



Honolulu Board of Water Supply Stakeholder Advisory Group

Meeting 13 – Tues. March 14, 2017 4:00 to 6:30 pm
Neal S. Blaisdell Center, Hawai'i Suites
777 Ward Avenue, Honolulu, HI 96812

Meeting Notes

PURPOSE AND ORGANIZATION OF MEETING NOTES

The purpose of these notes is to provide an overview of the Board of Water Supply (BWS) Stakeholder Advisory Group meeting. They are not intended as a transcript or as minutes. Major points of the presentations are summarized herein, primarily for context. Copies of presentation materials were provided to all participants and are available on the BWS website. Participants made many comments and asked many questions during the meeting. These are paraphrased to be more concise.

ATTENDEES

There were 15 stakeholders present, in addition to staff members from the BWS and CDM Smith. The stakeholders represent diverse interests and communities island-wide.

The following Stakeholders Advisory Group members attended:

Mark Fox	The Nature Conservancy
Tim Brauer	James Campbell Company LLC
Neil Hannahs	Commission on Water Resources Management
Shari Ishikawa	Hawaiian Electric Co.
Micah Kāne	Hawai'i Community Foundation
Will Kane	Mililani Town Association
Gladys Marrone	Building Industry Association of Hawai'i
Helen Nakano	Resident of City Council District 5
Robbie Nicholas	Resident of City Council District 3
Dean Okimoto	Nalo Farms Inc.
Bob Leinau	Resident of Council District 2
Cynthia Rezentes	Resident of Council District 1
Josh Stanbro	Hawai'i Community Foundation
Cruz Vina Jr.	Resident of Council District 8
Christopher Wong	Resident of City Council District 7

MEETING AGENDA

- Welcome
- Public Comment on Agenda
- BWS Updates
- Accept Notes from Meetings 11 and 12
- Correlation of Pipeline Repairs and Main Breaks, including Costs
- Evaluation of Financial Policies on Revenue Requirement
- Summary and Next Steps

WELCOME

Dave Ebersold, meeting facilitator and Vice President of CDM Smith, welcomed the group and introduced Tim Brauer, President and CEO of James Campbell Company LLC, the newest stakeholder to join the group.

Dave reviewed the meeting objectives, which included the continuation of a discussion carried over from Meeting 12 about main breaks and pipeline repairs. He also said he hoped the group would reach consensus on straw man financial policies.

In response to questions raised at Meeting 12 in February 2017, Dave said that the BWS staff researched information regarding the quantity of water that is being bottled and sold by companies located on-island. Results were:

Used for bottled water	46,403,000 gallons per year (equivalent to 0.09% of BWS's total and would serve a population of approximately 820 people)
Used for soft drinks and breweries	63,323,000 gallons per year (equivalent to 0.12% of BWS's total and would serve a population of approximately 1,119 people)
Total BWS water produced	52,231,500,000 gallons per year

QUESTIONS AND ANSWERS

Q. How does BWS charge these customers?

A. All non-residential customers, the commercial customers, pay the same rate. This topic will be discussed more when we get to the rates process.

PUBLIC COMMENT ON AGENDA ITEMS

None.

ACCEPTANCE OF NOTES FROM MEETINGS 11 AND 12

Both sets of meeting notes were accepted without changes.

BWS UPDATES

Ernest Lau, BWS Manager and Chief Engineer, greeted the group and welcomed Tim Brauer. He thanked the stakeholders, and recognized how valuable their input and involvement has been to this process.

Ernest said that, in recent citywide discussions, a suggestion was made that the BWS waive connection fees for new affordable housing. Ernest said the BWS is supportive of community issues like this, but at the same time, we financially depend on the revenues from people paying their water bills, and other charges for water service. Whenever a fee waiver is granted for a certain group of customers (like affordable housing), the other customers have to pay a bit more so BWS can continue to provide everyone with water. For example, the BWS currently charges a lower (subsidized) water rate for agricultural customers, and other customers pay a little more for that valued subsidy.

Ernest reported that the Mayor also recently proposed a new trash collection fee that would be added to the Department of Environmental Services (ENV) portion of our water/wastewater bills. BWS is tasked to do the wastewater services billing and collections for ENV. The combined billing has been a source of confusion for BWS customers. Adding a trash collection fee could increase the confusion and challenges.

Ernest briefed stakeholders on a final update about lead found in the soil in an area near Kalihi, in the vicinity of Factory, King, and Waterhouse streets. The Department of Health found lead levels to be pretty high. Coincidentally, the BWS has a water line replacement project in this same area. Around August 2016, we were informed about the high lead levels. We adjusted our construction project to avoid replacing water lines in this area until we could determine how to do it safely and how to properly handle soil that might be contaminated with lead. A report from the EPA and Department of Health indicates the environmental action limit is about 200 milligrams per kilogram. The highest levels found in soil were significantly more. There is no indication that water supplies have been impacted.

