

EXECUTIVE SUMMARY

Goals

Water Supply Management Goals for the Cumberland Water Department (CWD) and its water system embody fundamental supply demand, and financial management objectives, consistent with the Water 2030. These goals are:

1. Provide an adequate and safe water supply for domestic, commercial, and industrial development of the Town of Cumberland, Rhode Island (Town of Cumberland), the efficient use of this resource consistent with the Town of Cumberland's Comprehensive Community Plan and those of the State of Rhode Island.
2. Protect the ground and surface water resources of the CWD by water conservation measures, limiting the wasteful and unnecessary use of water, establishment of water rates that discourage water waste, promote land use, watershed and aquifer protective measures that ensure long-term protection of reservoirs, streams, rivers, and groundwater of the Town of Cumberland and for downstream users.
3. Manage the water system in a financially sound Enterprise System method allowing for necessary capital improvements, maintenance and operation, and the employment and training of personnel who are responsible for the day-to-day system operation, quality of its water supply and level of service to the community.
4. Provide Emergency Management for the water system by coordination of efforts with land use planning activities near or proximate to water supply sources. Review and update response plans for hazardous material spills near reservoirs, streams, or aquifers with each of the local fire districts, police, and public works departments, and other emergency response agencies of the State. Preparation of emergency contingency plans for large scale or localized water supply contamination. Respond to water system leakage or breaks in a planned and organized method by maintenance of equipment and required spare parts. Maintain an active backflow prevention program. Maintain an active quality monitoring program.

The foregoing objectives cover a broad spectrum of Water Supply System Management goals that the CWD has integrated into the operation of its water system.

Introduction

This Water Supply System Management Plan (WSSMP) has been prepared as required under Rhode Island General Laws (RIGL) 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 and Providence for Water Supply System Management Planning, October 2002, as amended to implement the provisions of the Act.

Under this legislation, the CWD, as a water purveyor supplying over 50 million gallons (MG) of water per year, is responsible for the preparation and adoption of a WSSMP. It is also required that the CWD review and update this WSSMP at least once every five years, or as otherwise stipulated in the Regulations.

This WSSMP has been prepared as an update to the 2016 WSSMP and to provide framework to promote the effective and efficient conservation, development, utilization, and protection of the natural water resources of the State, as utilized by the CWD. Further, the overall goals shall be consistent with Water 2030. The purpose of this WSSMP is to outline the objectives of the WSSMP process for the CWD, and to serve as a guide to employ the proper decision-making process.

The WSSMP contains a detailed description of the water system and includes the policies and procedures related to the general operation and management of the water system.

Background

The Town of Cumberland is operated under the Town Council/Mayor form of government, wherein the council enacts local legislation and the Mayor, elected by the voters, executes the laws and the administration of the Town Government in accordance with the Town Charter. The CWD was established by legislation of the General Assembly of the State of Rhode Island in 1893. In 1929, the Town of Cumberland, utilizing Sneece Pond as its supply, installed a pump station, a 0.35 MG tank, and transmission and distribution piping in and around Nate Whipple Highway and Mendon Road. By the early 1940's, the system had been expanded to service the area of Cumberland Hill and the adjoining Town of Lincoln to serve the village of Albion and the Berkshire Hathaway Mill Complex. In the 1950's, with the formation of the Lincoln Water System, these portions of the water system were turned over to Town of Lincoln. An emergency interconnection is still maintained on Martin Street with the Town of Lincoln to this day.

In the 1950's the CWD constructed a water treatment plant (WTP) at Sneece Pond and expanded its service area to include Ashton, Berkley, Upper Lonsdale, Monastery Heights, Diamond Hill, Arnold Mill and Grants Mill areas of the Town of Cumberland. Note that this treatment facility was upgraded in 2007-2008 to improve compliance with the newer, and stricter, water quality requirements in place since the plant's original construction. In the mid to late 1960's and 1970's the Town of Cumberland developed new well supplies in Cumberland Hill, Arnold Mills and at Martin and Lennox Street. These wells have since been abandoned due to contamination from a neighboring site. Wells were installed at the Manville and Abbott Run well sites in 1968. Additional wells were installed at the Abbott Run well site in 1988 and 1992, and satellite wells were installed at the Manville well site in 1995. In 1955, the Marshall Avenue Pump Station was constructed. This station, forming the interconnection with the Pawtucket Water Supply Board (PWSB), is designed to boost water purchased from Pawtucket into the CWD system. Upgrades to this station were performed in the early 1990's to increase overall capacity and reliability, and again in 2012 to improve energy efficiency at the current, lower pumping requirements. The CWD currently relies on the wholesale interconnection with PWSB as a source of supply.

