

Water Master Plan Quarterly Update

Safe, dependable, and affordable water now and into the future



Board of Water Supply
City and County of Honolulu

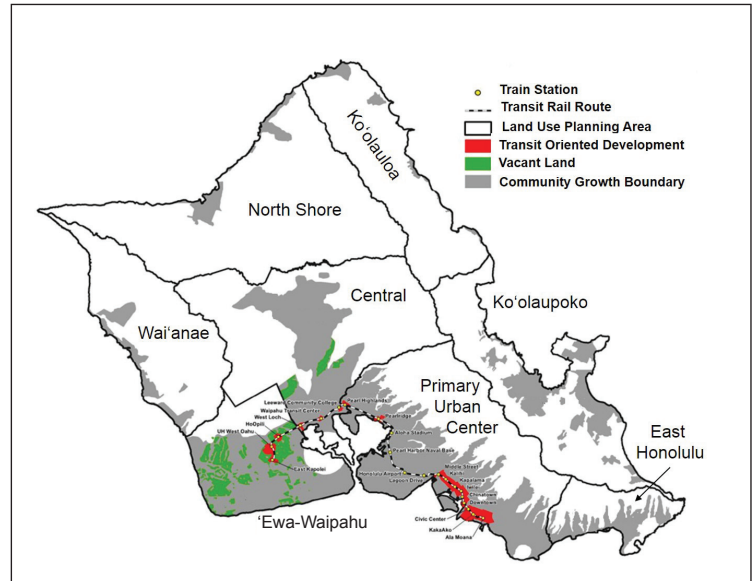
Volume 2 • Issue 2 • June 2016

A Lens Into the Future

Looking Ahead

An important part of the BWS Water Master Plan (WMP) is the Water System Analysis (WSA), which assesses the water system's ability to provide safe and dependable water throughout the 30-year planning period of the WMP. The WSA combines water system data with population forecasts and projections for customers' water use around the island. The evaluation tells us when and where the existing system will need improvements to meet the future demands of a growing population.

Combined with technical studies and research, engineering review and evaluation, the WSA provides a lens into the future. One component of the WSA is a computerized hydraulic model that integrates these and other details to identify gaps in the BWS water system.



Population growth projections reflect land use within planning areas established by the Honolulu Department of Planning and Permitting.

The Draft Water Master Plan is approximately 85% complete. A public draft will be ready this summer.

Looking Beyond Infrastructure

Now that we know the likely magnitude and locations of new demands, the next step is to consider the options, timing, and best solutions to increase water supplies where they are needed. In keeping with our commitment to diversified and resilient solutions, the BWS will also be looking at non-infrastructure alternatives to bridge the gaps between demand and supply.

Some possibilities include:

CONSERVE
Reduce water demands in growing areas with advanced conservation measures such as ultra-efficient plumbing, sub-meters, rain catchment.

RECHARGE
Reinforce watershed partnerships; capture stormwater at Nu'uuanu dams for aquifer recharge.

REUSE
Satellite recycled treatment plant for irrigation of Ala Wai Golf Course will offset use of potable water.

The BWS Hydraulic Model Makes Data Come to Life

Hydraulic models are used to analyze the system for flows, water pressures, and reservoir tank-refill cycles. The data we get back from the model helps us understand what will happen in the future as the population grows and determine how best to meet the projected conditions.

The BWS Hydraulic Modelling Team used computer software to create a powerful model that makes thousands of data points come to life and realistically simulate how the existing water system works, and – more importantly – assess how facilities will perform in the future under a variety of real-life scenarios. This sophisticated tool has enabled the WMP team to make reliable recommendations for capital improvement projects for the near-term and far into the future.

Good Data In ...

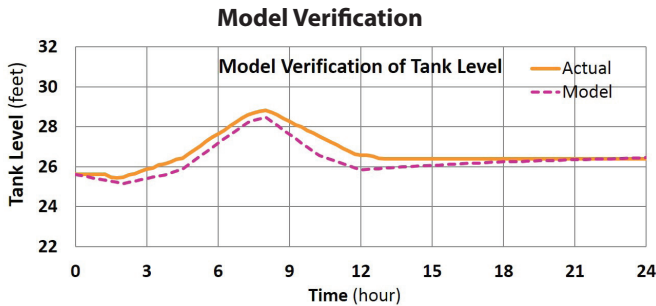
The Hydraulic Modelling Team used extensive, detailed data about the water system as “inputs” for the model.

