

EXECUTIVE SUMMARY

Every organization needs a vision to guide its direction. Water Plan 2020 is the latest update of the County of Kauai Department of Water's (DOW's) long-range plan. It is our vision for the next 20 years, a roadmap for the future as we enter the new millennium. The project to update the plan began in mid-1999, and was completed in early 2001. It is a comprehensive plan that covers all of the water systems of the Department of Water, County of Kauai, from Haena to Kekaha.

Serving as inspiration and guiding us in the update of the plan is the Department's mission statement:

"Together, we provide safe, affordable, and sufficient drinking water through wise management of our resources and with excellent customer service for the people of Kauai."

For the first time, the plan addresses the difficult issue of deteriorating and aging water system infrastructure (i.e., the pipes, water tanks, wells, etc.). It also examines the financial needs of our water systems over the next 20 years. As a result, Water Plan 2020 provides a roadmap to operating our water systems in a sustainable fashion that ensures the reliability of our precious water systems for our community into the future. Sustainable operation of the water systems is especially important because the Department operates as an enterprise, relying solely upon the fees it charges for water.

PURPOSE

The purpose of the Water Plan 2020 project was to develop a long-range plan to guide the DOW for future operations and to identify the needed improvements and facilities required to continue to provide safe, affordable, and reliable water service to our community in a sustainable and financially secure manner. The DOW faces a similar challenge that many utilities across the nation are encountering... aging, deteriorating infrastructure. Years of growth and expansion of our water systems now yield to the challenge of maintaining service at the level citizens of Kauai have come to expect.

The goals of Water Plan 2020 include:

- Ensuring a reliable future water supply.
- Caring for our deteriorating and aging water systems.
- Ensuring water quality by meeting changing state and federal drinking water regulations.
- Increasing our customer service.
- Operating our water systems in a sustainable and financially secure manner.

To accomplish these goals, Water Plan 2020 included the development of:

- A Capital Improvements Program (CIP) that addresses existing capacity deficiencies in our water system and how to meet future needs for water by our community
- A Capital Rehabilitation (CRP) and Capital Replacement Program (CRPL) to repair or replace deteriorating and aging infrastructure.

- A Financial Plan that examines our financial condition over the next 20 years.
- A Water Rate evaluation that develops the rates and charges needed to support the implementation of the first five years of the 20-year plan.

The Board of Water Supply and the DOW have agreed to meet the challenge of improving and maintaining the existing water system infrastructure. Water Plan 2020 is a product of this initiative. Once the plan is completed, it will be submitted to the Board of Water Supply for adoption. Water Plan 2020 will then serve as the Department’s official long-range plan.

PLANNING DATA & WATER DEMAND FORECAST

The planning data and water demand forecast serve as the building blocks for many aspects of a water comprehensive plan including supply, storage, and fire protection; therefore, projecting water use as accurately as possible for the planning horizons is critical. The *Kauai Water Plan 2020* had the advantage of utilizing population and land use projections developed through the recent update of the *Kauai General Plan (2000)*. The demand projections provide island-wide water use through 2020.

Population Projections

Table 1 shows population currently and as forecast for 2000, 2020, 2050, and build-out within DOW service areas. The year 2050 projections were prepared assuming that the forecasted growth rate from 2010 to 2020 will continue through 2050. Population forecasts were used to develop water demand forecasts for the purposes of long-term planning.