In 2015, the CWD placed into service a gravity (non-pumped) interconnection between the Town of Cumberland and the Woonsocket Water Division (WWD). This interconnection has allowed the CWD to help satisfy consumption during peak demands as well as offset wholesale water delivered from the PWSB, which requires pumping to reach the higher elevations at the north end of the Town of Cumberland.

In 2021, the CWD developed new well supply at Franklin Farm which went online in early 2022. A second well supply was evaluated in 2012 and received approval in 2016. The CWD plans to install this well supply in the near future.

Water System Description

The CWD currently supplies drinking water to approximately 21,016 residents using five different water sources. These sources include:

1. Groundwater from the Abbott Run Wells (Emergency Only);
2. Groundwater from Manville Wells;
3. Groundwater from Franklin Farm Wells;
4. Purchased water from the PWSB; and
5. Purchased water from the WWD.

Recently, the CWD’s supply capacity from the Town of Cumberland’s own sources have greatly increased. This has led to substantial cost savings to the CWD and the ability to fund infrastructure and capital improvement projects, without increases in water rates. The table below illustrates the amount of water obtained from CWD’s own sources of supply and the amount of water obtained from a combination of the PWSB or WWD over the last 10 fiscal years (FY).

Table ES-1: Total Consumption by Fiscal Year

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021
Purchase (MG)	149.50	193.00	278.9	264.46	311.60	280.69	530.49	499.52	468.03
Production (MG)	651.00	610.01	598.49	570.05	511.36	545.85	267.22	285.29	421.33
Total (MG)	800.5	803.01	877.39	834.51	823.96	826.54	797.72	784.81	889.36

CWD Sources

The CWD presents the monthly withdrawal of each source of water, including the volume purchased from the PWSB and WWD, in their annual report submitted to the state. The monthly withdrawal volumes for Sneece Pond, the Manville Wells, and Abbott Run Wells, along with the monthly volume purchased from the PWSB and WWD in FY2021, is presented in Figure ES-1, below.

