

**TOWN OF JAMESTOWN  
DEPARTMENT OF PUBLIC WORKS  
WATER DEPARTMENT**

**WATER SUPPLY SYSTEM MANAGEMENT PLAN  
5-YEAR UPDATE**

**EXECUTIVE SUMMARY**

PREPARED FOR:

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WATER RESOURCES BOARD  
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## EXECUTIVE SUMMARY

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 the Act.

The Jamestown Water District (JWD), as a water purveyor supplying over 50 million gallons (MG) of water a year, is responsible for updating its WSSMP every 5 years. This WSSMP update has been prepared to be consistent with the goals of the Rules as well as the strategies and goals articulated in the RIWRB’s 2012 Strategic Plan and the RIWRB’s Water Use and Efficiency Rule for Major Water Suppliers. It is also consistent with the goals of State Guide Plan Element No. 721 – RI Water 2030 and the goals stipulated in the Comprehensive Plan for the Town of Jamestown.

### ***Background***

The JWD was established by legislation of the General Assembly of the State of Rhode Island in March 1969. The original system, privately developed and owned, dated back to 1890. The source of supply was derived from two surface water storage impoundments, the North and South Ponds, constructed in 1901 and 1909, respectively. North Pond was expanded to increase overall capacity in the early 1900s. The JWD, to this day, continues to derive its primary source of supply from North Pond.

A conventional water treatment plant was originally installed in 1920 and upgraded periodically over time. By the 1950s, the system served approximately 2,000 year-round residents and up to 4,000 seasonal residents. A distribution system and storage tank were in place to serve the southern portion of the island south of Rhode Island Route 138. In 1991, the Town constructed a new pretreatment facility and main treatment plant. The Town has since constructed a new treatment plant to replace the prior facility, which was put into service in 2010.

The main service area for the public water supply is the Village area of Jamestown. The urban district is the area which has historically served as the commercial and residential focus for the island. Public services and facilities have traditionally been located in the Village area. Water service is also supplied to the rural water district, the area to the south of the Village area. Water service connections in the rural water district area are subject to the approval of the Town’s Board of Water and Sewer Commissioners and must be consistent with the Comprehensive Community Plan.

### ***Water System Description***

The JWD supply and distribution system is classified by the Rhode Island Department of Health as a “Community” Public Water Supply System. As such, the system is required to conform to applicable rules and regulations of the RIDOH and the Federal Safe Drinking Water Act (SDWA). The water system currently maintains full compliance with the stipulations of these rules and regulations.

The existing JWD system was developed primarily from the original water supply system that originated in the 1890’s. Improvements to the infrastructure have been implemented over the years to maintain and upgrade the system to keep pace with increasingly stringent water quality regulations. The water quality has consistently been rated as good to excellent with occasional



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exceedances of secondary water quality standards for color and turbidity from the surface water supply of the reservoirs.

The water supply consists of two reservoirs that capture surface water runoff and two supply wells. The North Pond reservoir has a watershed of approximately 192 acres and a water body of 28 acres with a net usable water volume of 51 million gallons. The South Pond reservoir has a watershed of approximately 448 acres and a water body of 7.3 acres with a net useable volume of 8 million gallons. The two reservoirs are interconnected and deliver water to the treatment facility through a 10-inch PVC main. The total maximum safe day yield for North Pond is 194,000 gpd and it is 89,000 gpd for South Pond. Two supply wells, JR-1 (installed 1996) and JR-3 (installed 2004), are each rated for 50,000 gpd though only one can be used at a given time. The JWD also maintains an emergency interconnection (6-inch flexible water line) with the Town of North Kingstown water system across the Jamestown Verrazano Bridge. The interconnection has the capability of supplying the JWD with up to 200,000 gallons daily but is only used for emergencies. It has not been used since 2002.

