



Barrington, Bristol and
Warren, Rhode Island

WATER SUPPLY SYSTEM MANAGEMENT PLAN

EXECUTIVE SUMMARY

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This Water Supply System Management Plan (WSSMP) has been prepared as required under Rhode Island General Laws 46-15.3, as amended and titled “The Water Supply System Management Planning Act” (Act). The legislative authority to effectuate the goals and policies of this Act has been conferred to the Rhode Island Water Resources Board (RIWRB). To this end, the RIWRB has promulgated the Rules and Regulations for Water Supply System Management Planning (Rules), last revised in October 2002, as amended to implement the provisions of this Act.

The Bristol County Water Authority (BCWA), as a water purveyor supplying over 50 million gallons (MG) of water a year, is responsible for updating its WSSMP every five years. This document is the 2014 Update of the WSSMP. The WSSMP has been prepared to be consistent with the goals of these Rules as well as the strategies and goals articulated in the RIWRB’s 2012 Strategic Plan. It is also consistent with the goals of State Guide Plan Element No. 721 – RI Water 2030 and the goals stipulated in the Comprehensive Plans for the Towns of Bristol, Warren, and Barrington.

INTRODUCTION

The BCWA was formed in February 1984 for the purpose of:

- Purchasing the private Bristol County Water Company and operating the water system;
- Rehabilitating and upgrading the distribution system; and
- Building and operating a connection to the Providence Water supply system.

The three goals established for the BCWA are all within the overall goal of providing a sufficient supply of potable water to meet the needs of the residents of Bristol County.

In order to supply the citizens of Bristol County with sufficient supplies of potable water to meet their needs, the BCWA prioritizes the following activities:

- Complying with all applicable laws and regulations;
- Providing service to all locations within the service area;
- Conforming to the overall goals of the Act; and
- Implementing the Bristol County Water Supply Act.

The Bristol County Water Supply Act (RIGL 46-15.5) declared that:

1. The citizens of Bristol County lack an adequate and secure supply of potable water;
2. Heretofore acting through the Bristol County water authority, the citizens of Bristol County have presented a proposal for the construction to bring water from the Scituate Reservoir to Bristol County;
3. The state and its citizens would be better served and the environment enhanced by the construction of an additional connection connecting Bristol County to the Scituate Reservoir;
4. The need for water in Bristol County is critical and requires immediate and prompt action on the part of the state, its agencies, boards and commissions;
5. Bristol County will require an alternate source of supply in order to construct the improvements to its existing system of reservoirs, wells, and treatment plants;

6. The alternatives authorized by this chapter will be less expensive than the East Providence connection, so-called;
7. Reliance by citizens of East Providence and Bristol County on a single connection would create a hazard to the health, safety and welfare of the citizens of East Providence and Bristol County, and, therefore, the construction of an emergency connection which shall permit water to flow in either direction is a public necessity; and
8. The state is mandated to upgrade the current Bristol County water system of reservoirs, wells, treatment plant, and transmission lines, with the first priority being given to the construction of a new raw water transmission line.

Actions taken by the BCWA to comply with the Bristol County Water Supply Act include:

- Constructing and maintaining the East Bay Pipeline, a second cross-bay connection between Providence Water and the East Bay (East Providence has a separate connection with Providence Water);
- Maintaining emergency interconnections with the City of East Providence;
- Rehabilitating the water transmission line to the existing reservoirs (Shad Factory Pipeline);
- Performing upgrades to the Child Street Water Treatment Plant (WTP) to meet Safe Drinking Water Act requirements;
- Rehabilitating, upgrading, and renovating the surface water system of reservoirs, dams, and dikes to maintain their viability; and
- Maintaining the distribution system of pipes, storage tanks, and pump stations in a good, sound, and safe condition.

WATER SUPPLY SYSTEM DESCRIPTION

Organization and Legal Structure

The BCWA is a public corporation created by an Act of the Rhode Island Legislature, Chapter 102 of the Public Laws of 1981 as amended. The Act required authorization by the Towns of Barrington, Warren, and Bristol, which was completed by referendum in each town in November 1983. The referendum was approved by greater than 80% of the voters in each town.

The enabling legislation also called for each of the Town Councils to appoint three members to the Authority's Board of Directors, which was done in early 1984. The Board of Directors establishes policies and budgets. Each town continues to be represented by three board members.

The owners of the BCWA are the customers that reside in Bristol County. Control of operations is vested in the Executive Director/Chief Engineer. All employees of the BCWA are subject to the direction of the Executive Director/Chief Engineer. The BCWA currently has 34 employees, ten (10) staff and 24 union employees. The BCWA organizational chart follows this page.

The BCWA maintains its offices at 450 Child Street, Warren, RI 02885. The main telephone number is 401-245-2022.

Insert Organization Chart

Water Supply Sources

The BCWA maintains a surface water supply consisting of a total volume of 356 million gallons with a combined safe yield of 3.4 MGD. The BCWA surface water supply consists of four separate water bodies:

Kickemuit Reservoir, located in Warren, RI	35 million gallons
Swansea Reservoir, located in Swansea, MA	154 million gallons
Shad Factory Reservoir, located in Rehoboth, MA	39 million gallons
Anawan Reservoir, located in Rehoboth, MA	128 million gallons
<hr/>	
Total	356 million gallons

<i>Massachusetts portion of total supply volume</i>	<i>90%</i>
<i>Rhode Island portion of total supply volume</i>	<i>10%</i>

The reservoirs are located in two watersheds, both primarily located in Massachusetts. The Palmer River watershed includes the Anawan Reservoir, which flows by stream to the Shad Factory Reservoir. Water has not typically been withdrawn from the Anawan Reservoir other than at times when the water level in the Shad Factory Reservoir was low, and it has not been used for supply since the completion of the East Bay Pipeline. Water flows from the Shad Factory Reservoir to the Kickemuit Reservoir through 7 miles of 18-inch and 21-inch pipeline with a capacity of 0.7 MGD, identified as the Shad Factory Pipeline. It is very old and is in poor condition. The Kickemuit River watershed consists of the Swansea Reservoir, which flows by stream to the Kickemuit Reservoir. The Kickemuit Reservoir terminates outside the Child Street WTP in Warren.

The Anawan Reservoir is impounded by an earth filled dam, 750 feet long, with a 55-foot gravity type concrete spillway, constructed in 1912, with steel plate wickets being added in 1945. The spillway was reconstructed by the BCWA in 2002. The dam is classified as a Class II, Significant Hazard. The dam and reservoir are owned by the Anawan Club, but the BCWA (and RIWRB) are responsible for maintenance and upgrades. An inspection in 2011 identified that the dam is in “fair” condition and listed a number of items that needed to be addressed. Construction for the upgrades and repairs necessary to bring it into compliance with MA regulations is ongoing at an estimated

cost of \$500,000. Once renovated, the BCWA may look to cancel the contract with the Anawan Club and discontinue responsibility for the dam.

