8 Timeline

The timeline for this option consists of construction of the individual pump stations, the intermediate lift station(s) and pressure sewer collection pipeline. It is also noted that coordination between all involved parties should be in place before design and construction is started. It is anticipated that the total time to completion for this option is 18 to 36 months.

CHAPTER 4 - RECOMMENDATIONS

4.1 AQUA's Review and Recommendation

The quantitative values given in the previous section, including timeline, environmental impact, and capital and O&M costs, are summarized in Table 12.

Table 12. Quantitative Summary.

Evaluation Criteria	ATUs	Onsite Facility	Kalahuipua'a Facility	
Timeline, months	18-30	24-48	18-30	
Phosphorous, mg/L	3-6	1*	3-6*	
Nitrogen, mg/L	10-20	10*	10-20*	
Capital Cost, millions	$5,751,200	$9,016,700	$9,144,300 (Route A)	$9,937,700 (Route B)
O&M, Annually	$572,400	$239,200	$316,500	
O&M, Monthly Cost/Lot	$300	$134	$166	

*Phosphorous and nitrogen may be removed by crop uptake in irrigation.

Timeline is the first item considered in this table and is impacted by several factors. However the main factor influencing the overall timeline is coordination with various entities and obtaining the required permits to implement the alternatives. Both Option 1 and Option 3 provide the better options with respect to time. Option 1 requires individual lot permitting through the County along with an SMA permit and some potential EA work. The onsite facility, Option 2, will require the most permitting because a new treatment facility is required, with its associated NPDES and recycled water permits in addition to the EA and SMA processes. Connecting with the existing Kalahuipua'a Facility, Option 3, will require some permitting and coordination with not only HAW, but also with the various entities within the Mauna Lani development. This option also requires the SMA and EA permits. While less permitting will be required, the additional coordination with Mauna Lani and HAW will add to the overall time of this alternative. Thus the timelines associated with the alternatives are estimated to vary from 1 to 4 years.

Environmental impacts of the alternatives are not completely quantifiable, but the phosphorus and nitrogen concentrations listed in the table demonstrate differences in the effluent quality of

the alternatives. Option 2, onsite treatment facility, will provide the best treatment with respect to removing nutrients from the effluent. This alternative will be designed to provide excellent nitrogen and phosphorus removal and thus will have the least amount of nutrients in the effluent. In addition, this alternative will reuse the water for irrigation of grass or another crop, which will further use and reduce the nutrients in the effluent. The ATU alternative could reduce the nutrients in the effluent if it was properly managed and run by the individual owners, but this would be difficult to consistently achieve. The Kalahuipua'a alternative does not remove nutrients but the effluent is used to irrigate sod and other plants, thus reducing the nutrients from the effluent. This would reduce the potential for nutrients to continue migrating to and impacting the reefs, but there is no guarantee this facility will be able to use the effluent for irrigation in the future. The disposal method could be changed to their existing injection wells, which is an option, but may allow nutrient rich effluent to reach the reefs near Puakō. Thus, from an environmental standpoint, Option 2 appears to have the least adverse impact. It should be noted that all of the alternatives will have a positive impact with respect to the environment and will improve the quality of discharged effluent.

Capital costs of the alternatives are fairly self-explanatory. The cost to implement the ATU alternative is the lowest because it requires the least amount of infrastructure. Also, there are some existing ATUs, which lowers the overall cost. The other two options are higher in capital cost and are fairly comparable with each other. Please note the costs were developed based on construction estimates from local contractors. Also, 30% contingency is included on the construction portion of the estimates.

Operational costs were also developed based on normal power, maintenance, and labor requirements to properly maintain and run the three alternatives. The operational costs of the ATU system are highest based on the annual requirements to service and pump the systems as prescribed by the County. The onsite facility appears to have the lowest operational costs with the Kalahuipua'a alternative being slightly higher.

While the evaluation matrix looks at both capital and operational costs, it is also common to combine these costs into a 20-year net present value, which compares the overall project costs over a 20-year life. This is done by taking the annual O&M costs and inflating them each year for a 20-year period at an annual inflation rate of 3%. The 20-year O&M cost is then brought back to present day dollars (present value) using a discount rate of 6%. The 20-year net present value is then calculated by adding the present day 20-year O&M cost to the capital cost. The 20-year net present value costs are calculated as follows:

- ATU – $14,027,700
- Onsite – $12,475,300
- Kalahuipua'a – $13,720,600

While this is not a specific criterion, it provides a different view and comparison of the alternatives with respect to costs. Even though the ATU system is significantly cheaper with respect to initial capital cost, it is not cheaper over a 20-year period. The collection system with onsite treatment appears to be the lowest overall cost when looking at a 20-year present value.

Based on the alternative information given in the previous chapter and the comparison presented above, the following evaluation matrix has been created. Each evaluation criteria is weighted by importance from 1-5. Higher weighted values correspond to more important criteria. An impact value from 1-5 is assigned to each criteria for each option, with higher values representing a more desirable outcome. This weighted value is multiplied by the impact value and the total for each criteria is summed to provide a total score for each option. The option with the highest total score represents the most favorable solution. Weighted values and impact values for the table below use values as determined by AQUA.

Table 13. Evaluation Matrix.

		ATUs		Onsite Treatment		Kalahuipua'a Facility	
Evaluation Criteria	**Weighted Value**	**Impact Value**	**Total**	**Impact Value**	**Total**	**Impact Value**	**Total**
Timeline	3	3	9	2	6	3	9
Permitting	2	4	8	3	6	4	8
Environmental	5	2	10	5	25	4	20
Capital Cost	4	5	20	3	12	3	12
O&M	4	2	8	5	20	3	12
		Total	**55**	**Total**	**69**	**Total**	**61**

Given this information, the best option to improving the quality of the Puakō-Mauna Lani reef and surrounding waters is Alternative 2: install individual sump stations at each residence, construct a low pressure collection main and build an onsite treatment facility. Treated effluent would be discharged using recycled water for irrigation.

The University has planned to construct a Marine research facility near Puakō and the reef, along with its own small treatment facility. If an agreement can be reached with the University, a common treatment facility between the community and the research facility could serve both parties.

If an agreement with the University is not reached, a site near the community should be identified that would serve as a location for a new wastewater treatment facility, as well as locations for reusing the water for irrigation.

The option of installing ATUs at each residence would be better than doing nothing and can be implemented for the lowest capital cost. However, due to the high O&M costs, over a 20-year period and because it provides the least benefit from an environmental standpoint, this may not be the best option. While these units can be as successful in the removal of nitrogen and phosphorous as a centralized treatment facility, the remaining nutrients and organic material is still discharged into the groundwater and quickly into the ocean.

The final alternative of connecting to the existing HAW facility is feasible and provides a viable option. This option is slightly more expensive and does not provide the same level of environmental benefits. Thus it is rated slightly lower than the other two alternatives.

4.2 Advisory Committee Meeting

On Saturday, August 22nd, 2015, the Advisory Committee met to discuss the findings of this report and to review the evaluation criteria and recommendation from the previous section. With an understanding of the benefits and limits of each option, each member of the committee completed an individual evaluation matrix, using the same evaluation criteria and weight values, but assigning impact values according to his or her best judgement. The results of each member's evaluation were averaged and a composite total value for each option was determined. The results of this are given in Table 14 below.

Table 14. Composite Evaluation Matrix from Advisory Committee.

		ATUs		Onsite Treatment		Kalahuipua'a Facility	
Evaluation Criteria	**Weighted Value**	**Impact Value**	**Total**	**Impact Value**	**Total**	**Impact Value**	**Total**
Timeline	3	3.8	11.3	2.2	6.7	2.8	8.3
Permitting	2	3.9	7.8	2.6	5.1	2.8	5.7
Environmental	5	2.1	10.6	4.4	22.2	3.4	17.2
Capital Cost	4	4.3	17.3	2.9	11.6	2.9	11.8
O&M	4	1.8	7.1	3.9	15.6	4.0	16.0
		Total	**54.1**	**Total**	**61.1**	**Total**	**59.0**

After further discussion, Option 1 was eliminated from further evaluation for the following reasons:

- This option provides a lack of adequate protection to the reef by allowing wastewater with some remaining nutrients from entering the ocean.
- Because of this wastewater entering the ocean, a lack of protection to human health may also exist.
- This option requires certain available space for drain fields for lots that do not currently have them. On some lots, this land may not be available, and as such, this option may not be able to be fully implemented across the community.

- While the ATUs provide a certain degree of treatment, this is somewhat contingent upon regular maintenance and adjustments based on water quality testing. While a service contract can and should be established in connection with this option, if this contract is maintained, or if adequate service is not provided, the quality of treatment is lessened, and risk to the coral reef and human health increases.

The two remaining options were discussed in greater detail and the Advisory Committee unanimously selected the onsite treatment system option as the recommended alternative. This decision was made because the Committee felt that there was greater benefit to having control over the disposal method and it was not clear how wastewater sent to the Kalahuipua'a Facility would be disposed.

CHAPTER 5 - IMPLEMENTATION PLAN – ONSITE TREATMENT

Based on the selection of the Advisory Committee, a number of tasks must be completed to implement the selected option. These include administrative tasks, the process of filing and obtaining needed permits for design and construction, engineering work that needs to be completed, and possible avenues that should be pursued to obtain adequate funding for capital expenses. With these tasks adequately detailed, a timeline is given to reasonably estimate the schedule of the project through the completion of construction.

5.1 Administrative

The construction of individual pump stations, collection lines, and a treatment system requires an entity to oversee and manage the work. We recommend that the next step is to immediately investigate options for ownership and operation. Based on past experience, ownership and operation is commonly managed under a service district. If a service district is determined to be the method of management and operation, the major steps of formation are as follows:

- *Submit a petition requesting institution of the procedure.* A petition has to be put assembled and submitted to the County Council in order to begin the formation process. The petition will request that the district be formed according to Hawaii County Code Chapter 32. A map showing the proposed boundaries of the district will have to be included with the petition. A description that the district is being formed to provide wastewater collection and treatment services for the community of Puakō will also be required. Finally, the petition application requires the petition to include the signatures of owners of not less than twenty-five percent of the area of land within the proposed district boundaries.
- *Adoption of resolution of intention.* With the petition submitted, the County Council will then adopt a resolution in a regularly scheduled Council meeting and fix a time and place for a public hearing on the establishment of the district which shall not be less than sixty or more than ninety days after the adoption of the resolution of intention.
- *Planning and execution of a public hearing.* The public hearing will allow all interested persons to provide testimony for or against the establishment of the district, the extent of

the district, and so forth. At the conclusion of the public hearing, the Council will determine whether to proceed with establishing the district.

- *Adoption of ordinance of formation.* If the Council determines to establish the district, it shall adopt an ordinance of formation establishing the district.

Once the district is formed, trustees will need to be elected. The trustees will work in behalf of the community to establish ordinances and to oversee the district operations. This interaction will be similar that of the Puakō Community Association (PCA) except that now it would be a government entity working under County Authority. Again, the district board would be responsible for the collection of fees and payment of operational costs and any applicable loan payments. Also the district board would hire an operator or operations group to operate and maintain the collection system and treatment plant. This group would take care of the daily operations of the system and report back to the board.

While some tasks could begin concurrently with the establishment of the district, this task is the primary and most important task associated with the implementation of the proposed project. The formation task needs to begin immediately as part of the project implementation.

5.2 Permitting

The first critical item that needs to be addressed in this implementation plan is the acquisition of land for the placement of the treatment facility and obtaining easements for the collection main. Acquiring land for the facility will likely either be in coordination with the University of Hawaii or through leasing of State land. Easements for the collection main will need to be coordinated with the County.

Permitting for the collection system and treatment plant should also begin immediately as to avoid any delays in design or construction. The first step that should be taken in permitting is to complete an Environmental Assessment (EA), which will require coordination between several governmental agencies responsible for evaluating the impact of the project on the natural resources in the area. It is anticipated that the completion of this assessment will take up to 60 days, with an additional 30 days of public response time. Assuming there is a Finding of No

Significant Impact (FONSI), a completed EA is submitted with the application for an SMA permit. If a FONSI is not issued, an Environmental Impact Statement must be prepared. This could add another 3 months. The timeline for approval of the SMA permit is approximately 6 months.