The system employs a pretreatment facility located at South Pond. This facility pretreats between 180,000 to 350,000 gpd. Pretreatment consists of pH adjustment, chlorine dioxide (ClO<sub>2</sub>) bleaching for odor, color, and taste, and flow monitoring. The main water treatment plant is a new facility that was constructed in 2010, replacing a facility that had been in service since 1991. The new facility was designed to treat up to 500,000 gpd, including raw water from South Pond. It also produces higher quality finished water and reduces backwash water discharges to Great Creek.

Raw water enters the clearwell of the 1991 treatment plant before passing through a screener and then into a chemical mixing tank where it undergoes pH adjustment and coagulant addition. Flow then splits into parallel treatment trains consisting of coagulation basins and membrane filtration basins. Finished water is pumped to the system's two storage tanks by a pump station with two 350 gpm pumps.

The transmission and distribution system consists of upwards of 20.5 miles of asbestos cement, cast iron, and polyvinyl chloride (PVC) pipeline, the majority of which is less than 20 years in age and ranges in size from 6-inch to 12-inch. New and replacement main sections consist predominantly of PVC pipe. The service area is operated as a single pressure zone that is controlled by the overflow elevation (204.0 feet MSL) of two one million gallon storage standpipes. The original standpipe was constructed in 1974 and a second standpipe was constructed in 2007. These tanks establish the hydraulic grade and maintain system pressure in the range of 30 to 60 psi. The tanks are located alongside one another and the useable storage capacity of each tank is estimated at 0.7 million gallons but there is a transfer pump station between the two tanks which effectively increases the usable storage of the two-tank system.

The source and distribution system is 100% metered. The water department staff is responsible for the daily operation and maintenance of the water system that also includes metering and billing of customers. The JWD is operated as an "Enterprise Fund Agency" within the municipal corporation of the Town of Jamestown. The Town has established enterprise funds for operations that are organized to be self-supporting through user charges. It is the intent that all costs of providing the services to the public on a continuing basis be financed or recovered fully through user charges.

The service population is comprised of residential, commercial, and government uses and there are approximately 1,493 metered accounts as of 2016. The service population is approximately 3,184 people, of the roughly 5,472 residents in Town. The remaining residents not serviced by the



public water system are served via private individual wells. Current average day demand (ADD), based on measured water withdrawals from the JWD's supply sources in 2016, is approximately 215,000 gallons per day. Total water withdrawals were 78.65 million gallons in 2016, primarily from North Pond with supplemental withdrawals from well JR-1. On this basis, the maximum day demand (MDD) is estimated to be 430,000 gallons per day using an assumed MDD to ADD multiplier of 2.0.

Actual metered water use in the system was estimated to be 55.42 million gallons in 2016, representing an ADD of 0.152 MGD. The vast majority of total water use, approximately 48.13 million gallons or 87%, was residential water use. Per capita residential water use for 2016 was estimated at approximately 41.3 gallons per capita per day (gpcd) on average, consistent with recent prior years.

***Water Quality Protection Component***

Water quality protection is an important aspect to the JWD as the source of supply continues to be affected by growth, potential pollution sources, and increases in demand. The Source Water Assessment Plan (SWAP) prepared for Jamestown identified North Pond to be at LOW RISK and South Pond to be at MODERATE RISK. These risk ratings were evaluated and appear to remain applicable to the JWD supply.

The Town currently employs zoning ordinances, site plan reviews, and has made numerous land purchases within the watershed and wellhead protection area. It has also created conservation easements for parcels within the wellhead protection area and an overlay district has been established for the Center Island Watershed. The Town also instituted a wastewater management ordinance which specifically addresses onsite wastewater treatment systems (OWTS) in the Jamestown Shores area. The intent of this ordinance is to increase inspection and maintenance requirements on existing OWTS to help protect water resources in order to reduce potential future pressures to extend water service to this area of Town. The Town does not believe extension of water service to Jamestown Shores is feasible based on current available supply.

***Anticipated Future Demands***

The population in Jamestown is expected to rise gradually but modestly over time, and it is anticipated that the population changes in the JWD service area will generally mirror population changes throughout the Town. Future estimates of population for 5-year and 20-year planning periods were made using available US Census data and projections made by the RI Division of Planning. These population projections, as well as their anticipated impacts on future demand, are summarized in the following table.