Ernest said that the BWS operates a fully pressurized water system, but out of an abundance of caution, we're sampling at the taps of some of our customers within this area, just to see if they might have been impacted by lead in the soil. We're also taking some samples at the source.

In the old days, installers used lead solder, so that's why the EPA and Department of Health require BWS to conduct tests for lead and copper. We are fortunate in Hawai'i and on O'ahu particularly, where our water supply has a stable pH and is entirely groundwater-based.

QUESTIONS AND ANSWERS

Q. Does the BWS have a service fee?

A. Yes. We have a billing service charge.

Q. Has there been any recent progress about allowing customers to use gray water from their dishwashers, washing machines, etc. on their lawns.

A. Josh Stanbro explained that there is a bill at the legislature that would help expedite updated plumbing code adoption that would provide for gray water systems. O'ahu is currently operating on plumbing codes from 2006, which don't allow for gray water use. If the most recent plumbing code is adopted, it will allow for gray water use at someone's home. Ernest added that the BWS is working on testimony in support of the proposed new plumbing codes. The new plumbing code would allow gray water reuse on a property in addition to water conservation efforts.

Q. Where's the BWS's closest wellhead to the area with concerns about lead?

A. It's about, 3,000 feet away from that area. The area of soil contamination is over the cap rock, which provides a separation from the aquifer we use for water supply. When the Department of Health and EPA investigated, they found the highest levels to be in the top six inches to a foot of the soil. Lead is easily bound up in soil, protecting the water supply.

Q. Has the source of the lead been determined?

A. It's possible that it came from a company making fishing sinkers in the old days, but these questions are best answered by the Department of Health.

Q. Is it possible to use EPA funds to clean up the lead contamination so BWS does not have to worry about it when replacing the pipelines?

A. Good question! That's actually what the Department of Health's HEER branch, Hazard Evaluation and Emergency Response, would pursue because a Superfund site, or even just a Brownfields site could qualify for federal funds to help out. We will keep the group apprised of the situation. Ellen Kitamura mentioned that *Hawai'i News Now* will run a story on the lead contamination tonight.

Q. The City recently released the General Plan "round two". Did the BWS find anything in the revised plan that is particularly onerous? The community has until May to make comments so it might be good to discuss this as a group.

A. We will look for the revised so we can begin the process of reviewing.

CORRELATION OF PIPELINE REPAIRS AND MAIN BREAKS, INCLUDING COSTS

Carl Lundin, from the BWS Water Master Plan (WMP) Team, began with an overview of the information provided at Meeting 12 related to the main break repair at Kalanianaʻole. Carl informed the group that this break was on a transmission pipeline, one of the large-diameter pipes of 16 inches diameter or greater that move water around the island. Large diameter pipes make up about 18 percent of the total BWS system. On Oʻahu, there is currently an average of 13 large-diameter pipe breaks per year – about 4 percent of the total annual main breaks.

Main breaks are costly to repair. Most of these costs are directly incurred by the BWS, but there also are costs that the community bears including property damage and lost business, although those affected can make claims to BWS for reimbursement. There also are less tangible costs to the community, for example being caught in traffic. As a result, consideration of how much to invest in avoiding main breaks goes beyond the costs for BWS to repair the break. That decision also should consider impacts to the community, which are hard to quantify, but are no less real.

A typical break takes BWS about 24 hours to repair. Usually, about 10 to 20 feet of pipe in the trench are replaced. Costs for a typical repair are generally about \$10,000, including any claims for property damage or lost business. In comparison, the Kalanianaʻole break took about 96 hours to repair; about 20 feet of pipeline were replaced; and while costs still are coming in, we're pretty comfortable saying it'll be less than \$500,000.

People sometimes ask whether it would be cheaper to replace pipes before they break. The answer is somewhat complex. For example, if a decision had been made prior to the break to proactively replace the Kalanianaʻole pipe, BWS would have replaced about 1,400 feet of pipeline, which is in keeping with the industry practice of replacing a full section of pipeline subject to similar conditions and thus susceptible to similarly fail. Replacement would have taken a contractor about a year and would cost about \$6 million.

Carl demonstrated a process to determine when replace pipes based solely on cost to BWS. As they age, pipes will break more frequently. At some point, the cost of repairing will exceed the cost of replacement. By analyzing the data, it's possible to identify the most *economical* point for replacement. But, the most economical point is not necessarily the best. For example, what if the most economical point of replacement is when there's a break every other year? This could be a straight-forward decision in terms of engineering or economic standards alone, but it's likely to be unacceptable in terms of community values.

As part of the Water Master Plan (WMP), all 2,100 miles of BWS pipeline were statistically analyzed to determine the predicted number of breaks, with particular focus on the next five years. Each segment of pipeline was assigned a risk score based on the likelihood of failure and the consequences of a failure.

