

CATALOGUE OF WASTEWATER TREATMENT FACILITIES:

STATE OF HAWAII

by

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POLLUTION AND REUSE OF WASTEWATER EFFLUENTS AND STORMWATER IN HAWAII

OWRR Project No. A-018-HI, Grant Agreement No. 14-31-0001-3011

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## INTRODUCTION

The Water Resources Research Center initiated the project, "Pollution and Reuse of Wastewater Effluents and Stormwater in Hawaii," in July 1969. The objective of this project is to determine physical, chemical, and microbiological characteristics of wastewater effluents and stormwater runoff from representative areas, relate the characterization to the State Water Quality Standards, and determine treatment required and suitability for reuse in irrigation or artificial recharge. It is a three-year project, now entering its second year.

The focus of the first year's work was on the characterization of wastewaters at selected treatment plants on Oahu. In attempting to select the treatment plants to be surveyed, it was realized that there was no catalogue or inventory of wastewater treatment facilities for the state which provided information on location, using agency, type of treatment, and method of effluent disposal. Anyone desiring such information has to individually query each agency in the state concerned with wastewater treatment or pollution control, thus creating an endless repetition of inquiries.

It seemed only logical then that during the initial year this project include in its scope the preparation of a catalogue or inventory of wastewater treatment facilities. An effective water pollution control program for the state requires sufficient information on existing treatment and pollution control facilities and projections of needs for future facilities. Hence, the catalogue should provide a basis for guiding pollution control planning and programs.

## STUDY

The necessary information was gathered in the following manner: Letters of inquiry were sent to government and private agencies directly concerned with wastewater generation, handling, and treatment and disposal or both and included requests for detailed information on facilities under their control. The information which was requested included location, responsible or using agency, type of treatment, design flow, method of effluent disposal, type and frequency of analyses on waste-

water, and plans for expansion. Questionnaires were sent to the City and County of Honolulu, County of Hawaii, County of Maui, County of Kauai, U.S. Navy, U.S. Army, U.S. Air Force, Hawaii State Health Department, Water Pollution Control Committees of the pineapple and sugar industries, Standard Oil Co, of California (Western Operations), Gaspro, Hawaiian Electric Co., Maui Electric Co., Hilo Electric Co., Kauai Electric Co., Hawaiian Western Steel, Hawaii-Kai Development Corp., R. M. Towill Co., Belt-Collins and Associates, and American Factors.

## RESULTS

Replies were received from 80 percent of the agencies and offices queried. The first reply from the U.S. Navy was in such good order that the format was followed for the tabulation of the data obtained (Tables 1 to 4). It should be noted that the letters of inquiry did not specifically ask for information on volume or location of untreated discharges and thus is incomplete in this respect. It is estimated that there are at least 50 such discharge sites in the state. Where information on these discharges was supplied by the agencies or was available from other sources, it was included in the listing. A summary table was compiled to categorize the information received on number of plants by type, method of effluent disposal, and approximate design flow. Additional information that could be incorporated in future revisions to make this preliminary catalogue on wastewater and water pollution control facilities in the State of Hawaii more complete is invited. It is hoped that this listing can be kept updated to be of fullest use to professional and community groups.

SUMMARY TABLE

	<u>Number of Systems</u>				<u>Volume of Discharge in MGD</u>			
	Public	Private	Federal	Total	Public	Private	Federal	Total
Waste Treatment Plants	25	5	15	45	34.3	5.0	16.7	56.0
Untreated Discharges	5	2	1	8	58.7	15.4	--	74.1
Primary Plants	6	2	4	12	14.2	0.9	4.0	19.1
Secondary Plants	19	1	7	27	20.2	1.1	12.6	33.9
Trickling Filter Plants	5	--	6	11	8.6	--	5.1	13.7
Activated Sludge Plants	14	1	1	16	7.8	1.1	7.5	16.4
Oxidation Ponds	1	2	3	6	--	3.0	0.1	3.1
Tertiary Treatment Plants								
Discharges to Marine Waters	13	3	6	22	84.5	18.9	11.5	114.9
Discharges to Surface Waters	11	2	7	20	5.4	0.4	5.0	10.8
Discharges Disposed on Land	5	1	1	7	3.1	1.1	0.2	4.4

TABLE 1. U. S. ARMY.