**Table 1  
CURRENT AND PROJECTED WATER CONSUMPTION RATES**

Year	Total Population in Jamestown	Population Projected in Service Area	Metered/Projected Water Usage			Average Day Demand*
			Residential	Commercial	Government	
2016	5,451	3,184	48.13 MG	5.45 MG	1.84 MG	0.152 MGD
2021	5,487	3,268	49.22 MG	5.90 MG	2.0 MG	0.156 MGD
2036	5,675	3,456	52.10 MG	7.26 MG	2.3 MG	0.169 MGD

\* Based on consumption alone (i.e. non-account water not included)



Residential water use for the 5-year period was projected based on a service area population of 3,268 people and an average per capita residential water use of 41.3 gallons per capita per day (gpcd), equivalent to the average per capita residential water use for 2016. Only modest population growth is expected over this timeframe and residential water use is anticipated to remain relatively consistent. Similarly, residential water use for the 20-year planning period was projected based on a service area population of 3,456 and 41.3 gpcd. This assumes that efficient residential water use continues to be a priority in Jamestown.

Commercial and governmental water usage for the 20-year planning period was projected to be equivalent to the highest use rates over the previous 10 years. Commercial water use was 7.26 MG in 2005 and governmental water use was 2.30 MG in 2009. Estimates for the 5-year planning period were made assuming a steady, constant increase from 2016 to 2036. Water use by the commercial and government sector in Jamestown has declined over time, and relatively little commercial and governmental development is expected in the JWD service area or in Jamestown as a whole.

The JWD has traditionally used a maximum day to average day peaking factor of 2.0 to estimate maximum day demand (MDD) in the system. Table 2 shows the current ADD and MDD as well as projections for the 5-year and 20-year planning periods, based on consumption.

**Table 2  
CURRENT AND PROJECTED AVERAGE DAY & MAXIMUM DAILY DEMANDS**

YEAR	AVERAGE DAY DEMAND*	MAXIMUM DAY DEMAND**
2016	0.152 MGD	0.304 MGD
2021	0.156 MGD	0.312 MGD
2036	0.169 MGD	0.338 MGD

\* Based on consumption along (i.e. non-account water excluded)

\*\* Estimated using MDD to ADD ration of 2.0

Projected estimates for water produced have been made assuming 15% non-account water, consistent with State goals. Therefore, the ADD and MDD based on water production are estimated to be 0.18 MGD and 0.36 MGD, respectively, for the 5-year planning period. Similarly, the ADD and MDD are estimated to be 0.19 MGD and 0.39 MGD, respectively, for the 20-year planning period. It is noted that non-account water currently exceeds 15% but it has met the State's goal of 15% in the past.

***Available Water***

The primary supply for the JWD is surface water from North Pond, supplemented with water from South Pond. The capacity and safe yield of North and South Ponds, based on the most recent safe yield analysis performed in 2000, is as follows:

<u>Reservoir</u>	<u>Area</u>	<u>Capacity</u>	<u>Safe Yield</u>
North Pond	27.5 Acres	70 MG	194,000 gallons/day
South Pond	7.3 Acres	8 MG	89,000 gallons/day



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South Pond has not been used for a number of years due to water quality concerns. The new treatment plant was designed with the ability to treat water from South Pond, but the treatment process is inefficient due to the amount of sludge generated.

The JWD also has two supply wells, JR-1 and JR-3, which have a 50 gpm pumping capacity and safe yield of 50,000 gallons per day. Only one well is used at a given time, typically JR-1. Well JR-1 is generally only used during the summer months when demand is high and at or exceeding the safe yield of North Pond. The JWD's emergency interconnection with North Kingstown has a capacity of 200,000 gallons per day but this is reserved for use during emergencies and has not been used since 2002.