Figure ES-1: Monthly Withdrawal Volumes for Fiscal Year 2021

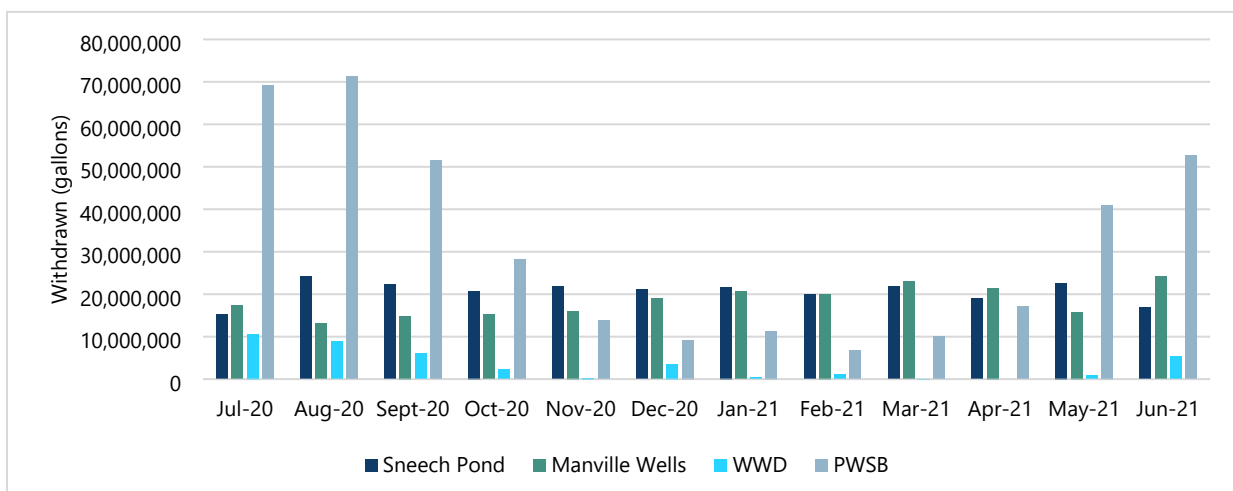


Table ES-2, below, presents the yield from each of the supply sources. There is a contract for PWSB supply water to Cumberland although it is expired. However, both parties continue to honor the contract and the Town of Cumberland continues to purchase water under the terms of the original contract. CWD has the ability to purchase as much as 4.5 million gallons per day (MGD) through the Marshall Avenue Pumping Station. The capacity of CWD pumps and distribution mains hydraulically limits the amount of water that can be purchased from PWSB. CWD and WWD have a Memorandum of Understanding (MOU), which outlines the terms and conditions of emergency and wholesale purchases between the two communities.

Table ES-2: Water Supply Production

Supply Source	Yield (MGD)	Capacity (MGD)
Sneech Pond ¹	0.68	1.2
Manville Well 1 & Satellite Well	0.37	1.0
Manville Well 2 & Satellite Well	0.23	1.0
Abbott Run Well 1	0.0	0.0
Abbott Run Well 2	0.0	
Abbott Run Well 3	0.0	0.64
Franklin Farm Well 2 ²	0.36	0.43
Franklin Farm Well 3 ²	0.73	0.86
Marshall Avenue Pump Station (Purchased from PWSB)	1.05	4.5
Highland Corporate Park Station (Purchased from WWD)	0.11	2.0
Available Production		10.34

Capacity: The amount of water that an individual site is either permitted for or capable of producing.

Yield: The amount of water that is actually produced at an individual site based on an annual average.

¹ Sneech Pond WTP was decommissioned in 2021. The yield shown is prior to decommissioning the WTP.

² The design yield of the site. Production data is not yet available.

Surface Water and Groundwater Sources:

Sneech Pond was taken offline and decommissioned in 2021, the Town of Cumberland does not use any surface water sources. The Sneech Pond WTP was removed from service to comply with Consent Agreement RIA-433, which required that the CWD cease discharge to Sneech Pond. Previously, the Sneech Pond WTP discharged backwash water after settling out residuals but could not comply with contaminant limits under the Rhode Island Pollutant Discharge Elimination System (RIPDES) program.

The CWD draws groundwater from the Manville Well, Abbott Run Wells and Franklin Farm Wells. In recent years, the Manville and Abbott Run wells have undergone an aggressive reconditioning program that has increased their yield.

Table ES-3: CWD Groundwater Sources

Well	Depth (FT)	Diameter (Inch)	Well Type
Abbott Run Well 1	77.9	18	Gravel Packed
Abbott Run Well 2	80	8	Gravel Packed
Abbott Run Well 3	77.9	12	Gravel Packed
Manville Well 1	85.5	18	Gravel Packed
Manville Well 1 (Satellite)	81	12	Gravel Packed
Manville Well 2	55.9	18	Gravel Packed
Manville Well 2 (Satellite)	55	12	Gravel Packed
Franklin Farm Well #2	91.5	24	Gravel Packed
Franklin Farm Well #3	94	24	Gravel Packed

In 2012, the CWD began evaluating alternative sources of water supply and identified two new potential groundwater sources. Permit applications for the development of these sites were submitted in 2015 and conditional approvals were received in 2016. In 2021, one of the sites, Franklin Farm Wells was constructed and went online in early 2022.

Infrastructure Components

The system operated by the CWD includes critical infrastructure components necessary to deliver water to their customers. Infrastructure components include transmission/distribution piping, booster pump stations, well pump stations, and storage facilities. Master meters and distribution meters are also maintained by the CWD.

Chemical addition is performed at the Abbott Run Wells, Manville Wells and Franklin Farm Wells.

Well Pump Stations

The CWD has well pump stations at the Abbott Run, Manville, and Franklin Farm well sites. The pumping capacity for these stations are presented in the table below.