Location	Using Agency	Type Of Treatment	Design Flow (MGD)	Method Of Flow Measurement	Method Of Effluent Disposal	ROUTINE ANALYSIS				Expansion Planned	Comments
						By	Frequency	Type *	Data Available Year		
Schofield Barracks (Wheeler AFB)	U.S. Army	Secondary Trickling Filter	4.08		Waikele Stream	Using Agency	3x Weekly	BOD <sub>5</sub> , SS, DO, Cl <sub>2</sub> res.	1945-1946	4.2 MGD Replacement FY 1971	
Helemano Radio Rec. Station	"	"	0.50		Helemano Stream	Using Agency	2x Weekly	BOD <sub>5</sub> , SS		Tentatively Programmed FY 1978	
Waiawa Radio Trans. Station	"	Secondary Oxidation Pond	50 man Barracks ~ 3500 gpd		Evaporation & Seepage at Pond	None			None		Future utilization of installation uncertain
Aliamanu Military Reservation	"	Secondary Trickling Filter	3000 men ~ 0.21		Salt Lake	Using Agency	As Requested	BOD <sub>5</sub> , SS			
Waianae-Kai	"	Primary (Septic Tank)			Ocean Outfall	None			None		Planned Abandonment w/sewer Tie-in to City & County System
Fort Shafter	"	None			Sand Island 36" Outfall 3100 lf at 18' depth					2.0 MGD Activated Sludge Plant Proposed For FY 1972	3 miles of 24" Force Main to Sand Island
Schofield Barracks Area X	"	Primary (Septic Tanks)	4.0		Kaukonahua Stream	None			None		Area not in use by Army. Will Probably phase out with Tie in to Schofield Barracks Sewage Collection System

\* BOD = Biochemical Oxygen Demand, SS = Suspended Solids, DO = Dissolved Oxygen.

Location	Using Agency	Type of Treatment	Design Flow (MGD)	Method of Flow Measurement
Ahuimanu	City & County	Activated Sludge	0.29	Flow Indicator & Transmitter at Chlorine Contact Basin
Halawa		Primary	0.465	
Jail		Trickling Filter	0.03	
Kailua		Trickling Filter	7.0	
Kaneohe		Trickling Filter	4.3	
Kukanono		Extended Aeration	0.07	
Makakilo		Extended Aeration	0.60	
Maunawili		Extended Aeration	0.14	
Maunawili Estate		Extended Aeration	0.09	
Nanakai		Extended Aeration	0.125	
Pacific Palisades		Trickling Filter	0.675	
Pearl City		Primary	5.0	
Pohakapu		Trickling Filter	0.426	
Wahiawa		Hi-Rate Activated Sludge	2.5	
Waianae		Primary	1.72	
Waipio		Extended Aeration	0.25	
Waimanalo	DOWALD	Activated Sludge	1.10	
Mililani	City & County	Hi-Rate Activated Sludge	0.93	

\* DO = Dissolved Oxygen, BOD = Biochemical Oxygen Demand, SS = Suspended Solids, SVI = Sludge Volume Index, MLSS = Mixed Liquor Suspended Solids, BACT = Coliform Bacteria.

TABLE 2. CITY AND COUNTY OF HONOLULU.