The Shad Factory Dam was listed in “satisfactory” condition in its last inspection. The dam, constructed in 1912, is earth embankment, 10 feet wide at the top by 400 feet long, with a concrete spillway and outlet at each end. A fish ladder was constructed in 2002. There are no known issues at this time. The BCWA owns the dam and will continue to maintain it until a means of divestment is determined, once an alternate supply is available.

The Swansea Dam is an 1883 earth embankment dam that no longer meets standards and may need to be replaced or removed, if feasible. The dam section is approximately 1,100 feet long and has an average height of 9 feet. The spillway is a simple concrete crested weir, 124 feet long with a rubble wing wall. The dam is classified as Significant Hazard. The BCWA owns it and is presently investigating the feasibility of removing it or transferring ownership to the Town of Swansea.

The Warren Reservoir (Kickemuit) Upper Dam is a dike built to prevent salt water from moving up the Palmer River in a storm. The last full inspection listed it in “good” condition. The BCWA is investigating the removal of the dam and is working with the Fish & Wildlife Department of the RIDEM as it would provide fish access to the upper waters.

The Warren Reservoir Lower Dam was also listed in “good” condition on its last full inspection, classified as a Potential Hazard. The BCWA owns the dam and some property on the reservoir. The lower Kickemuit dam will continue to be maintained by the BCWA even after an alternate supply is in operation. The Town of Warren has no interest in taking responsibility for the dam.

Treatment, Storage, and Transmission Facilities

Historically, the BCWA effectively operated two separate but interconnected water systems. The part of the system primarily serving Warren and Bristol was supplied by the BCWA’s surface water sources that were treated at the Child Street WTP. The part of the system primarily serving Barrington was supplied from a groundwater source at the Nayatt Road well field, which was treated at the Nayatt Road Treatment Plant and distributed into the system by a pump station at that site. During drought or high demand conditions, these sources would be supplemented with up to 1.0 MGD of wholesale water purchased from East Providence through two 8-inch

emergency interconnections between the two water supply systems. This practice was discontinued in 1998 when the East Bay Pipeline was completed, allowing BCWA to supplement their supply with wholesale water from Providence Water. Currently, the entire system is supplied through the East Bay Pipeline.

The part of the system serving Warren and Bristol operates at a hydraulic grade line (HGL) established by the elevation of the Bay View Storage Tank (approximately 176 feet) in Bristol, while the part of the system serving Barrington operates at an HGL established by the Fountain Avenue Standpipe (approximately 150 feet) in Barrington, 26 feet lower than the Warren/Bristol service area. The two parts of the system are interconnected as follows:

- Through one 12-inch water main crossing the Palmer River at the North Main Street Bridge between Warren and Barrington; and
- Through the 24-inch East Bay Pipeline, crossing the Warren River from Ferry Lane in Barrington, to Water Street in Warren, to a 12-inch water main at the intersection of Campbell Street and Main Street in Warren.

A small portion of the Warren/Bristol service area is served by a higher HGL of approximately 255 feet. This area consists primarily of residential units in the higher elevations of Bristol, east of Metacom Avenue. The area is served from the Metacom Avenue elevated storage tank located in Bristol, which receives its water from the Barrington Booster Pump Station on Nayatt Road.

Treatment

The BCWA historically treated raw water from their surface water reservoirs at the Child Street WTP, located in Warren adjacent to the Kickemuit Reservoir. The plant was built in 1908 with additions constructed in 1921 and 1947. It underwent a major rehabilitation effort from December 2001 to December 2005 as part of a Phase I Improvement Project. The plant was shut down and the entire system was supplied by water purchased from Providence Water through the East Bay Pipeline during that project.

The Phase I Improvements were completed at a cost of approximately \$1.7 million, of which \$1.2 million was funded by the State under the Water Facilities Assistance Program. These improvements were necessary to meet EPA Standards Stage I Disinfection and Disinfection By-

Product Rule and the Interim Enhanced Surface Water Treatment Rule, which became effective on January 1, 2002.

The Child Street WTP has a design capacity of 4.0 MGD but is currently limited to operating at an average rate of approximately 1.5 MGD, due to its limited chemical treatment capacity in meeting current EPA Stage 2 Disinfection and Disinfection By-Product Rule standards. Production above this level results in water quality deterioration. The treatment plant has not been used to supply the system since July 2011 but is operated monthly so that it remains functional in the event of an emergency.

Storage Facilities

There are five storage facilities in the distribution system, as follows:

- Hope Street Standpipe, in Bristol, was built in 1908 and has a capacity of 0.5 MG;
- Bay View Storage Tank, in Bristol, was built in 1928 and has a capacity of 2 MG;
- Fountain Avenue Standpipe, in Barrington, was built in 1952 and has a capacity of 846,000 gallons;
- Metacom Avenue Tank, in Bristol, was built in 1970 and has a capacity of 0.25 MG; and
- Ferry Road Storage Tank, located in Bristol, also known as the Roger Williams Elevated Steel Tank, was built in 2010 and has a capacity of 300,000 gallons.

The total distribution system storage is 3.9 MG, which exceeds the estimated average daily water use in the system. The Child Street WTP also contains a 50,000 gallon clearwell in addition to the storage facilities listed above.

The Fountain Avenue Standpipe was completely rehabilitated in 2002 at a cost of approximately \$350,000. The Hope Street Standpipe and the Metacom Avenue Elevated Spheroid Tank were completely rehabilitated in the spring of 2010. The Bay View Storage Tank was rehabilitated in December 2010. The rehabilitation of these three tanks in 2010 was financed using a State Revolving Fund (SRF) loan at an approximate cost of \$1.5 Million.

The construction of the Ferry Road Storage Tank, which is also referred to as the Roger Williams Elevated Steel Tank, was completed in the summer of 2010. Roger Williams University fully funded the construction of this storage tank, and transferred ownership to the BCWA.

A spray aeration system and chlorine injection was added to the Bay View Storage Tank in 2013 for disinfection byproduct removal. Similarly, a spray aeration system and Tideflex passive mixing system are proposed for the Fountain Avenue Storage Tank to control disinfection by products. This is expected to be completed in 2015.

Pump Stations

The following pump stations are part of the BCWA system:

- Nayatt Road Pump Station (Inactive)
- Child Street WTP Pump Station (Inactive)
- Barrington Booster Pump Station
- East Providence Emergency Pump Station
- Rehoboth (Shad Factory) Pump Station
- Metacom Avenue Pump Station

The Nayatt Road Pump Station is located at Nayatt Road in Barrington and is inactive. The Barrington Booster Pump Station, on the East Bay Pipeline, is also located at Nayatt Road, and raises the hydraulic grade line (HGL) from Providence Water to the HGL of the BCWA distribution system. This pump station has two pumps, each rated for 5,200 gallons per minute (gpm) or 7.5 MGD. The Metacom Avenue Pump Station has two 300-gpm pumps that transfer water from the Bay View Storage Tank to the Metacom Avenue Elevated Spheroid, which serves the High Service Area of Bristol.