For the Kalaniana'ole break, the WMP analysis predicted 0.007 breaks in the next 5 years, which equates to a little less than 1 percent probability. However the consequences of this pipeline failing are very high, recognizing its location on a highway, on a bus route, with heavy traffic, etc.

From a statistical perspective, we would not have expected this pipe would break. While we would not have identified the pipeline for replacement before it broke, this section of pipe was identified for monitoring on a 10-year cycle.

Carl said that pieces of broken pipe are often forensically analyzed. BWS sandblasted the failed section of pipe. Graphitic corrosion, which undermines the structural integrity of the pipe, is nearly impossible to see without sandblasting. Carl showed photos of the sandblasted pipe and reported that there was very little corrosion on the pipe removed from the Kalaniana'ole break. That eases concern for similar pipe breaks to occur in the immediate vicinity.

Decisions on the rate of pipe replacement come down to acceptable level of service based not only on engineering and cost factors, but also on community values and an understanding of tradeoffs between level of service and water rates. This is the reason that there has been and will continue to be discussion with the group on how much pipe in the system should be replaced each year, and at what cost.

QUESTION AND ANSWERS

Q: Are most main break repairs funded from the existing budget?

A: The majority of main break repairs are smaller in size, so are performed by BWS staff. When there's a break of great size and magnitude like Kalaniana'ole, we have to call in contractors under emergency procurement for specialty items like shoring and paving. The money to pay for this comes from BWS's field operations budget.

Q: Is there any thought of lining a water pipeline instead of replacing it?

A: Generally, we'll replace a segment at a time, maybe one major valve to the next, or some major subset that makes sense. Linings sometimes are considered, but they don't tend to result in as long a lifespan as replacement. Also, linings tend to be pretty expensive. You have to punch a hole every 300 feet or so to put the liner in. Often, it's actually better from a capital perspective to replace the pipe.

Ernest added that the BWS is looking at possibly relining a 42-inch diameter cast iron transmission pipeline across Honolulu. BWS will first install in a new 42-inch main. Once that's in service, we'll go back and work on the existing 42-inch main that was installed in the 1940s and 50s. BWS wants to get another 70 to 100 years out of that pipe, because it's such a critical main serving Waikiki and East Honolulu. Having parallel lines allows us to continue service even if one line breaks.

Q: What is BWS's policy about abandoning pipes? I'm getting this picture of subterranean space junk – all kinds of pipes just left in the ground to rot.

A: We cannot tell for sure what the thinking was when the Kalanianole pipe was installed. Today, faced with similar circumstances, we would remove the old abandoned line that was above the new line after the new line was in service. Mike Fuke added that BWS sometimes will leave old pipes in the ground based on agreements that allow repurposing abandoned lines as a conduit for telecommunications. In fact, almost all old pipelines are left in place due to the high cost of removal, additional disruption to traffic that would result, and the potential for alternative use.

A comment was added from the advisory group about the abandoned 24-inch pipeline on Farrington Highway, where the old line was left to deliver recycled water for irrigation.

Comment: One stakeholder said that, as a resident of Hawaii Kai, he was in the traffic from the water main break. The speed with which the BWS got that all taken of was impressive. He thanked BWS for a bang-up job with the repairs.

Ernest responded with thanks and explained he'd go out to the site at 5 in the morning and Mike Fuke was already there and dealing with reporters. Ernest also recognized the collaboration of the City Department of Transportation, State Highways, Honolulu Police Department, and Mayor's office. There was excellent cooperation.

EVALUATION OF FINANCIAL POLICIES ON REVENUE REQUIREMENT

Dave reviewed some of the basics of long-term financial planning and the rate making process, to set the context for further discussion. There are 3 key steps to ratemaking: revenue requirement, which we've likened to determining the size of the pie; cost of service, which we've likened figuring out the cost of the pie's ingredients; and rate design, which we likened to size of each piece of pie.

Dave continued with discussion of the four main drivers of revenue requirements:

- Operation and maintenance costs.



- How the capital improvement program (CIP) is financed.
- Financial policies for credit ratings and stability.
- Preparedness to respond to changing trends and risks.

Dave explained the advisory group has been focusing on the financial plan and its role in defining the revenue requirement. In particular, we've been talking about reserves in working capital and debt service, how we finance the capital program, as well as trends and risks. As part of these discussions, we have begun looking at the 30-year CIP and the financial effects of different rates of replacing water mains annually (e.g., replacing six miles per year vs. 20+ miles per year). The reason we're spending so much time on these matters is that they are primary drivers of the revenue requirement.