Method of Effluent Disposal	By	Frequency	ROUTINE ANALYSIS	Data Available Year	Expansion Planned
			Type *		
Ahuimanu Stream	C & C Sewer Division Analyst	Every 2 weeks	III = pH, DO, BOD, SS, Set-S, DO <sub>4</sub> , Res-Cl <sub>2</sub> SVI, MLSS, BACTI.	1965	No
Outfall into Pearl Harbor		Every 2 weeks	IV = pH, DO, BOD, SS, Set-S, Res-Cl <sub>2</sub>	1962	No
South Fork Hilawa Stream		Once weekly	II = pH, DO, BOD, SS, Set-S, PO <sub>4</sub> , Org-N, NH <sub>3</sub> -N, Res-Cl <sub>2</sub>	1962	No
Ocean Outfall Kailua Bay 500'; 42'		Once weekly	II + Bacti	1964	Yes
Outfall Kaneohe Bay 2100'; 48"		Once weekly	II + Bacti	1962	No
Sump in Kawaiui Swamp		Every 2 weeks	III	1961	No
Recharge pits/or Ewa Plantation Irrigation System		Every 2 weeks	I = pH, DO, BOD, SS, Set-S, SVI, Res-Cl <sub>2</sub> MLSS	1962	Yes
Maunawili Stream		Every 2 weeks	III	1965	No
Maunawili Stream		Every 2 weeks	III	1965	No
Sump/or Ewa Plantation Irrigation System		Every 2 weeks	I	1965	No
Waiaua Stream		Once weekly	II	1962	No
Outfall into Pearl Harbor 2300'; 36"-54"		Once weekly	IV	1964	Yes
Kawainui Swamp		Once weekly	II + Bacti	1957	No
Lake Wilson		Once weekly	II + SVI	1928	No
Ocean Outfall Pokai Bay 2900'; 36"		Once weekly	IV	1968	Yes
Waikakalua Gulch		Every 2 weeks	I	1960	No
Recharge Wells 3-16"		---	---	---	Yes
Kipapa Stream	Every 2 weeks	I	1969	Yes	

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Outfall into Pearl Harbor		Every 2 weeks	IV = pH, DO, BOD, SS, Set-S, Res-Cl <sub>2</sub>	1962	No
South Fork Halaia Stream		Once weekly	II = pH, DO, BOD, SS, Set-S, PO <sub>4</sub> , Org-N, NH <sub>3</sub> -N, Res-Cl <sub>2</sub>	1962	No
Ocean Outfall Kailua Bay 500'; 42"		Once weekly	II + Bacti	1964	Yes
Outfall Kaneohe Bay 2100'; 48"		Once weekly	II + Bacti	1962	No
Sump in Kawaiinui Swamp		Every 2 weeks	III	1961	No
Recharge pits/or Ewa Plantation Irrigation System		Every 2 weeks	I = pH, DO, BOD, SS, Set-S, SVI, Res-Cl <sub>2</sub> MLSS	1962	Yes
Maunawili Stream		Every 2 weeks	III	1965	No
Maunawili Stream		Every 2 weeks	III	1965	No
Sump/or Ewa Plantation Irrigation System		Every 2 weeks	I	1965	No
Waiaua Stream		Once weekly	II	1962	No
Outfall into Pearl Harbor 2300'; 36"-54"		Once weekly	IV	1964	Yes
Kawaiinui Swamp		Once weekly	II + Bacti	1957	No
Lake Wilson		Once weekly	II + SVI	1928	No
Ocean Outfall Pokai Bay 2900'; 36"		Once weekly	IV	1968	Yes
Waikakalua Gulch		Every 2 weeks	I	1960	No
Recharge Wells 3-16"		---	---	---	Yes
Kipapa Stream		Every 2 weeks	I	1969	Yes