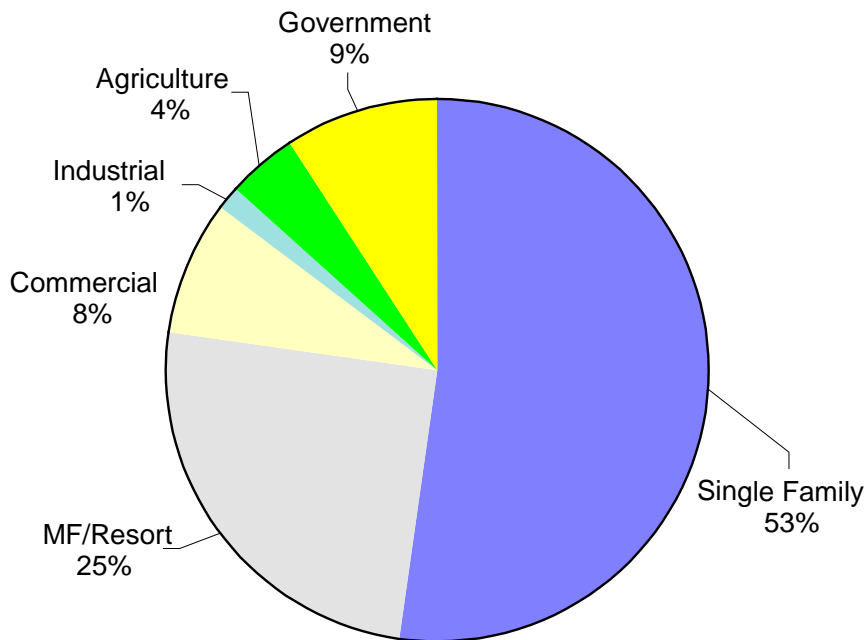
Table 1
Population Projection

District/Water System	2000	2020	2050	Build-out Populations
West side	9,124	11,273	14,809	17,959
Waimea-Kekaha	4,827	5,595	6,858	8,550
Hanapepe-Eleele	4,297	5,678	7,951	9,409
Kalaheo-Poipu-Koloa	11,467	14,733	20,071	35,563
Kalaheo	4,889	5,596	6,762	10,790
Lawai-Omao	3,264	3,795	4,672	6,571
Koloa	1,666	3,250	5,825	8,109
Poipu	1,649	2,092	2,813	10,092
Lihue	11,446	14,606	19,770	32,372
Puhi-Lihue-Hanamaulu	11,446	14,606	19,770	32,372
Wailua-Kapaa	17,595	21,263	25,588	35,637
Wailua-Kapaa	16,038	18,346	22,151	32,200
Anahola	1,518	2,812	3,240	3,240
Moloaa	40	106	197	197
North Shore	5,166	7,004	9,664	11,421
Kilauea-Waipake-Kalihiwai	3,066	4,541	6,602	6,602
Anini	178	211	266	323
Hanalei	933	1,065	1,283	2,217
Wainha-Haena	989	1,187	1,513	2,279
TOTAL	54,798	68,880	89,901	132,952

WATER USE

Residential single-family water use comprises the majority of the Dow's consumption, with more than 50 percent of the total water use. Average daily water use in the service areas varies from a low of 315 to a high of 772 gallons per unit. The range in water use patterns may be attributed to differences in development, weather patterns, meter accuracy, and other factors. The combined multi-family/resort category makes up about one quarter of the water use and the remaining categories of commercial, industrial, agriculture, and government comprise the remaining 25 percent. Figure 1 graphically depicts water use by category.

Figure 1
Percentage of water use by category in 1998-99



The majority of the water use is concentrated in a few of the service areas. The service areas of Wailua-Kapaa, Puhi-Lihue-Hanamaulu, and Koloa-Poipu comprise approximately 65 percent of the annual average water use. With the inclusion of Waimea-Kekaha and Hanapepe-Eleele, these top five service areas use more than 80 percent of the water delivered to DOW systems on the island. During the past five years, from 1995 through 1999, DOW's Average Daily Demand has been 14 mgd; this includes a 25 percent allowance for non-metered use.

A reduction in non-metered water has been projected, and was based on improved metering of sources, expanding the leak detection program, and pipeline replacements. In some service areas that are forecast to have limited growth because of a reduction in non-metered water, Water Plan 2020 forecasts decreases in overall water use during the 2000 to 2020 planning period. The water demand forecast is presented in Table 2.

Table 2
Historical and Forecast Water Use

Water System	Historical Use (1,000 gallons/day)			Forecast Use (1,000 gallons/day)	
	1995-96	1998-99	2005	2010	2020
Waimea-Kekaha	1,444	1,621	1,590	1,701	1,918
Hanapepe-Eleele	1,020	1,071	1,149	1,218	1,361
Kalaheo	702	666	704	717	746
Lawai-Omao	441	415	435	443	458
Koloa	459	391	520	614	798
Poipu	1,980	2,325	2,454	2,628	2,953
Puhi-Lihue- Hanamaulu	3,054	3,321	3,570	3,733	4,066
Wailua-Kapaa	3,600	3,220	3,426	3,501	3,648
Anahola	256	290	321	367	460
Molooa	2	9	7	9	13
Kilauea-Waipake- Kalihiwai	663	718	779	842	969
Anini	36	45	40	41	43
Hanalei	168	161	174	177	181
Wainiha-Haena	157	154	166	169	179
TOTAL	13,982	14,407	15,335	16,160	17,793

Historical and forecast water demands include estimated non-metered water (25% in 1995-1999, 22.5% in 2005, 20% in 2010, 15% in 2020)

CURRENT CONSERVATION EFFORTS

Current conservation activities in the Department include 100% customer metering, meter repair/replacement program, non-metered water analysis/report, leak detection, tank overflow controls/alarms, plumbing code water efficient fixture and pressure reducing valve requirement, voluntary water restriction notice, and public outreach/ education programs.