With that in mind, it's also important to recognize the relative magnitude of impact these factors would have on the revenue requirement. For example, if we rated the working capital or managing trends and risks at a level 1 of impact on the revenue requirement, then managing operations and maintenance would be rated at a level about 5 times as great. And, if we talk about the magnitude of impact of the CIP (pipeline replacement, etc.) on the revenue requirement, it would be about 10 times as great as working capital or trends and risks.

Brian Thomas led a discussion of the financial policy related to level of cash on hand. This discussion was carried over from Meeting 12.

1. Fund Balance / Working Capital (Amount of Cash on Hand)

	<p>Current</p> <ul style="list-style-type: none"> • Unrestricted fund balance = 45 days of operating expenses • Includes annual debt service • Allows setting aside net revenues that exceed budget for general contingencies (no limits)
	<p>Straw Man</p> <ul style="list-style-type: none"> • Target 180 days, never less than 60 days • Exclude annual debt service (for consistency) • Cover disasters and unforeseen circumstances • Large enough to provide some rate stabilization • >180 days may be re-programmed to fund CIP

Brian said the working capital policy focuses on how much money the BWS should have available in the event of emergencies or other unforeseen circumstances. The metric for this policy is “days cash on hand”, which means how much money could be quickly accessed to pay all of the BWS’s operating and maintenance (O & M) expenses. The existing BWS policy specifies 45 days cash on hand plus the debt

service payments that would accrue over that period. This equals about one billing cycle for BWS.

The straw man policy targets coverage for 180 days of expenses, but it does not include debt service. In other words, BWS would be able to make it through a half year without any additional revenues to pay O & M expenses. This would not include payment for capital expenses or payment on debt services.

Lenders look for a double A or double A plus rating, which would make it possible for BWS to borrow money for capital improvements at lower cost. Rating agencies look for water utilities having 150 to 365 days uncommitted cash on hand to grant those high ratings. Funds committed to capital projects are not included.

BWS believes the increase from 45 days is warranted not only for higher bond ratings, but also for emergency situations, which were a key point of discussion at Meeting 12. The advisory group had requested additional information about disasters in Hawai'i, their magnitude and resulting damage, costs for recovery, and the role of FEMA.

Dave showed a table of major disaster declarations by the federal government for incidents in Hawai'i, going back to 1992, shown below.

Time for Federal Major Disaster Declarations in HI have Averaged 42 Days

Incident Start	Declaration Date	Days	Incident Description	Declaration Type
9/11/2016	10/6/2016	25	Severe Storms, Flooding, Landslides, and Mudslides	Major Disaster
9/4/2014	11/3/2014	60	Volcanic Eruption and Lava Flow	Major Disaster
8/7/2014	9/12/2014	36	Tropical Storm Iselle	Major Disaster
3/3/2012	4/18/2012	46	Severe Storms, Flooding, and Landslides	Major Disaster
3/11/2011	4/8/2011	28	Tsunami Waves	Major Disaster
10/10/2008	1/5/2009	87	Severe Storms and Flooding	Major Disaster
12/4/2007	2/6/2008	64	Severe Storms, High Surf, Flooding, and Mudslides	Major Disaster
10/15/2006	10/17/2006	2	Earthquake	Major Disaster
2/20/2006	5/2/2006	71	Severe Storms, Flooding, Landslides, and Mudslides	Major Disaster
10/30/2004	2/1/2005	94	Severe Storms and Flash Flooding	Major Disaster
10/28/2000	11/9/2000	12	Severe Storms And Flooding	Major Disaster
11/5/1996	11/26/1996	21	Severe Storms/Flooding	Major Disaster
9/11/1992	9/12/1992	1	Hurricane Iniki	Major Disaster

Dave pointed out the significant differences in number of days before a federal disaster was declared: as quickly as a single day in some cases, and delayed as long as three months in others. Hurricane Iniki was declared as a federal disaster in just a day. Disaster declaration is just the start of the process. Receiving FEMA money is a reimbursement process, so it's not immediately accessible for recovering from a disaster.

Regarding BWS insurance on infrastructure, mentioned at Meeting 12, this insurance operates similar to homeowner's insurance. There's a process that involves determining the damages, what it will take to repair, and finding a contractor to do the repairs. As invoices come in and are paid, they're turned over to the insurance company at which point it would take 30 to 60 days for reimbursement.

BWS researched recovery from hurricanes, including a look at the Kaua'i Department of Water's audited financial statements. Based on the information found, the water infrastructure damage from Hurricane Iniki amounted to about 1.3 percent of net assets. That seemed low, so other sources were sought, including a study from the Economic Research Organization of the University of Hawai'i (UHERO). One of the things this study showed was population trends of Kaua'i compared to Maui, with very close trending for the two islands. Immediately following Iniki, there was a 10 percent drop in population on Kaua'i. This plummet in population failed to fully recover through the close of the study in 2006. Even more dramatic was the impact on tourism. Tourism on Kaua'i plummeted 70 percent following Iniki. It took 14 years for tourism to recover. Based on these findings, necessary days cash on hand for the disaster would be estimated at 102.

