SOMERSET, MASSACHUSETTS

JANUARY 2020

Integrated Water Resources Management Plan

WRIGHT-PIERCE
Engineering a Better Environment

BETA

INTEGRATED WATER RESOURCES MANAGEMENT PLAN

FOR THE

TOWN OF SOMERSET, MA

JANUARY 2020

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TOWN OF SOMERSET

INTEGRATED WATER RESOURCES MANAGEMENT PLAN

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SECTION I

INTRODUCTION

I.1 BACKGROUND INFORMATION

The Town of Somerset is primarily a suburban community located in Bristol County, approximately 20 miles southeast of Providence, RI and 44 miles south of Boston. The Town is comprised of 8.11 square miles of land area and 1.2 square miles of water surface area. Somerset is bordered by Swansea to the northwest; Dighton to the north; the Taunton River to the east; Mt. Hope Bay to the south; and Lee's River to the southwest.

Interstate 195 crosses through the town and provides access to Providence, RI to the west and Fall River to the East. Route 6 also crosses east to west through the Town to connect to the surrounding communities. In addition, Route 138 runs north to south, and includes the commercial center of the town, located in central Somerset.

From the 1960's to the 2010's, Somerset was a hub for energy production in Southern New England. During this time the community hosted two power plants and energy production was the main industry within the Town. The industry has been on the decline for the past decade, and both power plants have ceased operations since 2017. The resulting loss of industry has a large impact on the Town as the industry represented a significant portion of the Town's tax base. In addition, much of the Town's infrastructure was built to support the industry and is now aging and in need of improvement or replacement. To help plan and prioritize the needed improvements for the Town's water related infrastructure, the Town has created an Integrated Water Resources Management Plan.

I.2 PURPOSE AND SCOPE OF SERVICES

In March 2018, the Town of Somerset (the Town) retained Wright-Pierce in collaboration with BETA Group to prepare an Integrated Water Resource Management Plan (IWRMP), which will be used as a water, wastewater, and stormwater planning tool to guide the Town for the next two decades.

The Town continues its efforts to evaluate, update, and improve its water resources infrastructure to remain in compliance with its regulatory requirements. This report includes capital improvement recommendations for the Town's water infrastructure including:

- Drinking Water Sources
- Drinking Water Treatment Systems
- Drinking Water Distribution System (Booster Stations, Storage Tanks, Watermains)
- Wastewater Collection System
- Wastewater Pump Stations
- Wastewater Treatment Facilities
- Stormwater Collection System

I.3 CAPITAL IMPROVEMENT PLANNING APPROACH

The Integrated Water Resources Management Plan planning process was generally structured to follow the following process:

1. Collect information on existing conditions from stakeholders
2. Describe existing water infrastructure systems
3. Stakeholder involvement on existing conditions and deficiency identification
4. Identify and evaluate capital improvement projects to resolve deficiencies
5. Prioritize projects based on project needs and financial considerations with stakeholder input
6. Develop an implementation schedule for each water infrastructure system to meet system needs.
7. Integrate implementation schedule into an integrated capital improvement plan that outlines drinking water, wastewater, and stormwater capital needs for the next 20 years.

   This planning approach is further documented in the three planning reports included in the Appendix as follows:

- **DWMP –** Drinking Water Management Plan
- **CWMP –** Comprehensive Wastewater Management Plan
- **CSWMP –** Comprehensive Stormwater Management Plan

I.4 STAKEHOLDERS

The Town of Somerset understands the importance for the involvement of the citizens and interested stakeholders in Somerset as part of the CWMP process. The stakeholders include the Somerset Board of Selectman, the Water Pollution Control Facilities Department (Sewer), the Water Department, the Highway Department, Board of Water & Sewer Commissioners, Board of Health, Conservation Commission, Planning Board; citizens of Somerset; the Southeast Regional Planning and Economic Development District (SRPEDD); MassDEP; Department of Fish, Wildlife and Environmental Law Enforcement (DFWELE), Natural Heritage Program; Water Resources Commission (WRC); Executive Office of Energy and Environmental Affairs (EOEEA); The Taunton River Wild & Scenic Commission; and officials from neighboring communities. Town of Somerset staff has provided input regarding the development of the Integrated Water Resources Management Plan (IWRMP). The report for the IWRMP will be available for review and comment by all interested stakeholders. There also will be opportunity for the public and interested stakeholders to provide input for the IWRMP during a public meeting as part of the IWRMP effort.

I.5 REGULATORY REQUIREMENTS

This IWRMP for the Town of Somerset has been prepared to help the Town address several pending regulatory requirements. The Town’s WPCF is currently operating on an expired NPDES permit that is expected to be issued by MassDEP shortly and will include a numerical total Nitrogen limit. The Town has prepared a CWMP as part of the IWRMP to qualify for reduced rate financing from the CWSRF in order to complete the necessary improvements. The Town acknowledges that with completion of the CWMP they are eligible for 2% interest rate financing for all WPCF upgrades and 0% for any improvements related to nutrient (nitrogen) removal. In order to be eligible for this funding, the CWMP was completed in compliance with the Massachusetts Department of Environmental Protection Guide to Comprehensive Wastewater

Management Planning, published in January 1996. In addition, there are 4 other requirements for 0% SRF loan financing.

I.6 PUBLIC PARTICIPATION

A public hearing is scheduled for February 5^{th}, 2020 to provide public comment on the IWRMP. Comments received from the public hearing will be included in an appendix to the Final IWRMP. A draft of the IWRMP report was made available in December 2019 for public review.

I.7 PROJECT FUNDING

The Integrated Water Resource Management Plan is funded 50 percent by the Town, while the remaining 50 percent is provided by the US Economic Development Administration (EDA). This funding was secured through the Southeastern Regional Planning & Economic Development District (SRPEDD) to assist in dealing with the impacts faced by the closure of the Brayton Point Power Generation Facility.

The Massachusetts State Revolving Fund (SRF) Program provides low interest loans to communities to fund qualified wastewater projects. The Town of Somerset is funding the IWRMP with Town and EDA resources, but intends to fund future upgrades to the WPCF utilizing SRF loan funding. In addition the Town can use SRF funding to fund future projects for improvements to the wastewater collection system, water system projects, and stormwater system projects.

Section II
Drinking Water Management Plan Summary

SECTION II

DRINKING WATER MANAGEMENT PLAN SUMMARY

II.1 INTRODUCTION

A comprehensive evaluation of the water system to determine the operational and capital needs over the next 25-year planning period was performed and presented in the Drinking Water Management Plan.

The 2018 Annual Statistical Report (ASR) showed that the average amount of water pumped from the Town's sources was about 1.84 MGD with a maximum day demand of 2.997. Based on population projections, Somerset can expect to see average water demands ranging from 1.942 – 2.106 MGD and maximum day demands of 3.069 – 3.327 MGD by the year 2040.