The current and projected future MDD, as well as the ADD during the peak summer season, exceed the safe yield of North Pond and often exceeds the combined safe yield of North Pond and JR-1. The JWD has taken a number of actions to manage demand, which is reflected by the decreases in water use when compared to previous versions of this WSSMP. However, it is imperative that the JWD continue to promote efficient water use, monitor land use and development within the service area, reduce leakage, improve their understanding and accounting of non-account water, and implement other demand management strategies to reduce pressures on the supply sources currently available to the JWD.

#### ***Demand Management***

The *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers*, adopted May 16, 2011, established efficient water use targets for major public water suppliers, which includes the JWD. The JWD's 2012 Demand Management Strategy, and this update of the WSSMP, showed that the JWD is in general compliance with the residential average per capita water use goal of 65 gpcd, which was most recently estimated at 41.4 gpcd for 2016.

The JWD estimates non-billed water from various uses, such as firefighting, system flushing, and use at the treatment plant and meets the metering and billing requirements stipulated in the Act, including quarterly billing for the entire system and the use of radio-read meters. The JWD has also promoted efficient indoor and outdoor water use through offering residential retrofit kits, rebates for use of water efficient appliances, and providing educational materials to the customer base.

The 2012 Demand Management Strategy estimated average leakage in the distribution system to be approximately 8.6% of system-wide water use, meeting the State's goal of 10%. However, recent estimates of leakage as reported in this WSSMP are significantly higher, estimated at about 17.4% for 2016 based on 13.7 MG of estimated leakage. This drastic change in estimated leakage suggests that there may be other sources of non-account water that are not being adequately accounted for and estimated. The JWD will perform a leakage study, will continue to assess leakage rates, and will review their accounting of non-billed water as a whole.

#### ***System Management***

The major goals of system management include the following:

- Maintaining non-account water use to below 15% of total system demand, in accordance with State Guide Plan Element 721;
- Reducing leakage to below 10% of system demand;
- Establishing a preventive maintenance program; and
- Maintaining compliance with the applicable requirements of the *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers*.



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The JWD shall continue to employ proper system management procedures including programs for meter management (source and distribution), leak detection and repair, implementation of their preventive maintenance plan, infrastructure rehabilitation, and a billing rate schedule which promotes efficient and non-wasteful water use. It is intended that the financial management of the system will be one in which normal operation, maintenance, and rehabilitation will be funded through operating revenue from the customer base. Where possible, the JWD shall seek alternate funding sources such as State and Federal grants, for major improvement projects.

### ***Emergency Management***

The Emergency Response Section of this WSSMP was reviewed and modified accordingly as part of this WSSMP Update. The Emergency Response section generally establishes the following:

- Responsibilities and authority within the JWD for responding to most probable emergencies;
- Most probable causes for emergencies and their potential impacts to the system;
- System components that are vulnerable to damage or incapacitation based on the most likely causes for emergency; and
- Specific tasks for carrying out functional and constructive solutions based on a review of the potential emergencies and the associated system risks.

The procedures outlined are believed to be consistent with the goals of the State Emergency Water Supply System Management Plan. In addition to emergency response, it is also intended that this section of the WSSMP 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 quality and quantity.

### ***Drought Management***

The JWD recognizes the Drought Watch/Warning System of the National Weather Service, as follows:

1. Normal;
2. Advisory;
3. Watch;
4. Warning; and
5. Emergency

The Water Resources Board administers these phases with aid from the Drought Steering Committee. The JWD takes a variety of demand and supply management actions based on the various stages of drought. The JWD also monitors the water levels in their own supply sources and takes a series of actions in the distribution system based on these measurements, as follows:

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|--------|--|
| Step 1 | <u>Capacity to -6" below capacity</u><br>No restrictions   |
| Step 2 | <u>-6" to -1' below capacity</u><br>Public notification – voluntary conservation.                    |
| Step 3 | <u>-1' to -2' below capacity</u><br>Restrict outside water use to odd/even days for residential use. |



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- Step 4      -2' to -3' below capacity  
Reduce water pressure 5 psi.  
Continue public notification for voluntary conservation.
- Step 5      -3' to -3.5' below capacity  
Reduce pressure 5 psi.  
Establish a residential ban on car washing and lawn watering.  
Restrict swimming pool filling.
- Step 6      -3.5' to -5' below capacity  
Ban outside water use entirely.
- Step 7      -5' to -6' below capacity  
Reduce pressure 5 psi.  
Restrict water use at marinas to potable water use only.  
Begin commercial carwash and other non-essential commercial use restrictions.
- Step 8      -6' to -7' below capacity  
Restrict all non-essential water use.
- Step 9      -7' to -8' below capacity  
Reduce pressure 5 psi.  
Continue restrictions on all non-essential water use.