Once the SMA permit is issued, Basis of Design and Engineering Design report should be submitted for the Department of Health's (DOH) review at least six months prior to the commencement of construction. This report will include project information including descriptions of collection treatment and irrigation plans, and how the treatment will meet the DOH requirements for treatment. This report is assembled and approved prior to finalizing project design. Upon completion of the project design, Construction Plans are submitted to DOH for approval.

Prior to construction commencing, the following approvals must be obtained. These are relatively minor and the timeline is much shorter than the previously mentioned permits:

- Plan Approval, submitted to the Planning Commission of the County
- Building Permit, Grading Permit and Work Within the Right-of-Way Permit, submitted to the Department of Public Works for the County of Hawaii
- NPDES Permit, applied for through the USEPA

5.3 Engineering

Engineering design should begin once funding sources have been identified and are available, at least to fund the design tasks. Specific engineering tasks include a survey of the area, geotechnical investigation, environmental assessment, design and selection of individual pump systems and treatment facility, and design of the low pressure collection main. All of this work is critical to the project implementation and needs to be done prior to the construction phase. Some of the preliminary engineering design (up to about 30% complete) may be required for the permitting process to be completed. Additionally, the environmental assessment will be required to complete some of the permitting processes. This will most likely be required to be completed in parallel with the permitting and district formation tasks.

5.4 Funding

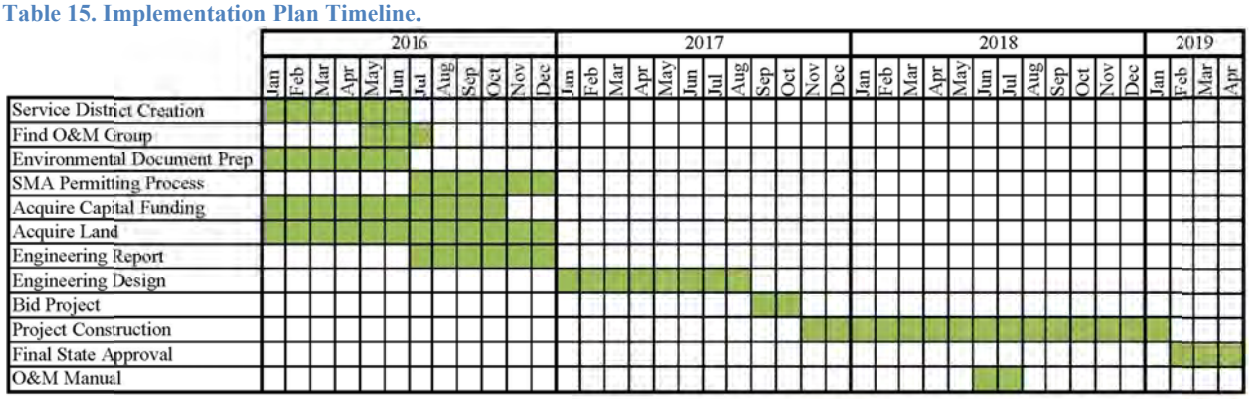
As several of the tasks that must be completed are contingent upon acquiring adequate funding, this fundraising process should begin immediately. The goal should be to provide funding for all capital expenses. Sources that could and should be solicited for funding include the Rural Water Association, the State Revolving Fund, the Army Corps of Engineers, the Environmental Protection Agency, private donors and various incentive programs.

Monthly costs for operation of the system will be given to the individual homeowners and would be collected by the service district described above. As discussed in Chapter 3 of this report, it is estimated that these monthly expenses will be approximately $134 per lot.

5.5 Timeline

Based on the items discussed above, an implementation timeline has been created and is shown in Table 15. Several of these tasks can be accomplished concurrently. This results in an estimated time of completion for the entire project by the end of 2018.

Table 15. Implementation Plan Timeline.



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APPENDIX A

Table 1. Option 1 – Vacant Lot Development Capital Costs

Description	*Qty*	*Units*	*Unit Cost*	*Total*
CBT 1.0KFO ATU	43	ea	$10,000	$430,000
ATU Installation	43	ea	$22,000	$946,000
Electrical Installation	43	ea	$3,000	$129,000
Drainage Field (43 lots)	280	sq ft/lot	$30	$361,200
Contingency	30%	%	$1,866,200	$559,900
Total Cost				**$2,426,100**

Table 2. Option 1 – Additional Waialea Bay Community Capital Costs

Description	*Qty*	*Units*	*Unit Cost*	*Total*
CBT 1.0KFO ATU	20	ea	$10,000	$200,000
ATU Installation (on sites with existing septic tanks)	8	ea	$2,000	$16,000
ATU Installation (on sites without septic tanks)	12	ea	$22,000	$264,000
Electrical Installation	20	ea	$3,000	$60,000
Drainage Field (12 lots)	280	sq ft/lot	$30	$100,800
Contingency	30%	%	$640,800	$192,300
Total Cost				**$833,100**

Table 3. Option 2 – Vacant Lot Development Capital Costs

Description	*Quantity*	*Units*	*Unit Cost*	*Total Cost*
DH-071-61 E-One Pumps	43	ea	$6,100	$262,300
E-One Pump Installation	43	ea	$7,000	$301,000
Electrical Installation	20	ea	$3,000	$60,000
Furnish and Install HDPE Laterals	1,000	lf	$160	$160,000
Contingency	30%	-	$783,300	$235,000
Build-Out Capital Cost				**$1,018,300**

Table 4. Option 2 – Additional Waialea Bay Community Capital Costs

Description	*Quantity*	*Units*	*Unit Cost*	*Total Cost*
DH-071-61 E-One Pumps	12	ea	$6,087	$73,000
E-One Pump Installation	12	ea	$7,000	$84,000
Orenco Drop-In Pumps	8	ea	$2,300	$18,400
Orenco Pump Installation	8	ea	$1,000	$8,000
Electrical Installation	20	ea	$3,000	$60,000
Furnish and Install HDPE Laterals	1,000	lf	$160	$160,000
Furnish and Install HDPE Sewer Main	4,500	lf	$180	$810,000
Asphalt Cutting and Patching	27,000	sq. ft	$6	$162,000
Contingency	30%	-	$1,375,400	$412,600
Waialea Bay Capital Cost				**$1,788,000**

Table 5. Option 2 – Vacant Lot Development O&M Costs

Description	*Quantity*	*HP*	*hrs/day*	*Annual Cost*
Individual Residence Pumps	43	1	0.42	$2,100
Description	*Annual Amount*	*Units*	*Unit Cost*	*Annual Cost*
Alum	700	gallons	$3	$2,100
Sludge Disposal	23,000	gallons	$0.30	$6,900
Individual Residence Pump Service	43	lots	$650	$27,950
Build-Out O&M Costs				**$39,050**

Table 6. Option 2 – Additional Waialea Bay Community O&M Costs

Description	*Quantity*	*HP*	*hrs/day*	*Annual Cost*
Individual Residence Pumps	20	1	0.42	$1,000
Description	*Annual Amount*	*Units*	*Unit Cost*	*Annual Cost*
Alum	300	gallons	$3	$900
Sludge Disposal	9,500	gallons	$0.30	$2,850
Individual Residence Pump Service	20	lots	$650	$13,000
Waialea Bay O&M Costs				**$17,750**

Table 7. Option 3 – Vacant Lot Development Capital Costs

Description	*Quantity*	*Units*	*Unit Cost*	*Total Cost*
DH-071-61 E-One Pumps	43	ea	$6,087	$261,700
E-One Pump Installation	43	ea	$7,000	$301,000
Electrical Installation	43	ea	$3,000	$129,000
Furnish and Install HDPE Laterals	2,150	ft	$158	$339,700
Contingency	30%	%	$1,031,400	$309,400
Build-Out Capital Cost				**$1,340,800**

Table 8. Option 3 – Additional Waialea Bay Community Capital Costs

Description	*Quantity*	*Units*	*Unit Cost*	*Total Cost*
ARVs and Cleanouts	1	ea	$6,200	$6,200
DH-071-61 E-One Pump Stations	12	ea	$6,100	$73,200
E-One Pump Station Installation	12	ea	$7,000	$84,000
Orenco Drop-In Pumps	8	ea	$2,300	$18,400
Orenco Pump Installation	8	ea	$1,000	$8,000
Electrical Installation	20	ea	$3,000	$60,000
Furnish and Install HDPE Laterals	1,000	ft	$158.00	$158,000
Furnish and Install HDPE Sewer Main	7,500	ft	$180.00	$1,350,000
Asphalt Cutting and Patching	45,000	sq. ft	$6.00	$270,000
Lift Station Construction	1	ls	$25,000	$25,000
Submersible Lift Pumps	2	ea	$10,000	$20,000
Contingency	30%	%	$2,072,800	$621,800
Waialea Bay Capital Cost				**$2,694,600**

Table 9. Option 3 – Vacant Lot Development O&M Costs

Description	*Annual Amount*	*Units*	*Unit Cost*	*Annual Cost*
Individual Pump Stations (1 HP each)	5,000	kWhr	$0.45	$2,300
Individual Pump Stations Service	43	lots	$650	$28,000
Monthly User Fee	43	lots	$1,200	$51,600
Total Cost				**$81,900**

Table 10. Option 2 – Additional Waialea Bay Community O&M Costs

Description	*Annual Amount*	*Units*	*Unit Cost*	*Annual Cost*
Lift Station #2 Pumps (5 HP each)	9,200	kWhr	$0.39	$3,600
Individual Pump Stations (1 HP each)	2,300	kWhr	$0.45	$1,000
Individual Pump Stations Service	20	lots	$650	$13,000
Monthly User Fee	20	lots	$1,200	$24,000
Total Cost				**$41,600**

Table 11. 20-Year Net Present Value Calculations

Annual O&M Cost	**Inflated Cost/Present Value (Discount Rate of 6%)**		
Year	Option 1	Option 2	Option 3
1	$572,400	$239,200	$316,500
2	$540,000	$225,660	$298,585
3	$523,852	$218,912	$289,656
4	$507,802	$212,205	$280,781
5	$491,890	$205,556	$271,983
6	$476,153	$198,979	$263,282
7	$460,621	$192,489	$254,694
8	$445,322	$186,096	$246,234
9	$430,279	$179,809	$237,917
10	$415,513	$173,638	$229,752
11	$401,039	$167,590	$221,749
12	$386,873	$161,670	$213,915
13	$373,025	$155,883	$206,259
14	$359,506	$150,234	$198,783
15	$346,322	$144,724	$191,493
16	$333,478	$139,357	$184,392
17	$320,979	$134,134	$177,481
18	$308,827	$129,055	$170,761
19	$297,021	$124,122	$164,234
20	$285,563	$119,334	$157,898
20-Year O&M Present Value	$8,276,500	$3,458,600	$4,576,300
Capital Cost	$5,751,200	$9,016,700	$9,144,300
20-Year Net Present Value	**$14,027,700**	**$12,475,300**	**$13,720,600**

APPENDIX B

SPECIAL MANAGEMENT AREA USE PERMIT APPLICATION

SPECIAL MANAGEMENT AREA USE PERMIT APPLICATION

COUNTY OF HAWAII
PLANNING DEPARTMENT

(Type or legibly print the requested information)

APPLICANT:_____

APPLICANT'S SIGNATURE:_____DATE:_____

ADDRESS:_____

_____

_____

LIST APPLICANT'S INTEREST IF NOT OWNER:_____

LIST PRINCIPAL(S) INCLUDING NAMES OF MAIN OFFICERS:_____

PHONE:(Bus.)_____ (Res.) _____ (Fax)_____

LANDOWNER(S):_____

LANDOWNER SIGNATURE(S):_____ DATE:_____

(May be by letter)

LANDOWNER(S) ADDRESS:_____

_____

_____

REQUEST:_____

_____

TAX MAP KEY:_____ZONING: _____

SIZE OF PROPERTY OR AFFECTED AREA(S):_____

AGENT:_____

ADDRESS:_____

_____

_____

TELEPHONE:(Bus.)_____ (Res.)_____ (Fax)_____

Please indicate to whom original correspondence and copies should be sent.