The Town was authorized to withdraw 3.82 MGD in 2018. The Town has filed a withdrawal permit (which is pending) that requests 4.02 MGD in 2029. The average amount of raw water pumped by the Town's sources was about 2.603 MGD in 2018. This amounts to 68 percent (2.603/3.82) of the Town's permitted withdrawal. Somerset currently has a surplus in supply of approximately 1.217 MGD (3.82 – 2.603), and an anticipated surplus of 1.914 MGD (4.02 – 2.106) in the future.

Somerset is facing two primary needs with regard to drinking water quality. One of the needs is to address the water quality complaints in the Village area/North End of the distribution system. The second water quality issue is the elevated levels of total trihalomethanes (TTHMs) in the distribution system.

The dirty water complaints in the Village area stem from the convergence of the well water, which is unchlorinated, and the treated surface water from the WTP, which is chlorinated. The manganese in FJM Well #2 is likely being oxidized and forming particulate that settles in the water mains. When there are changes in flow direction, the particulate is suspended causing dirty water complaints. Alternative approaches for utilizing this well should be considered to improve water quality in this area of the distribution system.

The elevated levels of TTHMs are a result of , increasing levels of Total Organic Carbon (TOC) in the raw water (the precursor to TTHM formation), the limited capability of the existing water treatment processes for removing TOC, and the increasing water age in the distribution system as a result of the declining water use.

The other component to the elevated levels of TTHMs is water age. Water age can be impacted by the size of the piping in the distribution system as well as the size of the storage tanks. Water infrastructure sizing has competing goals in that larger components are desired to provide fire-fighting capabilities as well as available water supply under emergency situations. Meeting these goals can significantly increase water age.

Some of the infrastructure has been upgraded recently including much of the equipment in the Segreganset Pump Station in 2012, new Hot & Cold Lane tanks in 2012, and some equipment at the Water Treatment Plant (WTP) in 2017. Much of the infrastructure is aging and in need of replacement or rehabilitation, especially the distribution system with over 25% more than 70 years old.

II.2 WATER SUPPLY RECOMMENDED PLAN

The existing water supply sources are adequate for the projected planning period. While this is certainly an excellent situation, there are a number of operational and capital improvements that should be implemented in order to maintain continued water supply reliability.

The surface water supply system is reported to have a safe yield of 5.0 MGD. This is based on the evaluation completed in 1988. New methods of calculating safe yield are available as well as more recent meteorological and hydrological data which would be more reflective of recent changes in climate. While it is believed that there is sufficient supply from the surface water system, a recalculation of the safe yield is warranted and should be completed in the near future.

The Segreganset River is a significant part of the surface water supply safe yield and therefore a vital component of the Somerset water system. It is important that the pumping system is available at all times during the late fall, through the winter and into early spring to ensure adequate supply in maintained.

The Segreganset River Transfer Station was rehabilitated in 2012. This work included building renovations; installation of new valves; rebuild of the raw water pumps; a new electrical service; and replacement of the motor control center. The mechanical and electrical components will require reassessment within the 25-year planning period.

There are other features of the transfer station and transmission main that require consideration for future upgrades in order to enhance reliability of this water supply source, particularly between November and May when the transfer station is operational. The transfer station does not currently have standby power; which for an asset of its significance, is a notable vulnerability. Providing standby power at the station can be provided either by two straightforward means; (1) installation of a permanent (fixed) generator located adjacent to the transfer station or, (2) a trailer-mounted, portable generator that can be brought onsite during an extended outage.

Two other infrastructure components of the Segreganset River system that require consideration are the transmission main that delivers water from the Segreganset to the Somerset Reservoir and the dam that controls the flow of water down the river.

The 3-mile 30-inch transmission main is the singular conduit for transporting water from the Segreganset River to the Somerset Reservoir, making it a critical infrastructure asset. Should the transmission main fail due to a large break or other interruption of service, the town could potentially face a water supply emergency. The structural condition of the transmission main is not known and therefore a pipeline condition assessment is highly recommended. There are several techniques and methods for pipeline condition assessment ranging from traditional CCTV visual inspection to more advanced acoustic and electromagnetic investigations. Once the transmission main is evaluated a specific plan for rehabilitation or replacement can be implemented. For the purposes of this DWMP, we have assumed that either the entire length of the transmission main would need to be lined or replaced.

The Segreganset Dam is also a critical asset that the Somerset Water Department maintains. The dam creates a barrier to separate freshwater (upstream water from Segreganset) and brackish water (downstream from Segreganset and Taunton Rivers). The dam also creates a pool from which the pump station draws water. Routine maintenance of this dam is critical to the operation of the Segreganset transfer station and the Somerset water supply in order to maintain safe drinking water.

The FJM Well #2 supply is providing significantly less than its permitted capacity because of operational concerns with the removal of the Richmond Hill Tank and water quality concerns. While the capacity of this well is not critical to supporting the future water supply needs, operating this well at the lower capacity is inefficient. Alternative approaches for utilizing this well should be considered to improve efficiency and water quality in the distribution system.

The FJM Well #2 has been inactive since improvements to the chemical storage areas were completed in the Fall of 2018. There have been numerous water quality complaints in recent years within the FJM Well #2 service area. Water quality complaints in the area of the FJM Well #2 have been significantly reduced since the well has been taken offline.

In the past, the FJM Well # 2 and its service area experience water quality complaints during periods of high demand, likely due to the groundwater (containing slightly elevated levels of manganese) blending with chlorinated water from the WTP. Samples collected from the well in 2017 had manganese levels ranging from 0.14 mg/L to 0.48 mg/L.

EPA has regulated manganese as a secondary contaminant with a secondary maximum contaminant level (SMCL) of 0.05 mg/L. In addition, MassDEP has established a Health Advisory (HA) level for manganese at 0.3 mg/L. The SMCL is a non-enforceable level, however if concentrations are in excess of 1.0 mg/L MassDEP will require removal of manganese, and if levels are above the HA level of 0.3 mg/L, MassDEP will require an assessment from MassDEP's Office of Research and Standards to determine whether removal is required. Because the manganese level in the FJM Well #2 has been detected above the SMCL with a few results above the HA level, it is recommended that manganese removal be considered, and may be required by MassDEP in the future.

There are three alternatives considered most feasible for the future of FJM Well #2; (1) install a manganese treatment system and reactivate the well, (2) convert the well to a raw water supply pumping directly to the reservoir or, (3) a long-term lease agreement with the Dighton Water District for them to use this water supply to meet their water demands.