***Implementation and Financial Management***

The JWD has undertaken two projects in an effort to increase supply, which is the most significant challenge facing the JWD system. One of these projects was a pumping system that recirculates treatment plant backwash water as opposed to dumping it to Great Creek. It is anticipated to be completed soon and is estimated to save the JWD approximately 8 million gallons annually once completed. A second project, which is currently in the preliminary evaluation stage, would include modifications to a stormwater pump station operated by the Rhode Island Bridge and Turnpike Authority (RIBTA) on North Road and Route 138 that may allow for recharge of the watershed to North Pond.

The JWD is operated as an Enterprise Fund, with annual operating revenue of approximately \$1.2 Million and annual expenses typically around \$1.0 Million. Remaining revenue is used for debt service. The JWD bills residential and commercial customers quarterly. Current rates, which went into effect in October 2015, are as follows:





**Table 3  
WATER RATES - MINIMUM IN ADVANCE CHARGES**

Meter Size	Quarterly Billing Rates	Seasonal Billing Rates	Miscellaneous Charges
5/8"	\$76.13	304.51	Turn-on/off \$30.00
3/4"	\$114.27	\$457.07	Install/Remove \$100.00
1"	\$141.92	\$567.64	Early Install/Remove \$50.00
1-1/2"	\$174.81	\$698.46	Sprinkler Charge/unit \$0.18
2"	\$227.71	\$910.84	Frozen meter charge \$125.00
3"	\$419.82	\$1,679.23	Special Reading \$20.00
4"	\$631.91	\$2,527.68	Call Out \$150.00

**Table 4  
CURRENT EXCESS WATER RATES**

Gallon Tier Structure		Rate per 1,000 Gallons
0	5,000	\$0.00
5,000	9,999	\$6.40
10,000	14,999	\$6.89
15,000	19,999	\$8.74
20,000	49,999	\$12.16
50,000	99,999	\$14.90
100,000	199,999	\$19.08
200,000	999,999,999	\$24.27

***Coordination***

The 2014 Jamestown Comprehensive Plan, which was adopted by the Jamestown Planning Commission and Jamestown Town Council on June 18, 2014, was reviewed while updating this WSSMP and it is the intent that this WSSMP be consistent with the goals and policies of the Town's Comprehensive Plan.

The Preamble to the Comprehensive Plan identifies that the driving theme of the plan is to promote the protection of the town's rural character. The Comprehensive Plan also indicates that the "Center Island Watershed should continue to be protected. Development should not exceed on-island natural supplies of water. Conservation of existing water supplies should continue to be emphasized, as well as finding new methods to supplement the existing yield." The Comprehensive Plan lays out a number of goals and recommended actions in order to protect the quality and quantity of the potable water resources on the Island. The JWD acknowledges and supports these goals and recommended actions.

The JWD has an emergency interconnection with the Town of North Kingstown and maintains a close working relationship with the Town with regard to the maintenance of the emergency interconnection. The JWD will approach the Town of North Kingstown to request that both



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systems pursue an update to the current emergency interconnection agreement. The updated emergency interconnection agreement will be appended to the WSSMP once available. The JWD also coordinates with the local fire department to track water usage for fire-fighting and training exercises. The JWD estimates that approximately 200,000 gallons of water is used annually by the fire department.

Municipal wastewater collection and treatment, in addition to water supply, is provided by the water and sewer division of the town's Department of Public Works. The Jamestown Town Council sits as the Board of Water and Sewer Commissioners. Joint billing is not currently in place but may be a future consideration in Jamestown.