Data inputs included accurate features of water infrastructure and their use, including:

- ▶ Pipes – diameters, lengths, elevations, materials, and ages
- ▶ Pump stations – size of each pump, what controls on/off e.g. pressure downstream
- ▶ Reservoirs – locations and elevations, sizes
- ▶ Tunnel and shaft configurations
- ▶ Historical customer billing records and customer meter locations
- ▶ Average water demands and daily patterns in water use (that differ by land use type)

continued on page 2

continued from *The BWS Hydraulic Model*, page 1



The model's accuracy for the BWS's water system facilities was verified against real-life data. The figure above shows how closely actual measurements compare to computer-generated results from the hydraulic model.

Good Data Out ...

Data "outputs" include information that demonstrates how the system would operate under different future scenarios. That information includes pressures throughout the entire system, reservoir levels, flow velocities, and much more. Because the hydraulic model is highly detailed, thorough, and accurate, water master planners know they can trust the data outputs to be the basis for developing long-range solutions.

The Bottom Line

The WMP team used the computer model to show how much and where needs in the water system would occur in current and 2040 scenarios.



The Hydraulic Modelling team built the program that helped analyze our water system so the BWS can assess our future needs. Pictured left to right: Lyann Okada, Tony Shing, Tom Otaguro, James Kim, Ann Wong, Oryn Nakamura, Isaac Hayashi, and Janelle Sebastian. Not in photo: Youssif Hussein, Sandy Anderson, Shilpa Shivakumar.

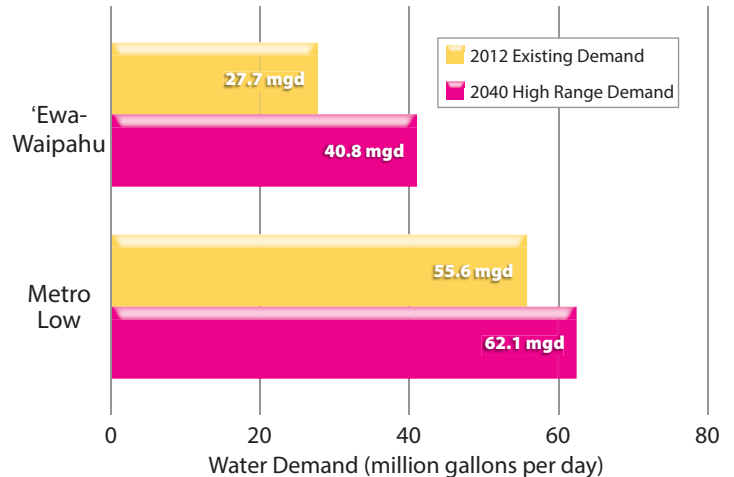
The WMP team then ran proposed infrastructure changes/additions through the model to see if they worked to solve the deficiencies. The hydraulic model enables the WMP team to make sound, water system improvement recommendations to meet the current and future needs of the water system.

continued from *A Lens Into the Future*, page 1

Bridging the Gap

The WMP anticipates that the largest gaps between supply and demand will develop in 'Ewa-Waipahu and Metro Low (lower elevation portion of the Primary Urban Center). Increased demand will be driven by new development and aggregated population along new transportation nodes (Transit Oriented Development or TOD).

2040 High Demand Estimates for 'Ewa-Waipahu and Metro Low Water Systems



Water demand is anticipated to both decrease and increase across the island. The greatest increase is projected for 'Ewa-Waipahu and Metro Low. Future conditions are based on high-range demands for 2040.

The 'Ewa-Waipahu system's water use is expected to increase from 27.7 million gallons per day (mgd) in 2012 to 40.8 mgd in 2040. System changes to deliver this increase include new storage, pipelines, and wells. The BWS is also planning for expansion of the recycled water system and new desalination facilities, to diversify supplies.

The Metro Low system includes downtown Honolulu, Waikiki and Hawai'i Kai, and represents about 38 percent of island-wide demand. The Metro Low system's water use is expected to increase from 55.6 mgd in 2012 to 62.1 mgd in 2040. Potential changes include developing new local groundwater sources, increasing transfers into the area, more aggressive conservation (particularly for new developments), and diversifying supplies. New pipelines are proposed within the system.



Board of Water Supply
City and County of Honolulu