The East Providence Emergency Pump Station is located on Pawtucket Avenue in East Providence. It has two 4,510 gpm pumps and a 200 kW emergency generator. The Rehoboth (Shad Factory) Pump Station, located in Rehoboth, MA, is no longer operable, and should the supply be put back into service, a new pump station would be required.

Transmission

The East Bay Pipeline represents the most significant transmission main in the water system. It is a 50,000 linear foot water main consisting of mainly 24-inch and 30-inch diameter ductile iron pipe that was put into service in December 1998. It connects to the Providence Water supply system with a 30-inch diameter pipe at Virginia Avenue. The pipeline reduces to 24-inch steel pipe and crosses under the Providence River, then increases to a 30-inch diameter DI pipe and enters the Pawtucket Avenue Meter Vault/Pump Station. At this meter vault, an emergency connection and pumping station is connected to the East Providence system.

Following the Pawtucket Avenue Pumping Station, the 30-inch DI pipe continues to the Barrington Booster Pumping Station at Nayatt Road. After the Barrington Booster Pumping Station, the pipe reduces to a 24-inch DI pipe to the Warren River. At the Warren River Crossing, the pipeline enlarges to a 28-inch diameter high density polyethylene (HDPE) pipeline. After the Warren River, the pipeline reduces to a 24-inch ductile iron pipe and connects to the BCWA system at its terminus at Main Street in Warren.

The Shad Factory Pipeline is another significant transmission main. Raw water is transported from BCWA's surface water reservoirs to the Child Street WTP through this pipeline as well as in natural waterways in the watershed. The capacity of this pipeline, which originally had a design capacity of 3 MGD, has been limited by its age (more than 100 years old) and its poor condition, which limits the current operational pressure to approximately 40 psig. Significant repairs were designed for this pipeline with construction anticipated to last 6 years at a cost of approximately \$8 million. This project has not been constructed and is no longer being pursued since the BCWA no longer uses its own surface water reservoirs for supply and the Child Street WTP has been shut down.

The 20-inch diameter 4,300-foot Kickemuit transmission main, installed in 1957, pumps water from north of the Upper Warren Reservoir to the Child Street WTP in case of salt water incursion to the lower reservoir, but it too is not currently in use.

Major finished water transmission mains include 12-inch pipelines in Barrington that extend from the Nayatt Road site in a northwesterly direction toward the Fountain Avenue Storage Tank, connecting to the Bristol-Warren part of the system in northern Warren. Major 12-inch and 16-

inch transmission mains in the Bristol-Warren part of the system extend from the Child Street WTP south in Metacom Avenue and Hope Street to south Bristol.

Distribution

The water distribution system includes approximately 230 miles of water mains ranging in size from 1-inch to 30-inch, with the majority of pipes being between 2-inch and 8-inch in diameter. Pipes are primarily ductile iron and either unlined or cement lined cast iron, though asbestos cement pipe is present in some parts of the system.

Several improvements have been made to the water system since the formation of the BCWA and over 60 miles of pipeline has been repaired, replaced, or rehabilitated since the late 1980s. Recently, the BCWA performed cleaning and lining of several sections of pipe in Barrington and Bristol in 2014 and plans on cleaning and lining the Child Street water main in Warren in 2015. They also completed the installation of approximately 6,700 linear feet of new DI and HDPE water main in the Poppasquash section of Bristol to improve fire flow in this part of the system.

Interconnections

The BCWA has three emergency interconnections with the City of East Providence water system. Two of these are 8-inch connections near the East Providence/Barrington town line. One connection was completed in July 1987 and the second connection was completed in August 1987. The interconnections are controlled jointly by East Providence and BCWA and their use must be justified by an emergency situation without creating adverse effects on either system. The total available supply from these connections is approximately 1.0 MGD. The BCWA has evaluated ways of improving these interconnections to increase available supply.

Historically, water has been withdrawn from these connections to supplement supply for various reasons during the early and mid-1990's. Since the completion of the East Bay Pipeline in 1998, there has been no need or use of the interconnections. The interconnections are maintained in the event they are needed in an emergency.

The East Providence Emergency Pump Station, also referred to as the Pawtucket Avenue Pump Station, is a third interconnection between BCWA and East Providence. It is supplied directly

from the East Bay Pipeline. The East Providence system is supplied from the East Providence Emergency Pumping Station through a 16-inch cast iron water main in Pawtucket Avenue.

Service Area

The BCWA's service area consists of substantially all of Bristol County, 24.9 square miles in area. The population of Bristol County is approximately 49,875 residents, per the 2010 US Census. This represents a decrease in the population from 2010, which was approximately 50,648. While previous studies predicted population increases in upcoming years, the current trend shows a net migration from Bristol County (as well as the State as a whole).

The BCWA serves virtually the entire population of the County, approximately 49,425 people with 450 residents not presently being served by the BCWA. Service is provided through 16,953 residential, commercial and industrial connections. The only areas in the County not served by the BCWA is the area served by the Touisset Community Water system and a portion of the area commonly referred to as the Poppasquash section of Bristol, which is served by individual wells.

Source and Distribution Metering

Master meters are located in several locations in the system; two at the Child Street WTP, one at the Barrington Booster Station, one at the Pawtucket Avenue interconnection in East Providence and one on the East Bay Pipeline connection to Providence Water at the Columbia Park site in Providence. The master meters at the plant measure finished water from the plant into the transmission/distribution system. Master meters are tested and calibrated biannually.

Water withdrawn from the surface water sources is not separately metered. Plant use is determined by a combination of metering, in various places, and calculated flow and use where metering is not currently available or feasible. The reservoirs are not being used at this time and the long-term plans of the BCWA are to continue supplying the system entirely with wholesale water purchases. Therefore, the addition of source metering is not prudent at this time.

All users of the BCWA system are currently metered. The BCWA currently reads meters and bills large commercial and industrial users on a monthly basis while all other users are metered and billed quarterly. The system has approximately 16,953 active metered accounts.

The following is an analysis of the types of meters currently in use:

<u>Meter Register Type</u>	<u># of Accounts</u>	<u>Percent</u>
Orion Radio Read	10,642	62.78
Trace Radio Read	6,288	37.10
Manual Read	11	.06
<u>Remote Read</u>	<u>12</u>	<u>.06</u>
Total	16,953	100

The BCWA has been actively modernizing its meter reading technology since 1998, when the first Trace Radio Read Meters were installed. The BCWA has installed 16,930 Orion and Trace Radio Read Meters from 1998 to June 30, 2014. In July 2007, the BCWA instituted a Three-Year Meter Modernization Plan to replace the remaining non radio-read meters. Between July 2007 and July 2010 BCWA replaced 8,557 non-radio read meters with Badger Orion Radio Read Meters. This program was funded through a Clean Water Financing loan, for a total cost-to-date of \$1,504,817.09. The BCWA has established a new meter upgrade program that will lead to the retrofit and/or replacement of approximately 6,311 additional meters to equip them with Orion Radio Read technology.