The operation and maintenance of this remote station is a moderate expense which adds to the water department's overall annual operating budget. The estimated annual cost to operate and maintain the FJM Well #2 is $72,000 which includes approximately 400 hours of labor. This cost equates to about $685/MG. For comparison, if the FJM Well #2 were to be operated only as a raw water pumping station with no chemical addition or disinfection, the estimated annual cost is $40,000, or $365/MG.

Supplying water from the well to the reservoir can either be achieved by the construction of a new transmission main, or by constructing an interconnection to the existing 30-inch Segreganset River Transmission Main. By pumping the raw water supply directly to the reservoir, the current treatment and chemical addition at the well can be eliminated. The primary operations and maintenance costs would only include periodic visits, electricity costs, building heat and routine maintenance. Because of the elevated levels of manganese in the ground water, the impact to manganese levels within the reservoir, and subsequent treatment facility, would need to be monitored and assessed.

The Somerset Reservoir and dam were constructed in 1965. The reservoir has an estimated storage capacity of 1,400 MG. A 1988 study estimated the safe yield of the reservoir, including the transfer from the Segreganset River, to be 5 MGD. Since this last study MassDEP has developed an advanced software package for determining safe yield. Weather patterns have been changing as a result of climate change, and this information should be incorporated into the safe yield analysis. A safe yield analysis should include a bathymetric survey to also update information relating to the reservoir characteristics including the stage-storage relationship. Updates to the safe yield can be completed with the use of grant money made available from MassDEP. Applicable grant programs could include the Municipal Vulnerability Preparedness (MVP) program, as well as the Water Management Act (WMA) Grant. The WMA Grant program includes safe yield studies for the first time in 2019 and will likely be included in future funding years. The WMA Grant includes an 80% grant that requires a 20% match from the municipality.

In the Spring of 2018, emergency repairs needed to be made to the reservoir intake structure due to the failure of the mid-level intake gate. The intake structure is a critical asset, and if the structure fails, delivering water to the water treatment plant becomes very difficult. The low-level and high-level inlet gates and operators should be considered for replacement to avoid future failure of these items. The outlet pipe gate, valve operator, and pipe should also be assessed and considered for replacement to avoid future failure of these critical items. To ensure a reliable water supply is maintained, the Town should continue with annual dam inspections.

Repairs and improvements to the dam have also been designated as a primary project under the Town's Municipal Vulnerability Preparedness (MVP) effort. With the assistance of their dam consultant, the Town identified improvements to the reservoir and dam to withstand a ½ probable maximum flood (PMF). The Town is planning to apply for MVP grants for design and construction of these improvements.

Somerset has existing interconnections with the neighboring communities of Dighton, Fall River, and Swansea. These interconnections are aging and in need of replacement. Several emergency situations have occurred in the last several years which the Town could have benefitted from more reliable interconnections, but due to the uncertainty of the integrity of the connections, supplemental water was not provided. Replacement of these interconnections would increase the reliability and redundancy for Somerset.

Interconnections with each town should be metered with capability to send water in either direction. Reestablishing interconnections will require review of water quality compatibility, especially with regard to the Lead and Copper Rule. Rates for water purchase will also need to be established. Somerset may want to initiate discussion with each of the municipalities to investigate the possibility of cost sharing as these interconnections would be mutually beneficial.

TABLE II-1

WATER SUPPLY RECOMMENDATIONS

Project Identifier	Capital Improvement	Estimated Cost of Improvement
WS-1	Install Standby Generator	$100,000
WS-2a	Evaluate the 30-inch Transmission Main Condition	$100,000
WS-2b	Line the entire length of Transmission Main (3.8 miles)	$4,000,000
WS-2c	Replace the entire length of Transmission Main (3.8 miles)	$6,000,000
WS-3	Dam Evaluation and Spillway Improvements	$500,000
WS-4	Replace/rehabilitate pumps in 2032	$500,000
WS-5	Install treatment for Manganese removal	$3,000,000
WS-6	Modify piping to pump water to Reservoir	$500,000
WS-7	Lease agreement with Dighton Water District	TBD
WS-8	Bathymetric Survey and Safe Yield update	$50,000*
WS-9	Replace gates, valve operators, and piping at intake structure	$500,000
WS-10	Somerset Reservoir Spillway and Dam Improvements	$4,000,000
WS-11	Replace Fall River Interconnection	$600,000
WS-12	Replace Dighton Water District Interconnection	$200,000
WS-13	Replace Swansea Water District Interconnection	$300,000

*There is a new grant available for projects that address climate change under which this work may be eligible for funding.

II.3 WATER TREATMENT RECOMMENDED PLAN

The water treatment plant is designed for a maximum capacity of 6.0 MGD. The current average day demand within the Town is approximately 1.9 MGD. The treatment plant staff are challenged in operating the treatment plant at this reduced flow. The treatment system is not recommended for operation at less than 1 MGD per unit and 2 MGD with two units. Operation with just one unit is not desirable because of the frequent clarifier flushes that stop forward flow. To maintain steady flow with consistent and reliable treatment, a minimum of 2 units need to be in operation.

The facility addition was constructed in 1994, and many of the components are approaching the end of their service life unless upgrades are implemented to extend the service life another 10-15 years. Alternatives to consider include near-term improvements to the existing facility to improve the operations, safety, and drinking water quality, and replacement of the entire plant with a new treatment plant that is more robust and provides greater flexibility in operations.

II.3.1 Upgrade Existing Water Treatment Plant

An evaluation of the existing WTP was completed in 2016. A number of recommended upgrades were presented in the 2016 evaluation report to extend the service life of the facility.

II.3.1.1 Raw Water Pumping

The two raw water pumps are rarely operated, as the clarification units can almost always be supplied raw water from the Somerset Reservoir by gravity. The raw water pumps, piping, valves, and appurtenances should be surface prepared and recoated with fresh paint to remove and reduce any future surficial corrosion.

II.3.1.2 Pre-Treatment Chemical Addition

The PACl and Non-Ionic Polymer feed pumps are original to the 1994 facility and need replacement. The unused potassium permanganate and carbon dioxide systems should be disconnected and removed from the facility.

II.3.1.3 Process Equipment

The Trident contact clarifier units were rehabilitated in 2019 including removal and replacement of the clarifier media, replacement of air scour piping in the clarifier section, and assessment and repair of the clarifier and filter components. The backwash pumps and filter-to-waste pumps are original to the 1994 plant upgrade, are near the end of their expected service life and should be replaced. One new blower was installed in 2019 and the other was rehabilitated.

II.3.1.4 Post Treatment Chemical Addition

The sodium hypochlorite system was installed in 2017. The sodium fluoride and polyphosphate chemical feed systems are original to the 1994 water treatment plant upgrade. These systems are in need of replacement, including metering pumps, mixers, controls, and chemical storage tanks.