The Department has prepared a water conservation plan as guidance to the DOW in meeting long-range water conservation goals. The Water Conservation Plan is based upon the Environmental Protection Agency's (EPA) water conservation plan guidelines. The EPA guidelines emphasize goal-oriented planning, which can help water systems improve their capacity to provide safe and reliable water service as well as to eliminate, downsize, or delay infrastructure projects.

WATER SYSTEM POLICIES

Water System Policies guide the development and financing of the water system infrastructure required to provide water service throughout the service area. Board policies may impact many areas of planning including service areas, system redundancy, development, and system sizing. Current DOW water system policies are described and documented in the *Rules and Regulations, Department of Water County of Kauai*, (effective November 20, 1976 and as amended). Water system policies also include Board policies that are established from time to time by the Board. There are also, administrative (engineering based) procedures of the Department, and the *Water System Standards* (1985 and as amended) that guide the actions of the DOW.

LEVEL OF SERVICE

Level of Service (LOS) standards are the collections of water system standards and planning criteria that guide the development of new facilities and improvements to existing facilities. Level of Service standards establish criteria for evaluating and planning sources of supply, fire protection, storage, transmission and distribution systems, pump stations, treatment, and system redundancy.

The DOW planning and design standards are incorporated in the *Water System Standards*, State of Hawaii, adopted in 1985 as amended or updated. These standards provide specific criteria for each of the major water suppliers on the islands of Kauai, Oahu, Maui, and Hawaii. Prior to these standards, the DOW designed and planned around standards presented in *A General Plan for Domestic Water/Island of Kauai*, 1972, prepared by the State of Hawaii Department of Land and Natural Resources and *The Standards Specifications For Waterworks Construction* (1963 or later,) and the requirements of the State Department of Health.

Through the Water Plan 2020 evaluation process, several modifications have been recommended to the 1985 water system standards. The proposed changes have been made to reflect higher levels of service and better alignment with historical water use and service patterns. The most significant changes to the level of service criteria include:

- Minimum main size of 6-inches for all the DOW installed construction and
- Determination of maximum day supply based on 24-hour/day pumping for source and booster pumping capacity.

Another area that is currently being reviewed by DOW and coordinated with the County Fire Department is the minimum fire flow requirements. There are various locations in the DOW water systems that are either rural or are isolated service areas. Particularly in agriculture zoned areas, the water systems were not sized to accommodate fire flows. However, continued development has attracted other uses and additional densities, creating the need for these systems to provide some level of fire protection. DOW and the Fire Department are developing alternative approaches to providing fire protection including DOW/Fire Department Memorandum of Agreement (MOA) regarding DOW off-site and fire department on-site fire code requirements needed for fire protection in agricultural and rural areas. It is anticipated that an approach will be adopted during 2001.

SUPPLY

The year 2020 demand and current conditions have been analyzed to assess the adequacy of the water supply on the island. Using the demand forecasts developed during this study, projected supply requirements have been calculated for 2020. With a few exceptions the individual service areas are not interconnected and must rely on local sources to provide domestic and emergency water. This makes it very important that reliable high quality water supply is available on a local basis. Table 3 is a summary of the DOW's supply and future needs.

Table 3
Source Needs by Water System

Water System	Supply Needed, gpm	
	Year 2000	Year 2020
Waimea-Kekaha	0	200
Hanapepe- Eleele	0	0
Kalaheo	0	0
Lawai-Omao	0	0
Koloa-Poipu	0	0
Puhi-Lihue-Hanamaulu	1,730	0
Wailua-Kapaa	700	0
Anahola	300	0
Moloaa	0	0
Kilauea-Waipake-Kalihiwai	400	0
Anini	0	0
Hanalei	200	0
Wainiha-Haena	100	0
Island-wide Total	3,430	200

*gallons per minute (gpm)

STORAGE

The storage analysis is based on the DOW level of service criteria. Two level of service criteria exist for storage tanks/reservoirs. Storage requirements are based on the larger of the two criteria. The storage sizing criteria are as follows:

Criteria 1: Fire Suppression Storage: provide Maximum Day Demand (MDD) plus fire flow, with the reservoir three quarters full at the start of the fire. Incoming supply from sources can be credited to this volume with the largest source out of service. This criteria is also referred to as Fire Flow Storage.

Criteria 2: Equalizing and Emergency Storage: provide Maximum Day Demand with the tank full at the beginning of a 24 hour period, not including any sources of supply. This criteria is also referred to as Maximum Day Storage

Table 4 is a summary of the storage capability and needs for DOW’s systems.