ORIGINAL:_____ COPIES:_____

THIS SPECIAL MANAGEMENT AREA USE PERMIT APPLICATION SHALL BE ACCOMPANIED BY THE FOLLOWING:

1. A filing fee of five hundred dollars ($500) with check shall be made payable to the County Director of Finance.

2. The Original (signed) and twenty (20) copies of the completed application.

3. The Original and twenty (20) copies of the following background information on the subject request:

   A. An EIS, if required, under Chapter 343, HRS, or when required by the Director may be submitted in lieu of this section.

   B. Detailed written description of the proposed project and a statement of objectives and reasons for the request.

   C. Description of the subject property in sufficient detail to precisely locate the property. Describe existing uses, structures and topography.

   D. A statement of the valuation of the proposed use, activity or operation.

   E. State/County Plans affecting the subject request: General Plan designation and Community Development Plans.

   F. A written statement discussing the proposed development in relationship to the objectives and policies as provided by Chapter 205A, HRS, and the Special Management Area guidelines as contained herein.

   G. Surrounding zoning and land uses.

   H. Flood Insurance Rate Map (FIRM) designation (contact Department of Public Works - Engineering Division).

   I. Archaeological Resources (<u>one</u> of the following):

      1. An archaeological inventory report containing significance assessments, effect determinations, and proposed mitigation commitments. The report should be completed pursuant to State Department of Land and Natural Resources Historic Preservation Division (DLNR-SHPD) rules.

      2. A "no effect" letter from the State DLNR Historic Preservation Division.

      3. A copy of a letter written by the applicant to the State DLNR Historic Preservation Division requesting a "no effect" letter, including supporting documentation, to which SHPD has not responded after 30 days (SHPD's time limit under their rules).

   J. Floral and Faunal Resources.

   K. Valued Cultural Resources: Identify any traditional and customary native Hawaiian rights that are exercised in the area; the extent in which the proposed development will affect these rights; and feasible action to be taken to protect native Hawaiian rights if they exist.

   L. Public Access: Existing public access to and along the shoreline or to mountain

areas and knowledge of whether public access is being used.

M. Description of access(es) to the area (e.g. width, type of surface and condition of roadway). If a private roadway, submit evidence of access rights.

N. Traffic impacts - assessment of existing traffic conditions, anticipated increase in traffic and traffic impacts from proposed use (a formal study may be requested by Department of Public Works or Department of Transportation during the review process).

O. Availability of Utilities: Water, telephone, electricity, sewage disposal.

P. In the case of an applicant whose proposed development has been assessed, any information as to the areas of critical concern delineated by the director.

4. An Original and twenty (20) copies of the anticipated impacts of the proposed development on the Special Management Area, including but not limited to the following:

   A. Description of environmental setting;

   B. The relationship of the proposed action to land use plans, policies, and control of the affected area;

   C. The probable impact of the proposed actions on the environment;

   D. Any probably adverse environmental effect which cannot be avoided;

   E. Alternatives to the proposed action;

   F. Mitigating measures proposed to minimize impact; and

   G. Any irreversible and irretrievable commitment of resources.

5. The Original and twenty (20) copies of a preliminary site plan drawn to scale showing property lines and measurements; all existing and proposed structures with elevations, uses and improvements; proposed subdivision and reference points such as roadways, shoreline, etc.

6. One copy of a full-size (2' x 3') scale-drawn plot plan of Item 5 for presentation purposes.

7. A shoreline survey when the parcel abuts the shoreline, except as may be waived by the Director when the proposed development is clearly and unmistakably located on a shoreline parcel at a considerable distance from the shoreline.

8. In the case where a multi-unit residential structure, containing more than ten units is proposed, the Director may require the applicant to develop a scale model or three-dimensional rendering of the proposed development and related improvements.

9. A list of names, addresses and tax map keys of all owners and lessees of record of surrounding properties who are required to receive notice. See attached instructions for notification procedures.

10. Any other plans or additional information relevant to this application may be requested by the Planning Director to facilitate processing of this request.

HAWAII REVISED STATUTES

§205A-2 Coastal zone management program; objectives and policies.

(a) The objectives and policies in this section shall apply to all parts of this chapter.

(b) Objectives.

(1) Recreational resources;
  (A) Provide coastal recreational opportunities accessible to the public.

(2) Historic resources;
  (A) Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

(3) Scenic and open space resources;
  (A) Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.

(4) Coastal ecosystems;
  (A) Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

(5) Economic uses;
  (A) Provide public or private facilities and improvements important to the State's economy in suitable locations.

(6) Coastal hazards;
  (A) Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

(7) Managing development;
  (A) Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

(8) Public participation;
  (A) Stimulate public awareness, education, and participation in coastal management.

(9) Beach protection;
  (A) Protect beaches for public use and recreation.

(10) Marine resources;
  (A) Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

(c) Policies.

(1) Recreational resources;
  (A) Improve coordination and funding of coastal recreational planning and management; and
  (B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:
    (i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;
    (ii) Requiring replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;
    (iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;
    (iv) Providing an adequate supply of shoreline parks and other recreational

facilities suitable for public recreation;

(v) Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

(vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6.

(2) Historic resources;

(A) Identify and analyze significant archaeological resources;

(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and

(C) Support state goals for protection, restoration, interpretation, and display of historic resources.

(3) Scenic and open space resources;

(A) Identify valued scenic resources in the coastal zone management area;

(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and

(D) Encourage those developments that are not coastal dependent to locate in inland areas.

(4) Coastal ecosystems;

(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

(B) Improve the technical basis for natural resource management;

(C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

(D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

(E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

(5) Economic uses;

(A) Concentrate coastal dependent development in appropriate areas;

(B) Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

(C) Direct the location and expansion of coastal dependent developments to areas

presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

(i) Use of presently designated locations is not feasible;

(ii) Adverse environmental effects are minimized; and

(iii) The development is important to the State's economy.

(6) Coastal hazards;

(A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;

(B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;

(C) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and

(D) Prevent coastal flooding from inland projects.

(7) Managing development;

(A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

(B) Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and

(C) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

(8) Public participation;

(A) Promote public involvement in coastal zone management processes;

(B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and

(C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

(9) Beach protection;

(A) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;

(B) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

(C) Minimize the construction of public erosion-protection structures seaward of the shoreline.

(10) Marine resources;

(A) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

(B) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;

(C) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

(D) Promote research, study, and understanding of ocean processes, marine life, and

other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

(E) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

§205A-26 Special management area guidelines. In implementing this part, the authority shall adopt the following guidelines for the review of developments proposed in the special management area:

(1) All development in the special management area shall be subject to reasonable terms and conditions set by the authority in order to ensure:

(A) Adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas, and natural reserves is provided to the extent consistent with sound conservation principles;

(B) Adequate and properly located public recreation areas and wildlife preserves are reserved;

(C) Provisions are made for solid and liquid waste treatment, disposition, and management which will minimize adverse effects upon special management area resources; and

(D) Alterations to existing land forms and vegetation, except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, wind damage, storm surge, landslides, erosion, siltation, or failure in the event of earthquake.

(2) No development shall be approved unless the authority has first found:

(A) That the development will not have any substantial adverse environmental or ecological effect, except as such adverse effect is minimized to the extent practicable and clearly outweighed by public health, safety, or compelling public interests. Such adverse effects shall include, but not be limited to, the potential cumulative impact of individual developments, each one of which taken in itself might not have a substantial adverse effect, and the elimination of planning options;

(B) That the development is consistent with the objectives, policies, and special management area guidelines of this chapter and any guidelines enacted by the legislature; and

(C) That the development is consistent with the county general plan and zoning. Such a finding of consistency does not preclude concurrent processing where a general plan or zoning amendment may also be required.

(3) The authority shall seek to minimize, where reasonable:

(A) Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough or lagoon;

(B) Any development which would reduce the size of any beach or other area usable for public recreation;

(C) Any development which would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management areas and the mean high tide line where there is no beach;

(D) Any development which would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast; and

(E) Any development which would adversely affect water quality, existing areas of open water free of visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.

FOR REFERENCE TO THE ABOVE SUBMITTAL REQUIREMENTS PLANNING COMMISSION RULE 9-SPECIAL MANAGEMENT AREA CAN BE OBTAINED FROM THE COUNTY OF HAWAII WEBSITE UNDER PLANNING DEPARTMENT, PLANNING RULES.

COUNTY OF HAWAI'I
PLANNING DEPARTMENT

Requirement to Inform Surrounding Property Owners and Lessees of Contested Case Procedure

These requirements are prepared in accordance with the Planning Commission's Rules of Practice and Procedure, Rule 4, Contested Case Procedure, effective April 19, 2010. Rule 4, Contested Case Procedure affects "all cases where the action of the Commission is the final action of a County official or agency, prior to the opportunity for appeal to Circuit Court, whenever it is required. It shall therefore be followed in all cases where statutes provide for direct appeal from the Commission to Circuit Court." Applications affected by Rule 4 include Special Permits, Shoreline Setback Variances, Special Management Area (SMA) Use Permits and Use Permits.

First Notice

Within (10) days after the Planning Department or Planning Commission has officially acknowledged receipt of your application, you are required to serve notice of your application on surrounding property owners and lessees of record, in accordance with the Hawai'i County Zoning Code, Section 25 - 2 - 4.

Second Notice

Special Permit Applications: You are required to serve a second notice to surrounding owners and lessees of record within ten (10) days after receiving notice from the director of the date of the scheduled hearing but not less than ten (10) days prior to the date of the scheduled hearing.

Shoreline Setback Variance Applications: You are required to serve a second notice within ten (10) days after receiving notice from the director of the date of the scheduled hearing but not less than ten (10) days prior to the date of the scheduled hearing.

SMA Use Permit Applications: You are required to serve a second notice within ten (10) days after receiving notice from the director of the date of the scheduled hearing but not less than twenty (20) days prior to the date of the scheduled hearing.

Use Permit Applications: You are required to serve a second notice within ten (10) days after receiving notice from the director of the date of the scheduled hearing but not less than ten (10) days prior to the date of the scheduled hearing.

Both notices shall include the following information:

1. Name of the applicant;

2. Precise location of the property involved, including tax map key identification, location map and site plan;

3. Nature of the application and the proposed use of the property;

4. Date on which the application was filed with the director or the commission;

5. Inform the landowner and lessee that they have a right to submit a written request for a contested case procedure. Should they seek to intervene as a party, they shall file a written request on the attached form, "Petition for Standing in Contested Case Hearing." You should include this form in both notices to the landowners and lessees. The request shall be filed with the Planning Commission at Aupuni Center, 101 Pauahi Street, Suite 3, Hilo, Hawai'i 96720; and accompanied by a filing fee of $200 payable to the Director of Finance. The required information shall be submitted no later than seven (7) calendar days, prior to the Commission's first scheduled public hearing to consider the application;

6. Inform the landowner and lessee that should they choose not to submit a written request for a contested case procedure, they may express their support/opposition in writing or by oral testimony at the Planning Commission public hearing to be scheduled; and

7. Planning Department mailing address and phone number should there be any questions.

In addition, the second notice shall include the date, time and place that the scheduled public hearing will be held to consider the application.

Who Should Be Notified?

When the subject property is located within the State Land Use Urban or Rural District, notice shall be served to owners and lessees of record of all lots within three hundred feet (300') of the perimeter boundary of the subject property.

When the subject property is located within the State Land Use Agricultural District, notice shall be served to owners and lessees of record of all lots within five hundred feet (500') of the perimeter boundary of the subject property. Except that if the surrounding properties are located within either the State Land Use Urban or Rural District, notice shall be served to owners and lessees of record of all lots within three hundred feet (300') of the perimeter boundary of the subject property.

Data available from the Real Property Tax division of the Department of Finance shall be utilized in determining the names and addresses of the affected owners and lessees of record. The applicant shall also provide notice to such other owners and lessees of record when the applicant has actual knowledge of such names or as informed by the Planning Director or Planning Commission.

Proof of service for the first notice and second notice shall be submitted to the Planning Director or Planning Commission prior to the date of public hearing. Proof of service may consist of certified mail receipts, affidavits, declarations or the like. The list of names, addresses and tax map keys of those individuals notified and one copy of the first and second notification letter shall also be submitted.

Should you have any questions, please contact the Planning Department at 961-8288 or 327-3510.