BWS also looked at other water utilities across the nation with predominantly underground infrastructure that had been impacted by a major disaster and whose financial statements were accessible. Following Hurricane Katrina, the Sewerage and Water Board of New Orleans experienced net asset damages of 3.7 percent, and in the 3 months following the event their revenue dropped 90 percent. In the year following, revenue loss was 24 percent. This was equivalent to 237 days cash on hand.

Damages for the City of Galveston, Texas water system from Hurricane Ike were equivalent to 4 to 5 percent of net assets, but the revenue loss was fairly small – only 1.9 percent in the following year. Total necessary days cash on hand came to about 65 days.

Superstorm Sandy resulted in damages for the New Jersey Water Supply Authority of about 4.8 percent of net assets and a 2.4 percent drop in revenues, with a total estimated need for about 141 days cash on hand.

Further broadening the information to consider, Dave recalled Barry Usawaga's comments at Meeting 12 where he indicated one of his greatest concerns about the BWS system are the pipelines on bridges at low elevations that are susceptible to damage and costly to repair or replace. Dave showed a map of BWS's 24 pipeline bridge crossings that are at low elevation or near the coast. These are distributed pretty equally around the island. If any of these pipelines were damaged, BWS would need to decide whether to take a short term approach and run an emergency water line while waiting for DOT (or whomever) to rebuild the bridge. Alternatively, a long-

term fix would require BWS to tunnel under the stream and permanently bypass the bridge. This is just one of many potential impacts in a hurricane, tsunami or tidal surge.

With the additional information that stakeholders requested in mind, the BWS went back and revised the scenarios for varied levels of days cash on hand previously shared with the advisory group, as shown in the following table:

BWS Disaster Recovery Scenarios

Item	Scenario A		Scenario B		Scenario C	
	Rate	\$ M	Rate	\$ M	Rate	\$ M
Damages	2%	\$22.4	4%	\$44.8	4%	\$44.8
Revenue Loss	50% Months 1-3	\$28.9	25% Months 1-3	\$14.4	100% Month 1	\$19.2
Revenue Loss	25% Months 4-12	\$43.3	10% Months 4-12	\$17.3	50% Months 2-3	\$19.2
Days Cash	201		163		177	

Dave described three scenarios for days cash in hand based on varied possibilities for disaster-related damages. As the group reviewed and discussed these scenarios, it became apparent that a disaster hitting O’ahu could result in 40 to 45 million dollars in infrastructure damage, which is more than earlier estimates presented. A significant portion of this would have to be covered by BWS before FEMA or insurance funding would be available. As shown in Scenario C above, it would likely be very difficult if not impossible to read meters and bill customers following a major event. BWS can assume 100 percent revenue loss in the first month, followed by something like a 50 percent loss in months two and three. Optimistically, after that conditions may become somewhat normal. Such a scenario would require 177 days cash on hand.

Dave stressed that there’s not a right or wrong answer to setting the number of days cash on hand. It’s a matter of seeing what’s plausible, what makes sense after considering potential impacts, and how people perceive the acceptable level of risk.

QUESTIONS, ANSWERS, AND COMMENTS

Q. It seems that 180 days cash on hand, which was in the previous straw man policy, is marginal. The numbers BWS looked at are 162 and 201 days, which bracket 180. So we're in the ballpark. The question is: Do we need to fine-tune this?

A. Yes. It's also possible to say the smallest number is from Kaua'i (102 days) and the biggest is from New Orleans (237 days).

Q. But if I look at Kaua'i and consider what happened with Iniki, these numbers seem pretty low. What we saw tonight gives us some better validity for 180 days. The question is whether we are comfortable enough with the 180 days, or do we want to adjust it a little bit upward?

Q. There's another question to consider: What does it cost?

Q. In business, what they do is get a line of credit. When the money is needed, they go to the bank and say "I need the money now." What's the advantage of putting the money in the bank (as cash on hand) rather than establishing a line of credit so you can get the money when you need it?

A. There are utilities that have a line of credit to augment their cash on hand. In a major disaster, they can draw on the cash or draw down the line of credit. Having some capital on hand helps the bank to see the enterprise in terms of credit worthiness. Having a half-year (180 days) of cash on hand would be helpful if it was necessary to get a line of credit for 45, or 50, or 100 million dollars and would make it possible to borrow at the lowest cost.

It was concluded that having insurance still requires time and a process for submitting a claim. Ernest added that FEMA would require us to first exhaust our insurance options before turning to the federal government for assistance. If we increase our insurance coverage, it may limit the potential for future federal funding. BWS will closely monitor any cuts in FEMA funding in the federal budget. If FEMA is drastically cut, we may need to reevaluate our approach to disaster funding and look to insurance, or lines of credit, or commercial paper, or other options.