Table ES-4: Well Pumping Stations

Pump Station	Capacity (MGD)
Abbott Run Well 1	0.30
Abbott Run Well 2	0.30
Abbott Run Well 3	0.30
Manville Well 1 Manville Satellite Well 2	1.00
Manville Well 2 Manville Satellite Well 2	1.00
Franklin Farm Well 2	0.43
Franklin Farm Well 3	0.86

Chemical addition is performed at each of the well pumping stations before water enters the distribution system. The treatment methods for each of the well stations can be found in Table ES-5, below.

Table ES-5: Chemical Feed Systems at Well Pumping Stations

Pump Station	Chemical Feed Systems
Abbott Run Well	Chlorine (Cl ₂), Sodium Fluoride (NaF), and Potassium Hydroxide (KOH)
Manville Well 1	Potassium Hydroxide (KOH)
Manville Well 2	Potassium Hydroxide (KOH)
Franklin Farm Well 2	Chlorine (Cl ₂), Sodium Fluoride (NaF), and Potassium Hydroxide (KOH)

Distribution System

The transmission and distribution system consists of upwards of 137 miles of asbestos cement, cast iron, ductile iron, and polyvinyl chloride (PVC) water mains, ranging from 6-inch to 20-inch diameter. The system is relatively young with majority of water mains installed in 1940's through 1960's. New and replacement main installations consist of cement lined ductile iron (CLDI) and PVC pipe materials.

Storage Facilities

There are five water storage facilities in the CWD's system. They include the Monastery (Palomino) Tank, Thompson Hill Tank, Coppermine Tank, Fisher Road Tank, and the Highland Park Tank. It should be noted that the Fisher Road Tank was replaced and brought into service in 2017.

Table ES-6: Water Storage Facilities

Water Storage Tank	Constructed	Type	Capacity (MG)	Overflow El. M.S.L. (ft)
Monastery	1969	Steel Reservoir	3.2	371
Coppermine	1969	Steel Reservoir	3.13	481
Thompson Hill	1958	Elevated Steel – Torosphere	0.75	371
Fisher Road	2017	Prestressed concrete tank	0.65	487
Highland Park	1995	Steel Standpipe	3.00	481
Total Storage (MG)			10.66	

¹Constructed dates were taken from the 2003 CWIRP

With a total storage of 10.66 MG, the system could supply the Town of Cumberland for approximately 5.2 days at average day demand conditions. The system could supply the Town of Cumberland for approximately 3.5 days at maximum day demand.

Pumping Stations

The CWD has six functioning booster pumping stations. As seen in Table ES-7: Pumping Stations below, the Marshall Avenue Station has the largest capacity. The Lippit Estates Pump Station is off-line with no immediate plan for re-instatement, and therefore is not included in the table.

Table ES-7: Pumping Stations

Pump Station	Capacity (MGD)
Marshall Avenue	4.50
Angell Road	1.00
Girard Road	1.90
Fisher Road	0.60
Mendon Road Booster/P.R.V.	0.75

Master Meters

There are six master meters in the system located at Manville Well #1, Manville Well #2, Abbott Run Wells, Sneece Pond WTP, and the interconnections with PWSB and WWD. All customers serviced by the CWD are metered, except for 14 locations at the Town of Cumberland owned facilities. The field conditions at these facilities complicate the installation of meters, with the majority of them requiring the installation of a metering pit. All residential customers are equipped with Sensus meters and a fixed base Automatic Meter Reading (AMR) system. This is the result of a system wide meter replacement program, started in 2009, which replaced approximately 7,900 meters, and all meters that are newly installed are also connected to the AMR system. The installation of the new meters and AMR system has greatly improved the efficiency of the billing process at the CWD.

