Long Range Financial Plan

SUMMARY

Board of Water Supply
City and County of Honolulu

Water for Life, Ka Wai Ola

MARCH 2018

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This is a summary of the Long Term Financial Plan prepared by the City and County of Honolulu Board of Water Supply, March 2018. The full plan and its companion publications – a Water Master Plan and a 30 year Infrastructure Investment Plan – are available on the Board of Water Supply web site.

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City and County of Honolulu

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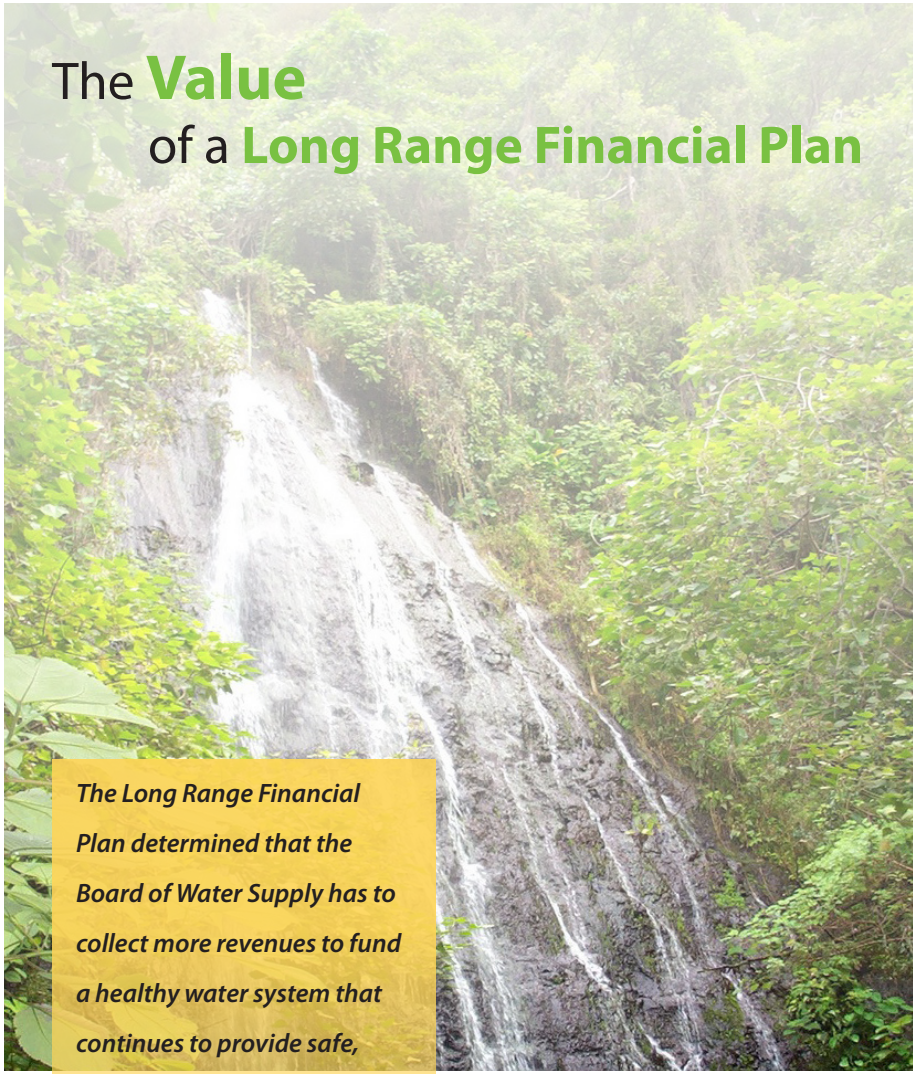
The **Value** of a **Long Range Financial Plan**



The Long Range Financial Plan determined that the Board of Water Supply has to collect more revenues to fund a healthy water system that continues to provide safe, dependable and affordable water now and into the future. Financial modeling showed how to pay for future expenses with only moderate, stable revenue increases over time.

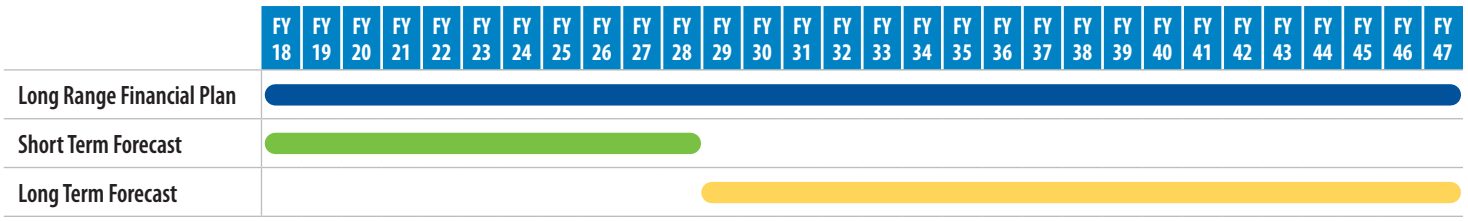
Ka Wai Ola – Water For Life captures the essence of the Honolulu Board of Water Supply's (BWS) responsibility to the community to preserve and protect O'ahu's water resources, as well as its duty to provide safe, dependable and affordable water today and for generations to come.

This duty extends to ensuring that a Long Range Financial Plan is in place to support a large and complex water system, not just for the next few years, but for future generations as well. The BWS has spent more than a year developing a plan to guide how to best pay for annual costs that will run into hundreds of millions of dollars to keep the water system operating efficiently and effectively, to continually repair and replace the system parts, and to expand infrastructure when and where needed to accommodate for growth, system resiliency, drought, and emergency response. The Long Range Financial Plan strives to do all of this while also keeping water rates affordable.