Brian showed a table of the percentages of additional revenue requirements over the next 10 years to support a range of cash on hand options from 90 days to 180 days. Figures in the table assume only the following changes: desired level of cash on hand, desired target to hit by 2026, and how percentage of change in revenue requirement might roll out over the decade. The table included only effects driven by differences in cash on hand (e.g., not the costs of the CIP or other uses of revenue). The differential between 90 days and 180 days is about 2 percent spread over the 10-year period.

Dave framed the core question to consider: The current BWS policy is for 45 days cash on hand, which basically accounts for only a turn in the billing cycle. The BWS

has concluded we need to be better prepared to manage risk, and are looking to the advisory group for input and a suggestion of how much higher to set the policy for cash on hand and at what cost.

QUESTION, ANSWERS, AND COMMENTS

Comment: My community has been involved with disaster preparation and response four years or so. FEMA has given lots of hints that Hawai'i will be on our own.

Along with that, I think we're going to experience greater, more severe and prolonged weather changes, and it's going to escalate. We had better plan on a very healthy contingency fund. Our state is going broke. Our city is broke already, and our federal government is not doing so well financially. I think we should learn more about all of these agencies and what they will or won't do for us.

Comment: I want to echo what was just said in terms of preparation. If you were dealing with any commodity other than water – the one we all need to survive in the aftermath of a disaster – you could probably be more lenient. But it pays to be prudent in this situation.

Looking at the slide with the scenarios, it shows an immediate drop in revenues, but then things bounce back. I'm not sure that holds true. I don't know if our risk exposure is different from Kaua'i. Waikiki is the most risk prone area on the island, and it accounts for 10 percent of our GDP. If it's taken out for any prolonged period, then tourism revenue drops. It seems the picture of recovery is skewed towards a pretty quick bounce back, which I'm not sure is real.

Dave noted that coincidentally, he and Brian discussed the same topic earlier, and concluded that one of the scenarios in the long term financial plan should show a substantial and prolonged drop in tourism, drop in consumption and drop in population.

Comment: We had 7 hurricanes come by O'ahu a season before. This would assume you've got to build your cash reserves over time and plan for more frequent storms as well as greater ferocity as they come through.

Ernest responded that building up cash reserves is not the only option. Another approach might be to provide enough cash for a six-month period, during which we would do a more comprehensive assessment and develop a strategy of rate increases and other actions that are more specific to the situation at that time.

Comment: That's a good point. Recall, the BWS has had a lot of challenges and charter resolutions. It can be an issue when you build up cash for emergencies or working capital, and your savings become very attractive to other agencies that have

programs they want to push. There is constant tension. Water is life, so we want to be very prudent. You can do without electricity, but you cannot do without water. Water and food are essential to our survival. We're not going to get a lot of help; we need to be self-sufficient in our community. And, depending on how the federal government goes with the cuts that are being proposed to energy, to the EPA, perhaps to FEMA, these programs may not be as reliable or generous as we have experienced in the past. Our ability to recovery on our own, with our own strength, and pulling ourselves up and being able to stand on our own, might become more important.

Comment: I agree. I'm inclined to believe that a more robust or more thriving economic situation is better than a weaker one, and 180 days gives us that. But, I do think it might fare a little better because most of the BWS's high cost infrastructure is buried. If we were earthquake prone it might be different, but we're going to get hit by wind, rain, fire, tidal events. So does that reduce some of the risk a bit?

Comment: The loss of electricity is recognized in the revenue loss because BWS cannot pump and deliver water to customers, and thus is not getting paid for the water. That's where that risk is captured.

Ernest explained that BWS looked at water and sewer systems as comparatives for damage estimates because they have a comparable makeup of infrastructure to that on O'ahu. The 3 to 4 percent estimates are valid. Looking at above-ground facilities, probably the most vulnerable are the base yards and offices. A number of fire hydrants may be sheared off and the mains on coastal bridge crossings may be lost when the bridge is wiped out. After Iniki, the coastal road on Kaua'i was basically gone.

A key issue for the BWS is dependence on power. Without power, water cannot be pumped to customers. So some of the gap in service will be contingent upon how quickly power can be restored to the island. A "gut feeling" is that 30 days is optimistic because in a hurricane, cyclone or tsunami, there's going to be a tremendous amount of debris across the island from man-made structures and vegetation. Debris is going to restrict the ability to get power restored to the BWS pumping stations. BWS is in the process of incrementally adding generators to our inventory, both fixed in place generators at the pump stations and portable generators that can be hauled to a site.

Ernest explained that following a disaster it may be impossible to send meter readers into the field or the meters may be buried under tons of garbage or debris. The ability to restore normal meter reading and billing is going to be severely hampered.