System Production Data & Water Use

The BCWA currently obtains all of its system supply from Providence Water through the East Bay Pipeline. Under the General Laws of Rhode Island, the BCWA is allowed to purchase up to a maximum of 7.5 MGD from Providence Water. Wholesale water purchases totaled 1,180.43 MG for Fiscal Year 2013 with an Average Day Demand (ADD) of 3.23 MGD. Based on a service area population of 49,425, this equates to approximately 65.4 gallons per capita per day (gpcd).

Residential water use has typically made up between 60% and 65% of total water use. The average annual residential water use in the BCWA system was estimated to be 40.7 gpcd for Fiscal Year 2013. This is based on total residential water sales of 734,251,000 gallons and the estimated 49,425 residents. This is consistent with BCWA's calculations of residential average annual water use for other years and meets the State's goal of a maximum of 65 gpcd.

The Maximum Day Demand (MDD) is estimated to be 7.6 MGD for Fiscal Year 2013, based on a MDD to ADD multiplier of 2.36 used in previous studies conducted by the BCWA.

Major Users

The BCWA serves 10 major users. Roger Williams University is by far the largest user, with total water use of over 33 MG in Fiscal Year 2013.

Legal Obligation to Provide Water

The BCWA is authorized to provide water to the residents of Bristol County. The BCWA has no legal obligation to provide water outside of Bristol County and has no specific legal obligation within Bristol County beyond the implied contract with each service connection. The BCWA has an existing contract with Providence Water that allows the BCWA to withdraw up to 7.5 MGD, which is the capacity of the East Bay Pipeline.

Non-Account Water Use

The BCWA has been aggressive in implementing programs that are designed to reduce non-account water (i.e., leak detection, meter replacement, and distribution system rehabilitation). The BCWA had a full leak survey performed in 2013-2014. In 2014, leak detection correlators were purchased to perform leak detection in-house. All leaks that are found are promptly repaired. The BCWA intends to continue to have professional leak detection surveys of 50% of the system each year, supplemented with the in-house leak detection correlators.

These policies and actions have resulted in reducing previously high levels of non-account water to below the statewide goal of fifteen (15%) percent. Non-account water was approximately 13% in Fiscal Year 2013. Similarly, leakage was estimated to be 9.5% of total water in the system for Fiscal Year 2013, meeting the State's goal of 10%.

Water Conservation Program

The BCWA has also aggressively pursued water conservation programs to minimize as much as possible elevated maximum day demands. These programs, along with a water rate structure that

is specifically designed to discourage inefficient uses of water, have resulted in one of the lowest per capita residential water rates in the State.

Informational flyers are distributed at the Administrative office. Schools can schedule tours of the water treatment plant, during which informational materials are distributed to all participants. Area schools can also request an in-school presentation by BCWA personnel. The BCWA also conducts an annual calendar/poster contest and an annual essay contest that corresponds with National Drinking Water Week.

WATER QUALITY PROTECTION AND MANAGEMENT

The Bristol County water system was historically supplied by treated groundwater from the Nayatt Road well field in Barrington and surface water treated at the Child Street WTP in Warren. Now, the system is entirely supplied by wholesale water from Providence Water. The BCWA collects water quality protection charges and remits them to the RI Water Resources Board and Providence Water, as required, in accordance with the Public Drinking Water Protection Program (RIGL 46-15.3).

The BCWA completed a Water Quality Protection Plan (WQPP) which was last updated in 2001. The WQPP along with the policies of the State of Rhode Island; the Towns of Barrington, Bristol and Warren in Rhode Island; the State of Massachusetts; and the Towns of Swansea and Rehoboth in Massachusetts provide the basis for protection of the watershed and water supply management actions.

The following are ongoing programs for protection of the watershed and recharge area:

- Management and maintenance of land owned by the BCWA within the watershed areas;
- Maintaining a liaison with enforcement agencies dealing with various aspects of control in the watershed such as local police, planning, zoning and health boards, EPA and Rhode Island Department of Environmental Management, Massachusetts Department of Environmental Protection, and local conservation commissions as applicable;
- Participation in public meetings regarding planning and zoning for all land in the watershed area; and
- Involvement with all federal and state agencies and all adjacent Rhode Island and Massachusetts towns regarding any aspects of land use that may affect water quality.

The WQPP further identifies the vulnerability of the sources of water to contamination from ongoing land uses and indicates the BCWA's utilization of the funds available from the Water Quality Protection Fund to purchase land and/or development rights and the implementation of other programs to reduce inappropriate flows to water resources. The BCWA's goal is to minimize potential deterioration of the raw water quality in the surface water (and groundwater) sources so that they remain in a suitable condition for system supply in the event they are needed.

The Town of Rehoboth has established a Water Resources Protection District through much of the town that includes a large part of the Shad Factory Watershed. Both the Anawan Reservoir and Shad Factory Reservoir are located in Rehoboth. The town also established a bylaw that strictly controls land use. The town's Land Use Plan allows for very low density residential development in undeveloped parts of the district, which appears to be generally consistent with current land use in this part of the town.

The Town of Swansea established an Aquifer Protection District which incorporates large parts of the watershed to the Swansea Reservoir and Kickemuit Reservoir. Also, the Town of Warren established a watershed protection overlay district for the Kickemuit Reservoir in 1997. The overlay district prohibits land uses that might be harmful to water quality of the reservoir while establishing development standards and requiring site plan review for most types of development. The Warren Comprehensive Community Plan sets a policy to "preserve and protect the Kickemuit Reservoir and its watershed and tributaries for continuing use as a public drinking water supply and as a natural and scenic resource" through the following actions:

- Maintain input to the BCWA to retain and preserve the Kickemuit Reservoir and the rest of system as the primary or backup water supply;
- Protect the watershed through rezoning, performance and development standards, purchase of development rights, and/or outright purchase; and
- Work with neighboring Towns in protecting the watershed.

Other measures implemented to maintain and protect raw water quality are summarized below.