TABLE

Location	Using Agency	Type of Treatment	Design Flow	Method of Flow Measurement	Method of Effluent Disposal	By	ROUTINE Frequency
<i>Fort Kam Stp</i>	USAF U.S. Army U.S. Navy	Step Aeration Activated Sludge	$Q_{av}$ = 7.5 mgd $Q_{max}$ = 16.0 mgd $Q_p$ = 22.0 mgd	Flow Indicator-Transmitter at Chlorine Contact Tank	Ocean outfall sewer 1725 LF 30" RCP w/diffusers, disch. @ 46' ± depth	PNFEC SEL Chemist & Microbiologist	Intermittent-approx once/month
NAS Barbers Point	U.S. Navy	Primary	$Q_{av}$ = 1.5 mgd $Q_{max}$ = 4.35 mgd $Q_p$ = 4.44	Indicator-Recorder at Chlorine Contact Tank	Ocean outfall sewer, exist sewer is 30" CIP & RCP. Extends approx. 300' offshore, dischg. @ about 6' depth		
Capehart Housing, Iroquois Point	U.S. Navy	Primary	$Q_{av}$ = 0.533 mgd $Q_{max}$ = 1.86 mgd $Q_p$ = 1.93 mgd	Cumulative Totalizer @ Cl <sub>2</sub> Tank. Also, Flow Indicator.	Ocean outfall sewer, exist sewer is 16" CIP, extending approx. 160' offshore, dischg. @ about 30' depth		
Lualualei	U.S. Navy	Raw Sewage Lagoon (NAD)			Disch. into dry stream bed. Evap. & percolation		
		Septic Tanks & Effluent to old trick. filter (NRS)	0.10 mgd per plant Acc't. card	None	Disch. of chlorinated effluent into station drainage system		
<i>NAD West Loch</i>	U.S. Navy	Central area (Plant A) Extended Aeration "Package Plant"	$Q_{av}$ = 0.042 mgd Infil. = 0.021 mgd $Q_p$ (governed by lift sta) = 152 gpm		3 leaching pits & short subaqueous outfall for emerg. relief		
		Makai area (Plant F) Extended Aeration "Package Plant"	$Q_{av}$ = 6000 gpd $Q_{max}$ = 30000 gpd Infil. = negligible		1 leaching pit & exist. sewer & subaqueous outfall for emerg. relief		
MCAS, Kaneohe	USMC	Primary	$Q_{av}$ = 2.0 mgd $Q_{max}$ = 3.0 mgd All pumps on $Q_{max}$ = 5.0 mgd	1. Flow indicator. 2. Daily rate of flow recorder. 3. Cumulative totalizer All at Cl <sub>2</sub> Tank.	Ocean outfall sewer 1500' ± 24" d.		
<i>Poroi Island</i>	U.S. Navy	Extended Aeration	$Q_{av}$ = 230,500 gpd Infil. = 51,120 gpd	Flow transmitter @ Chlorine Contact Tank. Totalizer, Indicator, recorder & Receiver in Control Bldg.	Ocean outfall sewer, 15" RCP 228' ± 42' depth		
<i>Waipio</i>	U.S. Navy	Degaussing Station: Extended Aeration "Package Plant"	$Q_{av}$ = 3,300 gpd Peakflow = 50 gpm (governed by ejector stas) Infiltration = negligible		1 leaching pit-6' I.D. x 8' deep 6" V.C. overflow to exist. 6" sewerline which dischrgs. into ocean		
		Inactive Service Craft: Extended Aeration "Package Plant"	$Q_{av}$ = 11,600 gpd Peakflow = 500 gpm Infiltration = negligible		1 leaching pit-6' I.D. x 8' deep		
<i>Industrial Wastes Treatment Facilities, P.H.</i>		Acid-Alkali Wastes Chromium Wastes Cyanide Wastes	20,000 gal. ea. annually 12,000 gal. annually 2,800 gal. annually	Estimate qty of batch deliveries	Discharge into sanitary sewer for ult. treatment @ Fort Kam Stp		
		Oil Wastes	$Q_{max}$ = 325 gpm	Estimate qty of batch deliveries	Dischg. into Pearl Harbor		
<i>BMR Barking Sands, Kauai</i>	U.S. Navy	Raw Sewage Lagoon	$Q_{av}$ = 0.054 mgd $Q_{max}$ = 0.27 mgd		Ocean Outfall Sewer 1000' offshore x 25' deep		
Kunia	U.S. Navy	Trickling Filter	Design Flow = 0.28 mgd		10" Dischg into ditch-Final disposal by surface evaporation & absorption		
Capehart Housing, Manana	U.S. Navy	Trickling Filter	Av. for Jan-July '69 = 31,600 gpd		Discharge into Waiawa Stream		
NCS Wahiawa	U.S. Navy	Trickling Filter			Discharge into Gully - (Dry stream bed?)		