As a prelude to the Long Range Financial Plan, the BWS prepared a Water Master Plan, adopted in 2016, that is guiding decision-making to help sustain a healthy water system for O'ahu. It assessed the condition of the water system's components, estimated future water demands, and outlined projects to address wear, age, growth, and supply sustainability. The planning horizon was set at 30 years, a full generation longer than typical water master plans.

To put the Water Master Plan into action, the BWS also developed a 30-Year Infrastructure Investment Plan that prioritizes the repair and replacement of portions of the water system based on risk assessment. This plan provides an analysis-based strategy as to where and when specific water infrastructure projects should be implemented.

Like the Water Master Plan, the Long Range Financial Plan emphasizes balancing affordability with the BWS's continued stewardship of water resources. The BWS has carefully considered current and future infrastructure needs along with the uncertainties of today's world, like preparing for climate change challenges, anticipating changing demographics, and continuing to satisfy customer expectations.



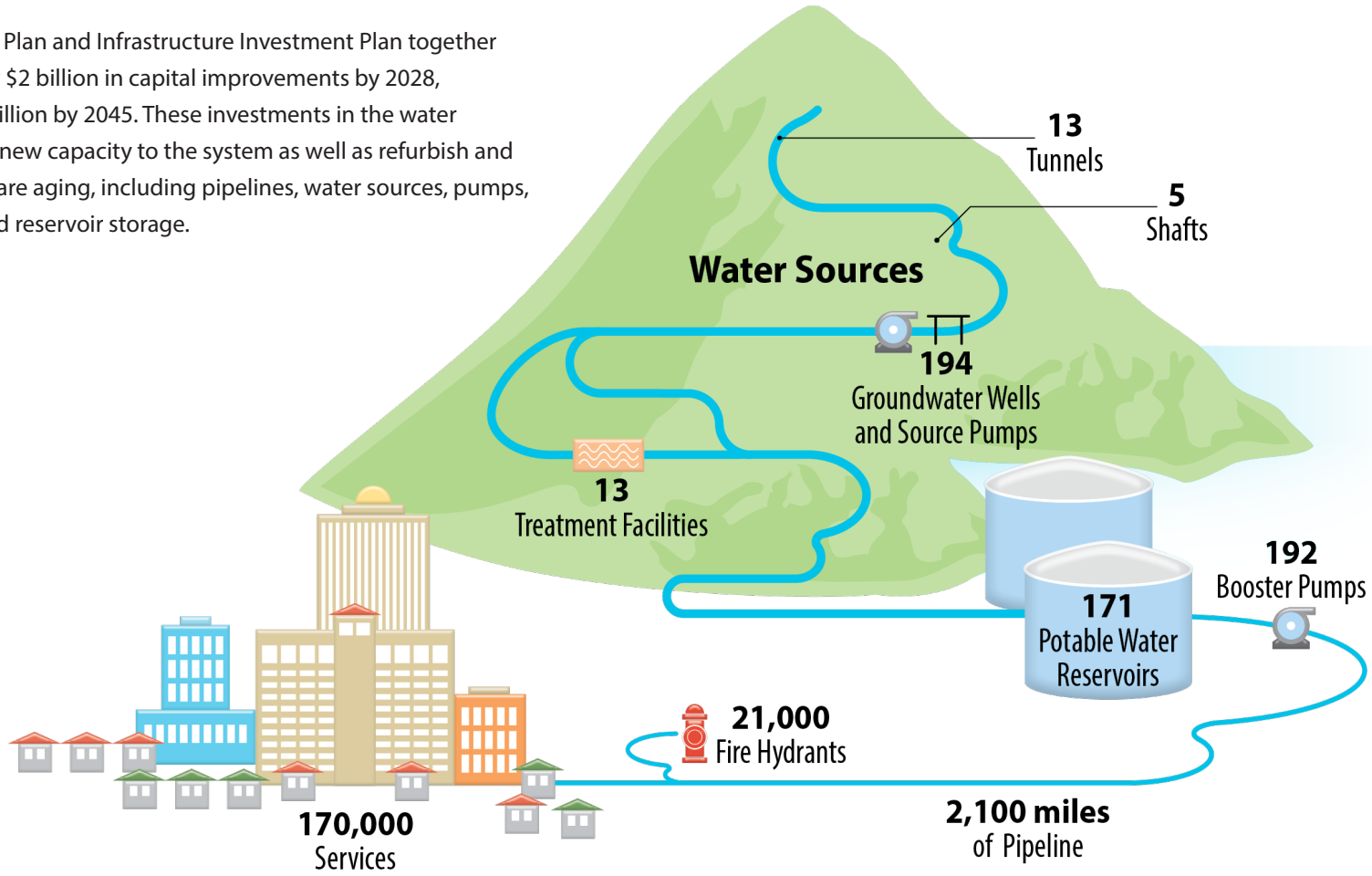
Revenue requirements forecast for the short term –fiscal years 2018 – 2028 – are more detailed, as data are more reliable for the upcoming decade than a 30-year time-span. The long term forecast, which includes assessment of trends and risks, extends to fiscal year 2047. This forecast is less certain, and will be monitored and adjusted over time.

The BWS's **Large** and **Complex** Water System

Since 1929, the Board of Water Supply has built, operated, and maintained a water system that extends island-wide and now serves O'ahu's population of about 1 million people. The system has been built in phases over a century and currently has a replacement value of nearly $16 billion. As one of the largest water systems in the country, it is made up of thousands of individual components or assets that are long lived and require long range planning.