<i>Actions to Date</i>	
Patrol watershed and groundwater recharge areas	When the system was in operation, the BCWA personnel made daily inspection rounds of the watershed areas; this work is on-going in a reduced capacity.
Acquiring Land or Development Rights in Watershed	BCWA has identified 265+ acres of land in the surface water watersheds strategic to water quality protection. With the funding available from the Water Quality Protections programs, BCWA has purchased approximately 88 of these strategic properties, including a 0.8-acre parcel in Warren in recent years. Detailed information on the exact properties is on file at the RIWRB.
Regulatory protective actions	<p>In a joint effort with Swansea, new fencing with a remote control gate was installed, which prohibits public vehicles from direct access to the property and water body of the Swansea Reservoir.</p> <p>Fencing has been installed around farm properties along the Kickemuit Reservoir to restrict and control access of farm animals to the water body.</p> <p>BCWA continues to monitor activities in the Town of Barrington to ensure that development over the groundwater recharge area is in accordance with best practices in the event of future use of the Nayatt Road wells, though redevelopment of this source is considered unlikely and economically infeasible at this time.</p>
Other watershed protection activities	<p>Fish ladders at Shad Factory Reservoir and the Kickemuit Reservoir were constructed in 2002 and are in full operation.</p> <p>Performed required upgrades and repairs at the Anawan Dam in 2014.</p> <p>The BCWA continues to monitor activities surrounding the Massachusetts watershed area and any proposed development in the area in the Towns of Swansea and Rehoboth, MA. The BCWA plays an active role in Town meetings relating to existing conditions or future development.</p>

The WQPP identified potential sources of contamination for the source waters. While the WQPP has not been updated since 2001, the 2003 Source Water Assessment Plan (SWAP) prepared by the University of Rhode Island included a review and inventory of potential contaminant sources to the surface water and ground water supplies of the BCWA. While the BCWA has not updated the 2003 SWAP prepared by URI, many of the conditions and concerns of that plan are believed to exist today. The BCWA is not aware of any new or potential point sources of contamination. Through constant monitoring and observations by BCWA staff and testing by the RIDOH, indications are that potential point sources of contamination are gradually being reduced through regulatory actions, purchase of watershed properties and the installation of facilities to control direct access to the water bodies.

However, the TMDL study by the RIDEM in 2006 listed the Kickemuit Reservoir as impaired as a drinking water supply due to excessive levels of phosphorous, pathogens, turbidity, excess algal growth and taste and odor. The largest sources of bacteria and phosphorous for the reservoir are thought to be failing onsite wastewater treatment systems, unmanaged runoff from agricultural operations along the upper portions of the Kickemuit River. Fertilizers and sediment from tilled cropland are potential pollution sources but actual impacts are highly variable and can be minimized with good farming practices. Sewers in the RI portion of the Kickemuit River help to reduce the risk of contamination from wastewater, provided that these systems are operated and maintained to standards. Other potential sources of bacteria and phosphorus identified in the TMDL study included piped input from the Shad Factor Reservoir and stormwater runoff, agricultural in areas directly adjacent to the main branch of the river in both Massachusetts and Rhode Island. Waterfowl and wildlife are also suspected to be contributing bacteria and phosphorous to the shallow river.

SUPPLY MANAGEMENT

Supply sources currently available to the BCWA include the interconnection with Providence Water, which has a rated capacity of 7.5 MGD, BCWA's four reservoirs, which have a combined safe yield of 3.4 MGD, and three interconnections with the East Providence Water Department (EPWD). Raw water from the reservoirs has historically been treated at the Child Street WTP, which has a rated capacity of 4.0 MGD. While the Providence Water connection has sufficient capacity to meet system demand, the production capacity of the Child Street WTP does not. Additionally, the supply that is actually available from the treatment plant (1.5 MGD) is effectively far less than its rated capacity, due primarily to the age of the plant and the difficulty it has at meeting current drinking water standards. The operation of the treatment plant was discontinued in 2011. It is being maintained as an emergency supply.

Each of the Massachusetts surface water supplies has very limited capacity, totaling 307 million gallons. The Kickemuit Reservoir in Warren provides only another 35 million gallons. In comparison, the Scituate Reservoir has 41 billion gallons of storage while the reservoirs used by the Pawtucket Water Supply Board (PWSB) total 4.1 billion gallons. Before the Providence Water connection was placed into service, the water customers now served by the BCWA experienced numerous restrictions on water use, especially during drought periods.

Water quality and maintenance of the watersheds associated with the BCWA reservoirs present other issues. The reservoirs themselves are surrounded by vegetation, allowing for the decomposition of leaves and other organic materials to contribute to high NOMs (natural organic materials) in the water supply. This is especially true since the reservoirs are such small bodies of water. NOMs are very difficult to remove by most treatment processes and they react with chlorine to form disinfection by-products, possible carcinogens that are strictly regulated by the EPA.

Additionally, the State of Massachusetts has recently passed the Sustainable Water Management Initiative (SWMI), which limits the amount of water withdrawals allowed from existing sources and transfers more responsibility for the watershed to the public water suppliers. This introduces increased maintenance and additional costs for the use and management of the BCWA's three reservoirs in Massachusetts. Similarly, the watershed of the Kickemuit Reservoir is vulnerable to contamination and would require the BCWA to assume control of more land within the watershed to ensure protection of the water quality. The DEM 2006 Source Water Assessment describes the

Kickemuit Reservoir as impaired for the use as a Public Drinking Water Supply in the categories of phosphorous, pathogens, turbidity, excess algal growth, and taste and odor. Attempts to improve this supply would require significant investment and continued operational costs.

The BCWA has determined that the overall limitations of the reservoirs and the costs required to upgrade the reservoirs and their dams, construct a new Shad Factory pipeline and pump station, replace the Child Street WTP, and maintain these components is economically unsustainable while not providing a reliable source of supply. Therefore, it is the BCWA's overall goal to entirely discontinue use of the treatment plant and to cease operation and maintenance responsibilities for the reservoirs, dams, and supply infrastructure to the extent possible. However, a secondary source of supply must be established before this can be implemented, as it would be imprudent to rely solely on the Providence Water connection. It has been determined that a connection to the PWSB can provide an alternate source of supply of high quality water.

The PWSB obtains its supply from the Diamond Hill Reservoir and the Arnolds Mills Reservoir in northern Rhode Island. With a safe yield of 22 million gallons per day, the PWSB recently constructed a 25 MGD water treatment plant. They also constructed new transmission mains, storage, and renovated or replaced most of their transmission and distribution infrastructure. Their customer water use has dropped from 13.5 MGD to 8 MGD, leaving an excess supply of high quality water.

An interconnection would require the construction of a transmission main from the PWSB system through East Providence with capacity of up to 4 MGD for the BCWA, matching the rated design capacity of the Child Street WTP but far exceeding its current operational capacity. The East Providence Water Department has also expressed considerable interest in a connection to the PWSB, as it is adjacent to their system and would provide a redundant, alternate supply to their current connection to Providence Water.

It has therefore been in BCWA's best interest to join the EPWD in studies evaluating the feasibility of constructing the Pawtucket pipeline. The study proposal was submitted to the RIWRB to apply for matching funds provided for water system interconnections (the Pawtucket-EPWD-BCWA interconnection is also listed in the RIWRB Strategic Plan). A study funded by the EPWD, the BCWA and the RIWRB evaluating possible routes, anticipated costs, and treatment requirements for the new transmission main has recently been completed, and the estimated total cost of the project is \$27 million.

The Pawtucket pipeline project has not been funded at this time. The BCWA is still pursuing the project and is evaluating funding sources, and it remains their intent to construct the interconnection and eventually discontinue use of the treatment plant and reservoirs. The Child Street WTP is maintained and operated monthly so that it remains operational in the event it is needed during an emergency, but BCWA envisions permanently taking it offline upon operation of the new transmission main. Demolition costs are estimated at \$1.8 million.