**Table 4
Storage Needs by Water System**

Water System	Storage Needed	
	2000	2020
Waimea-Kekaha	600,000	500,000
Hanapepe- Eleele	0	40,000
Kalaheo	500,000	0
Lawai-Omao	250,000	0
Koloa-Poipu	500,000	1,000,000
Puhi-Lihue-Hanamaulu	0	0
Wailua-Kapaa	2,150,000	0
Anahola	0	40,000
Molooa	15,000	0
Kilauea-Waipake-Kalihiwai	650,000	0
Anini	0	0
Hanalei	100,000	0
Wainiha-Haena	210,000	0
Island-wide Total	4,975,000	1,580,000

TRANSMISSION & DISTRIBUTION

Overall the system is in poor condition with old and deteriorating pipelines. There are many “cross-county” mainlines located in remote areas with poor access that increase system vulnerability and impedes repair and maintenance. Also, undersized pipeline that was installed prior to adoption of current fire protection standards are inadequate to provide the required fire flows. Approximately, 23% of Dow’s pipelines were installed prior to 1960. DOW has identified 127 miles of pipeline that need replacement over the next 20 years. Figure 2 illustrates that 86 miles of pipeline that was installed between 1921 and 1960 should be replaced and upgraded. In addition, 41 miles of pipeline that was installed in the early 1960’s are experiencing frequent leaks and also require replacement and upgrade.

Figure 2
DOW Pipeline Inventory by Miles of Pipeline and by Year Installed Dates

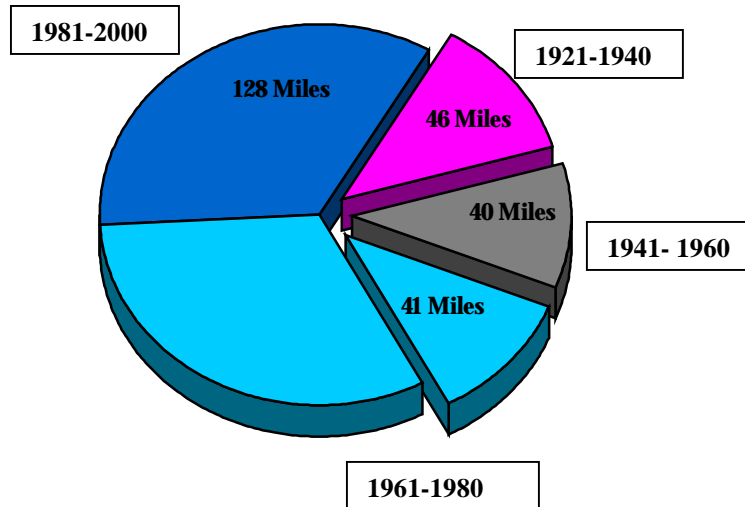


Table 5 is a summary of the transmission and distribution system.

Table 5
Transmission and Distribution

District/Water System	System Analysis Summary
West Side	
Waimea-Kekaha	<p>The existing mains are adequate for peak hour demands, but lack adequate fire flow capacity for commercial and certain residential areas in Kekaha and Waimea that are serviced by smaller pipes. The oldest pipelines were installed in 1924. The remainder was constructed after the 1950's.</p> <p>Major mainline projects proposed include the replacement of older and undersize mains located in Kekaha, Waimea Town, Waimea Heights and Waimea Valley with 6, 8 and 12-inch mains over the next 20 years.</p>

Hanapepe-Eleele	<p>The oldest mainline was installed in Hanapepe Town during the 1920's. Hanapepe Valley is serviced by 8-inch main installed in 1933 and portions of Hanapepe Heights are serviced by 4 and 6-inch pipeline installed in 1946. Fire flow is deficient in the Salt Pond area. There are no low-pressure areas in Hanapepe-Eleele.</p> <p>Proposed mainline projects include a replacement 6-inch pipeline project located in Hanapepe Town and Eleele and an 8-inch mainline replacement project in Hanapepe Valley. Approximately 7,000 feet of replacement 6-inch main is also planned for lower Hanapepe Heights and a 5,300-foot-long 6-inch mainline is planned for the Salt Pond area.</p>
Kalaheo-Poipu-Koloa	
Kalaheo-Lawai-Omao	<p>An 8-inch mainline along Kaumualii Highway installed in 1964 interconnects the Kalaheo and Lawai-Omao areas. Water from the higher Kalaheo system can be released to enter the Lawai-Omao system when needed. Conversely, water from Lawai-Omao can be made available to Kalaheo when needed via the Kalaheo Booster pump station.</p> <p>No low pressure areas were noted for Kalaheo, however the Hailima Road area in Lawai does experience low service pressure. Fire flows are deficient in the agricultural/open zoned areas of Kalaheo and Lawai-Omao. In addition undersized mains are not adequate to provide adequate fire flow for the small commercial area and some residential private roads in Lawai-Omao. The oldest pipeline was installed in Kalaheo in 1942-1953. The oldest pipeline in Omao was installed in 1953. Much of the remaining pipeline was installed after 1960 in both systems.</p> <p>New major pipeline projects for the Kalaheo System include a 6-inch mainline upgrade along Waha, Niho and Wawae Roads, a 6-inch replacement mainline along Puu Road in Kalaheo, 12, 8 & 6-inch mainline upgrades in Kalaheo Town and mauka Kalaheo Homesteads. Many of the older and undersized mains in Lawai-Omao will be replaced with 6 and 8-inch mainline over the next 20 years.</p>