The BWS Water Master Plan and Infrastructure Investment Plan together identify approximately $2 billion in capital improvements by 2028, and an additional $3 billion by 2045. These investments in the water infrastructure will add new capacity to the system as well as refurbish and replace elements that are aging, including pipelines, water sources, pumps, treatment facilities, and reservoir storage.

Continually reinvesting in the system is a responsible and necessary part to being financially sound, where forward-looking plans are not only developed but also implemented. As part of this implementation, the BWS's Long Range Financial Plan will be revisited every 5 years to make sure assumptions reflect current and evolving conditions and knowledge, and that appropriate adjustments are made as needed.



The **Long Range** Financial Plan and Rate Setting

Everything that the Board of Water Supply (BWS) does is paid for through water rates and charges. From time to time, these need to be adjusted to ensure recovery of costs related to conditions that change over the years. Planning for necessary adjustments to water rates is no simple task, and it begins with creating a strong Long Range Financial Plan. Building from the BWS's Water Master Plan, the financial plan identifies revenue requirements needed for 10-year and 30-year planning horizons. The 10-year revenue requirement is the foundation of the rate setting process.

The Three Components of Rate-Setting

Revenue Requirement

The rate setting process starts with determining revenue requirements, in short: How much money is needed? The BWS's current budget for fiscal year 2018 is $311.4 million.

Future revenue requirements were estimated based on anticipated water sales, operations and maintenance costs, infrastructure investment needs, working capital requirements, and future trends and risks.

See page 10 for details on the BWS's 10-Year Revenue Requirement.

Cost of service is the next consideration, rooted in the reality that the cost to provide water varies for each of the different types of BWS customer: single-family residential, multi-unit residential, non-residential, agricultural, non-potable, and recycled water. The cost to deliver the same amount of water to residential customers is more than for most other customers. That is because more infrastructure and electricity are necessary to provide water during peak demand periods to residential customers in the morning and late afternoon/ evening, which drives capital and operational costs higher.

Single-family residential, agricultural, recycled water and non-potable water customers currently pay less than their cost of service. Multi-unit residential and non-residential customers pay more than the cost of service.

Rate design is the third step. This begins by establishing rate objectives, a process that involved the BWS Stakeholder Advisory Group.

Objectives included that rates must:

- Be legal, fair and equitable.
- Be understandable and affordable.
- Recover the full cost of water.
- Support credit strength.
- Remain stable and predictable.
- Encourage conservation.

Extensive financial modeling analyzed how to best balance the need for additional revenue with the needs for system reliability and overall affordability.

Rates for the different customer classes were proposed in Spring of 2018 and are currently under consideration.

Infrastructure Investments (Fiscal Years 2018 – 2028)

The Board of Water Supply (BWS) developed cost estimates for infrastructure projects that are included in 6-Year, 10-Year and 30-Year Infrastructure Investment Plans. The infrastructure projects include many that will expand the capacity of the water system so that the BWS can meet increasing demands as the population grows. They also include projects that maintain as well as replace parts of the existing water system to ensure that the BWS can provide a continuously high level of service to its customers.

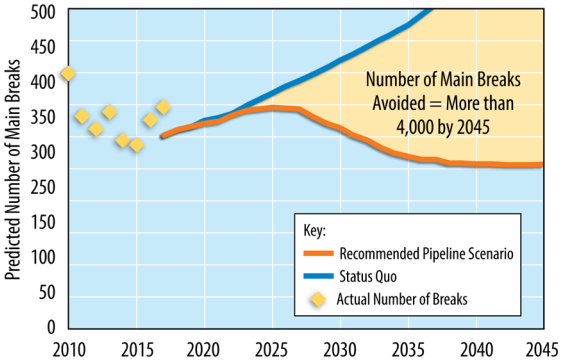
An important question that impacts the cost of future infrastructure investments is: **What level of service, including the frequency of water main breaks, is acceptable?**

This was addressed in the Water Master Plan by developing a scorecard system that enables the BWS to track and report progress on sustaining the health of the system and schedule necessary improvements.

Some system components have flexibility in scheduling of projects – like when and how many pipelines to replace. An extensive study of the effect of replacing more high-risk pipelines sooner found that this approach could reduce the number of main breaks significantly.

The study analyzed pipeline alternatives and considered these key factors among many:

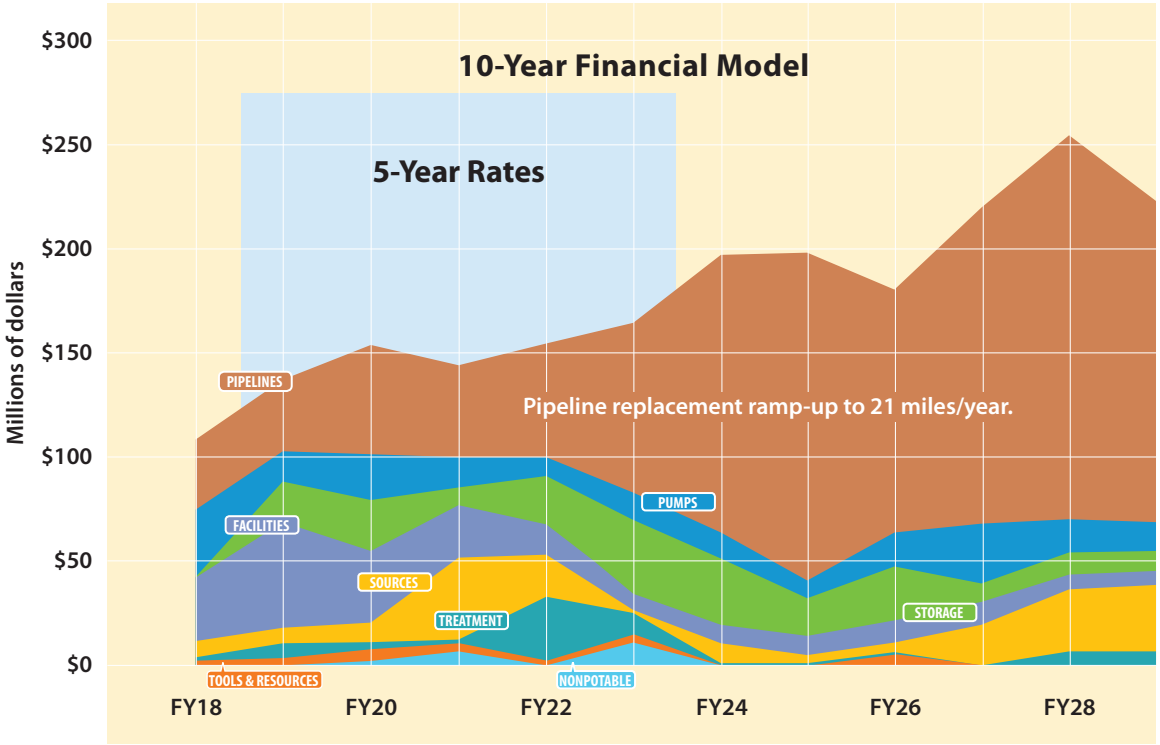
- Number of miles of pipeline replaced and costs.
- Number of water main breaks that would likely be prevented.
- Changes in cumulative costs and the amounts of bonds that would need to be issued.
- Alternatives' alignment with goals of the Water Master Plan.
- Feasibility of implementation.
- How much the alternatives shift cost burdens to future generations through the use of debt.



Annually replacing 21 miles of pipeline is recommended to reduce main breaks.

The analysis led to a critically important decision to ramp up the amount of pipelines replaced annually, from 6 miles in 2017 to 21 miles per year within 10 years. This investment in replacing high-risk, aging pipelines can potentially prevent 4,000 water main breaks by 2045. (see above)

10-Year Infrastructure Investment Cost Projection through FY 2028 ($M)



The chart above shows costs projected for the next 10 years of infrastructure investments. Increased pipeline replacement is the largest element of the capital costs and drives larger Infrastructure Investment Plans going forward.

In addition to meeting the needs of renewing the existing sytem, the BWS must also address growth. Growth-related projects must be completed at certain times, before they are needed to meet rising demands for more water. These projects include new water sources, pumps, and reservoirs for storage.

Operating Expenses (Fiscal Years 2018 – 2028)

The Board of Water Supply's (BWS) water system is one of the largest in the country. Operating and maintaining (O&M) takes hundreds of employees working in shifts around the clock to keep the system healthy and delivering safe, dependable, and affordable water to 1 million people. The annual O&M budgets reflect employees' salaries and benefits, materials and supplies to service and maintain the system, equipment, and outside services.

The Long Range Financial Plan included 10-year and 30-year analyses and projections of future operating expenses. Future O&M cost projections were impacted by several factors, including:

- Increasing the amount of annual pipeline leak detection from 18 percent to 25 percent of the 2,100-mile system.
- Increasing the BWS's technology capabilities.
- Increasing staff and services to implement a larger Infrastructure Investment Plan.

An estimated escalation of 3.5 percent was included in projected expenses because all costs are expected to rise from inflation and other economic drivers.

Forecasting Operating Costs through FY 2028 ($M)

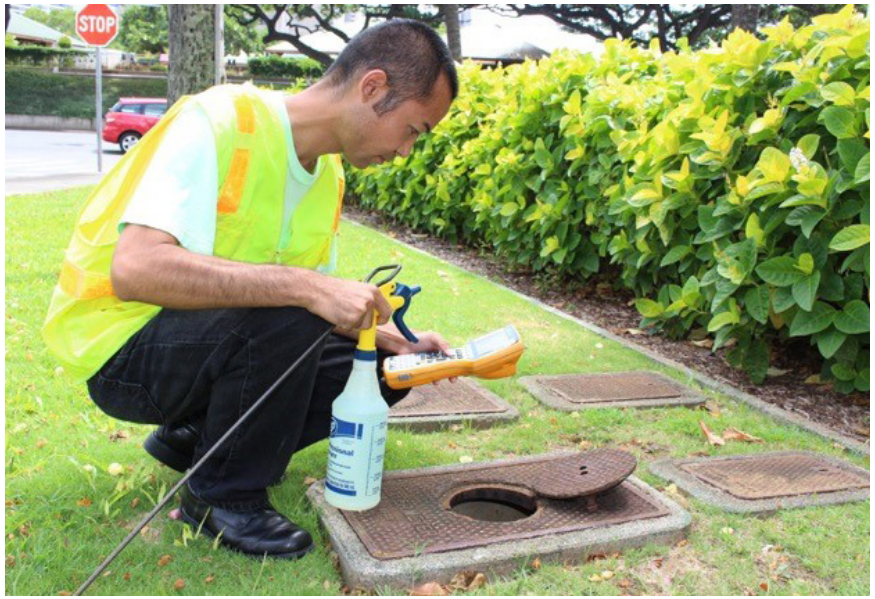
Line Item	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Personnel Services	$39.2	$42.4	$43.8	$45.1	$46.3	$47.5	$48.3	$48.9	$49.2	$50.0	$51.4
Materials, Supplies, & Services	$51.6	$50.9	$53.0	$55.8	$59.9	$64.3	$67.0	$71.7	$76.5	$80.6	$84.7
Equipment	$4.6	$2.7	$2.7	$2.9	$3.3	$3.6	$3.8	$3.7	$4.0	$5.3	$5.5
Fixed Charges	$41.4	$42.3	$43.4	$44.5	$45.7	$46.8	$48.1	$49.3	$50.6	$52.0	$53.2
CIP Implementation Allowance	$0.0	$0.8	$1.0	$0.9	$1.2	$1.1	$1.3	$1.4	$1.3	$1.6	$2.0
Total [1]	$137	$139	$144	$149	$156	$163	$168	$175	$182	$190	$197