Interconnections

As mentioned, the CWD maintains interconnections with the PWSB and WWD for wholesale water purchase purposes and an emergency interconnection with the Town of Lincoln. The interconnection with the PWSB is located at the Marshall Avenue Pump Station, in the southern portion of the system. The recently improved connection can supply up to 4.5 MGD. There is a contract for PWSB to supply water to the Town of Cumberland although it is expired. However, both parties continue to honor the contract and the Town of Cumberland continues to purchase water under the terms of the original contract. Once CWD has constructed its new sources, PWSB and CWD plan to enter into a new agreement. The interconnection with WWD is via the Highland Corporate Park Station, located in the northwest of the system. The newly constructed connection can supply up to 2.0 MGD and has allowed the CWD to satisfy consumption during peak demand periods. The emergency interconnection with the Town of Lincoln is located in Albion Road and is currently inactive.

Service Area

Geographic Area

The CWD's water service area does not include the entire Town of Cumberland, since the Valley Falls area is served directly by the PWSB. The area that is serviced by the CWD is divided into five pressure zones, each of which operates independently of the others.

There continues to be a portion of the service area that depends primarily on private well systems. The majority of these private wells are associated with single-family residences; however, some wells provide water to commercial and industrial facilities within the service area. These private well systems and their service population would also be eligible to be served by the CWD.

Water Services History

In the period between 2015 and 2021, the CWD has seen a decrease in total population served (22,654 in 2015 to 21,016 in 2021). As seen in the table below, the total number of service connections increased by 2.5% along with a 4.2% decrease in the number of residential service connections. The number of commercial/industrial/government service connections decreased approximately by 33%. Service connections categorized as "Other" increased from 14 to 650 between 2015 and 2021. The decrease in residential services, decrease in commercial/industrial/government services, and large increase in other services are most likely due to a change in CWD's service categorization process.

Table ES-8: Water Service History

Type	2015	2021	%Change
Total	8,267	8,474	2.5
Residential	7,957	7,625	(4.2)
Commercial/Industrial/Government	296	199	(33)
Other	14	650	-

Population Projections

As mentioned, the CWD's service area does not include the entire Town of Cumberland. In 2021 the population served by the water system was approximately 21,016, or about 58% of the total population of the Town of Cumberland (36,405 based on the 2020 US Census). The CWD currently has 8,474 total service connections with meters. There are approximately 2.48 people per service connection. It should be noted that 100% of the Valley Falls area is serviced by the PWSB with approximately 6,000 people serviced from private wells in the Town of Cumberland. The population served in 2025 is estimated to be approximately 25,944.

Historic population growth in the Town of Cumberland has been at a greater rate than that of the State of Rhode Island as exhibited in Table ES-9 (Source: U.S. Census).

Table ES-9: Cumberland Population Growth

Year	Town of Cumberland			State-Wide		
	2000	2010	2020	2000	2010	2020
Population	31,840	33,508	36,405	1,048,319	1,052,567	1,095,610
%Change	+5.2%	+2.9%	+5.6%	-	0.4%	3.7%

Water Use

CWD provides service to residential, commercial, industrial, and governmental users. On average, the CWD supplies approximately 2.4 MGD of water. The peak daily demand has historically been as high as 7 MGD but has declined over the past decade due in part to the loss of several large commercial and industrial customers. Historically, residential use consumed the majority of the water supply. In FY2021, the residential consumption was approximately 79% of the total supply usage. Commercial use was approximately 7% and industrial and government use were approximately 1% each. The usage rates in FY2021 changed significantly from previous years due to the addition of the "Other" users category. The new category

accounts for the decreases in the four existing categories. The table below shows water use data by category.

Table ES-10: Historical Usage Summary by User

User	FY2005 Usage (MGY)	FY2010 Usage (MGY)	FY2015 Usage (MGY)	FY2021 Usage (MGY)
Residential	598.58	527.00	582.69	548.63
Commercial	84.05	38	64.7	46.01
Industrial	44.05	10.00	39.31	10.39
Government	15.85	20.00	21.78	10.40
Other	-	-	-	81.5

The system's major users are read monthly, and there are three major users that are greater than 3 million gallons per year (MGY). The overall water usage amongst the major users has reduced as compared to 2016. Okonite Company has also switched to recycled-water use, which has led to an overall decrease in water usage. However, there has been an overall increase in the number of users since 2016, causing the system demand to remain constant since 2016.