LOCATIONS IN ITALICS ARE PLANTS NOT YET CONSTRUCTED

\* LF = Linear Foot, CIP = Cast Iron Pipe, RCP = Reinforced Concrete Pipe,  $Q_p$  = Peak Discharge, NAD = Navy Ammunition Depot, DO = Dissolved Oxygen, BOD = Biochemical Oxygen Demand.

TABLE 3. MILITARY.

By	ROUTINE ANALYSIS Frequency	Type	Data Avail. (From)	Expansion Planned	Comments
CP	PNFEC SEL Chemist & Microbiologist	Intermittent-approximately once/month	pH D.O. Total Solids	Yes	Completion of 1st increment, PWC Pearl P-010 scheduled for Jan. 1970. 1st increment design flow = 4 mgd.
is 500' h			Settleable Solids Suspended Solids BOD (5-day) Chlorine residual (effluent)	1953	Yes FY 73 or 74: P-092 will provide for: (BOD & SS = 200 mg/l) a) Secondary treatment by activated sludge process b) Improvement of ocean outfall sewer
is off-				1957	Yes FY 73 or 74: FHI Project C-387 will provide secondary treatment by the activated sludge process. BOD = 240 mg/l, SS = 200 mg/l
				1954	
				1955	Operator reports low rates of flow ("trickle").
us				No	FY 70: P-034 BOD & SS = 240 mg/l
				No	
				1954	Yes FY70: P-010 will provide secondary treatment by trickling filter.
					Growth factor was not used in design of plant but possible expansion was recognized. Plant is designed to lend itself to incremental expansion if req'd
p ocean p					See "Comments" FY70: P-116 Plant will be sized for 4000 gpd as "Pkg. Plants" come in increments of 1000 gpd.
					See "Comments" Plant will be sized for 12,000 gpd.
itp				No	FY70: P-116 Plant to be sited near SPS #9 of PWC Pearl Project P-010. (6th Ave. & South St.)
				No	Plant to be sited at location of exist. API separator.
				No	FY71: P-708; Deferred to possibly FY73 or 74. Currently under construction under FY 68-69 Family housing Program.
				1958	
				1959	No FY71 MCN Project P-117 will connect housing to C & C of Honolulu Pearl City System at R/R R/W through exist. lines below Kam Hwy.
				1962	No

TABLE 4. ALL ISLANDS.