PETITION FOR STANDING IN A CONTESTED CASE HEARING

NAME: _____

ADDRESS: _____

_____

_____

PHONE NO.: _____

APPLICANT/

DOCKET NO.:_____

A. Is your interest in this matter clearly distinguishable from that of the general public?

Yes_____ No_____

If the answer is "yes", please explain:

_____

_____

_____

If the answer is "no", please explain how the proposed action will nevertheless cause you actual or threatened injury:

_____

_____

_____

B. Are you a government agency whose jurisdiction includes the land involved in the subject request?

Yes _____ No _____

If the answer is "yes", please explain the nature of the agency's jurisdiction:

_____

_____

_____

C. Do you lawfully reside on or have some property interest in the land involved in the subject request?

Yes _____ No _____

If the answer is "yes", please explain:

_____

_____

D. Are you a person or persons descended from native Hawaiians who inhabited the Hawaiian Islands prior to 1778, who practiced those rights which were customarily and traditionally exercised for subsistence, cultural, or religious purposes?

Yes _____ No _____

If the answer is "yes", please submit any genealogical evidence and historical evidence showing the exercise of those rights to support your statement:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

_____
Petitioner's Signature

STATE OF HAWAII)
) SS.
COUNTY OF HAWAII)

On this _____ day of _____, 20___, before me personally appeared _____, to me known to be the person described in and who executed the foregoing instrument, and acknowledged that he executed the same as his free act and deed.

_____
Notary Public, State of Hawaii

My commission expires: _____

POSTING OF SIGNS FOR PUBLIC NOTIFICATION

In accordance with Chapter 25 (Zoning Code), Article 2, Division 1, Section 25-2-12, Hawaii County Code 1983 (2005 Edition) and/or Planning Commission Rules of Practice and Procedure, within ten (10) days of being notified of the acceptance of an application, the applicant shall post a sign on the subject property notifying the public of the following:

1. The nature of the application;
2. The proposed use of the property;
3. The size of the property;
4. The tax map key(s) of the property;
5. That the public may contact the Planning Department for additional information; and
6. The address and telephone number of the Planning Department.

The sign shall be not less than nine square feet and not more than twelve square feet in area, with letters not less than one inch high. No pictures, drawings, or promotional materials shall be permitted on the sign.

The sign shall be posted at or near the property boundary adjacent to a public road bordering the property and shall be readable from said public road. If more than one public road borders the property, the applicant shall post the sign to be visible from the more heavily traveled public road.

The sign shall, in all other respects, be in compliance with Chapter 3 (Signs), Hawaii County Code 1983 (2005 edition).

The applicant shall file an affidavit with the Planning Department not more than five (5) days after posting the sign stating that a sign has been posted, and that the applicant will not remove the sign until the application has been granted, denied, or withdrawn. A photograph of the sign in place shall accompany the affidavit.

The sign shall remain posted until the application has been granted, denied, or withdrawn. The applicant shall remove the sign promptly after such action.

INDIVIDUAL WASTEWATER SYSTEM APPLICATION

DEPARTMENT OF HEALTH - WASTEWATER BRANCH
INDIVIDUAL WASTEWATER SYSTEM (IWS)
APPLICATION INFORMATION SHEET
Please Print or Type

Engineer: _____

Owner: _____

Owner's Mailing Address: _____

_____

Project Location: _____
(Street Address, Subdivision Name and General Area):

_____

Project Tax Map Key (TMK) Number: (____) ____ - _____ - _____: _____

Lot Size: _____

Projected Flow (gallons per day) or Number of Bedrooms: _____

Proposed Treatment Unit (Manufacturer, Model, Design Capacity):

_____

Proposed Disposal System: _____

Design Percolation Rate: _____ min/in

Existing IWS on lot: NO YES Type: _____

Existing potable drinking water well within 1,000 ft of the proposed disposal system? NO YES

Existing structure on lot: NO YES Type:_____

LCC upgrade? NO YES

- -

FOR DEPARTMENT USE ONLY:

Date Received: _____ Project Engineer: _____ File No. _____

Filing Fee ($100_____ $25_____) Check Date: _____ Check No._____

Notes: _____

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

In reply, please refer to:
EMD / WB

DEPARTMENT OF HEALTH - WASTEWATER BRANCH REQUIREMENTS FOR REVIEW PROCESS OF INDIVIDUAL WASTEWATER SYSTEMS (IWS)

The following items must be submitted to the Department of Health, Wastewater Branch for the review of building permit applications (BPAs):

1. Completed Application Form;
2. Construction plans of the IWS prepared by a licensed engineer;
3. Site plan;
4. Floor plans for the dwelling unit(s);
5. Owner's Certification Form;
6. Site Evaluation Form;
7. Operation and Maintenance manual;
8. Sludge Disposal Plan; and
9. Maintenance contracts for aerobic units.
10. Application Fee of $100 - check payable to **STATE OF HAWAII**.

The review process could take approximately two days to two weeks, depending on the completeness of the submitted paperwork. You will be informed in writing of the approval of your system.

Should you have any questions, please call the Wastewater Branch's Planning & Design Section Engineer at telephone (808) 586-4294. We are located at:

919 Ala Moana Blvd. Room 309
Honolulu, Hawaii 96814-4920
Phone (808) 586-4294 Fax (808) 586-4300

DEPARTMENT OF HEALTH - WASTEWATER BRANCH
INDIVIDUAL WASTEWATER SYSTEM (IWS)
OWNER'S CERTIFICATION FORM

Subject: Individual Wastewater System for _____

Tax Map Key (TMK) Number: (___) ____ - ____ - _____ : _____

Mailing Address: _____

_____

I, _____ , hereby certify that I am the owner (s) of the
(please print name)
subject property and that I have read the following and shall comply with all provisions. Failure to comply with any or all of the provisions can lead to imposition of the penalties and remedies as provided for in Administrative Rule, Title 11, Chapter 62, Section 11-62-72, Penalties and remedies.

1. I certify that as the owner of the Individual Wastewater System (IWS) serving the subject property, the IWS will be inspected, operated and maintained in accordance with the operation and maintenance manual developed by my IWS design engineer section (section 11-62-31.1(e)(2)).

   Furthermore, if an aerobic unit is utilized for wastewater treatment, an active service contract for the proper operation and maintenance shall be maintained at all times (section 11-62-33.1.(b)(3)).

2. I understand and shall comply with the provision of section 11-62-08 (g) which requires that the IWS be constructed by a licensed contractor with a license type of: **A, C-9, C-37, C-37a or C-43**.

3. I understand and shall comply with the provisions of section 11-62-31.(f) which states that the IWS must be inspected and approved of by the Department prior to use.

Furthermore, I shall instruct and require my contractor to leave uncovered for inspection, various parts of the IWS system. These parts include manhole/access openings, distribution boxes, ends of trenches to visually see gravel, pipe and geotextile fabrics used and/or seepage pit openings. I understand that I will be required to re-expose these areas if at the time of inspection they are not visible.

4. I understand and shall comply with the provisions of section 11-62-31.1.(e)(2) which required me to certify upon sale or transfer of the subject property, that the appropriate transfer or sales documents and provisions shall bind the new owners to the operation and maintenance provisions referenced in item 1 above.

5. I understand and shall submit any and all changes made to my IWS plans to the Department (section 11-62-08(b)) for review and approval. Changes to the approved IWS plans that need to be submitted to the Department include but are not limited to the following - changes in location of any component of the wastewater system, changes in the type of products used, changes in the disposal system methods, changes in the dwellings/buildings location or size and changes in the design engineer for the IWS.

Signed: _____ Dated: _____

DEPARTMENT OF HEALTH - WASTEWATER BRANCH
INDIVIDUAL WASTEWATER SYSTEM (IWS) - SITE EVALUATION / PERCOLATION TEST

Date / Time: _____ Test Performed by: _____

Owner: _____ TMK: (____) _____ - _____ - _____ : _____

Elevation: _____ feet
Depth to Groundwater Table: _____ feet below grade
Depth to Bedrock (if observed): _____ feet below grade
Diameter of Hole: _____ inches
Depth to Hole Bottom: _____ feet below grade

Depth, inches below grade	Soil Profile (color, texture, other)
_____	_____
_____	_____
_____	_____

PERCOLATION READINGS:
Time 12 inches of water to seep away: _____ minutes
Time 12 inches of water to seep away: _____ minutes

Check one:

____ Percolation tests in sandy soils, recorded time intervals and water drops at least every 10 minutes for at least 1 hour.

____ Percolation tests in no-sandy soils, presoaked the test hole for at least 4 hours. Recorded time intervals and water drops at least every 10 minutes for 1 hour of time for the first 6 inches to seep away in greater than 30 minutes record time intervals and water drops at lest every 30 minutes for 4 hours or until 2 successive drops do not vary by more than 1/16 inch.

Time Interval	Drop in Inches	Time Interval	Drop in Inches
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Percolation Rate (time/final water level drop): _____ minutes/inches

As the engineer responsible for gathering and providing site information and percolation test results, I attest to the fact that above site information is accurate and that the site evaluation was conducted in accordance with the provisions of Chapter 11-62, "Wastewater Systems" and the results were acceptable. I also attest that three feet of suitable soil exist between the bottom of the soil absorption system and the groundwater table or any other limiting layer.

_____ _____
Engineer's Signature/Stamp Date

DEPARTMENT OF HEALTH - WASTEWATER BRANCH
INDIVIDUAL WASTEWATER SYSTEM

FALLING HEAD TEST PROCEDURE

1. Preparing Percolation Test Hole(s)
    1. Dig or bore a hole, four to twelve inches in diameter with vertical walls to the approximate depth of the soil absorption system (bottom of trench or bed).
    2. Scratch the side wall and bottom to remove any smeared soil and remove loose material.
    3. Place one inch of coarse sand or gravel on bottom.

B. Determine Percolation Rate
    1. Place twelve inches of water in hole and determine time to seep away. Record this time on the site evaluation form.
    2. Repeat step B.1. above. Also record this time on the site evaluation form.
    3. If the time of the second test is less than 10 minutes go to Step C, if not skip to Step D.

C. Sandy (granular) Soils
    1. Establish a fixed reference point, add water to six inches above gravel and measure water level drops every ten minutes for 1 hour.
    2. Use a shorter time interval if first six inches seeps away in ten minutes or less.
    3. Refill when necessary, do not exceed six inches of water.
    4. Record time intervals and water drops on site evaluation form.
    5. Use final water level drop interval to calculate percolation rate. (Step E)

D. Other Soils (non-granular, e.g. silt, loams & clays)
    1. Maintain at least twelve inches of water in the hole for at least four hours to presoak soil.
    2. Do not remove water remaining after four hours.
    3. Permit soil to swell at least 12 hours. (Dry clayey soils should be soaked and permitted to swell for longer periods to obtain stabilized percolation rates).
    4. After swelling, remove loose material on top of gravel.
    5. Use fixed referenced point, adjust water level to six inches above gravel and measure water level drop.
    6. If the first six inches of water seeps away in less than 30 minutes, measure water level drops every ten-minutes and run for one hour.
    7. If the first six inches of water takes longer than 20 minutes to seep away, use 30 minute time intervals for four hours or until two successive drops do not vary by more than one-sixteenth inch (stabilized rate).
    8. Refill with water only when necessary, but no adjustment during last three readings except to the limit of the last drop. Do no exceed six inches of water.