Koloa-Poipu	<p>Although the Koloa-Poipu system was adequate to handle peak hour demands, fire flow capacity in Koloa Town and outlying agricultural/open areas was not sufficient. There are older cast iron and galvanized steel pipeline in Koloa Town that was installed between 1924 and 1937. Much of the undersized pipeline that served the former sugar plantation camps in Koloa was replaced with standard sized mains as a result of residential subdivision development after the 1960's.</p> <p>Major pipelines proposed for transmission and distribution consist of 16-inch and 12-inch replacement mains along Poipu Road and Hoonani Road respectively. Also, 12 and 8-inch mainline upgrade projects are planned for Koloa Road and Waikomo Road to improve fire flow in Koloa. A 12-inch mainline upgrade along Omao Road is planned to improve flow from the Omao Tank site to the Koloa-Poipu system.</p>
Lihue	
Puhi-Lihue-Hanamaulu	<p>Source supply for the Puhi-Lihue-Hanamaulu is transmitted by four major mainlines. These include the old 15-inch concrete Kokolau Tunnel main, the 16" Puhi Wells mainline, the 18-inch Kilohana Wells mainline and the newly installed 16-inch Maalu Road mainline. Trunk lines consist of 8, 12 and 16-inch pipes along Kaumualii Highway, Rice Street, Nawiliwili Road, Kuhio Highway, Ahukini Road and Kapule Highway.</p> <p>The existing mainlines are adequate to handle the peak hour demands over the 20 year planning period. However, distribution capacity was not adequate for required fire flow demand in the commercial, school and older residential areas of Lihue and Hanamaulu. The oldest pipelines were installed in Lihue and Hanamaulu between 1926 to 1935.</p> <p>Major proposed pipeline improvements include a 16-inch replacement of the 14,600-foot-long Kokolau Tunnel mainline, 8-inch upgrade pipeline segments in the older Lihue and Hanamaulu residential areas, a 12-inch mainline along Kuhio Highway in Hanamaulu and 8-inch mainline segments in the older commercial areas of Lihue.</p>
Wailua-Kapaa	