II.3.1.5 Finished Water Pumps

The three finished water pumps are original to the 1994 water treatment plant upgrade and in need or replacement. Replacement of the finished water pumps should include not only the replacement of the pumps and motors, but new VFDs as well.

II.3.1.6 Residuals and Disposal

Lagoons 2 and 3 have overgrown vegetation and are in need of maintenance to restore capacity of the lagoons. The washwater residuals pumps that pump the lagoon supernatant to the sanitary sewer system are also in need of replacement, as they have experienced operational issues in recent history and are nearing the end of their service life.

II.3.1.7 Building

The building has been well maintained, but it is aging infrastructure that will need upgrades. The upgrades recommended in the 2016 report include concrete repairs, door upgrades, new floor finishes, adding insulation, roof repairs and other general architectural repairs, HVAC system upgrades, security improvements, lighting improvements and other general electrical equipment upgrades.

II.3.2 New Water Treatment Plant

Portions of the existing water treatment plant are 25 years old and others are over 50 years old. Replacement of the existing water treatment plant should be designed as a 6 MGD plant based on the current population projections and demand trends. Piloting different technologies will need to be considered to determine which treatment technology will be the most appropriate for the system.

Technologies to consider include rapid clarification technologies including DAF (dissolved air flotation) and ballasted sand flocculation. The treatment plant would primarily be designed for turbidity, TOC and microbial removal, but should also consider iron and manganese removal. The Somerset Water Department has faced challenges in the past with high TTHM levels, and increased TOC removal would help lower TTHM levels in the distribution system. The addition of chloramines or post-filtration GAC adsorbers could be considered for inclusion in the project to aid in reduced TTHM concentrations.

The timeline for a new water treatment plant from design to start-up of the facility is expected to require 5-6 years, consisting of piloting (1.5 years), design and permitting (1.5 years), and construction (2-3 years).

The alternatives for water treatment are listed in **Table II-2**.

TABLE II-2
ALTERNATIVES FOR WATER TREATMENT

Project Identifier	Capital Improvement	Estimated Cost of Improvement
WT-1	Upgrades to existing WTP	$6.5M
WT-2	New WTP with more robust treatment and flexibility	$36-$42M

II.4 WATER DISTRIBUTION SYSTEM RECOMMENDED PLAN

The distribution system needs identified in the Drinking Water Management Plan include programs and infrastructure projects that address:

- areas with low fire flows
- areas with low pressures
- high water age resulting in water quality issues

The approach used to evaluate the needs of the distribution system was to first identify the hydraulic requirements of the system, and secondly to identify the adequacy and limitations of the system under the existing and projected demand conditions.

Several factors are normally considered in the evaluation of the adequacy of a water distribution system. These include; system pressures, velocity of water in the pipelines, headloss, pipe looping, redundancy, piping reliability and adequacy, and future fire flow capabilities. The following is a discussion of several of these factors, as well as how they apply to both existing and projected demand conditions.

II.4.1 Areas with Low Fire Flow

The Somerset hydraulic model was used to evaluate available fire flows under existing operating conditions. Water mains that did not provide adequate fire flow were prioritized for replacement with a larger diameter watermain or reconfiguration to reduce dead ends

II.4.2 Areas with Low Pressure

The hydraulic model was used to identify areas with low pressure under existing conditions. The high service booster pump station (BPS) located near the Hot and Cold Lane west tank is not able to operate as designed and does not increase the level of the Read Street Standpipe sufficiently to raise the HGL of the High Service Zone.

Water system needs include addressing the improper performance of the pump station. Alternatives include rehabilitation of the existing pump station, installing a new BPS at the existing site and relocating the BPS to the Read Street Tank site.

TABLE II-3

ALTERNATIVES FOR WATER DISTRIBUTION BOOSTER PUMP STATION

Project Identifier	Capital Improvement	Estimated Cost of Improvement
WD-1	Rehabilitate Existing Pump Station	$450,000
WD-2	Replace Pump Station at Existing Site	$750,000
WD-3	Relocate New Pump Station at Read Street Tank Site	$950,000

II.4.3 Water Age

The hydraulic model was used to identify water age within the distribution system under existing conditions. The average water age in the Hot and Cold Lane Tanks with both tanks online is estimated to be 19 days. The water age could be reduced to an average of 12.5 days by placing one of the tanks off-line. This can be done without significantly impacting the available fire flows. Reducing the water age should be a benefit in reducing TTHM levels.

The Town of Somerset has petitioned the Massachusetts Department of Environmental Protection Drinking Water Program and received approval to place a tank off-line. The Town can monitor the quarterly TTHM sampling to assess the impact of the reduced water age.

II.5 WATER MAIN REPLACEMENT PROGRAM

A water main replacement program was developed to prioritize water mains most in need of replacement and develop an annual schedule for replacement. Projects were prioritized based on the following criteria:

- Year Installed
- Diameter
- Material
- Estimated Remaining Service Life
- Break History
- Pressure
- Available Fire Flow

In total, 43 projects were identified to be prioritized for replacement. The projects listed in order of priority for the 20-year planning period are included in the **Table II-4**.

TABLE II-4

WATER MAIN REPLACEMENT PROJECTS BY PRIOIRTY

Project	Location	Reason	Cost
1	Lees River Avenue, Ocean Boulevard, Milton Avenue and Enterprise Drive	Age, AC, FF	$1,355,000
2	Buffington Street, Hichney Lane, Fatima Drive, Lourdes Road, and Apostle Road	Age, FF	$1,297,000
3	Elm Street	Age, AC, FF	$832,500
4	Read Street, Highland Road, Hot and Cold Lane, Travers Street, Seaver Street, and Bertram Road	Age, FF	$1,849,000
5	Riverside Avenue	Age	$3,700,000
6	Lepes Road, Kaufman Road, Hillside Avenue, Sherman Road, Mellen Avenue, Bower Street, Bodwell Street, Blossom Avenue	Age, AC, Breaks	$1,440,000
7	O'Neil Road, Ripley Street, Angus Street, Perkins Street, Massasoit Street, Keene Street, Carey Street, Burrows Street, Stoddard Street, Pocasset Street, Farren Street, and Anawam Street	Age, Breaks	$1,092,000
8	Chatterton Avenue, Thelma Avenue, Perron Avenue, Riverside Avenue, and Owen Avenue	Age, AC, Breaks	$1,113,000
9	Westhill Avenue, Riverside Avenue, Newhill Avenue, and Longhill Avenue	Age	$1,205,000
10	County Street from North Street to FJM Well #2	Age, WQ	$4,350,000
11	Linden Drive, Hemlock Street, Birch Street, West County Street, Ash Street, Pine Street, Judy Lane, Lorraine Avenue, and Violet Avenue	Age	$700,000
12	Wilbur Avenue, Walker Street, Arch Street, and Alden Place	Age	$1,205,000
13	Read Street, Meadow Lane, and Doherty Avenue	Age	$1,110,000
14	Pleasant Street, Old Colony Avenue, and Sandy Point Avenue	Age, WQ	$1,245,000