[1] Does not include future debt service.

These projections are not the same as annual O&M budgets. The BWS typically spends less than its approved budget limit. Future cost estimating was set at 85% of the annual budget so that the financial planning process did not overestimate actual revenue requirements.

Building Blocks of the 10-Year Revenue Requirement

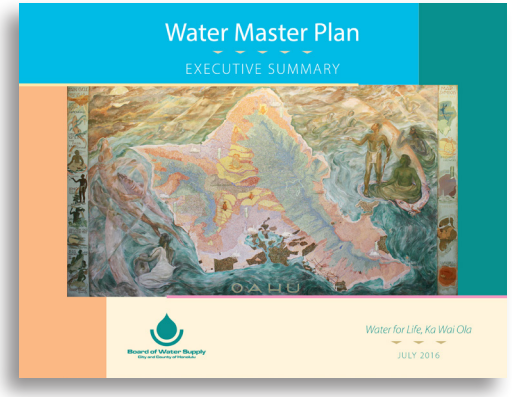
The 10-year Infrastructure Investment projection (page 7), the 10-year Operating Costs forecast (table above) and a financing strategy are the core building blocks of the BWS's 10-Year Revenue Requirement (see Funding the Implementation of the Water Master Plan, page 10). Extensive work went into developing these critical elements in the Long Range Financial Plan. That work involved every division of the BWS contributing their visions and historical data to determine a sound 10-Year Revenue Requirement, which is the foundation for setting rates.



Reading water meters is a core BWS operating function.

Funding the **Implementation** of the Water Master Plan

The Board of Water Supply (BWS) has already begun implementing the Water Master Plan. Over the next 10 years, more than 450 projects that are vital to the future of the water system, estimated to cost approximately $2 billion, will be designed, built, and placed into service to benefit our customers. The annual cost of operating the system is expected to rise to nearly $200 million per year by fiscal year 2028 (see page 9).



The fundamental question that the Long Range Financial Plan addresses is – *How do we pay for this?*

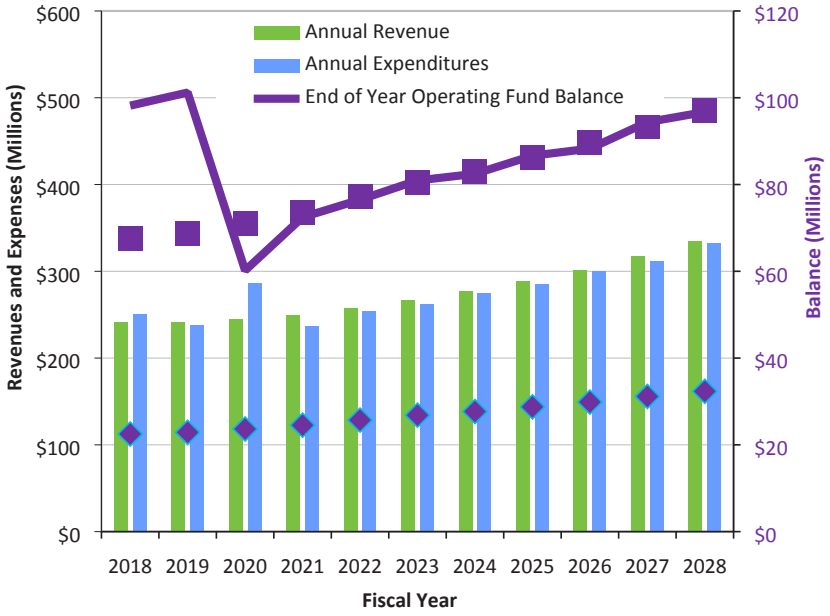
The process of coming up with the answer has been quite rigorous. The key step was to determine the net 10-year revenue requirement. Drivers to determine the 10-year revenue requirement are as follows:

- Operating and Maintenance Costs: BWS division and staff office managers projected 10-year O&M budgets, including additional staffing to implement the larger Infrastructure Investment Plan, IT support systems, conservation and watershed management programs.
- Infrastructure Investment Plan: The next driver of the 10-year revenue requirement is the costs associated with delivering high priority infrastructure projects planned for fiscal year (FY) 2018 – FY 2028. These projects include ramping up to 21 miles of pipeline replacement per year.
- Financing Strategy: Updating financial policies in 2017 supports using a combination of approximately 50 percent cash and 50 percent debt (mostly through issuing bonds) to pay for capital costs, which helps make the program more affordable for our customers.

Through the process of financial modeling, the BWS analyzed numerous possible funding scenarios with objectives that focus on affordability, equitable distribution of costs to customers for generations to come, alignment with the life of the assets, and gradual increases to revenue requirements.