In the meantime, the WTP and supply reservoirs must be maintained in an operational condition to provide a redundant source of supply to the Providence Water connection in the case of an emergency. In addition, the Anawan Club, the owner of the Anawan Dam, has filed a lawsuit against the BCWA and the RIWRB to provide repairs and upgrades to the dam to meet present standards. As stated before, the design work has recently been completed with construction begun in 2014. The Anawan Reservoir is not an essential source of supply when compared to the other reservoirs in the BCWA system, and the BCWA proposes to discontinue the contract with the Anawan Club upon completion of dam rehabilitation. The maintenance of the three remaining dams will be continued at least until the new connection to the PWSB is completed.

Anticipated Future Demands

Water use projections for the 5-year and 20-year planning periods are summarized below. These estimates are based on current water use, the estimated per capita water use, and population projections for the next 20 years. Both Average Day Demand (ADD) and Maximum Day Demand (MDD) are presented. The MDD to ADD peaking factor has been estimated at approximately 2.36 by previous studies performed by PARE for the BCWA.

	ADD	MDD
Current (2013)	3.2 MGD	7.6 MGD
5-Year (2018)	3.5 MGD	8.2 MGD
20-Year (2033)	3.6 MGD	8.5 MGD

The BCWA serves virtually the entire population of the County, which had a population of 49,475 according to the 2010 US census. The service area population was estimated to be 49,425 residents. The county’s population in 2010 decreased from the population reported in 2000,

which was 50,648 residents. It is also less than the population that had been projected for 2010, which was 51,596 residents.

It is likely that the recent decrease in population is due in part to the prolonged poor economic conditions in Bristol County and throughout the State as a whole. While population has migrated out of Bristol County, it has been coupled with relatively little new development. As the economy starts to recover, population may resume the upward trend that had once been predicted. For the purposes of water system planning, the BCWA is estimating that the population that had once been projected for 2010 (i.e., 51,596 residents) will be reached in the 5-year planning period (FY2018) of this WSSMP and the population projected for 2030 (i.e., 54,026 residents) will be reached in the 20-year planning period (FY2033). These projections also assume that the BCWA will serve all eligible residents of Bristol County, which may or may not occur.

Available Water

The BCWA currently obtains all of its water from the Providence Water connection, which has a capacity of 7.5 MGD. The BCWA maintains the Child Street WTP as an alternative supply capable of providing 1.5 MGD. Available water sources are sufficient to meet the current and anticipated future ADD and MDD of the system. Also, a 4.0 MG connection to the PWSB being pursued by the BCWA, in lieu of and as a replacement to the Child Street WTP, would increase total available supply to 11.5 MGD. Each of these wholesale connections would individually have the capacity to meet the current and future anticipated ADD and the Providence Water and PWSB connections would collectively meet the anticipated MDD.

DEMAND MANAGEMENT

Demand Management consists of conservation measures which achieve long-term water savings by providing incentives and technical assistance to the customer base as a means of improving water use efficiency and reducing waste. The *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers* (Act), enacted in 2011, set a number of demand management goals, including the following:

1. Residential average annual water use of 65 gallons per capita per day (gpcd);
2. Efficient outdoor water use;
3. Efficient indoor water use;
4. A full accounting of non-billed water;
5. Leakage of no more than 10%; and
6. Accurate metering and billing.

In addition, the Act established required methodologies that must be employed in an effort to meet these goals, including:

- Initiating a program to accomplish 100% metering of all water delivered by December 31, 2012, as specified in R.I. General Laws §46-15.3-22(b);
- Initiating a program for the maintenance and replacement of meters by December 31, 2012, as specified in R.I. General Laws §46-15.3-22(b);
- Initiating a program for installing radio frequency reading systems by December 31, 2012, as specified in R.I. General Laws §46-15.3-22(b);
- Recording metered usage and bill quarterly or more frequently by December 31, 2013, as specified in R.I. General Laws §46-15.3-22(c);
- Educating customers in regards to efficient water use;
- Establishing rate structures that are adequate to fund all water supply costs, are equitable, sensitive to economic impacts, and encourage efficient water use, per R.I. General Laws §39-15.1-3 or §45-39.1.5 as applicable; and

- Implementing leak detection programs in accordance with AWWA standards and initiating a system-wide leak detection program if leakage is more than 10% of the water purchased.

The BCWA is generally in compliance with the Act. The average annual residential per capita water use has historically been below the required 65 gpcd, and was estimated to be 40.7 gpcd for Fiscal Year 2013. Unaccounted-for water was estimated to be 13% and leakage was estimated to be 9.5% in Fiscal Year 2013. The BCWA has been aggressive at performing leak detection surveys and repairing leaks when they are identified.

The BCWA uses a five-step increase/decreasing/increasing block rate structure based on consumption and is transitioning to a three-tier inclining block rate structure. BCWA's water rates currently do not differentiate between residential and non-residential uses. The rate structure is such that it adequately funds operation and maintenance of the system while encouraging conservation without deterring commercial and industrial growth.

The BCWA had also offered the direct installation of water conservation retrofits to all of the residences in the service area. The kits consisted of low-flow showerheads, faucet aerators, toilet dams or displacement bags, and dye tablets to identify leaks. Starting in 1993, the BCWA supplied approximately 2,000 retrofit kits to the residential customer base.

The BCWA emphasizes educational and informational water conservation programs. The WATERHOG program provided water conservation educational and informational programs in schools, for other agencies and organizations, and to the general public. The BCWA also developed and instituted a Major Users Technical Assistance Program (MUTAP) in January 2008 and provided guidance to the major users in the system.

SYSTEM MANAGEMENT

Water conservation practices involving system management initiatives are directed at improving the efficiency of, and reducing waste in, the production and distribution of water within a supply system. Such practices are necessary to ensure that the physical components of the water system are properly operated and maintained. Goals of system management include the following:

- Minimizing non-account water and endeavoring to limit it to below 15% of total system demand, in accordance with State Guide Plan Element No. 721;
- Maintaining leakage at a rate below 10% of system demand and instituting leak detection and repair programs, if required;
- Establishing a preventative maintenance program;
- Maintaining compliance with RIGL Chapter 46-13: *Public Drinking Water Supplies*; and
- Maintaining compliance with applicable requirements of the *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers*.

In general, the BCWA manages the water system to meet the charge of the Bristol County Water Supply Act (RIGL Chapter 46-15.5). The BCWA provides for the potable water needs of the residents of Bristol County and operates and maintains the system in accordance with all regulatory requirements and industry standards. In doing so, the general functions of the BCWA are to collect, store and protect the quality of raw water supplies; efficiently transmit the raw water to the treatment facilities; efficiently and effectively treat the raw water so that the water quality, at a minimum, meets all of the regulatory requirements of the Safe Drinking Water Act; efficiently distribute the treated water to the consumers in the quantities demanded and fairly proportion the costs of operations to the users.