Average Daily Demand

The average daily demand is determined by the amount of water which is consumed within a distribution system over a 24-hour period. All water that is consumed by residential users over a 24-hour period is considered the residential average day demand. Average daily consumption per resident is expressed in gallons per capita per day (GPCD) and is calculated by dividing the residential average day demand by the estimated population served. Over the past decade, CWD's average GPCD has ranged from 61.7 to 71.5. CWD encourages water conservation through public education and availability of water conservation kits, which contribute towards attaining CWD's goal of 60 GPCD for the water system. The State's target is 65 GPCD. As previously mentioned, residential use accounts for the majority of water consumption. The table below shows a more detailed analysis of residential water use.

Table ES-11: Residential Water Use (2010 – 2021)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Annual Use (MG)	523	526	492	509	582	559	544	530	522	546	549
Average Daily Use (MG)	1.43	1.44	1.35	1.39	1.59	1.53	1.49	1.45	1.43	1.50	1.50
Service Connections	7914	7742	7856	7898	7957	8025	8380	8447	8481	8189	7625
GPCD	64.3	67.6	62.6	61.8	70.2	69.7	65.0	62.7	61.7	64.3	71.5

It should be noted that 2015-2016 was a drought period which caused an abnormally high use period. CWD continues to provide water conservation education, as outlined later in this report. The Town of Cumberland has not increased rates, and as part of the Cost-of-Service Study, increased water rates are recommended, which will help with water conservation.

CWD currently has 8,474 service connections, which service 21,016 people within its service area. There are no unmetered service connections remaining in the distribution system. CWD met their goal of 100%

metering. This has been reduced from 14 unmetered service connections in 2016. Excessive unaccounted-for or non-revenue water had plagued the system for many years. Over the past eight years, CWD identified this as a major deficiency and committed to implementing a program for leak detection and water audits to reduce unaccounted for water to 10% or less. The state target for unaccounted-for water and leakage is 15% and 10%, respectively. The CWD's efforts to reduce unaccounted-for water has resulted in CWD reaching their unaccounted-for water goal of 10% over the last two years.

The CWD has always closely monitored the state and safety of the distribution system. A leak detection program has been maintained through the use of ground sounding equipment. The process consists of sections of the distribution system being covered by a two-person crew. Since 2013, the CWD was able to utilize the new AMR system, in conjunction with data loggers and leak detection program, to more efficiently monitor the distribution system for leaks.

Water Quality Protection

Water quality protection is an important aspect to the CWD, as the sources of supply continue to be affected by growth, potential pollution sources, and increases in residential demand. The water supply for the CWD is obtained from a combination of groundwater sources. The groundwater sources are wells located near the Blackstone River and Abbott Run Brook. In addition, the PWSB, the primary wholesaler of water to the CWD, has surface and groundwater supply sources partially in the Town of Cumberland along Abbott Run Brook. The CWD and PWSB are both working in conjunction with the Town of Cumberland's Planning Department on the development of zoning regulations for a Drinking Water Quality Protection Overlay District for sources of water supply within the Town of Cumberland.

Recent System Improvements

From 2016 to 2021, CWD has initiated many capital improvements to improve water quality and increase, system capacity, redundancy, and efficiency while system demand has grown. Major projects completed during these years include:

- Emergency Generators Installations at Girard Road Pump Station, Abbott Run Wells, and Manville Wells
- Replacement of Fisher Road Water Storage Tank, including a passive mixing system and new Supervisory Control and Data Acquisition (SCADA) system control panel.
- Phase 1 Diamond Hill Road 12,500 linear feet (LF) of Water Main Replacement (Nate Whipple Highway south to I-295).
- Phase 2 Diamond Hill Rd. 8,500 LF of Water Main Replacement (I-295 south to 1364 Diamond Hill Road).
- Removed Sneece Pond WTP from service.
- Purchased Schofield Land in January 2021.
- Replacement of 850 LF of water main on Meadow Brook Drive.
- Replacement of pump motors at Marshall Avenue Pump Station.
- Replacement of master meter at WWD interconnection and installation of interconnect from the Town of Cumberland to WWD.

- Franklin Farm Well Facility construction and start-up.