Project	Location	Reason	Cost
15	High Street, Cherry Street, Clark Street, School Street, Poplar Road, Avon Street, Church Street, and Pleasant Street	Age, WQ	$1,100,000
16	Centre Street, Lincoln Avenue, Grant Avenue, Hargreaves Avenue, Gay Street, Garfield Avenue, Tyler Avenue, Everett Street, Sanford Avenue, and McKinley Avenue	Age, Breaks	$970,000
17	Palmer Street, Borland Avenue, Seward Avenue, Ranger Street, Davis Street, and Richmond Street	Age	$910,000
18	Pleasant Street, North Street, and Carol Street	Age	$860,000
19	Vermont Avenue, Massachusetts Avenue, and Watuppa Avenue	Age, AC, Breaks	$800,000
20	Prospect Street, Luther Avenue, Wordell Road, and at Berkeley Regional HS		$930,000
21	Shawomet Avenue, Marigold Avenue, Buxton Avenue, Spruce Street, Prospect Street, Shove Street, Dias Terrace, and Bowker Terrace	Age, Breaks	$1,015,000
22	Wilbur Avenue, Kathleen Avenue, Kenneth Avenue, and Randolph Street	Age, AC, Breaks	$721,500
23	Brayton Avenue, Slades Ferry Avenue	Age, AC	$750,000
24	Mohawk Road, Mount Hope Road, Bourn Avenue, Watuppa Avenue, Eddy Lane, and Stetson Lane	Age, AC	$1,240,000
25	Grandview Avenue, Luther Avenue, Harrison Avenue, Johnson Street, Berube Avenue, Meribah Street, Gardner Avenue, Durfee Court, Annette Avenue, and Roland Avenue		$980,000

Section III
Comprehensive Wastewater Management Plan Summary

SECTION III

COMPREHENSIVE WASTEWATER MANAGEMENT PLAN SUMMARY

The Town of Somerset has been involved in the wastewater planning process in various forms over the last several decades. In preparation for impending water pollution control facility upgrades that will be needed to comply with numerical total nitrogen limits in the new NPDES permit, the Town developed a Comprehensive Wastewater Management Plan (CWMP), as part of the larger Integrated Water Resources Management Plan (IWRMP). This document is prepared in accordance with the MassDEP's *Guide to Comprehensive Wastewater Management Planning (1996)*. A CWMP typically evaluates unsewered areas within a Town, population and planning efforts for growth within the Town, and an evaluation of the existing wastewater infrastructure (pipe, pump stations, treatment facility). The full CWMP can be found appended to this document and is available at the Water Department and online on the Town's website.

The Town's collection system was first constructed in the 1960's, around the same time the Water Pollution Control Facility (WPCF) was constructed. In total, the collection system consists of approximately 500,000 linear feet of gravity sewer, 2,345 sanitary sewer manholes, approximately 20,000 linear feet of force main, and 17 pump stations. Approximately 99% of Somerset residents are connected to the Town's wastewater collection system.

The WPCF's current National Pollutant Discharge Elimination System (NPDES) permit, #MA0100676, was issued by the EPA in 2004. The Town is expecting its new draft permit to be issued in 2020. The Town has had ongoing discussions with EPA and the Massachusetts Department of Environmental Protection (MassDEP) regarding what the draft permit will contain for new/revised discharge limits, schedule, and possible treatment plant upgrades required to meet the new limits. The draft permit is anticipated to include a numerical limit for total nitrogen as a mass-based limit.

III.1 UNSEWERED AREAS OF TOWN

The full analysis of the unsewered areas of Town can be found in the CWMP. Ultimately, there were no areas identified as having "high needs" for alternative wastewater disposal methods. For the areas of the Town not already connected to the collection system, there are regulations in place that state if a home is sold or if the septic system fails, the owner must connect to the collection system. There are some planned developments, including Brayton Point redevelopment, that must be considered when reviewing capacity within the collection system and the treatment facility.

III.1.1 Collection System (Gravity)

The existing gravity collection system was analyzed for age and condition as well as infiltration and inflow (I/I) removal. Much of Somerset's gravity collection system was built in the 1960s and 1970s and is 50 to 60 years old.

The Town has undertaken sewer collection system studies including manhole inspections, GIS mapping, and infiltration and inflow (I/I) studies. The most recent I/I control plan work commenced in the Spring of 2018 and includes flow metering, I/I analysis and recommendations for sewer system evaluation survey (SSES) tasks that will ultimately lead to sewer system rehabilitation.

III.1.1.1 Recommended Plan

The recommended plan for the collection system is to focus on reducing sources of I/I by first locating the sources using sewer system evaluation survey (SSES) investigative work. Focus will then shift to rehabilitating or replacing sewer pipes and manholes with significant sources of I/I and/or that have structural defects or other condition-related problems. As manhole inspections are performed during SSES phases, the pipe data including materials and inverts should be entered into the Town's GIS database. It is recommended that the Town develop a prioritized plan for cleaning, inspecting, and ultimately rehabilitation of gravity sewer pipes utilizing the Town's GIS data.

The Town will also continue to repair or replace sewer assets on an as needed and/or emergency basis (for example, sewer main or service lateral pipe breaks). Based on the results from the flow monitoring and infiltration/inflow (I/I) analysis, preliminary recommendations for sanitary sewer evaluation survey (SSES) work were made for areas of the collection system (prioritized by flow meter basins).

For planning purposes, a conservative approach to the collection system was utilized to estimate repair needs over the 20-year planning period. A broad assumption was made that 50% of the existing collection system would need to be repaired. It has been assumed for now, that methods utilized would be pipe and manhole lining (no replacements).If after sewer, manhole, and pipe inspections are completed, it is determined that some manhole and/or pipe replacement is warranted, these costs will be estimated at that time. Using pipe lining unit costs of $50 per linear foot and manhole repair at $3,400 each, a budget cost estimate was developed. These costs are estimated at the ENR index of 11380 (November 2019). The results are shown in **Table III-1**. These costs will be spread out over the 20-year planning period with prioritization related to the SSES work, starting with Phase 1 areas.