The BWS Board and the Stakeholder Advisory Group reccommended a funding scenario that would gradually and minimally increase revenue adjustments year to year.

Preferred Funding Approach



Timing when and how much to issue bonds will allow the BWS to keep revenue requirements smooth and gradual over the 10-year timespan. Each pair of blue and green bars above show the revenues to be collected (green) and the expenses planned (blue) for any given fiscal year. Annual revenue includes projected revenue increases. The purple squares show the amounts of cash on hand needed to fund 180 days of operations. The purple line shows the BWS's projected operating fund balance, which has a target of 180 days of operating expenses as cash on hand.

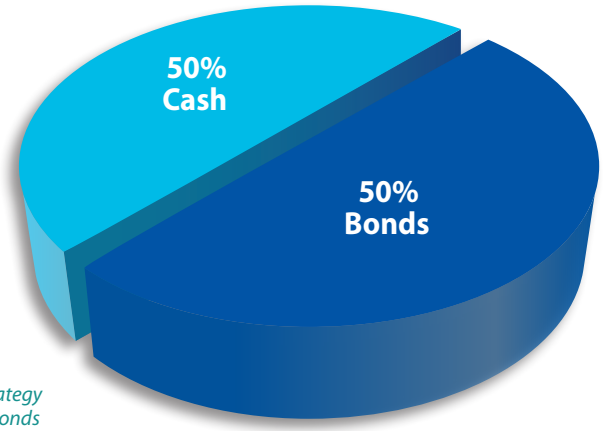
The preferred approach to funding the next 10 years of implementing the Water Master Plan is:

- Use cash and bonds to fund the investments.
- Issue approximately $900 million in bonds, in amounts timed for when and how much funding is needed.
- Balance cash and bond funding with carefully budgeted yearly expenditures (see chart on page 10) to smoothly cover all of the revenue needs, maintain 180 days of working capital, and gradually increase annual revenue adjustments from 0 to 5.5 percent over 10 years.

Important Findings of Financial Modeling

Financial modeling also revealed important information to take into account how to fund the implementation of the Water Master Plan:

- Putting off a rate increase at this time would jeopardize the BWS's ability to sustain and prepare the water system for the next generation.
- Without increasing revenues to fund additional water main replacement, main breaks can be expected to increase over the coming years.
- Using cash-only to pay for planned projects would place the $2 billion-financial burden on today's customers, even though the facilities will be in operation for many generations.
- The cash-only approach also causes the amount of revenues the BWS would need to collect each year to fluctuate too high and too much. Some years, the money collected through water bills (revenues) wouldn't have to increase at all from the previous year. But in other years, the increase could spike to as much as 25 percent. That degree of fluctuation is not stable, and is not good for customers or the BWS.
- Paying with cash only results in a 188 percent cumulative increase in 10 years of revenue adjustments. When funding with both cash and bonds, the cumulative increase is only 44 percent.



Financing Strategy of Cash and Bonds

Revenue vs. Rate Adjustments

The preferred funding scenario would have revenue adjustments that range from 0 to 5.5 percent annually between fiscal years 2018 – 2028. That is not the same thing as percentage increases in water rates. Rate setting begins with determining the revenue requirement, and then adds consideration of the cost of service and rate design (e.g., tiers) for the different customer classes (see Long Range Financial Plan and Rate Setting, page 5).

Considerable time and attention went into crafting the financial policy for Working Capital, which sets the level of cash on hand to cover expenses and continue service following unforeseen events, including natural disasters and maintaining the BWS's credit rating. The updated financial policy establishes a target of 180 days Working Capital, to be reached gradually over 10 years. In effect, this is a safety net - emergency fund that is invested, but can be readily accessed when needed. The policy reflects input from the Stakeholder Advisory Group considering O'ahu's remote location and limited accessibility, research on the history of major disasters in Hawai'i, and an assessment of how other water agencies addressed recovering from major hurricanes like Iniki and Katrina.

The Purpose of **Sound** Financial Policies

The Board of Water Supply's (BWS) financial policies define limits and principles – the amount of cash kept on hand, when and why to borrow money, how much can be borrowed, and the ability to make payments on bonds.

The BWS's strong financial policies:

- Form the basis for the Long Range Financial Plan and Rate Study.
- Position the BWS to maintain high bond ratings that allow it to borrow at lower rates.
- Provide a cushion for rate stabilization.
- Help ensure sufficient cash to address damage from natural disasters, like hurricanes, earthquakes and tsunamis.

The BWS Board unanimously approved updated financial policies in May 2017. By deciding to pay for long-lived infrastructure using approximately 50 percent cash and 50 percent bonds, future costs will be spread across generations. Like a mortgage on a home, bonds help reduce annual revenue requirements, and in turn, help to reduce and stabilize rates for customers.

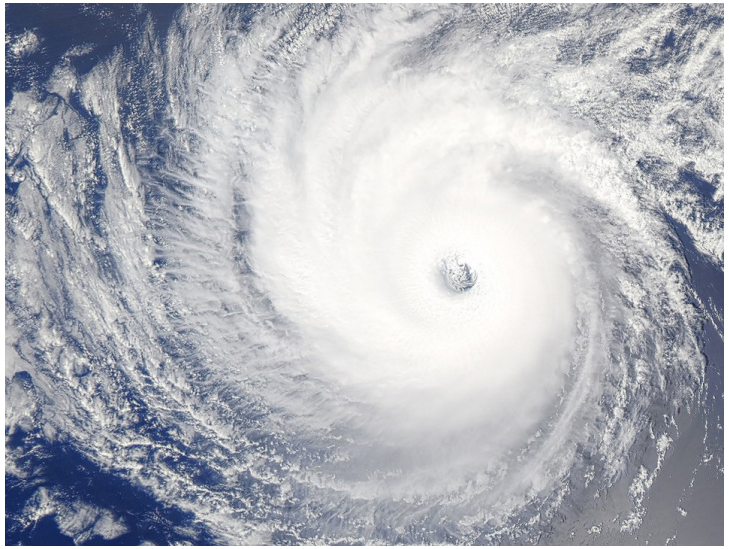
The BWS's Financial Policies (Updated 2017)