Newell Bridge and Granite Mills River Crossings. In conjunction with the development of this WSSMP, the CWD also completed an update to the water system hydraulic model which helped identify system deficiencies for inclusion in the CWD's Clean Water Infrastructure Replacement Plan (CWIRP).

Additionally, a five-year Capital Improvement Plan was adopted along with the CWD's FY2022 annual operating budget by the Town of Cumberland's Town Council. A detailed 5-year and 20-year improvement plan was developed and included in the CWIRP. Some of the projects span over several years due to the design and construction timelines. These projects are necessary for the CWD to continue to maintain and improve their system.

Supply & Demand Management

The CWD has taken an active stance to protect its existing and future water supply sources. The Town of Cumberland owns the majority of properties of its groundwater supply and is investigating the purchase of additional property surrounding each of their sources on an ongoing and continuous basis. CWD purchased the parcel adjacent to Schofield Farm, which is a future well site, in January 2021 to protect the future source water site.

Projected Future Demands

This population growth was considered in future water use demands. Several critical assumptions were made to develop these projections through the year 2040, and they include:

- The percentage of the population served by the Town of Cumberland's water distribution system was 64% for all projected years.
- The adjusted projections presented by Rhode Island Population Projections 2010-2040 were used.
- Each adjusted projection was increased by 4.9%. The Rhode Island Population Projections 2010-2040 stated that the 2020 adjusted population was 34,698; however, the 2020 U.S. Census stated the population was 36,405. Therefore, the U.S. Census included approximately 4.9% more people than the Rhode Island Population Projections 2010-2040 projected for 2020.

Available Water and Alternative Supplies

The CWD's overall objective is to ensure the availability of an adequate supply of potable water to meet the existing and future demands of its customers. In 2012, the CWD began evaluating alternative sources of water supply. As a result, five additional sites within the Town of Cumberland were identified for possible future use. These sites were chosen based on geology that appeared conducive to yielding large volumes of groundwater, the proximity to existing CWD infrastructure capable of supporting the introduction of large volumes of water, and geographically located in the northern section of CWD's service area. Short-term pump tests were conducted in 2013 followed by extensive long-term pumping tests in 2014. In 2015 CWD permit approval was received for installation of permanent municipal groundwater supplies at the Schofield Well site, which is not currently operational. Groundwater withdrawals from this well site will provide CWD with greater flexibility and water supply reliability, reducing the need for water purchases from the PWSB and WWD.

Demand Management

In August 2012, the CWD developed a Water Efficiency and Demand Management Strategy report, which outlined the current per capita water use, efficient indoor and outdoor water methods and strategies, accounting for non-billed water, leakage reduction, and metering goals. Through these strategies, the CWD has been able to reduce the demand and effectuate efficient use of water resources.

As mentioned, a system-wide meter replacement and AMR installation project was recently undertaken by the CWD. Meters with higher accuracy and installations on uses previously unmetered has led to the reduction of unaccountable for water. The new AMR system allowed the CWD to perform meter readings more frequently and monitor consumption trends more accurately.

Conservation

Water conservation initiatives are the methods, procedures, and devices designed to promote efficient use of water and eliminate the waste of water. The CWD has implemented and maintained several programs to promote the conservation of water including the Residential Retrofit Program (RRP).

The CWD has educational information and water conservation devices such as toilet dams, low flow showerheads, and faucet adapters (residential retrofit kits). Information regarding the use of these devices is fairly well publicized. The program is structured such that the CWD currently provides its customers with kits on a request basis and the kits may be picked up at the main office on Nate Whipple Highway. CWD keeps a stock of the retrofit kits and distributes 1-2 per year. The kits are suggested to customers that have high water bills and indicate that they have older plumbing and fixtures. CWD does not get requests for the retrofit kits.

Currently, the CWD has public education programs in place to encourage the conservation of water. Information relating to water conservation is available upon request from the CWD and free leak detection surveys are available to its customers. The CWD also performs elementary and middle school educational programs. The CWD is evaluating the development of an active system-wide public education program, specifically done in conjunction with the billing program. The CWD relies upon advertisements, and public service announcements in the local newspapers for notification of customers regarding flushing, water bans, or user restrictions.