<p>Wailua-Kapaa</p>	<p>The supply and distribution mains in the Wailua Homesteads 538 Zone area are relatively old 8 and 6-inch iron pipes. The oldest pipe in Wailua Homesteads date back to 1937. The supply line from the gravity fed tunnel sources for the 530 Kapaa Homesteads Zone is a combination of older 10 and 8-inch cast iron (circa. 1945) that leads makai along Kawaihau Road and serves the residential consumers in Kapahi and Kawaihau and Kahuna Road. Although newer 12 and 8-inch mains have been installed in some areas, much of the agricultural/open and rural area are still serviced by undersized and older cast iron and galvanized steel piping. The coastal 214 Zone include 12 and 16-inch supply and distribution mains from the Nonou Wells in Wailua House lots. The major distribution mains located along Kuhio Highway that serve the resort and commercial districts of Wailua River, Waipouli and Kapaa Town include 8 and 12 –inch pipes. Many areas in the 214 Zone are serviced with older and undersized cast iron and galvanized pipes.</p> <p>Low pressure service areas exist in the Vivian Heights area of the 214 Zone and in the upper Wailua Homesteads 605 Zone. Fire flow capacity is not adequate in the Waipouli area of the 214 Zone and in the agricultural/open areas.</p> <p>Major pipeline improvements in the Wailua Homesteads 538 Zone include a 8-inch mainline along Waipouli and Hauiki Roads and a replacement 8-inch mainline along Puu O Pae, Opaekaa, Kalama and Kipapa Roads. Proposed mainline projects for the Kapaa Homesteads 530 Zone include a 14,000 feet long, 12-inch mainline replacement project along Kawaihau Road and a 6-inch mainline upgrade project along segments of several collector and major roads in Kapaa Homesteads.</p> <p>Major pipeline improvements for the 214 Zone include 6 and 8-inch mainline upgrade projects within the Wailua House lots residential area and the construction of hydro-pneumatic booster pump system that will replace the old 6-inch (1937) cast iron mainline that currently supplies upper Wailua House lots from the Wailua Homesteads 538 Zone.</p> <p>Other pipeline improvements include the replacement of old 4 and 2-inch galvanized pipes with 6 and 8-inch mains in the Waipouli/Fujii Beach residential area as well as a replacement 16-inch mainline along Kuhio Highway between Wailua River and the Kawaihau Road. In order to improve the low service pressures at the Vivian Heights area, a pipeline upgrade and installation of pressure control valves is planned.</p>
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Anahola	<p>The existing system is adequate for peak hour demands for 2000 and 2020. The Anahola Valley area is deficient in fire flow capacity due to older and undersized piping that was installed in 1929. Most of the remaining pipes were installed after 1956.</p> <p>Major pipeline improvements include an 8-inch main replacement project along Anahola Road and 6-inch main replacement along Aliomanu, Kukuna and Hui Roads in north Anahola. Both projects will improve fire flow capacity the areas. A 12-inch main along Kealia road will replace “cross-county” pipelines and provide improved system reliability.</p>
Moloaa	<p>The distribution system consists of a 4-inch PVC mainline located along portions of Koolau Road and Moloaa Road that was installed in 1986. The single distribution mainline is adequate to provide peak hour demand and required fire flow for the agricultural/open district.</p> <p>Pipeline improvements for Moloaa include the relocation of the DOW master meter and realignment of 1,500 feet of 6-inch pipeline along Koolau Road.</p>
North Shore	
Kilauea-Waipake-Kalihiwai	<p>The distribution system includes 12-inch pipes that connect the supply source to the Kilauea Town and surrounding agricultural/open district. Although most of the original Kilauea Sugar Co. mains were replaced in 1972, there are segments of old pipelines that serve the Kalihiwai area. An 8-inch main stretches east along Kuhio Highway to the Waipake subdivision. Another main continues north along Kuhio Highway to inter-connect to the Kalihiwai Water System. Agricultural subdivisions are located both mauka and makai of Kuhio Highway. The Sea Cliff Plantation subdivision located on a hill makai of Kilauea Town experiences low water pressure due to its relative elevation with the Kilauea storage tanks. Fire flow capacity for school and commercial facilities are deficient.</p> <p>The major pipeline projects include upgrade of the old and undersized mains in the Kalihiwai area. Other mainline projects are planned to provide adequate fire flow for school and commercial uses including a 16-inch main upgrade between the Kilauea tank and well site and Kilauea Town and a 12-inch mainline along Kilauea Lighthouse Road.</p>

Anini	Fire flow capacity at the eastern end of the one pipeline system along Anini Road is deficient. Plans include replacing the existing 4-inch main with a 6-inch mainline. An alternate project is to construct a new 6-inch main along Anini and Kalihiwai Roads to interconnect with the Princeville Water System at Kalihiwai Road. The alternate project would provide a second supply point for the DOW Anini System and add greater system flexibility.
Hanalei	<p>The Hanalei Water System is adequate to handle the peak hour demands for 2000 and 2020. However, the distribution system is not sufficient to provide required fire flow for the commercial, school and Weke Road area in Hanalei Town. The oldest pipes were installed in 1924 and the remaining pipes were installed after 1962.</p> <p>Pipeline projects planned to improve fire flow capacity for Hanalei include a 12-inch mainline upgrade between the Maka Ridge Well and Tank site into Hanalei Town. Other projects include 6 and 8-inch replacement mainlines along Weke, Anae and Malolo Roads.</p>
Wainiha-Haena	<p>The Wainiha-Heana System is adequate for peak hour demands, but is deficient in required fire flow capacity in the Wainiha Valley area. Most mains were installed after 1965.</p> <p>Proposed pipeline projects include a 6-inch replacement mainline along Wainiha Powerhouse Road and along Kuhio Highway in west Haena.</p>

WATER QUALITY

All thirteen water systems owned and operated by the Department of Water are in compliance with current drinking water standards. In cases where contaminants were detected, the measured levels are consistently below the Maximum Contaminant Levels (MCLs). The DOW experienced one case of water contamination in 1999. Mercury was detected in the Wailua Homesteads Wells A and B. Well A has been shut down, but an activated carbon system was installed to treat the water. The DOW remains committed to the protection of public health through regular monitoring and maintenance of the water systems under its management.