E. Use final drop interval to calculate percolation rate and record on site evaluation form:

$$\frac{\text{Time Interval}}{\text{Water Level Drop}} = \text{Percolation Rate}$$

STATE OF HAWAII
DEPARTMENT OF HEALTH

Environmental Management Division - Wastewater Branch
Engineer's Certification
Conversion of Existing Cesspool to Seepage Pit

Property Owner: _____

Property Address: _____

_____

_____

Property TMK #: _____

As the design engineer responsible for the individual wastewater system design serving the above property, I attest to the fact that the following information has been investigated and found to be true:

A. No enforcement order, informal enforcement order, notice or correspondence has been issued to the above property owner due to cesspool overflows;

B. A search of cesspool pumping records indicates that the existing cesspool(s) has not been pumped more than twice within the last 12 months;

C. I or an agent of mine has inspected the existing cesspool and determined that it is functional and capable of handling the design peak flow from the project. At the time of inspection, there was a total of _____ feet from the inlet to the liquid level in the cesspool. The actual cesspool depth is _____ feet; and

D. The Site Evaluation/Percolation Test Form has been completed and signed and is attached.

_____

PRINT Engineer's Name Engineer's Signature & Stamp Date

_____

Engineer's Contact Phone Engineer's Email Address

WORK WITHIN COUNTY RIGHT-OF-WAY PERMIT APPLICATION

DPW Form
33(1) **Rev**
04-10-2015

COUNTY OF HAWAI'I
DEPARTMENT OF PUBLIC WORKS – ENGINEERING DIVISION

PERMIT TO WORK WITHIN THE COUNTY RIGHT-OF-WAY

CHECK ALL APPLICABLE BOXES:

☐ Construct new driveway approach Type of Driveway: ☐ Asphalt Driveway Use: ☐ Commercial
☐ Resurface/repair existing driveway approach ☐ Concrete ☐ Residential
☐ Construct or repair sidewalk
☐ Other (describe work): _____

_____

WIDTH OF APPROACH/DIMENSION OF WORK: _____ FT. x _____ FT. ESTIMATED COST: $ _____

_____ TAX MAP KEY: _____
Name of County Road / Street

START DATE: _____ COMPLETION DATE: _____ WORKING HRS: _____
(Minimum two working days after approval) (Monday thru Friday)

PERMITTEE: _____

MAILING ADDRESS: _____ PHONE NO.: _____

_____

CONTRACTOR: _____

MAILING ADDRESS: _____ PHONE NO.: _____

_____ LICENSE NO.: _____

IN CONSIDERATION OF GRANTING THIS PERMIT, THE PERMITTEE UNDERSTANDS AND AGREES TO:(Permittee to initial each line below)

____Agree to hold harmless, indemnify and defend the County of Hawaii, its officers, employees and agents thereof, from all claims, demands, suits, actions, or proceedings of every name, character and description which may be brought against the County of Hawaii for or on account of any injuries or damages to any person or property received or sustained by any person by or in consequences of any act or acts of the holder of this permit for actins doen under this permit [Hawaii County Code Section 22-4.2(7)];

____Submit with this permit a certificate of insurance and proof of a public liability insurance policy naming as an additional insured, **the County, its officers, representatives, employees, and agents** covering any claim or liability for damages, injuries or death resulting from any of the uses permitted hereunder. The minimum amount of coverage under such policy shall be $1,000,000 per occurrence. The policy and coverage shall be kept in force until all work under this permit is completed to the satisfaction of the director of the department of public works. [Hawai'i County Code Section 22-4.2(8)]; and

____Comply with all conditions as printed on the back of this permit. [Hawai'i County Code Section 22.4.4].

Byinitialing above and signing below, the Permittee certifies that the Permittee has legal authority to sign in the capacity stated, and the Permittee certifies that the Permittee has legal authority to sign in the capacity stated, and the Permittee understands and agrees that the terms and conditions of this permit are a legally binding contract.

By: _____
Permitee's Signature Date

Its: _____

APPROVED:

_____
Director, Department of Public Works Date

AGENCY USE ONLY

Final Acceptance Date: _____

By: _____
Inspector's Signature

Comments:

PERMIT NO: _____ **FEE:** _____

CONSTRUCTION PERMIT
CONDITIONS OF APPROVAL
(Hawai‘i County Code Section 22-4.4)

In addition to any other conditions imposed by Chapter 22 of the Hawai‘i County Code, all permits issued pursuant to this article shall be subject to the following conditions:

1. The applicant shall notify the director at least **48** hours before the commencement of any work within the county street.

2. The applicant shall maintain public safety while working in a county street by using barricades, construction signs, markings, warning lights, traffic control personnel and other devices according to the "Manual on Uniform Traffic Control Devices for Streets and Highways" on file in the Department of Public Works.

3. Unless otherwise permitted by law, the applicant shall keep at least one traffic lane open for two-way vehicular traffic during the working hours of the day and at least two traffic lanes open during non-working hours. When the work interferes with a sidewalk, the applicant shall also provide for the safe passage of pedestrians including the disabled around or through the work area.

4. For any excavation work, the application shall verify the location of all existing private and public utilities and shall be responsible for notifying all utilities affected by the construction 48 hours prior to commencing any work. Should an existing utility be damaged, the applicant shall immediately notify the affected utility.

5. The applicant shall be responsible for notifying all property owners affected by the construction **48** hours prior to commencing.

6. No material, except the trench excavated material, shall be stockpiled closer than 6-feet from the existing edge of pavement.

7. No construction equipment shall be parked or any materials stored in the county street in such a manner that the equipment or materials will obstruct or prohibit pedestrian and vehicular movements, including driveway movements, except during actual working hours.

8. No excavation shall be left open for more than **5** working days.

9. The applicant shall repair, restore, or replace all portions of a county street, including but not limited to utilities, drainage ways and structures, traffic markings and signs, driveways and private property that had been altered, broken up, dug up, disturbed, undermined, dug under or otherwise damaged during construction to a state equal to or better than its original condition. Regardless of existing conditions, work shall also include the construction of new curb-cuts for the disabled, accessible driveways or other improvements such that all repairs, restoration, or replacement work complies with the current requirements of the Americans with Disabilities Act (ADA).

10. Before issuing a permit, for all work with an estimated cost equal to or exceeding $20,000, the director may require a cash bond, surety company bond, or personal surety bond in favor of the county. The value of the bond shall be double the estimated cost of restoring or replacing the county street to a state equal to or better than its original condition.

11. Work must be completed within one year of the starting date shown on the permit unless otherwise specified. Failure to begin or complete the work will result in the termination of the permit.

12. Repair, restoration or replacement of county streets, highways and sidewalks shall comply with applicable specifications and plans on file in the department of public works. Copies of these specifications and plans shall be furnished to each applicant upon making a request.

13. Driveway approaches shall be constructed or repaired according to the provisions of this chapter and applicable specifications and plans on file in the Department of Public Works. Copies of these specifications and plans shall be furnished to each applicant upon making a request.

14. Upon completion of the work, the applicant shall immediately remove all equipment and materials and shall leave the work area in a clean, safe and sanitary condition satisfactory to the director.

15. All restoration and repair work of the pavement, shoulders and any other county facilities shall be guaranteed by the applicant against any defects for a period of one year from the date of final inspection.

16. No work within the County right-of-way shall be done on Saturdays, Sundays and holidays anytime without prior approval from the Department of Public Works. Work on normal working days shall be limited between the hours of 7:00 a.m. to 3:30 p.m.

County of Hawaii

DEPARTMENT OF PUBLIC WORKS – ENGINEERING DIVISION

Permit to Work within the County Right-of-Way

INSTRUCTIONS TO THE APPLICANT

1. The Applicant shall provide three (3) sets of plans to the Department of Public Works. The plans shall include the dimensions of work relative to the road and property lines, type of asphalt or concrete pavement, swales (or other drainage devices) and any other relevant information.

2. All work shall be in accordance with Chapter 22 – County Streets, of the Hawaii County Code, and as shown on the approved plans.

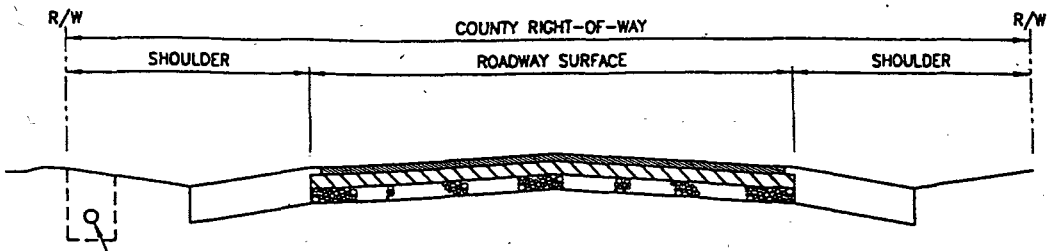
3. As required, all work shall be performed by a licensed contractor. The contractor may sign the permit application on behalf of the permittee/owner.

4. If required, the Applicant shall provide a copy of DCAB's "Document Review" confirmation letter with the application. A copy of DCAB's form and associated fee schedule can be found at http://health.hawaii.gov/dcab/files/2013/01/HRS-103-50-Transmittal-Form-Dec-2012.pdf.

5. If not already on file with the Department of Public Works, the contractor shall provide a certificate of insurance specifically naming as an additionally insured, the County, its officers, representatives, employees, and agents as required by Hawaii County Code.

6. The issued permit will become null and void if the authorized work is not completed within one (1) year of the issuance date.

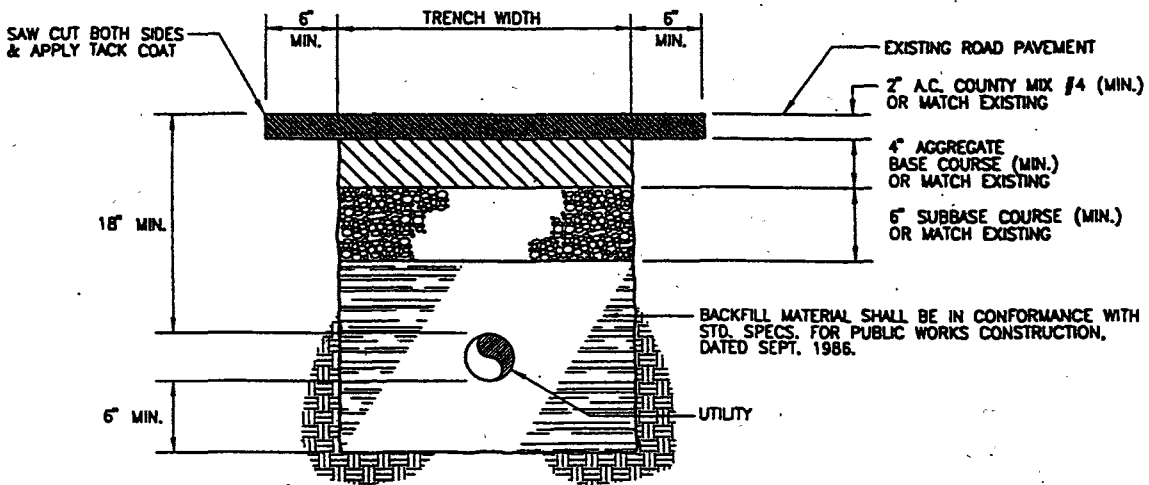
7. If you are closing a road, at least two (2) weeks before the scheduled closure, complete an application form and drop it off at the Police Department's Traffic Services. (Application Forms are available from Traffic Services 961-2227 or 961-2226). Attach a map of the area to the application. The Police Department will route the application through all applicable County agencies for approval.



PRIVATE UTILITY SHALL BE LOCATED AS CLOSE TO RIGHT-OF-WAY BOUNDARY AS POSSIBLE. PRIVATE UTILITY SHALL BE BURIED 18" MIN. WHERE IT CROSSES PRIVATE DRIVEWAYS AND COUNTY ROADWAYS. SEE ROAD PAVEMENT AND SHOULDER RESTORATION DETAILS.