Dave asked the group: "What is your inclination on this?"


Comment: Being conservative is good. Is there some way we can talk about cash on hand or an equivalent to reach 210 or 240 days? This could be achieved with cash and a line of credit, insurance, and/or whatever else. It could be more modest in terms of cash dollars.

Brian recommended that any policy be worded so there's a minimum of 60 days cash on hand, with a target of whatever number the group wants, be it 90, 120, 150, 180, or more days cash. The financial model will not intend that BWS instantaneously reach the established level of cash on hand, but gradually over time.

Comment: I like where this is going in terms of keeping some of the money in cash and finding other funding mechanisms so additional cash is available for emergency needs, whether it's insurance, an endowment, or whatever. We have to retain the money in this arena in a form so it's not a magnet for someone to take it and use it for something else.


Dave indicated that when this is brought back to the advisory group at the next meeting, members of the advisory group should be able to look at the policy and feel that it reflects their input. As a check, he indicated that the group seems agree 45 days cash on hand is not sufficient. The discussion has been trending towards higher levels of days cash on hand, greater definition about how insurance fits in, and ideas to mitigate the risk of losing emergency-intended funds through a political maneuver. BWS also will look at some increments of costs for additional days cash, see whether the group is willing to invest moving to those higher levels.

2. Purposes and Uses of Debt (When and Why to Borrow)



Current

- Select most economical financing source
- Term of debt limited to life of facility it is funding
- Cannot fund operations & maintenance
- No more than 20% variable rate debt
- Pay-as-you-go funding "...in a range in conjunction with debt to net assets ratio."



Straw Man

- Select most economical financing source
- Term of debt limited to life of facility it is funding
- Cannot fund operations & maintenance
- No more than 20% ~~25%~~ variable rate debt

At the February advisory group meeting there was considerable discussion of the appropriate limit on variable rate debt. The initial straw man proposed raising the limit on variable rate debt from 20 percent to 25 percent. However, following discussion and input from the advisory group, there was a sense of greater comfort among the members to retain the current level of 20 percent, which is consistent

with the rating agencies' perspective. At this point, BWS is not using any variable rate debt, so the lower percentage does not pose any limitation to financing strategies.

QUESTIONS, ANSWERS, AND COMMENTS

Comment: Actually, there are two kinds of variables. One is interest percentages that can vary. The other is the amount of debt that is in a variable position.

A. One of the things we can do is define what we mean by variable rate debt. In the municipal sector it traditionally means debt where the interest rate varies on a weekly, monthly or three month basis.

Q. Aren't we planning on having a CIP plan for the next 20 to 30 years? If you're going to be funding that plan, where does the debt come in?



A. Brian said we're going to look at varied scenarios to fund the capital program. One basic source of funding in a municipal environment is revenues – that's how much is collected every year from the sale of water. Another source is debt. If a utility is going to fund \$100 million in capital projects in a year, they don't want to spike rates to cover that expense. This is based on a number of reasons. One is costs to customers. Another is that they are going to be building a long-lived asset that's going to last 30 or 40 years. So, they borrow money for a part of that. They pay annual debt service, just like a home mortgage. The basic options in a municipal environment are revenues, debt, and sometimes grants. To the extent possible, it's preferable to go to the federal and state government and get grants to help fund the capital program. Also, there are State Revolving Fund loans, which is another form of debt that's lower cost.

He said as BWS looks at the capital program over the next 10, 20 or 30 years, we may want to think about what is the optimal mix of grants, loans, and revenues. We might start by considering issuing debt to fund half of the capital program and revenues to pay the balance. Considering how that scenario looks, at some point we may want to change the balance to 60 percent debt and 40 percent revenues. When this advisory group starts looking at rates, we can move that toggle in the model and gain a sense of the impacts.

Days cash on hand is not a stack of dollars sitting somewhere. It's money put in highly liquid investments, so there's some rate of return. When the advisory group looks at water rates, we will consider what the costs are and what revenues are coming in. Some of that revenue is going to be interest income that provides an offset to rates, which will reduce the amount charged to ratepayers.

Put simply, this set of policies puts some guidance around why BWS would borrow money and appropriate limitations on the uses of that borrowing. The next recommendation is to delete the current fifth bullet, as it has been impossible to clearly determine its meaning and intent.

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

	Current <ul style="list-style-type: none">• 40% to 50% debt to net assets ratio
	Straw Man <ul style="list-style-type: none">• No more than 50% debt to net assets ratio<u>OR</u>• Eliminate the policy

The third set of financial policies relates to the debt to net assets ratio, which is a measure of leverage that compares the total amount of outstanding debt and the total value of assets less depreciation. In short, it's debt to equity, calculated by taking all of the outstanding debt and dividing it by the worth of the system. The current policy says that should amount to 40 to 50 percent. Actually, the wording of this policy is problematic as it implies having less than 40 percent is not good, which is not the case. So the initial proposal was to change the percent to clearly communicate the ratio should not exceed 50 percent. At the February meeting, there was commentary that 50 percent could be too limiting.