Working Capital ***(Amount of Cash on Hand)***

- Target having enough cash on hand to fund 180 days of operations, and never have less than 60 days.
- Cover disasters and unforeseen circumstances.
- Keep enough cash on hand to provide some rate stabilization when needed.
- Any accumulated funds – over the target of 180 days cash on hand – may be used to fund the Infrastructure Investment Plan.

Purposes and Uses of Debt ***(When and Why to Borrow)***

- To select the most economical financing sources (get the best deal for customers).



The BWS's Working Capital Financial Policy was updated, in part, to keep up to 180 days of cash on hand to respond to emergencies.

- Debt cannot be borrowed for longer than the life of the infrastructure it is funding.
- Debt cannot be used to fund operations and maintenance.
- Limit any variable borrowing rate to 20 percent or less.

Debt to Net Assets Ratio ***(How Much Can be Borrowed)***

- Limit the debt-to-net assets ratio to 50 percent or less.
- This financial policy limits the amount of money that can be borrowed (debt) to 50 percent of the value of the water system (assets). The total value of the system today is approximately $16 billion. The BWS could borrow as much as $5.5 billion (debt), a figure that will increase over time as the value of the system (assets) increases with infrastructure investments.

Debt Service Coverage Ratio ***(Ability to Make Loan Payments)***

- Limit senior debt service to 1.7x.
- Limit total annual debt service "all in" to 1.6x.

Planning for **Uncertainties** In Future Decades (Fiscal Years 2029 – 2047)

The only thing that is certain about any plan that looks 30 years ahead is that, in 30 years, things will be different from what had been planned. This is an inevitable result of uncertainties. For this reason, it is very important to identify uncertainties, evaluate their potential impacts, and incorporate strategies to mitigate them. The Long Range Financial Plan analyzed how to prepare financially for these important trends, risks, and uncertainties. Highlights are shown to the right.

Long Range Financial Strategies

The BWS has developed financial strategies that could mitigate impacts of future events that are uncertain (e.g., economic downturn) or that will become much more specific in the years ahead (e.g., climate change). The applicable financial strategies are identified for each of the six major types of uncertainties analyzed, and are described below.

Access working capital

Funds up to 180 days of operating expenses (working capital) is readily available to use for unanticipated emergencies or natural disasters.

Defer expenses

Funds that were planned for infrastructure investments could be saved by deferring planned projects until a later time.

Raise or restructure rates

Following the due rate-setting process, rates could be raised and/or restructured if necessary.

Issue debt

Within the limits of financial policies, the BWS could issue additional bonds if needed.

Public private partnerships

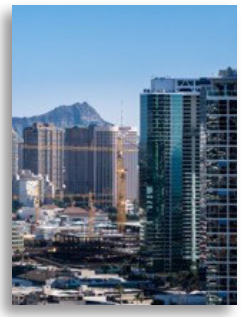
Funds can be saved through forging public private partnerships to jointly respond to the unplanned event.

Aggressive Conservation

The possible scenario: The Water Master Plan recommends pursuing conservation, reducing consumption from 155 gallons per capita per day to 145 gallons. If customers conserve even more than that, the revenues collected by the BWS would decrease below what is needed. Other states, like California, have experienced this situation as long droughts forced customers to conserve water more than the water utilities had planned, and forced the utilities to raise rates.

Financial readiness: *If the BWS finds itself in the same position, financial options include deferring some projects, as there may not be the need for as many new facilities to support growth. Rates may need to be restructured or raised. Another option would be to issue more debt (bonds) to finance a greater portion of the capital program, pushing those costs further out into the future.*

Aggressive Growth



The possible scenario: The Water Master Plan analyzed for planned population growth and determined that demand for more water will increase by 0.2 – 0.5 percent each year. If aggressive growth increases the demand for water more than that, the revenues from water sales collected by the BWS would also increase. But significantly higher demand could trigger the need to build additional water infrastructure sooner than scheduled.

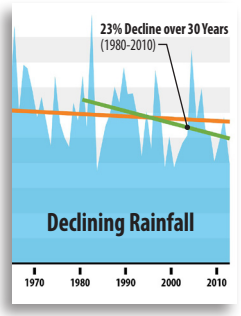
Financial readiness: *Revenues collected from increased water sales would help offset the BWS's higher operations and maintenance costs. Less certain would be the timing and location of the needed infrastructure to respond to aggressive growth. The BWS collects fees and charges to pay for the infrastructure that serves new development. If these charges or developers' other contributions to the water system were not enough to cover the unanticipated infrastructure costs, the BWS could issue debt. Accessing working capital could provide short-term financing. The BWS also has the option to raise or restructure rates to recover higher expenses.*

Major Natural Disaster

The possible scenario: A major hurricane or other natural disaster could damage the water system and lead to lost revenues while the island recovered. Research of how other water utilities addressed recovery from hurricanes showed that damage to infrastructure ran into the tens of millions of dollars, and revenue losses continued for up to a full year.