TABLE III-1

COLLECTION SYSTEM REHABILITATION BUDGET

COST ESTIMATE

ITEM	TOTAL COLLECTION SYSTEM COST
Sewer Pipe Lining	$12,000,000
Sewer Manhole Repairs	$4,000,000
Engineering Services/Subcontractors	$5,000,000
Contingency	$10,000,000
Total	**$31,000,000**

Using the MassDEP criteria, **Table III-2** summarizes the recommended collection system SSES investigation work. The following types of SSES tasks are recommended in meter basins, which are identified to have infiltration issues: manhole inspections, night flow isolations, and closed-circuit television (CCTV) inspection. The Town has recently and will continue to perform pipeline CCTV inspections for high priority areas of the collection system. For area with inflow problems, typical types of SSES work include manhole inspections, smoke testing, dye testing, and building inspections.

TABLE III-2

PLANNED SSES RECOMMENDATIONS

Meter Basin	Infiltration Priority	Inflow Priority	CCTV Inspection	Night Flow Isolation	Manhole Inspection	Smoke Testing	Dye Testing	Building Inspection	Flow Monitoring
M1	No	No	No	No	No	No	No	No	No
M2	No	Yes	No	No	Yes	No	No	Yes	No
M3	No	No	No	No	No	No	No	No	No
M4	No	Yes	No	No	Yes	Yes	Yes	Yes	No
M5	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
M6	Yes	No	Yes	Yes	Yes	No	No	No	No
M7	No	No	No	No	No	No	No	No	No
M9/M8	No	Yes	No	No	Yes	Yes	Yes	Yes	No
M10	No	No	No	No	No	No	No	No	No
M11	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
M12	No	Yes	No	No	No	No	No	Yes	No
M14	No	Yes	No	No	Yes	No	No	Yes	No
M15	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
M16	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
M19	No	Yes	No	No	Yes	No	No	Yes	No
M20/M13/M17/M18	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
M21	No	Yes	No	No	Yes	Yes	Yes	Yes	No
M22	No	No	No	No	No	No	No	No	No
M23	Yes	No	Yes	Yes	Yes	No	No	No	No
M24	No	Yes	No	No	Yes	No	No	Yes	No
M25	No	No	No	No	No	No	No	No	No
M26	No	No	No	No	No	No	No	No	No
Totals	**7**	**13**	**7**	**7**	**14**	**4**	**4**	**13**	**1**

1. Gray highlights represent "high priority" areas.

The planning level cost estimates for the six SSES phases are shown in **Table III-3**. These planning-level costs were developed using standard cost estimating procedures consistent with industry standards utilizing unit cost information. The project cost information presented herein is in current dollars and is based on the *Engineering News-Record* (ENR) Index of 11170 (September 2018) The estimated cost for all six phases is $2,188,700.

TABLE III-3

PLANNING LEVEL PROJECT COST ESTIMATE FOR RECOMMENDED SSES WORK

SSES Phase	Meter Basin	Total Cost
Phase 1	M4, M16, M21	$318,400
Phase 2	M6, M11. M15	$395,200
Phase 3	M2, M5, M12	$328,300
Phase 4	M9/M8, M14, M24	$327,600
Phase 5	M23, M20/M13/M17/M18[1]	$217,500
Phase 6[2]	M20/M13/M17/M18	$601,700
	TOTAL	**$2,188,700**

1. The work in M20/M13/M16/M18 will only be micro-metering and night flow isolations in this phase.
2. The results of the micro-metering during Phase 5 may reduce the quantity of SSES work for M20/M13/M16/M18 in Phase 6.

The Town is currently conducting CCTV inspections in all meter basins from Phase 1 and M15 (from Phase 2).

III.1.1.2 Implementation Plan

The implementation schedule shown in **Table III-4** includes provisions for the recommended SSES tasks over the next 13 years. The next phase of SSES work will be in 2021.

This schedule focuses on finding and quantifying the sources of I/I in the sanitary sewer system. Based on the findings from the SSES tasks, the Town will consider rehabilitation, repair, or replacement of sewer assets to address the problems identified. Collection system repair is assumed to occur in the years between SSES phases. Also, it is recommended that the Town perform post-rehabilitation flow monitoring to document the estimated amount of I/I removed from its sewer collection system, when feasible.

TABLE III-4

IMPLEMENTATION SCHEDULE

Task	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
SSES Evaluation		$318,400		$395,200		$328,300		$327,600		$217,500		$601,700									
Collection System Rehabilitation	$1,550,000		$1,550,000		$1,550,000		$1,550,000		$1,550,000		$1,550,000		$1,550,000		$1,550,000		$1,550,000		$1,550,000		$1,550,000

III.2 WASTEWATER PUMP STATIONS

There are currently 17 pump stations located throughout Somerset's wastewater collection system. Each of the pump stations currently being operated and maintained by the Town's Water Pollution Control Department are listed below:

1. Angus Street
2. Cherry Street
3. Dublin Street
4. Durfee Court
5. Foley Avenue
6. Gay Street
7. Grove Avenue
8. Lake Street
9. Lees River Avenue
10. Luther Avenue
11. Main Street
12. Millers Lane
13. Owen Avenue
14. Pilot Drive
15. Pleasant Street
16. Route 6
17. Wilbur Avenue

The pump stations were evaluated, and ranked, based on several evaluative criteria. The criteria included the following:

1. Condition of Station
2. Age of Station
3. Rated capacity
4. Safety concerns
5. Instrumentation and Communications
6. Standby power
7. Locational Impacts (environmental & residential impacts, odor, aesthetics, etc.)
8. Vulnerability to impact from sea level rise
9. Vulnerability to impact from hurricane surge

Based on the criteria above, recommendations for each pump station were made, cost estimates developed, and a prioritization list created for a Capital Improvement Plan (CIP).

III.2.1 Project Costs

We have summarized the estimated capital costs for high and normal priority improvements to each station in **Table III-5** below. The costs were estimated using similar pump station upgrade bid pricing and should be considered planning level costs for Town budgeting purposes. As the Town moves forward with station upgrades (preliminary and design phases), the cost estimates will need to be updated and adjusted to reflect the specific details for the upgrades for the given station. The costs are based on ENR index 11380 (November 2019).