TYPICAL ROADWAY SECTION

NOT TO SCALE

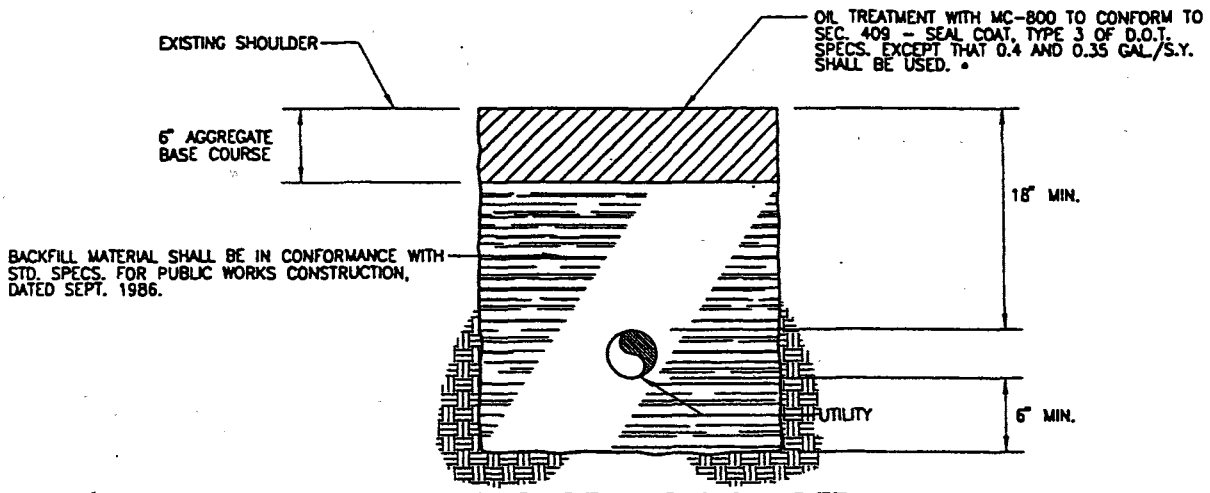


ROAD/DRIVEWAY RESTORATION DETAIL

NOT TO SCALE

NOTES:

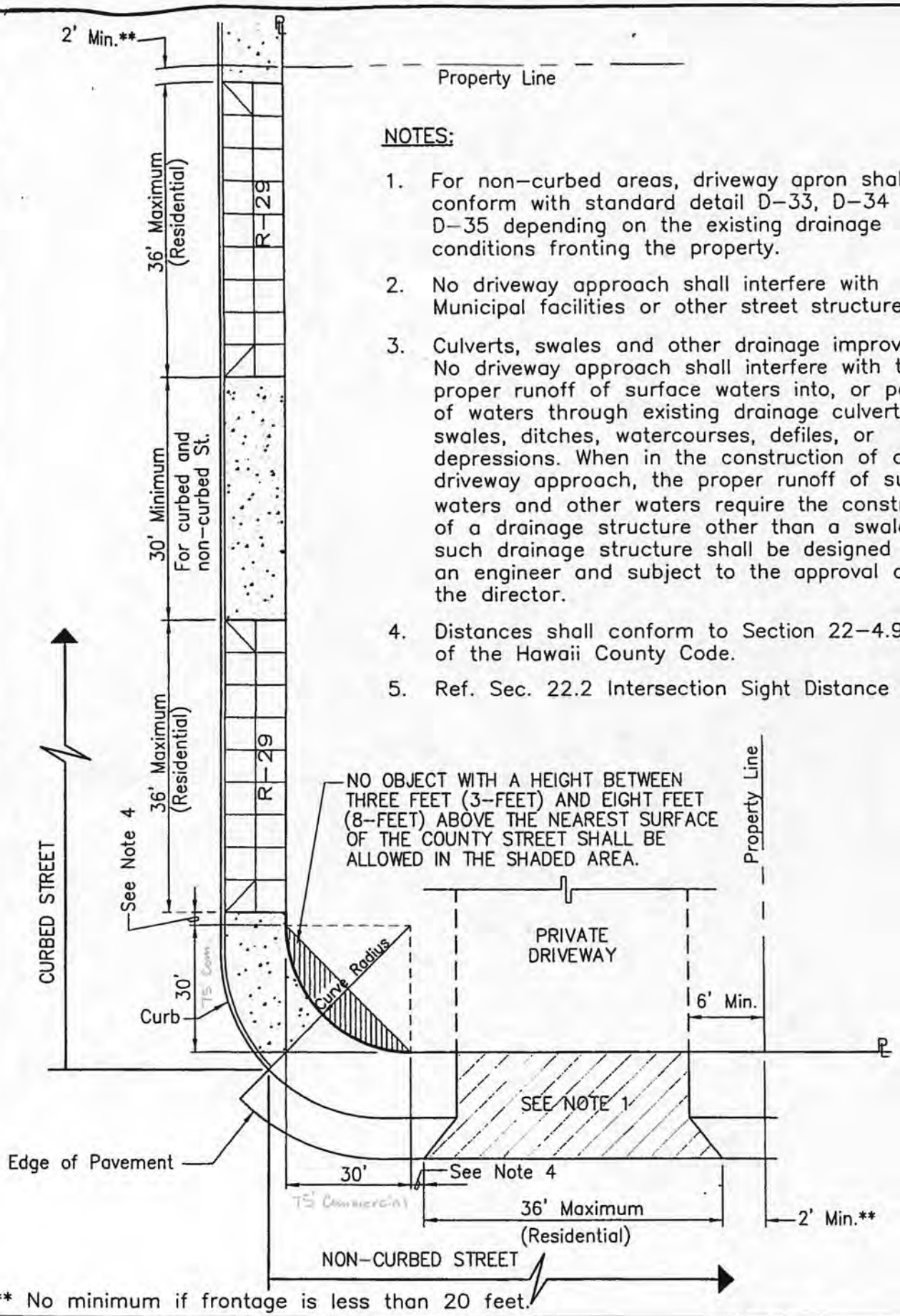
1. WHERE EXISTING RESIDENTIAL DRIVEWAY IS CONCRETE, 4" THICK CLASS "B" CONCRETE REINFORCED WITH 6x6-10/10 WWM ON 4" BASE COURSE SHALL BE USED IN LIEU OF THE ABOVE SECTION.
2. WHERE AN EXISTING DRIVEWAY IS UNPAVED, THE DRIVEWAY SHALL BE RESTORED TO A CONDITION EQUAL TO OR BETTER THAN THE EXISTING DRIVEWAY.
3. CONTRACTOR SHALL NOTIFY THE OWNER OF THE DRIVEWAY 48 HOURS BEFORE THE COMMENCEMENT OF ANY WORK.
4. AREAS WITH PAVEMENT / GEOTEXTILE FABRIC SHALL BE RESTORED AS DIRECTED BY THE DEPARTMENT OF PUBLIC WORKS.



SHOULDER RESTORATION DETAIL

NOT TO SCALE

*NOTE: FOR PAVED OR OTHER IMPROVED SHOULDER, SURFACE SHALL BE RESTORED TO A CONDITION EQUAL TO OR BETTER THAN THE EXISTING SHOULDERS, AS DIRECTED BY THE DEPARTMENT OF PUBLIC WORKS.



NOTES:

1. For non-curbed areas, driveway apron shall conform with standard detail D-33, D-34 or D-35 depending on the existing drainage conditions fronting the property.
2. No driveway approach shall interfere with Municipal facilities or other street structures.
3. Culverts, swales and other drainage improvements. No driveway approach shall interfere with the proper runoff of surface waters into, or passage of waters through existing drainage culverts, swales, ditches, watercourses, defiles, or depressions. When in the construction of a driveway approach, the proper runoff of surface waters and other waters require the construction of a drainage structure other than a swale, such drainage structure shall be designed by an engineer and subject to the approval of the director.
4. Distances shall conform to Section 22-4.9 of the Hawaii County Code.
5. Ref. Sec. 22.2 Intersection Sight Distance

** No minimum if frontage is less than 20 feet.

COUNTY OF HAWAII	DRIVEWAY LAYOUT	STANDARD DETAILS	R-38 REVISED
	SCALE: NOT TO SCALE FEBRUARY 2003		

ACORD CERTIFICATE OF LIABILITY INSURANCE

09/11/06

PRODUCER

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE	NAIC #
INSURER A:	41
INSURER B:	
INSURER C:	
INSURER D:	
INSURER E:	

INSURED

SAMPLE

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A	X	GENERAL LIABILITY [X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [X] POLICY [ ] PRO-JECT [ ] LOC	CGL54	06/01/06	06/01/07	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 100,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
A		AUTOMOBILE LIABILITY [X] ANY AUTO [ ] ALL OWNED AUTOS [ ] SCHEDULED AUTOS [X] HIRED AUTOS [X] NON-OWNED AUTOS	CBA 636	06/01/06	06/01/07	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ $ 1,000,000 $ 1,000,000 $ 1,000,000
		GARAGE LIABILITY [ ] ANY AUTO				AUTO ONLY - EA ACCIDENT OTHER THAN AUTO ONLY: EA ACC AGG	$ $ $
		EXCESS/UMBRELLA LIABILITY [ ] OCCUR [ ] CLAIMS MADE [ ] DEDUCTIBLE [ ] RETENTION $				EACH OCCURRENCE AGGREGATE	$ $ $ $ $
B		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below	FWC 713	12/01/05	12/01/06	[X] WC STATUTORY LIMITS [ ] OTHER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 500,000 $ 500,000 $ 500,000
		OTHER					

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

The County of Hawaii, its officers, representatives, employees and agents are named as additional insured in accordance with the General Liability policy provisions, covering any claim or liability for damages, injuries or death resulting from any of the uses permitted hereunder

CERTIFICATE HOLDER

County of Hawaii
Dept. of Public Works
Engineering Division
101 Pauahi St Ste 7
Hilo HI 96720

COUNCIL

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

NOTICE OF INTENT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACITIVITY UNDER AN NPDES GENERAL PERMIT

NPDES FORM 3510-9	EPA	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WASHINGTON, DC 20460 NOTICE OF INTENT (NOI) FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER AN NPDES GENERAL PERMIT	Form Approved. OMB No. 2040-0004

Submission of this Notice of Intent (NOI) constitutes notice that the operator identified in Section II of this form requests authorization to discharge pursuant to the NPDES Construction General Permit (CGP) permit number identified in Section I of this form. Submission of this NOI also constitutes notice that the operator identified in Section II of this form meets the eligibility requirements of Parts 1.1 and 1.2 of the CGP for the project identified in Section III of this form. Permit coverage is required prior to commencement of construction activity until you are eligible to terminate coverage as detailed in Part 8 of the CGP. To obtain authorization, you must submit a complete and accurate NOI form. Discharges are not authorized if your NOI is incomplete or inaccurate or if you were never eligible for permit coverage. Refer to the instructions at the end of this form.

I. Approval to Use Paper NOI Form

Have you been given approval from the Regional Office to use this paper NOI form*? ☐ YES ☐ NO

If yes, provide the reason you need to use this paper form, the name of the EPA Regional Office staff person who approved your use of this form, and the date of approval:

Reason for using paper form: _____

Name of EPA staff person: _____

Date approval obtained: _____

*** Note: You are required to obtain approval from the applicable Regional Office prior to using this paper NOI form.**

II. Permit Information

Tracking Number (EPA Use Only):

Permit Number: (see Appendix B of the CGP for the list of eligible permit numbers)

III. Operator Information

Name:

Phone: - - Ext. Fax (optional): - -

E-mail:

IRS Employer Identification Number (EIN): –

Point of Contact:

First Name, Middle Initial, Last Name:

Mailing Address:

Street:

City: State: Zip Code: -

NOI Preparer (Complete if NOI was prepared by someone other than the certifier):

Prepared by:

First Name, Middle Initial, Last Name:

Organization:

Phone: - - Ext. Fax (optional): - -

E-mail:

IV. Project/Site Information

Project/Site Name:

Project/Site Address:

Street/Location:

City: State: Zip Code: -

County or similar government subdivision:

For the project/site for you are seeking permit coverage, provide the following information:

Latitude/Longitude (Use one of three possible formats, and specify method):

Latitude 1. ___ ___° ___ ___' ___ ___" N (degrees, minutes, seconds)
2. ___ ___° ___ ___. ___ ___' N (degrees, minutes, decimal)
3. ___ ___. ___ ___ ___ ___° N (degrees decimal)

Longitude 1. ___ ___ ___° ___ ___' ___ ___" W (degrees, minutes, seconds)
2. ___ ___ ___° ___ ___. ___ ___' W (degrees, minutes, decimal)
3. ___ ___ ___. ___ ___ ___ ___° W (degrees decimal)

Latitude/Longitude Data Source: ☐ U.S.G.S. topographic map ☐ EPA web site ☐ GPS ☐ Other: _____

If you used a U.S.G.S. topographic map, what was the scale? _____

Horizontal Reference Datum: ☐ NAD 27 ☐ NAD 83 or WGS 84 ☐ Unknown

Is your project/site located in Indian Country lands, or located on a property of religious or cultural significance to an Indian tribe? ☐ YES ☐ NO

If yes, provide the name of the Indian tribe associated with the area of Indian country (including name of Indian reservation, if applicable), or if not in Indian country, provide the name of the Indian tribe associated with the property: _____

Are you requesting coverage under this NOI as a "federal operator" as defined in Appendix A? ☐ YES ☐ NO

Estimated Project Start Date: / / Estimated Project Completion Date: / /

Estimated Area to be Disturbed (to the nearest quarter acre): .