Financial readiness: *One of the reasons the BWS is keeping up to 180 days of working capital on hand is to be prepared for an event such as this. In addition to accessing working capital, some planned expenses could be deferred, debt could be issued, and public private partnerships would be forged to aid recovery through combining resources.*

Climate Change



The possible scenario: Climate change research shows that potential impacts include rising seawater levels that can threaten infrastructure in low lying areas closer to the coast, increasing seawater infiltration into fresh water aquifers, and decreasing rainfall to replenishing the island's aquifers. Knowing these potential impacts helps the BWS prepare. This includes identifying the areas most vulnerable, prioritizing water sources and replacements, and implementing strategies to adapt. Additional sources of fresh water would be needed to replace failing groundwater sources. Conservation could become mandatory. As sea levels rise and groundwater becomes saline, water infrastructure may deteriorate more quickly and need to be replaced sooner than planned. A quarter of the BWS's pipelines and other infrastructure are located in low-lying areas and close enough to the coast to be impacted, potentially cutting their useful life in half.

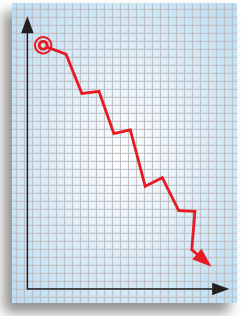
Financial readiness: *Depending on the situation, the BWS would be able to access the 180 days of working capital to address potential short term needs. Long term strategies would include raising or restructuring rates, issuing debt (bonds), and/or pursuing public private partnerships.*

Major Water Source Contamination

The possible scenario: A major aquifer water source – one that produces approximately 10 million gallons of water daily – could be contaminated by a sudden leak or by long-term legacy land use. Costs to develop a treatment solution or to construct a new replacement well(s) and accompanying pipeline would range from $30 million to more than $1 billion. Operating costs could increase up to $3 million annually. Monitoring its water resources is a core BWS responsibility, and it conducts thousands of water quality tests annually.

Financial readiness: *It is possible that the BWS would have to deploy all available financial strategies to deal with a major contamination of an important aquifer. The strategies include accessing working capital, deferring expenses, raising rates, issuing debt, and developing public private partnerships.*

Economic Downturn



The possible scenario: O'ahu could experience another economic downturn similar to the 18-month Great Recession during 2008 -- 2009. During the Great Recession, Hawai'i's Gross Domestic Product (GDP) dropped about 4%. The revenues collected by the BWS began to decline after 2009, and that decline continued for the next five years. The GDP rebounded in 2010 and continues to remain on track today. Economic cycles' impact on BWS finances is complex and the BWS closely monitors factors like the costs of borrowing money, construction market conditions, and others. Under consideration is having some projects "construction ready" and to release them for construction when market conditions are favorable.

Financial Readiness: *Accessing working capital would help the BWS weather an economic downturn similar to the Great Recession. Issuing debt (bonds) would be an option to provide needed funding. Deferring expenses by delaying scheduled projects, is not recommended as a long term financial strategy for an economic downturn because that could jeopardize the BWS's planned projects that have been prioritized based on risk assessments.*

The **Bottom** Line

The Long Range Financial Plan is the policy document that establishes financial strategies, helping the Board of Water Supply (BWS) implement its Water Master Plan. Key findings are shown below:

The Next **10 Years** (Fiscal Years 2018 – 2028)

- The annual cost of operating and maintaining the BWS's water system will increase from $137 million to $197 million (in escalated dollars).
- The annual cost for new infrastructure and for replacing and/or refurbishing the existing system will increase from $144 million to a peak of $255 million (in 2017 dollars).
- Pipeline replacement will ramp up from 6 to 21 miles per year over this period. Over time, the number of water main breaks is anticipated to decrease substantially as a result of replacing more high-risk pipelines – avoiding as many as 4,000 breaks by 2045.
- Borrowing money, both through State Revolving Fund and by issuing bonds, to finance a large part of our infrastructure costs will help the BWS keep water rates affordable.
- Financial modeling showed that issuing about $900 million in bonds over this 10-year period, compared to funding using cash only, produces vastly different results. Paying with cash only results in a 188 percent cumulative increase in revenue adjustments. Compare that to only 44 percent when funding with both cash and bonds.

The **Decades After** (Fiscal Years 2029 – 2047)

- The annual cost of operating and maintaining the BWS water system is expected to escalate at an average rate of 3.5 percent throughout the long term period.
- As pipeline replacement stabilizes at 21 miles per year continuously, annual investments in infrastructure are expected to stabilize at $180 million to $200 million (in 2017 dollars).
- Taking escalation into account, the total revenue requirement in fiscal year 2047 is anticipated to exceed $800 million, more than three times today's figure.
- The BWS is anticipating the need for annual revenue increases between 4.5 percent and 6 percent through the long term period.
- The BWS has strategies in place to successfully respond to future uncertainties and risks to financial security that could include aggressive conservation, aggressive growth, natural disaster, major contamination of a significant water source, climate change and economic downturn.

About the Cover

Pure Water – Man's Greatest Need, 1958 - Juliette May Frasier

A large, richly colored mural spans the walls behind the customer service counter in the lobby of the Board of Water Supply (BWS) Public Service Building. According to a pamphlet describing architectural and artistic features on the BWS Beretania campus, the mural depicts agricultural activities on O'ahu, from pre-contact to the 20th century. A section of the mural was selected to adorn the cover of this Infrastructure Investment Plan.

Juliette May Frasier was born in Honolulu in 1887. After graduating from Wellesley College with an arts degree, she returned to Hawai'i to teach art.

Board of Water Supply
City and County of Honolulu