TABLE III-5
SUMMARY OF TOTAL PROJECT COST ESTIMATES FOR
RECOMMENDED PUMP STATION IMPROVEMENTS

Pump Station	Estimated Costs		
	Normal Priority	**High Priority**	**Total**
Angus Street	$384,000	$17,000	$401,000
Cherry Street	$944,000	$0	$944,000
Dublin Street	$447,000	$161,000	$608,000
Durfee Court	$921,000	$0	$921,000
Foley Avenue	$816,000	$373,000	$1,189,000
Gay Street	$0	$913,000	$913,000
Grove Street	$498,000	$297,000	$795,000
Lake Street	$497,000	$0	$497,000
Lee's River Avenue	$517,000	$18,000	$535,000
Luther Avenue	$703,000	$269,000	$972,000
Main Street	$0	$1,983,000	$1,983,000
Millers Lane	$1,069,000	$0	$1,069,000
Owen Avenue	$933,000	$0	$933,000
Pilot Drive	$0	$1,215,000	$1,215,000
Pleasant Street	$0	$1,226,000	$1,226,000
Route 6	$0	$1,578,000	$1,578,000
Wilbur Avenue	$0	$1,712,000	$1,712,000
Overall Total	$7,729,000	$9,762,000	$17,491,000

III.2.1 Recommended Implementation Plan

The recommended improvements implementation schedule is detailed in **Table III-6.** This table shows the target year to complete the recommended improvements and the total estimated cost for such improvements. The schedule is based on the results of the pump station evaluation and ranking analysis as summarized in CWMP **Table III-5**. The intent is to spread the improvement costs over a 15-20-year duration and recognize that the Town needs to balance its wastewater pumping station improvements with other infrastructure improvements (WWTF upgrade, water system improvements, stormwater/drainage system improvements, etc.)

TABLE III-6

RECOMMENDED PUMP STATION IMPROVEMENTS IMPLEMENTATION SCHEDULE

PUMP STATION	CAPITAL IMPROVEMENTS PLAN YEAR																
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Angus Street																	$401,000
Cherry Street				$944,000													
Dublin Street													$608,000				
Durfee Court		$921,000															
Foley Avenue										$1,189,000							
Gay Street		$913,000															
Grove Street														$795,000			
Lake Street															$497,000		
Lee's River Avenue																$535,000	
Luther Avenue											$972,000						
Main Street			$1,983,000														
Millers Lane				$1,069,000													
Owen Avenue		$933,000															
Pilot Drive					$1,215,000												
Pleasant Street			$1,226,000														
Route 6	$500,000					$1,078,000											
Wilbur Avenue		$1,712,000															
YEARLY TOTAL	**$500,000**	**$4,479,000**	**$3,209,000**	**$2,013,000**	**$1,215,000**	**$1,078,000**	**$0**	**$0**	**$0**	**$1,189,000**	**$972,000**	**$0**	**$608,000**	**$795,000**	**$497,000**	**$535,000**	**$401,000**

III.3 WATER POLLUTION CONTROL FACILITY

The Town of Somerset's Water Pollution Control Facility (WPCF) was originally built in the late 1960's. In the mid to late 1980's the facility underwent a major upgrade (particulars included below). In 1993 a small upgrade was undertaken to construct an additional chlorine contact tank. In 1997 odor control was installed at the facility. In 2016 the chemical disinfection system was changed from chlorine gas to liquid sodium hypochlorite. Instrumentation system/SCADA upgrades have been implemented at the WPCF over the last few years. Other equipment replacements have also been completed over the last few years, including two new mechanical screens with screenings wash presses and two new screw pumps. Most of the remaining equipment and structures are of the 1990 upgrade vintage. As such, much of the equipment is past its useful life and many of the building systems are past their useful life and not code compliant (with today's codes).

In addition to aging equipment and building systems, the Town of Somerset is expecting to receive a numerical Total Nitrogen (TN) limit in its new NPDES permit. The Town is expecting that a mass limit of 105 lbs/day for TN will be included. This mass limit is equivalent to a TN concentration limit of 3.8 mg/l and 3.0 mg/L at average daily flows of 3.33 MGD and permitted capacity of 4.2 MGD, respectively. The Town cannot meet this limit with their existing treatment facility processes.

The recommended upgrade targets the immediate equipment replacement needs, building and system upgrades required, and a plan to address pending numerical permit limits for Total Nitrogen. The equipment and building upgrades will also target energy efficiency opportunities at the facility.

III.3.1 Recommended Plan

The recommended plan for the Somerset WPCF consists of phased upgrades for the 20-year planning period. The recommended first phase of these upgrades consists of equipment, processes and buildings in immediate need of replacement or upgrades related to achieving compliance with the pending NPDES permit (which will include total nitrogen-related effluent discharge limits). The other phases in the recommended plan consist of items that are not in immediate need of replacement, are not part of a building system that will trigger code requirements, and do not relate to achieving compliance with the pending NPDES permit.

The following list encompasses the systems and equipment in the 0-5-year (first phase) recommended upgrade:

- Preliminary Treatment – building improvements, grit removal upgrade, sampler and flow measurement replacement.
- Septage receiving – none.
- Primary Treatment – mechanism replacement, sludge and scum pump replacement. Evaluate weirs and baffles, and concrete repair.
- Secondary Treatment – see following section for aeration improvements. Replace secondary clarifier mechanisms, concrete repair and sludge (RAS and WAS) pumps. Evaluate weirs and baffles and addition of perimeter density baffle addition to increase performance. Operations building improvements.
- Disinfection – none.
- Solids Processing – see recommendation below.
- Flow Equalization – replace flow equalization pump. Install new aeration/mixing system in two rectangular equalization tanks. See other recommendations below.
- Composting – abandon and demolish composting, see recommendation below under solids processing for land use.
- Odor Control – see recommendations below.
- General site – replace electrical service and MCCs. Replace all generators with two new units. SCADA and instrumentation upgrade, including a site-wide fiber-optic network. General paving of the site.

Current and pending effluent quality limits require the facility to upgrade the secondary treatment process, implementing a Four-Stage Bardenpho and MLE processes to meet effluent nitrogen requirements. These two processes can be alternated to meet seasonal and year-round effluent nitrogen requirements. The existing aeration tanks need to be retrofitted into Four-Stage Bardenpho and MLE configurations to meet a seasonal effluent total nitrogen limit. During summer (growing season), the WPCF can be operated as Four-Stage Bardenpho process to meet an effluent TN of 4.9 mg/L, or less. During the winter season (non-growing season) the WPCF can be operated as an MLE process only having to “report” the effluent TN data.

A new bioreactor train will be needed if an effluent TN of less than 4.9 mg/L is required year-round. The new bioreactor train can be added by retrofitting two of the existing rectangular equalization tanks into a Four-Stage Bardenpho configuration. The following is a list of improvements that will be required for the secondary system to meet the new TN limits.

- Modify Bioreactors to create a 4-stage Bardenpho/MLE process, including demolition of existing equipment and piping within the tanks, repairing concrete, installing baffle walls, new slide gates, new aeration piping and valves, new diffuser grids, new anoxic zone mixers, internal recycle pumping, and new blowers. Associated piping, electrical, and instrumentation for this modification, including a new MCC and Control Panels with SCADA integration.
- Demolish and replace secondary clarifier mechanisms.
- Demolish and replace return-activated and waste-activated sludge pumps; replace piping and valves.
- Demolish and replace scum pumps; modify piping to discharge to SHTs.
- General piping and valve replacement in pump rooms.
- Flow distribution structure modifications.
- Lighting at clarifiers.
- New conduit and power, local control stations, and emergency stops for replaced equipment.
- New Instrumentation and SCADA integration for replaced equipment; new flow meters for sludge pumps.
- Replace HVAC system in Operations Building.
- Replace electrical systems in Operations Building, including new power and control stations to replaced equipment.
- New Instrumentation and SCADA integration for replaced equipment.
- General structural and architectural improvements to Operations Building, including window and door replacement.