Meter Installation, Maintenance, and Replacement Plan

The BCWA meters 100% of the water delivered to the system, as well as the water that is used internally by the BCWA. Water used for fire-fighting and system maintenance, such as water main flushing, is not metered but the BCWA estimates this usage to the degree possible. There are currently 16,953 active metered accounts in the system. Customer meters range in size from 5/8 inch to 6 inch and are all owned by the BCWA.

The BCWA maintains an active replacement/calibration program for all large meters on a biannual basis and for small meters on a 15-year cycle. The BCWA has been actively modernizing its meter reading technology since 1998, when the first Trace Radio Read Meters were installed. The BCWA has the capability of testing all size meters in-house. For large meters (i.e. greater than two (2) inches), the BCWA uses a calibrated meter to conduct the testing at the site of the meter. Because the BCWA reads water meters frequently (monthly or quarterly), tests are conducted when meter readings indicate a consumption rate substantially inconsistent with the consumption in previous periods. Residential meters are tested at a customer's request, or in the event of inconsistent water use that cannot be reconciled in any other way.

Master meters are located at the Child Street WTP, Barrington Booster Pump Station, the Pawtucket Avenue interconnection with East Providence, and on the East Bay Pipeline connection to Providence Water at the Columbia Park site in Providence. The master meters at the Child Street WTP measure raw water entering the facility as well as finished water production. Master meters are read daily and tested and calibrated biannually.

Leak Detection and Repair Plan

A professional leak detection survey was performed on the water system in 2013. The entire distribution system was surveyed and a total of fifty one (51) leak points were identified. A total of 15 leaks were discovered on water mains while 27 leaks were on services, 13 of which were the BCWA's responsibility to repair. All leaks discovered on BCWA mains and services were repaired immediately, while customer-owned service lines were allowed a limited period of time for repair. There were also 9 leaks discovered on hydrants and valves.

The BCWA purchased new leak detection equipment in 2014 and are performing leak detection surveys with their own trained employees. Correlators are used between valves to detect noise signals that indicated a leak. When leaks are discovered, they are promptly repaired. The BCWA is planning to have a professional survey of one-half of the system performed each year, to be supplemented with the in-house correlator leak detection system.

The potential for leakage on the East Bay Pipeline is evaluated on a regular basis. There are meters at the Columbia Park, East Providence Emergency pump station, and Nayatt Road pump station locations. These meters are tested and calibrated on an annual basis. Meter readings from

each location are compared to identify any significant variance. To date, identified variances are within the acceptable range of meter accuracy and no leakage is suspected.

Preventative Maintenance

The BCWA operates its facilities in accordance with industry standards. Maintenance and repair procedures, including preventative maintenance programs, are specifically identified for the purpose of interruption-free service to the system users to the extent possible. Redundancy and back-up facilities are designed into the systems to the extent it is cost-effective in order to minimize interruptions in service. Elements of the system that affect service and require repair (e.g. water mains that leak or break) are addressed expeditiously, regardless of time or weather, in order to minimize the period that any customer may be without water.

The BCWA conducts ongoing Preventative Maintenance programs in accordance with best management practices. Staff conducts daily inspections of all pump stations, storage facilities, and watershed properties. Equipment such as pumps, generators, and treatment systems are maintained in accordance with manufacturer's recommendations. Fire hydrants are inspected annually.

Inspections and repairs have been recorded via work orders and daily log books. The BCWA has recently purchased, and is implementing, a sophisticated work order/asset management software package that will allow the BCWA to more efficiently schedule and record preventative maintenance work.

EMERGENCY AND DROUGHT MANAGEMENT

The Emergency management section of the WSSMP establishes the general guidelines for responding to most probable emergencies based on a review of potential emergencies and risks. The procedures outlined are consistent with the goals of the State Emergency Water Supply System Management Plan. The intent is to provide guidance to ensure that the primary aspects of recovery from an emergency are addressed in an organized manner to aid in an efficient response and in maintaining drinking water of a high quality and quantity. The BCWA Emergency Response Action Plan provides a full discussion with regard to potential emergencies and corresponding responses.

The BCWA maintains an up-to-date inventory of critical spare parts and performs preventative maintenance/testing on all equipment at a minimum of twice yearly. The BCWA has a 24-hour, 7-day emergency telephone number (401-245-5071). BCWA personnel are also on call 24 hours a day, 7 days a week for emergencies and are required to respond within an hour of receiving an emergency call-out. The BCWA is a member of the Rhode Island Water/Wastewater Agency Response Network (RIWARN), which can provide emergency back-up if needed.

Drought is one specific type of emergency that is treated separately, as it can impact the system over an extended period of time. The BCWA currently obtains all of its supply from Providence Water, with its own supplies actively maintained so that they are available in emergencies. The BCWA works in conjunction with Providence Water to aid in drought management through demand management and system management activities.

The direct effects of drought on the BCWA system potentially include:

- Reduction of available wholesale water from Providence Water;
- Reduction of Providence Water's surface water levels which can adversely impact water quality in addition to water quantity;
- Reduction of BCWA's surface water levels which can limit their use in emergencies; and
- Reduction of operating income due to reduced deliver of water.

The five phases of drought consistent with the Drought Watch/Warning System of the National Weather Service, are:

- Normal
- Advisory
- Watch
- Warning
- Emergency.

Drought conditions are evaluated on a regional basis across the state and are assigned based on conditions represented by major hydrologic indices, including precipitation, groundwater levels, stream flow, and the Palmer Drought Index. The RIWRB and Drought Steering Committee evaluate the major hydrologic indices and adjust drought levels both statewide and on a regional basis, accordingly. The BCWA coordinates with each town in Bristol County when drought conditions impact the water system.

The BCWA has identified four water quantity tiers in its Emergency Response Action Plan. Water use reductions correspond to Tiers 2-4 water quantity conditions based on the severity of the drought or emergency, as follows:

1. Tier 1 – 3.6 MGD – Approximately the ADD of the BCWA water system;
2. Tier 2 – 2.5 MGD – A 30% reduction from Tier 1 water quantity, first stage of water use restrictions imposed under drought management;
3. Tier 3 – 1.8 MGD – A 50% reduction from Tier 1 water quantity, second stage of water use restrictions imposed under drought management; and
4. Tier 4 – 0.1 MGD – An extreme drought emergency in which water use is restricted to only basic health and sanitary needs (approximately 2 gallons per person per day).

The BCWA will take steps to restrict water use to these tiered conditions in the event of a drought or emergency, in accordance with the Emergency Response Action Plan.

IMPLEMENTATION PLAN

An Infrastructure & Capital Plan (ICP) was developed by the BCWA in October 2012 for the purpose of identifying key infrastructure upgrades necessary to maintain water quality and pressure throughout the system. Major infrastructure upgrades can generally be characterized as the cleaning and lining or replacement of cast iron mains; upgrades to storage tanks and improving water storage operations; upgrades to pump stations; installation of control and monitoring systems; institution of a unidirectional flushing program; and continuing current maintenance programs, such as leak detection and routine meter replacement.