Financial Management

The current water consumption charge is:

- Step 1: 0-50,000 Gallons – \$3.1846/1,000 gallons
- Step 2: 50,000-200,000 Gallons – \$4.4639/1,000 gallons
- Step 3: 200,000 + Gallons – \$4.7436/1,000 gallons

Water rates have been unchanged since 2015. Woodard & Curran is currently performing a cost-of-service water rate study for FY2023 through FY2027. It is anticipated that the results of this study will be available in September 2022. It is anticipated that water rates may need to increase to generate revenues sufficient to fully fund the Town of Cumberland's water operations, make needed capital investments, and maintain adequate reserve fund balances.

Capital Improvement

A five-year Capital Improvement Plan was adopted along with the CWD's FY2022 annual operating budget by the Town of Cumberland's Town Council. A detailed 5-year and 20-year improvement plan was developed and included in the CWD's CWIRP. Some of the projects span over several years due to the design and construction timelines. These projects are necessary for the CWD to continue to maintain and improve their system. Projects included in the 5-year improvement plan prioritize infrastructure that requires immediate attention. In addition, the CWD has put a strong focus on developing the additional groundwater sources and reducing their purchase of water from neighboring systems. Projects included in the 20-year improvement plan do not require immediate attention and focus on tank rehabilitation, pump station rehabilitation/replacement, and further improvements to the distribution system.

Emergency Management

The Emergency Management section of the Plan establishes the responsibilities and authority within the CWD for responding to most probable emergencies and outlines specific tasks for carrying out functional and constructive solutions based on a review of the potential emergencies and risks. The procedures outlined are consistent with the goals of the Water 2030. This document is also intended 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 quality and quantity.

With a total storage of 10.66 MG, the system could supply the Town of Cumberland for approximately 4.7 days at average day demand conditions. The system could supply the Town of Cumberland for approximately 2.3 days at maximum day demand.

The CWD has established procedures to follow in the event of an emergency regarding critical valves to close, well operation sequence, monitoring of chemical levels throughout the Town of Cumberland, and the monitoring of water quality in the system.

As previously mentioned, the CWD maintains three interconnections with neighboring water suppliers. Both the interconnections and stored water are available for use during an emergency.

Drought Management

A drought event is not immediate but occurs over a period of time. Generally, a drought is defined as a continuous period of time in which rainfall is significantly below the norm for a particular area. Historically, the CWD has not been affected by drought conditions, and the system's wells have recovered during past events. The CWD maintains active receiving interconnections with the PWSB and WWD, and an emergency interconnection with the Lincoln Water Department, all of which could aid the CWD in times of drought or emergency.

Indicators of the five phases of drought were identified in the Drought Response Plan developed for the CWD, dated February 2008. The indicators of each phase of drought are presented in the table below. Indicators of a drought can be witnessed through changing groundwater levels or from notifications from PWSB or Rhode Island and Providence Plantations RI Water Resources Board (RIWRB).

Table ES-12: Drought Phase Indicators

Drought Phase	Indicators
Normal	<ul style="list-style-type: none"> • Normal Operations
Advisory	<ul style="list-style-type: none"> • Decrease in reservoir level by roughly 20% capacity • Decrease in groundwater level by roughly 10% capacity • Notification from Water Resources Board and PWSB • Increase in daily pumpage and consumption from 2.5 MGD to 3 MGD
Watch	<ul style="list-style-type: none"> • Decrease in reservoir level by roughly 40% capacity • Decrease in groundwater level by roughly 20% capacity • Notification from Water Resources Board • Increase in daily pumpage and consumption from 3 MGD to 4 MGD
Warning	<ul style="list-style-type: none"> • Decrease in groundwater level by roughly 30% capacity • Notification from Water Resources Board • Increase in daily pumpage and consumption from 4 MGD to 4.5 MGD
Emergency	<ul style="list-style-type: none"> • Decrease in reservoir level by roughly 60% capacity • Decrease in groundwater level by roughly 50% capacity • Notification from Water Resources Board • Notification from PWSB

Coordination

The CWD maintains close working relationships with the PWSB, the WWD, and the Town of Lincoln in regards to the interconnections and the potential need for additional emergency supply, specifically in times of drought.