Dave asked the group to consider the options: Is 50 percent too limiting? Should it be higher? Is this policy even necessary?



QUESTIONS, ANSWERS, AND COMMENTS

Comment: HECO is doing some planning on the North Shore and we asked about their ratio. Their policy is 50 percent.

Comment: On bond issues and sales, like general obligation bonds, there are constitutional requirements and ceiling issues. Not to have a policy could take us into a different realm if for some reason BWS has to exceed the debt to net asset ratio.

Brian indicated that the comments from the group were leaning towards having a ceiling, and 50 percent seems pretty reasonable. Since it's an internal policy, it could be reviewed over time. Dave agreed that he was hearing a tendency to establish the upper limit.

4. Debt Service Coverage Ratio (Ability to Make Loan Payments)

	Current <ul style="list-style-type: none">• 1.6x senior annual debt service• 1.3x junior annual debt service
	Straw Man <ul style="list-style-type: none">• 1.7x senior annual debt service• 1.3x junior annual debt service• 1.6x total annual debt service "all in"

Brian began discussion of this fourth set of financial policies by defining the debt service coverage ratio, which measures the amount of money available to pay debt obligations. The first step is to calculate net revenues by subtracting all operating expenses from total revenues. Then, divide the net revenues by the annual principle on interest made on all debts. As an example, if you have net revenues of \$50 million and annual debt service (principle and interest) of \$25 million, the debt service coverage ratio is 2 times.

The straw man policy is that the BWS will always have at least 1.6 times the total annual debt service "all in", which means it includes all annual debt including revenue bond debt, variable rate debt, fixed rate debt, state revolving fund debt, lessees that look like debt, etc. Dave explained that at the February advisory group meeting the straw man included 1.3 times coverage for junior debt. This was eliminated based on a recommendation that it's redundant if we specify the 1.6 is "all in".

Dave reminded the group that there had been some question earlier in the meeting about the need for both policy 3 and policy 4, since the debt service coverage ratio policy provides confidence to lenders in the ability to repay them. Some agencies have a metric on debt to net assets and others don't. Brian indicated that the metrics in financial policies 3 and 4 work well together, providing both a 50 percent constraint and a 1.6 times target, which can be balanced over time.

QUESTIONS, ANSWERS, AND COMMENTS

Q. How do rating agencies look at these two issues, and do they prefer to have a policy for both?

A. Rating agencies tend to look at the cash coming in, so they'll look at coverage a lot. Coverage is very important to all of the three major rating agencies.

Rating agencies want to be sure that the enterprise has the ability to make payments, so they'll check out what the revenue stream looks like. They'll want to be certain that in the event that next year's revenues drop, the entity will have money in the bank so they can still pay their lenders. Rating agencies also look at how fast debt is being paid off. If you borrow money and extend payment out 30 years, that's a credit negative.

Q. I've listened to descriptions of bond conditions before, and sometimes there are issues with the amount of money owed for retirement funds. What's the status of the BWS employees and their retirement fund?

A. BWS is part of the Employee Retirement System of Hawai'i (ERS), which is a joint program with the other cities and counties in the state. BWS is fully contributing its portion. Because of the structure of the program, we pay at a level requested by the ERS. The evaluation goes up and down, and we contribute on time and on schedule.

Brian explained that payments to the retirement system are on an actuarial basis. A lot of agencies he works with have a funding ratio in the range of 65 to 75 percent, even though they're paying exactly what the retirement system asks. There's talk about retirement systems starting to charge more, to get the funding ratio higher.

Dave asked the group to look at the revisions noted and see if they seem reasonable. The BWS bumped up the numbers a little from the current policy, to achieve a strong position from a bond rating agency perspective. The policy on debt to net asset ratio is another safeguard. In the analysis thus far, it doesn't seem to limit BWS's ability to borrow. If it does become a limitation in the future, whoever the manager is at that point could go to their Board and seek a revision.

Dave said we will come back to the advisory group with more specificity on Financial Policy 1 at the next meeting and try to gain consensus on all four policies. If all goes well, Ernest's intent is to take the advisory group's recommendations to the BWS Board at their April meeting.

QUESTIONS, ANSWERS, AND COMMENTS

Comment: One stakeholder commended the team for doing the follow up research. He said it's so helpful that, when we have questions and bring issues up at one meeting, and then the team comes to the next meeting with actual data that can inform the discussion.

Dave thanked everyone for coming and said that we look forward to the next BWS Stakeholder Advisory Group meeting, April 19, 2017 at the Honolulu Club.