Have earth-disturbing activities commenced on your project/site? ☐ YES ☐ NO

If yes, is your project an "emergency-related project? ☐ YES ☐ NO

Have stormwater discharges from your project/site been covered previously under an NPDES permit? ☐ YES ☐ NO

If yes, provide the Tracking Number if you had coverage under EPA's CGP or the NPDES permit number if you had coverage under an EPA individual permit:

V. Discharge Information

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)? ☐ YES ☐ NO

Are there any surface waters within 50 feet of your project's earth disturbances? ☐ YES ☐ NO

Receiving Waters and Wetlands Information: (Attach a separate list if necessary)

Provide the name(s) of the first surface water that received stormwater directly from your site and/or from the MS4:	**Provide the names of any impaired waters to which you discharge and the pollutant(s) for which they are impaired**		**Provide the names of any waters to which you discharge for which there is an EPA approved or established TMDL, the name of the TMDL, and the pollutant(s) for which there is a TMDL**		
	Surface water name:	**Pollutant(s) causing the impairment:**	**Surface water name:**	**TMDL name:**	**Pollutant(s) for which there is a TMDL:**

Impaired Waters

Describe the methods you used to complete the above table:

Are any of the surface waters to which you discharge designated by the state or tribal authority under its antidegradation policy as a Tier 2 (or Tier 2.5) water (water quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water) or as a Tier 3 water (Outstanding Natural Resource Water)? (See Appendix F).

☐ YES ☐ NO

If yes, name(s) of receiving water(s) and its designation (Tier 2, Tier 2.5 or Tier 3): _____

VI. Chemical Treatment Information

Will you use polymers, flocculants, or other treatment chemicals at your construction site? ☐ YES ☐ NO

If yes, will you use cationic treatment chemicals at your construction site*? ☐ YES ☐ NO

If yes, have you been authorized to use cationic treatment chemicals by your applicable EPA Regional Office in advance of filing your NOI*? ☐ YES ☐ NO

If you have been authorized to use cationic treatment chemicals by your applicable EPA Regional Office, attach a copy of your authorization letter and include documentation of the appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards.

Please indicate the treatment chemicals that you will use: _____

* Note: You are ineligible for coverage under this permit unless you notify your applicable EPA Regional Office in advance and the EPA office authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards.

VII. Stormwater Pollution Prevention Plan (SWPPP) Information

Has the SWPPP been prepared in advance of filing this NOI? ☐ YES ☐ NO

SWPPP Contact Information:

First Name, Middle Initial Last Name:

Organization Name:

Phone: - - Ext. Fax (optional): - -

E-mail:

VIII. Endangered Species Protection

Using the instructions in Appendix D of the CGP, under which criterion listed in Appendix D are you eligible for coverage under this permit (only check 1 box)?

☐ A ☐ B ☐ C ☐ D ☐ E ☐ F

Provide a brief summary of the basis for criterion selection listed in Appendix D (e.g., communication with U.S. Fish and Wildlife Service or National Marine Fisheries Service, specific study): _____

If you select criterion B, provide the Tracking Number from the other operator's notification of authorization under this permit:

If you select criterion C, you must attach a copy of your site map (see Part 7.2.6 of the permit), and you must answer the following questions:

What federally-listed species or federally-designated critical habitat are located in your "action area": _____

What is the distance between your site and the listed species or critical habitat (miles): _____

If you select criterion D, E, or F, attach copies of any letters or other communications between you and the U.S. Fish and Wildlife Service or National Marine Fisheries Service.

IX. Historic Preservation

Are you installing any stormwater controls as described in Appendix E that require subsurface earth disturbance? (Appendix E, Step 1) ☐ YES ☐ NO

If yes, have prior surveys or evaluations conducted on the site have already determined historic properties do not exist, or that prior disturbances have precluded the existence of historic properties? (Appendix E, Step 2) ☐ YES ☐ NO

If no, have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties? (Appendix E, Step 3) ☐ YES ☐ NO

If no, did the SHPO, THPO, or other tribal representative (whichever applies) respond to you within the 15 calendar days to indicate whether the subsurface earth disturbances caused by the installation of stormwater controls affect historic properties? (Appendix E, Step 4) ☐ YES ☐ NO

If yes, describe the nature of their response:

☐ Written indication that adverse effects to historic properties from the installation of stormwater controls can be mitigated by agreed upon actions

☐ No agreement has been reached regarding measures to mitigate effects to historic properties from the installation of stormwater controls

☐ Other:

_____

_____

X. Certification Information

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

First Name, Middle Initial, Last Name: _____ _____ _____

Title: _____

Signature: _____ Date: ___ / ___ / _____

Email: _____

Instructions for Completing EPA Form 3510-9

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit

NPDES Form Date (2/16) This Form Replaces Form 3510-9 (11/08) Form Approved OMB No. 2040-0004

Who Must File an NOI Form

Under the provisions of the Clean Water Act, as amended (33 U.S.C. 1251 et. seq.; the Act), federal law prohibits stormwater discharges from certain construction activities to waters of the U.S. unless that discharge is covered under a National Pollutant Discharge Elimination System (NPDES) permit. Operator of construction sites where one or more acres are disturbed, smaller sites that are part of a larger common plan of development or sale where there is a cumulative disturbance of at least one acre, or any other site specifically designated by the Director, must submit an NOI to obtain coverage under an NPDES general permit. Each person, firm, public organization, or any other entity that meets either of the following criteria must file this form: (1) they have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or (2) they have day-to-day operational control of those activities at the project necessary to ensure compliance with the permit conditions. If you have questions about whether you need a NPDES stormwater permit, or if you need information to determine whether EPA or your state agency is the permitting authority, refer to www.epa.gov/npdes/stormwater/cgp or telephone EPA's NOI Processing Center at (866) 352-7755.

Completing the Form

Obtain and read a copy of the 2012 Construction General Permit, viewable at www.epa.gov/npdes/stormwater/cgp. To complete this form, type or print uppercase letters, in the appropriate areas only. Please place each character between the marks (abbreviate if necessary to stay within the number of characters allowed for each item). Use one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions on this form, refer to www.epa.gov/npdes/stormwater/cgp or telephone EPA's NOI Processing Center at (866) 352-7755. Please submit the original document with signature in ink - do not send a photocopied signature.

Section I. Approval to Use Paper NOI Form

You must indicate whether you have been given approval by the EPA Regional Office to use a paper NOI. Note that you are not authorized to use this paper NOI form unless the Regional Office has approved its use. Verbal approval from the Regional Office is sufficient. Where you have obtained approval to use this form, indicate the reason you need to use this form, the name of the EPA Regional Office staff person who provided approval for use of this form, and the date that approval was provided. See www.epa.gov/npdes/stormwater/contacts for a list of EPA Regional Office contacts.

Section II. Permit Number

Provide the number of the permit under which you are applying for coverage (see Appendix B of the general permit for the list of eligible permit numbers).

Section III. Operator Information

Provide the legal name of the person, firm, public organization, or any other entity that operates the project described in this application. Refer to Appendix A of the permit for the definition of "operator". Provide the employer identification number (EIN from the Internal Revenue Service; IRS), also commonly referred to as your taxpayer ID. If the applicant does not have an EIN enter "NA" in the space provided. Also provide a point of contact, the operator's mailing address, telephone number, fax number (optional) and e-mail address (to be notified via e-mail of NOI approval when available). Correspondence for the NOI will be sent to this address.

If the NOI was prepared by someone other than the certifier (for example, if the NOI was prepared by the facility SWPPP contact or a consultant for the certifier's signature), include the full name, organization, phone number and email address of the NOI preparer.

Section IV. Project/Site Information

Enter the official or legal name and complete street address, including city, state, zip code, and county or similar government subdivision of the project or site. If the project or site lacks a street address, indicate the general location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for permit coverage to be granted.

Provide the latitude and longitude of your facility either in degrees, minutes, seconds; degrees, minutes, decimal; or degrees decimal format. The latitude and longitude of your facility can be determined in several different ways, including through the use of global positioning system (GPS) receivers, U.S. Geological Survey (U.S.G.S.) topographic or quadrangle maps, and EPA's web-based siting tools, among others. Refer to www.epa.gov/npdes/stormwater/cgp for further guidance on the use of these methodologies. For consistency, EPA requests that measurements be taken from the approximate center of the construction site. Applicants must specify which method they used to determine latitude and longitude. If a U.S.G.S. topographic map is used, applicants are required to specify the scale of the map used. If known, enter the horizontal reference datum for your latitude and longitude. The horizontal reference datum used on USGS topographic maps is shown on the bottom left corner of USGS topographic maps; it is also available for GPS receivers. If you use EPA's web siting tool, or if you are unsure of the horizontal reference datum for your site, please check the "unknown" box.

Indicate whether the project is in Indian country lands or located on a property of religious or cultural significance to an Indian tribe, and if so, provide the name of the Indian tribe associated with the area of Indian country (including name of Indian reservation, if applicable), or if not in Indian country, provide the name of the Indian tribe associated with the property.

Indicate whether you are seeking coverage under this permit as a "federal operator" as defined in Appendix A.

Enter the estimated construction start and completion dates using four digits for the year (i.e., 10/06/2012). Indicate to the nearest quarter acre the estimated area to be disturbed.

Indicate whether earth-disturbing activities have already commenced on your project/site. If earth-disturbing activities have commenced on your site because stormwater discharges from the site have been previously covered under a NPDES permit, you must provide the CGP Tracking Number or the NPDES permit number if coverage was under an individual permit.

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit

NPDES Form Date (2/16) This Form Replaces Form 3510-9 (11/08) Form Approved OMB No. 2040-0004

Section V. Discharge Information

Indicate whether discharges from the site will enter into a municipal separate storm sewer system (MS4), as defined in Appendix A.

Also, indicate whether any surface waters (as defined in Appendix A) exist either on or within 50 feet from your site. Note that if "yes", you are required to comply with the requirement in Part 2.1.2.1 of the permit to provide natural buffers or equivalent sediment controls.

You must specify the names of any surface waters that receive stormwater directly from your site and/or from the MS4 to which you discharge. You must also specify the names of any surface waters that you discharge to that are listed as "impaired" as defined in Appendix A, including any waters for which there is an approved or established TMDL, and the pollutants for which the water is impaired or for which there is a TMDL. This information will be used to determine if the site discharges to an impaired waterbody, which triggers additional requirements in Part 3.2.2 of the permit. Applicants must specify which method they used to determine whether or not their site discharges to impaired waters. Also, if a TMDL has been approved or established, identify the title or reference of the TMDL document.

Indicate whether discharges from the site will enter into a surface water that is designated as a Tier 2, Tier 2.5, or Tier 3 water. A list of Tier 2, 2.5, and 3 waters is provided as Appendix F. If the answer is "yes", name all waters designated as Tier 2, Tier 2.5, or Tier 3 to which the site will discharge.

Section VI. Chemical Treatment Information

Indicate whether the site will use polymers, flocculants, or other treatment chemicals. Indicate whether the site will employ cationic treatment chemicals. If the answer is "yes" to either question, indicate which chemical(s) you will use. Note that you are not eligible for coverage under this permit to use cationic treatment chemicals unless you notify your applicable EPA Regional Office in advance and the EPA office authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards. If you have been authorized to use cationic treatment chemicals by your applicable EPA Regional Office, attach a copy of your authorization letter and include documentation of the appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards. Examples of cationic treatment chemicals include, but are not limited to, cationic polyacrylamide (C-PAM), PolyDADMAC (POLYDIALLYLDIMETHYLAMMONIUM CHLORIDE), and chitosan.

Section VII. Stormwater Pollution Prevention Plan (SWPPP) Information

All sites eligible for coverage under this permit are required to prepare a SWPPP in advance of filing the NOI, in accordance with Part 7. Indicate whether the SWPPP has been prepared in advance of filing the NOI.