SYSTEM RECOMMENDATIONS & IMPROVEMENTS

Through the Water Plan 2020 evaluation process, several modifications have been recommended to the 1985 water system standards. The changes have been made to provide improved fire protection and higher levels of service. The most significant changes to the Level of Service criteria include:

- Minimum main size of 6 inches for all DOW-installed construction
- Determination of maximum day supply based on 24-hour/day pumping, rather than the previous 16-hour/day pumping.

Improvement Projects were developed for all 13 DOW water systems and prioritized. The majority of the projects were improvements or replacements resulting from aging infrastructure, including pipeline, pump stations, and storage. The improvement projects were separated into three areas:

- CIP: Capital Improvement Project – new improvement sized to meet needed capacity.
- CRP: Capital Rehabilitation Project – in-kind replacement, no change in capacity.
- CRPL: Capital Replacement Project – replacement project sized with additional capacity.

The projects were then prioritized across the entire system as separated into phases with the following funding requirements:

- Phase 1 (2002 to 2006): \$51.7 million
- Phase 2 (2007 to 2011): \$38.0 million
- Phase 3 (2012 to 2021): \$58.5 million

Table 6 is a summary of the DOW improvement program by phases and project categories.

Table 6
Water System Summary - Improvements by Phase

WaterSystem	Number of Projects	Total Cost (in millions)	Phase 1 FY 01-06 (in millions)	Phase 2 FY07-11 (in millions)	Phase 3 FY12-21 (in millions)
Kekaha-Waimea	29	\$9.7	\$4.9	\$5.1	\$5.2
Hanapepe-Eleele	14	\$11.4	\$2.1	\$0.1	\$9.3
Kalaheo	12	\$10.3	\$2.5	\$3.7	\$4.1
Lawai-Omao	12	\$7.3	\$1.7	\$3.4	\$2.3
Koloa-Poipu	18	\$12.6	\$3.2	\$4.2	\$5.2
Puhi-Lihue-Hanamaulu	33	\$24.0	\$9.4	\$7.3	\$7.3
Wailua-Kapaa	37	\$37.7	\$19.9	\$6.0	\$11.8
Anahola	9	\$5.2	\$2.7	\$0.0	\$2.5
Moloaa	2	\$0.4	\$0.4	\$0.0	\$0.0
Waipake-Kilauea-Kalihiwai	18	\$11.9	\$3.3	\$4.5	\$4.1
Anini	2	\$1.6	\$0.0	\$0.0	\$1.6
Hanalei	9	\$4.8	\$0.8	\$2.1	\$1.9
Haena-Wainiha	14	\$5.9	\$1.0	\$1.7	\$3.3
Total		\$148.1	\$51.7	\$38.0	\$58.5

FINANCIAL PLAN AND RATE INCREASE

A 20-year financial plan was prepared for the DOW consistent with the operating and capital projections developed in Water Plan 2020. The current cost estimates developed in Water Plan 2020 were escalated for future years using a 3.0 percent annual inflation rate. The results of the first five-year period (FY 2002-2006), discussed in detail under the Revenue Requirements Analysis section below, indicated a need for two 32 percent increases, effective July 1, 2001 and July 1, 2003 to fund Phase 1 improvements and anticipated operating expenses. The following 15-year period was reviewed in two periods: the five-year period from FY 2007 to 2011 and the ten-year period from FY 2012 to 2021. Among the key assumptions made in the development of the financial plan were the following:

Average customer growth rate of 1.0 percent per year.

- Average water sales growth rate of 1.25 percent per year.
- Approximately 60 percent of the Water Plan 2020 funding needs would be debt-financed, 4 percent would be facilities reserve charge (FRC) funded, and the remaining 36 percent would be funded with rate revenues.
- Projected 4 percent annual increases in O&M expenditures (representing 3 percent inflation plus 1 percent customer growth).
- A minimum debt service coverage level of 1.25 was maintained.
- A minimum operating reserve level of approximately 5.0 percent of previous year's water sales revenue was maintained.

20-YEAR FINANCIAL PLAN

The long-term financial plan along with the previously mentioned rate increases creates a sustainable approach to long-term system financing. The results of the long-term financial plan for the FY 2007 to 2021 period are summarized in the following paragraphs.

For the FY 2007 to 2011 period, escalated Water Plan 2020 spending of \$47.8 million was projected, based on the 3 percent inflation rate. Assuming that approximately 60 percent of this funding need was debt-financed results in \$29.0 million in additional debt borrowing during this five-year period. These Water Plan 2020 capital funding needs, along with the projected 4 percent annual increases in O&M expenditures, result in an average annual rate increase of approximately 3.5 percent per year during the FY 2007 to 2011 time period. This is similar to the assumed annual inflation rate of 3.0 percent per year during this time period.