Location	Using Agency	Type of Treatment	Design Flow (MGD)	Method of Flow Measurement	Method of Effluent Disposal	By	Frequency	ROUTINE ANALYSIS	Data Available (Yr.)
								Type *	
Keauhou-Kona	Hawaii County	Activated Sludge	1.0	V-Notch weir chlorination basin	Irrigation (Golf Course)				
Kaanapali, Maui	Amfac, Inc.	Activated Sludge	1.1	V-Notch weir	Irrigation (Cane and Golf Course)				
Mauna Kea Beach Hawaii									
Wheeler AFB Oahu	USAF	Stabilization Pond	0.1		Post Chlorination Stream	Rec. by Army & USAF		BOD, DO, E. Coli	
Lahaina	Maui County	None	3.16		Ocean Outfall				
Paia	Maui County	None	0.96		Ocean Outfall				
Wailuku	Maui County	None	±2.5		Ocean Outfall				
Kahului	Maui County	None	±2.0		Ocean Outfall				
Lanai	Maui County	Septic Tank			Gulch				
Haliimaile	Maui Pineapple Co.	Oxidation Pond							
Kahului Apt.	State Dept. of Transportation	Oxidation Pond							
Wailua	Kauai County	Rapid Bioc-Aerobic Digestion	0.25 Current 0.50 Phase II 0.75 Ultimate	V-Notch weir chlorination basin	Ocean Outfall 600' to 25' Depth	Kauai County	Daily Weekly	pH, ORP, DO, SS, Set-S, TS, Cl <sub>2</sub> Residual BOD	
Lihue	Kauai County	Rapid Bioc-Aerobic Digestion	0.10 Ave. 0.50 Expansion 2.95 Ultimate	V-Notch weir chlorination basin	Lihue Plantation Co. Ditch (Ultimately to Ocean)	Kauai County	Daily Weekly	pH, ORP, DO, SS, Set-S, TS, Cl <sub>2</sub> Residual BOD	
Kailua-Kona	Hawaii County	Extended Aeration	0.30	V-Notch weir chlorination basin	Seepage Pit	Hawaii County	Periodic?	COD, BOD, SS, NH <sub>3</sub> -N, Org-N, ORP, DO, E. Coli, Cl <sub>2</sub> Residual	
Hilo	Hawaii County	Primary	7.0	V-Notch weir chlorination basin	Ocean Outfall Hilo Bay	Hawaii County	Daily	COD, BOD, SS, NH <sub>3</sub> -N, Org-N, ORP, DO, E. Coli, Cl <sub>2</sub> Residual	1966?
Hawaii-Kai	Oahu	Primary	0.9 1st phase primary 1.8 2nd phase primary 9.3 (Ultimate)	V-Notch weir chlorination basin	1500' Outfall 60' depth Waimanalo Bay	Hawaii-Kai			
Campbell Industrial Park	Standard Oil Co. of California, Western Operations, Inc.	Multi-Stage Oil Separator, Oxidation Pond, Settling & Skimming	3.0		Ocean Outfall	Using Agency	Bi-weekly	?	
Kalihi	Gaspro, Inc.	None	0.44	Pumping Rate	Kalihi Stream	Using Agency	Occasionally	Temperature	
Kalihi	Gaspro, Inc.	Primary	0.0016		Kalihi Stream	Using Agency	Occasionally	pH, Settleable Solids	
Kahului Maui	Maui Electric	None	15	Pumping Rate	Ocean Outfalls on Shoreline Kahului Bay	None			

\* BOD = Biochemical Oxygen Demand, DO = Dissolved Oxygen, ORP = Oxidation Reduction Potential, SS = Suspended Solids, TS = Total Solids, COD = Chemical Oxygen Demand

TABLE 4. ALL ISLANDS.

Method of Effluent Disposal	By	Frequency	ROUTINE ANALYSIS		Data Available (Yr.)	Planned Expansion
			Type *			
Irrigation (Golf Course)						
Irrigation (Cane and Golf course)						
Post Chlorination Stream	Rec. by Army & USAF			BOD, DO, E. Coli		No
Ocean Outfall						
Ocean Outfall						
Ocean Outfall						
Ocean Outfall						
Rich						
Ocean Outfall 0' to 25' Depth	Kauai County	Daily Weekly		pH, ORP, DO, SS, Set-S, TS, Cl <sub>2</sub> Residual BOD		Yes, Phase II Immediately
Wahie Plantation Co. trench (Ultimately to ocean)	Kauai County	Daily Weekly		pH, ORP, DO, SS, Set-S, TS, Cl <sub>2</sub> Residual BOD		Yes, Underway to 0.50 MGD
Waste Pit	Hawaii County	Periodic?		COD, BOD, SS, NH <sub>3</sub> -N, Org-N, ORP, DO, E. Coli, Cl <sub>2</sub> Residual		Yes, to 0.60 MGD (S.T.H)
Ocean Outfall Kona Bay	Hawaii County	Daily		COD, BOD, SS, NH <sub>3</sub> -N, Org-N, ORP, DO, E. Coli, Cl <sub>2</sub> Residual	1966?	No?
10' Outfall depth Manalo Bay	Hawaii-Kai					Yes, Activated Sludge 3.1 MGD 3rd phase 6.2 MGD 4th phase
Ocean Outfall	Using Agency	Bi-weekly		?		Under Study
Wahi Stream	Using Agency	Occasionally		Temperature		None
Wahi Stream	Using Agency	Occasionally		pH, Settleable Solids		Additional Clarifier 5/70
Ocean Outfalls on Kailua Bay	None					None