Indicate the street, city, state, and zip code where the SWPPP can be found. Indicate the contact information (name, organization, phone, fax (optional), and email) for the person who developed the SWPPP for this project.

Section VIII. Endangered Species Information

Using the instructions in Appendix D, indicate under which criterion (i.e., A, B, C, D, E, or F) of the permit the applicant is eligible with regard to protection of federally listed endangered and threatened species and designated critical habitat. A description of the basis for the criterion selected must also be provided.

If criterion B is selected, provide the Tracking Number for the other operator who had previously certified their eligibility under criterion A, C, D, E, or F. The Tracking Number was assigned when the operator received coverage under this permit, and is included in the notice of authorization.

If criterion C is selected, you must attach copies of your site map. See Part 7.2.6 of the permit for information about what is required to be in your site map. You must also specify the federally-listed species or federally-designated critical habitat that are located in the "action area" of the project, and provide the distance between the construction site and any listed endangered species or their critical habitat.

If criterion D, E, or F is selected, attach copies of any communications between you and the U.S. Fish and Wildlife Service and National Marine Fisheries Service.

Section IX. Historic Preservation

Use the instructions in Appendix E to complete the questions on the NOI form regarding historic preservation.

Section X. Certification Information

All applications, including NOIs, must be signed as follows:

For a corporation: By a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or

For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA). Include the name and title of the person signing the form and the date of signing. An unsigned or undated NOI form will not be considered eligible for permit coverage.

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit

NPDES Form Date (2/16) This Form Replaces Form 3510-9 (11/08) Form Approved OMB No. 2040-0004

Modifying Your NOI

If after submitting your NOI you need to correct or update any fields on this NOI form, you may do so by submitting a paper modification form, which you can obtain at the following link: http://www.epa.gov/npdes/pubs/cgp_modify.pdf

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 3.7 hours. This estimate includes time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Chief, Information Policy Branch 2136, U.S. Environmental Protection, Agency, 1200 Pennsylvania Avenue, NW, Washington, D.C. 20460. Include the OMB control number on any correspondence. Do not send the completed form to this address.

Submitting Your Form

Submit your NOI form by mail to one of the following addresses:

For Regular U.S. Mail Delivery:
Stormwater Notice Processing Center
Mail Code 4203M
U.S. EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460

For Overnight/Express Mail Delivery:
Stormwater Notice Processing Center
EPA East Building - Room 7420
U.S. EPA
1201 Constitution Avenue, NW
Washington, DC 20004

Visit this website for instructions on how to submit electronically:
www.epa.gov/npdes/stormwater/cgpenoi

COUNTY OF HAWAI'I BUILDING PERMIT WORKSHEET

COUNTY OF HAWAI`I DEPARTMENT OF PUBLIC WORKS – BUILDING DIVISION

BUILDING PERMIT WORKSHEET FOR CHAPTER 5, PERTAINING TO BUILDING

NOTE: THIS WORKSHEET SHALL ACCOMPANY CONSTRUCTION DRAWINGS. APPLICANT IS RESPONSIBLE TO APPLY IN PERSON.
WE DO NOT ACCEPT WORKSHEET / PLANS ELECTRONICALLY OR BY MAIL

Section 5-22. Expiration. (a) Every permit issued by the building official under the provisions of this code shall expire by limitation and become null and void (i) three (3) years after the date of issuance, or (ii) 180 days from the date of issuance if the building or work authorized by the permit is not commenced by such date. A permit shall expire if the building or work authorized by the permit is suspended or abandoned for a period of 180 days or more at any time after the work has commenced. In the event of strikes or other causes beyond the control of the builder, the building official may extend the aforementioned three (3) year or 180-day periods. The extension of time granted shall be a reasonable length of time but in no case exceed six (6) months. Requests for an extension must be made in writing to the building official. No exceptions will be allowed for building permits issued prior to the adoption of this code. (b) Upon expiration of a permit, all work shall cease and shall not be recommenced until a new permit is obtained. The building official may waive the requirements for submittal of plans and specifications in connection with a permit renewal if the work previously permitted remains the same, no amendments have been made to the building code affecting the work, and previously approved plans are still on file. When the building official determines that plans need not be submitted, the original plans, stamped and approved by the building official, shall be the renewed permit plans. (c) An owner-builder permit shall expire by limitation and become null and void five (5) years after the date of issuance. If the building or work authorized by the permit is suspended or abandoned any time after the work has commenced, the building official, upon request, may suspend the permit expiration until such a time that the owner-builder is ready to re-commence building or work authorized by approved permit. (Section 5-22) 3) refunds for permits shall be made in accordance with section 2-12 of the Hawai'i county code. (Section 5-32); 4) separate permits are required for electrical, plumbing, gas, signs, driveways, and grading; 5) data provided herein is public information.

This must be completed before processing by building division commences

APPLICANT TO FILL IN AREA BELOW - PLEASE PRINT WITH BLACK BALLPOINT OR TYPE

Legal Owner: _____ Mailing Address: _____

Lessee, Tenant: _____ Mailing Address: _____

Plans by: _____ Qualification: ◯ AR ◯ SE ◯ ME ◯ CE ◯ OTHER _____

Builder: _____ Mailing Address: _____

Scope of Work: ◯ New ◯ Alteration ◯ Move ◯ Reconstruction ◯ Electrical
◯ Addition ◯ Package Home ◯ Repair ◯ Demolition ◯ Emergency ◯ Plumbing

For New Residential Applications: Is this dwelling located in a wind borne debris region?
◯ Yes. Protection provided by: ◯ Protective glazing ◯ Plywood or shutters ◯ Residential safe room
◯ No.

Description of Work: _____

_____

Estimated Valuation For All Work To Be Performed: $_____ Project Address: _____

Flood Zone: _____ Engineering (initial): _____ Date: _____

DECLARATION (SEC 444 - HRS) CHECK (X) ONE

CONTRACTOR DECLARATION

◯ I declare that I am licensed under the provisions of Chapter 444, HRS, of the Department of Commerce & Consumer Affairs, State of Hawai'i. My license no. _____ is in full force and in effect. NOTE: RME (Responsible Managing Employee) only to sign. Notarized authorization from RME required for designated agents.

OWNER-BUILDER DECLARATION

◯ I declare an exemption under Sec. 444-2(7) for the following reasons: 1) this exemption allows me, as the owner or lessee of the property, to act as my own general contractor without possessing a license; 2) to supervise the construction myself; 3) to hire licensed subcontractors; 4) the building is for my personal use and not for the use or occupancy by the general public; 5) building will not be built for sale or lease within one (1) year after construction is complete. Section 5-4 Definition "Owner-builder" means owners or lessees of property who build or improve structures on their property for their own use, or for use by their immediate family. This definition shall not preempt owner-builder by exemption as defined by section 444-2.5, Hawai'i Revised Statues.

OWNER'S PHONE NO. _____
EMAIL: _____

CONTRACTOR'S PHONE NO. _____
EMAIL: _____

(3)

TAX MAP KEY NUMBER				
Z	S	PL	PAR	LOT

GRADING PERMIT APPLICATION

County of Hawai‘i

DEPARTMENT OF PUBLIC WORKS – ENGINEERING DIVISION

GRADING PERMIT NO. _____ Fee: $ _____

Check only – payable to:
County Director of Finance

Owner: _____ Address: _____ Phone: _____

Civil Eng. / Surveyor: _____ Address: _____ Phone: _____
License No.: _____

Contractor: _____ Address: _____ Phone: _____
License No.: _____

Location: _____ Tax Map Key: (3) _____ Cut (CY): _____

Parcel Area (acre): _____ Area to be Graded (acre): _____ Disposal Site: _____

Start Date: _____ Completion Date: _____ Fill (CY): _____
(minimum 2 working days after issuance date)

Borrow Site: _____

Remarks: _____

_____

_____

933-7653 (Hawai‘i Island) 40 Pookela Street, Hilo, HI 96720

1. STATE DLNR – HISTORIC PRESERVATION DIVISION Approved:

Received By: _____ Date: _____ _____ Date: _____

2. PLANNING DEPARTMENT Approved:

Received By: _____ Date: _____ _____ Date: _____

3. DEPARTMENT OF PUBLIC WORKS Approved for Permit Issuance:

Received By: _____ Date: _____ _____ Date: _____

I hereby certify that all work as requested above will conform to Chapter 10 of the Hawai‘i County Code.

Owner: _____ Date: _____

Return to the Department of Public Works, Engineering Division, upon completion of work.

Certification
Accepted by: _____ Date: _____
(DPW inspector / engineer)

Grading Permit
INSTRUCTIONS TO THE APPLICANT

1. The Owner/Applicant is responsible for obtaining all approvals. Approvals shall be obtained in numerical order. The Historic Preservation Division will issue a letter addressing the specific request. No work can begin until the grading permit is issued by the Department of Public Works.

2. All work shall be in accordance with Chapter 10 – Erosion and Sedimentation Control, of the Hawai‘i County Code, and as shown on the approved plan.

3. The Owner/Applicant shall provide three (3) sets of grading plans to the Department of Public Works. The plans shall include existing and proposed contours, erosion and sediment control measures, limits of grading providing proper setbacks from the property lines, location of any structures or easements, and any drainage patterns or devices.

4. The Applicant may call the Historic Preservation Division (933-7653) and the Planning Department (961-8288) for their requirements.

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
EMD / CWB

03047PJS.03a

March 21, 2003

To: All Persons with Construction Activities Disturbing One (1) or More Acres of Total Land Area

From: Denis R. Lau, P.E., Chief
Clean Water Branch

Subject: National Pollutant Discharge Elimination System (NPDES) Permit Requirements for Your Construction Activity

You need to obtain coverage under an NPDES permit from the Department of Health (DOH), Clean Water Branch (CWB) for your construction activities, including clearing, grading, and excavation, that result in the disturbance of one (1) or more acres of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. **An NPDES permit authorizing discharges of storm water associated with your construction activity to State waters is required before the commencement of the construction activities.**

The CWB requires that a Notice of Intent (NOI) to be covered by the NPDES general permit for your construction activities be submitted at least 30 days before the commencement of your construction activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

You may be required to apply for an individual NPDES permit if there is any type of activity in which wastewater (i.e., concrete truck wash water, etc.) is discharged from your project into State waters and/or coverage under the NPDES general permit(s) is not permissible. An application for the NPDES permit is to be submitted at least 180 days before the commencement of your construction activities. The NPDES application forms may also be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

Hawaii Administrative Rules, Section 11-55-38, also requires you to either submit a copy of the new NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD) or demonstrate to the satisfaction of the DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD. Please submit a copy of your request for review by SHPD or SHPD's determination letter for your project.

If you have any questions, please contact the Engineering Section of the CWB at (808) 586-4309.
or toll free 974-4000 + 864309#

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

Information for Review Submission of Hawai`i County Grading, Grubbing & Stockpiling Permits

To improve and expedite the State Historic Preservation Division's review of Department of Public Works grubbing, grading and stockpiling permits, we request that the following information be submitted with your permit application:

1. A site map showing the area of proposed land-altering within the affected TMK parcel(s)
2. Location map showing known historic sites and approved buffer zones in relation to the proposed project area
3. Description of current vegetation cover and condition of the project area; description of any structures, roads or other features within the project area (photographs are very helpful)
4. Copies of previously approved permits and/or and prior SHPD review and comment letters that pertain to the property
5. Summary of land use history if known (i.e., former cane cultivation)
6. Construction dates of buildings within the project area, if known
7. Mailing address and phone number of the contact person to whom we will send our review letter

Copies of completed permit application forms and the above information may be faxed to the Hilo SHPD office at (808) 933-7655, or dropped off or mailed to 40 Po`okela Street, Hilo (96720). If you have questions, call 933-7653 or 933-7650. If you intend to hand-deliver your information, please call first to ensure that someone is in and available to discuss your project with you.

SHPD does not sign the permit; we will send you a review letter which you will attach to the permit application. Do not send us your original permit application form; send us a copy so that we may keep it on file at SHPD.

Pursuant to the Hawaii Revised Statutes, Chapter 6E-11(c) "It shall be unlawful for any person to take, appropriate, excavate, injure, destroy or alter any historic property or burial site during the course of land development or land alteration activities to which §6E-42 applies, without obtaining the required approval."