For the FY 2012 to 2021 period, escalated Water Plan 2020 spending of \$92.7 million was projected, based on the 3 percent inflation rate. Assuming that approximately 60 percent of this funding need was debt-financed results in \$56.2 million in additional debt borrowing during this ten-year period. These Water Plan 2020 funding needs, along with the projected 4 percent annual increases in O&M expenditures, results in an average annual rate increase of approximately 3.0 percent per year during the FY 2012 to 2021 time period. Again this is similar to the assumed annual inflation rate of 3.0 percent per year during this time period.

Over the entire 15-year period, the average annual rate increase is approximately 3.2 percent per year, which is very close to the assumed level of inflation of 3 percent per year.

RESULTS OF REVENUE REQUIREMENTS ANALYSIS

The results of the revenue requirements analysis reflect not only the level of projected operating expenses and capital spending but two additional key elements:—the sufficiency of DOW’s end-of-year operating reserve levels and the adequacy of debt service coverage. The projected end-of-year operating reserve levels were set at 5 percent of previous year’s water sales revenue, a benchmark used by other water utilities. This level of operating reserves provides the DOW with contingency funds for certain emergency expenditures and to provide adequate cash flow to cover its revenue collections.

Debt service coverage was projected to be at or above a minimum of 1.25 times DOW’s annual debt expense consisting of principal and interest on outstanding bonds. While significant levels of additional debt are projected in the study period, Dow’s current relatively low debt level combined with additional future debt issuances results in strong debt service coverage in excess of 3.0 percent throughout the 2002-2006 time period.

The results of the revenue requirements analysis indicate a need for two system rate increases as follows:

- July 1, 2001 32.0 percent
- July 1, 2003 32.0 percent

A Power Adjustment Clause was proposed to be included in DOW’s rules and regulations. This clause protects the DOW against unanticipated large increases in power costs. The clause allows the automatic pass through of unanticipated power cost increases to customers through the water consumption charge. The implementation of this clause will be based on an annual review of actual and projected unit power costs and will apply to all water consumption by DOW’s customers.

ADOPTED RATE CHANGES

On January 24, 2001 the DOW held a public hearing to receive public input on the proposed rate changes. Immediately following this public hearing, the Board met and discussed the proposed rate changes. Based on the public input received, the Board approved the proposed rate changes with one modification. The proposed second block consumption charge for Agriculture Use effective July 1, 2001 was reduced from \$1.05 per thousand gallons (i.e., 50 percent of the \$2.10 per thousand gallons first block consumption charge) to \$0.70 per thousand gallons (i.e., 33 percent of the \$2.10 per thousand gallons first block consumption charge). With this one modification, the proposed rates were approved and adopted by the DOW Board on January 24, 2001, to be effective July 1, 2001 and July 1, 2003. Table 7 and 8 reflect the adopted rate changes.

Table 7
County of Kauai – Department of Water
Adopted Service and Consumption Charges

Monthly Service Charge:

Meter Size	Current	Effective	Effective
		July 1, 2001	July 1, 2003
5/8"	\$6.00	\$9	\$12
3/4"	7.50	12	16
1"	9.00	18	25
1-1/2"	18.00	35	45
2"	30.00	55	75
3"	60.00	100	130
4"	90.00	165	220
6"	187.50	325	430
8"	300.00	520	680

Consumption Charge per 1,000 gallons:

General Use Rate	Current	Effective	Effective
		July 1, 2001	July 1, 2003
1 st Block	\$1.78	2.10	2.76
2 nd Block	1.78	2.40	3.20
3 rd Block	1.78	3.40	4.50
Agricultural Use Rate*			
0 – 25,000 gallons	\$1.78	\$2.10	\$2.76
Over 25,500 gallons	0.60	0.70	1.38

*Gallons used bi-monthly per 1,000 gallons

Table 8
County of Kauai – Department of Water
Adopted Block Thresholds (gallons used per bi-monthly)

Meter Size (inches)	1 st Rate Block	2 nd Rate Block	3 rd Rate Block
5/8"	First 20,000	20,001-40,000	over 40,000
3/4"	First 70,000	70,001-140,000	over 140,000
1"	First 200,000	200,001-400,000	over 400,000
1-1/2"	First 600,000	600,001-1,200,000	over 1,200,000
2"	First 1,200,000	1,200,001-2,400,000	over 2,400,000
3"	First 3,000,000	3,000,001-6,000,000	over 6,000,000
4"	First 6,000,000	6,000,001-12,000,000	over 12,000,000
6"	First 15,000,000	15,000,001-30,000,000	over 30,000,000
8"	First 30,000,000	30,000,001-60,000,000	over 60,000,000