Two large scale capital improvement projects are anticipated by the BCWA and have been included in the 2012 ICP. One of these projects is the construction of the Pawtucket pipeline interconnection to the PWSB, which has been estimated to cost \$27 million. A study evaluating possible routes, anticipated costs, and treatment requirements for the new transmission main was recently completed. The next step would be performing design and permitting, identifying funding sources, and proceeding to bidding and construction. It is anticipated that the new transmission main could be completed and put into service as early as 2018.

The other major capital improvement project is the expansion of the high service area. A hydraulic evaluation performed in 2011 identified that low pressure and resulting fire flow issues in parts of the Main Service Area in Bristol and Warren that are at a relatively high ground elevation could be rectified through incorporating them into the High Service Area. Expansion of the system's high service area will require piping modifications, estimated to cost \$7 million, and the construction of a new pump station to transfer water from the Hope Street standpipe to the Metacom Avenue storage tank. The pump station is estimated to cost \$600,000.

The 20-year ICP follows this page.

Insert 20-Year ICP

FINANCIAL MANAGEMENT

Operating income and expenses include the following parameters:

Revenue

- Annual Water Rate Revenue – includes all income received from customers as service charges, water consumption fees and fire protection charges.
- General Facility Charge Revenue – Not used
- Special Assessment Revenue – Not used
- Capital Funds – Contributions and/or Grants in aid of construction projects
- Reserve Fund Revenue – Not used
- Other Earned Revenue – Interest Income
- Other Unearned Revenue – Not used

Expenses

- Debt Service on Bonds – Revenue that has been used to pay the interest on outstanding bonds for previously completed capital improvements.
- Operation and maintenance expenses – Revenue that has been used to pay:
 - Salaries and benefits
 - Materials and supplies
 - Repair and maintenance
 - Miscellaneous expense
 - Utilities
 - Administrative expenses
 - Depreciation
- Purchasing water from Providence, via the East Bay Pipeline: currently the water charge for purchasing water from Providence is \$1,731 per million gallons.
- Other Expenses – Loss on abandonment of distribution mains and maintenance of the East Bay Pipeline.

Outstanding Debt

Income earned from revenue and expenses has been used, in part, to pay the principal on outstanding debt. The total outstanding long-term indebtedness of the BCWA as of February 28,

2014 is \$14.8 million. The BCWA lowered its long-term outstanding debt by \$2.6 million, or about 15%, during Fiscal Year 2014.

Current Rates & Rate Structure

Water rates, which are established by the BCWA Board of Directors, include a service charge based on meter size and a consumption charge. The rate structure is a five-step increasing/decreasing/increasing block structure applied to all customers, regardless of the type of account (i.e. residential, commercial, etc.). This rate structure is designed to promote efficient use of water for the residential sector without penalizing the commercial and industrial sector where water use may be higher and is oftentimes directly correlated to business operations.

The BCWA had a rate study performed in 2013, which recommended a modification of the 5-tier rate structure to a 3-tier rate structure with a separate rate for commercial customers. The BCWA is looking to restructure the 5-tier rate once the new billing system is fully functional.

Current water use rates are summarized in the following table and went into effect on March 1, 2014 for Fiscal Year 2015. Water use rates for Fiscal Year 2014 are also included for comparison.

Per 100 Cubic Foot Usage Charge				
	Monthly	Quarterly	FY2014	FY2015
For the first:	500 CF	1,500 CF	\$2.984	\$3.103
For the next:	1,000 CF	3,000 CF	\$8.432	\$8.769
For the next:	8,500 CF	25,500 CF	\$6.422	\$6.679
For the next:	20,000 CF	60,000 CF	\$2.984	\$3.103
All Over:	30,000 CF	90,000 CF	\$3.865	\$4.020

Service Charge				
	Monthly		Quarterly	
	FY2014	FY2015	FY2014	FY2015
5/8"x3/4" Meter:	\$22.88	\$23.80	\$68.63	\$71.38
3/4"x3/4" Meter:	\$34.35	\$35.72	\$103.05	\$107.17
1" Meter:	\$57.25	\$59.54	\$171.76	\$178.63
1 1/2" Meter:	\$114.47	\$119.05	\$343.43	\$357.17
2" Meter:	\$183.15	\$190.48	\$549.43	\$571.41
3" Meter	\$343.43	\$357.17	\$1,030.36	\$1,071.57
4" Meter	\$572.37	\$595.26	\$1,717.11	\$1,785.79
6" Meter	\$1,144.79	\$1,190.58	\$3,434.30	\$3,571.67
8" Meter	\$1,831.63	\$1,904.90	\$5,494.84	\$5,714.63
10" Meter	\$2,632.98	\$2,738.30	\$7,898.84	\$8,214.79

65 Yrs/Older Rate:	\$17.53	\$18.45	\$52.57	\$55.32
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Private Fire Services				
	Annual		Quarterly	
	FY2014	FY2015	FY2014	FY2015
4" or Smaller	\$444.04	\$461.80	\$111.01	\$115.45
6"	\$998.99	\$1,038.95	\$249.75	\$259.74
8"	\$1,776.30	\$1,847.35	\$444.08	\$461.84
10"	\$2,775.59	\$2,886.61	\$693.92	\$721.68

Public Fire Hydrants	\$400.00	\$400.00	\$100.00	\$100.00
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The rates for Fiscal Year 2015 represent an average increase of 4% from the previous year's rates, while Fiscal Year 2014 rates were approximately 11% higher than rates in Fiscal Year 2013. Rate increases have been enacted to raise revenue for the cost of planned capital improvement projects, in accordance with the BCWA's 20-Year ICP, as well as to account for an increase in the wholesale rate charged by Providence Water.

Billing Frequency

Currently the BCWA reads meters and bills customers as follows:

- Residential accounts – Quarterly
- Small Commercial accounts – Quarterly
- Large Commercial accounts – Monthly
- Public accounts (Governmental) – Monthly & Quarterly
- Industrial accounts – Monthly & Quarterly

Bills are due when rendered and collections of the bills are actively pursued.

COORDINATION

The BCWA is the legal organization that has been established to provide potable water to the service area of Bristol County, which includes the Towns of Barrington, Bristol and Warren. The BCWA has reviewed the appropriate sections of each of the Towns Comprehensive Plans and has provided information to the Towns as applicable. Letters from each town stating BCWA coordination with local comprehensive plans will be submitted after they have indicated that their review of the WSSMP is complete.

The BCWA also actively coordinates with neighboring water systems. The BCWA is pursuing a potential connection to the Pawtucket Water Supply Board system and maintains three emergency interconnections with the East Providence Water District. Also, the BCWA is coordinating with the Town of Swansea about the feasibility of transferring water from their water system in case of an emergency, perhaps as much as 1.5 MGD. The BCWA is currently rehabilitating the 8" water main in Child Street in the event this connection proves feasible.