The solids processing equipment requires significant improvements to meet the needs of the facility going forward. Below is a list of recommended improvements.

- Demolish and replace belt filter presses with centrifuges.
- Install new conveyors.
- Demolish and replace gravity belt thickeners, in-kind.
- Demolish and replace polymer systems.
- Demolish and replace spray-wash water pumps.
- Demolish and replace thickened sludge pumps and centrifuge feed pumps.
- Replace piping and valving associated with solids processing.
- Demolish and replace sludge holding tank (SHT) blowers and diffusers.
- Install a new sludge holding tank underground next to the Sludge Building.
- Replace HVAC system in Sludge Building.
- Replace electrical systems in Sludge Building, including new power and control stations to replaced equipment. New MCCS and a new Electrical Room on upper floor of sludge building.
- New Instrumentation and SCADA integration for replaced equipment, including new control panels.
- General structural and architectural improvements to Sludge Building, including window and door replacement.
- New roll-off container room and structural modifications in existing sludge bay.
- Modifications to Sludge Building to renovate maintenance offices and remove administrative offices.
- Demolish and/or abandon composting operations; including existing biofilter.
- Construct new building to house administrative offices in or next to Composting Building

The odor control systems at the facility also need to be replaced and re-evaluated for what is necessary at the facility. Below is a list of needs for these systems.

- Demolish and/or abandon wet scrubbing unit in Preliminary Treatment Building.
- Demolish and/or abandon carbon unit for Septage Receiving.
- Demolish and/or abandon wet scrubber for Primary Clarifiers.
- Demolish and/or abandon biofilter.
- Replace equipment and media associated with wet scrubber for preliminary treatment building, repair vessel. New ductwork to GTs, and SHTs.

- New high-capacity carbon unit for Preliminary Building.
- New high-capacity carbon unit for Sludge Building.
- Associated electrical, instrumentation, SCADA integration, and piping/ducts for all systems.

There are no improvements recommended for the septage receiving and disinfection systems at the WPCF. The plant water system should be replaced.

III.3.2 Project Cost Estimates

Table III-7 and Table III-8 present a summary of the conceptual level cost estimates for upgrades/improvements to the WPCF. This cost estimate will be updated throughout the design process to reflect any changes to the preliminary and final design. The estimated cost to upgrade the WPCF was developed using standard cost estimating procedures, utilizing conceptual layouts, equipment quotations and unit cost information. Where appropriate, recent construction cost data were incorporated. Allowances were provided for general contractor overhead and profit, project location multiplier for Massachusetts construction, construction phase contingency, and engineering services for design, bidding, construction and other services. The total project cost estimate for the recommended upgrades/improvements is estimated to be approximately $57.6 million. The costs are based on ENR index 11380 (November 2019).

TABLE III-7

PLANNING COST ESTIMATE FOR WPCF UPGRADES/IMPROVEMENTS

ITEM	ESTIMATED COST
Civil	$1,694,000
Architectural	$2,573,000
Structural	$2,282,000
Process Equipment & Piping	$12,139,000
HVAC/Plumbing	$1,621,000
Instrumentation	$1,809,000
Electrical	$4,653,000
Contractor Mobilization (5%)	$1,339,000
Itemized Construction Subtotal	**$28,110,000**
Contractor Overhead and Profit (20%)	$3,666,000
Contractor Mark-up on Subcontractor Work	$733,000
Bonds and Insurances and Unit Price Items (4%)	$1,212,000
Construction Cost Subtotal	**$33,721,000**
Design Contingency (20%)	$6,744,000
Inflation to Mid-point of Construction (12%)	$4,061,000
Total Estimated Construction Cost	**$44,526,000**
Construction Phase Contingency (5%)	$2,230,000
Engineering Services – Design & Construction Administration (20%)	$8,905,000
Materials Testing (1%)	$445,000
Asbestos and Lead Paint Abatement	$10,000
Town Legal/Administration Fees (2%)	$891,000
Financing (1%)	$570,000
Total Project Cost Estimate	**$57,577,000**

TABLE III-8

PLANNING COST ESTIMATE BY UNIT PROCESS FOR WPCF UPGRADES/IMPROVEMENTS

ITEM	ESTIMATED COST
General Sitework And Paving	$1,555,000
Preliminary Treatment	$2,758,000
Flow Equalization	$1,254,000
Primary Treatment	$2,845,000
Secondary Treatment	$12,363,000
Solids Handling	$17,305,000
Administration Building	$1,579,000
Odor Control	$2,149,000
Plant Water	$173,000
Yard Pump Station Piping, Valving, and Pumps	$130,000
Fiber Optic Network	$156,000
Scada Software and Hardware	$156,000
Generators	$779,000
Power Feed and Associated Duct banks	$1,168,000
Site Lighting	$156,000
Total Estimated Construction Cost	***$44,526,000***
Total Project Cost Estimate	**$57,577,000**

III.3.3 Implementation Schedule

The estimated project schedule for WPCF upgrades/improvements is shown in **Table III-9**. The schedule is subject to change based on when the Town receives the new final NPDES permit and project funding/budgeting approvals. It is anticipated that the Town will proceed with the preliminary design phase for the WPCF upgrades/improvements in July 2021 after the annual Spring 2021 Town Meeting (needed to appropriate design funds).

TABLE III-9

PROPOSED SCHEDULE

MILESTONE	DATE
Final CWMP	January 2020
CWMP Public Hearing	February 2020
Draft/Final NPDES Permit Issuance	2020/2021
Preliminary Design Begins	July 2021
DEP SRF Loan Project Evaluation Form (PEF) Submitted	August 2021
Preliminary Design Report (30% design completion)	December 2021
MassDEP SRF Intended Use Plan (IUP) Notification-Draft	By December 31, 2021
Final IUP	January 2022
Final Design and Permitting Begins	January 2022
SRF Application Submission (90% Design completion)	By October 15, 2022
100% Design and Permitting Complete	By December 31, 2022
Bidding	January through March 2023
Start Construction	By June 30, 2023
Substantial Completion of Construction	June 2025
Final Completion of Construction	December 2025
One-year Warranty Period	June 2026

Section IV
Comprehensive Stormwater Management Plan Summary

SECTION IV

COMPREHENSIVE STORMWATER MANAGEMENT PLAN SUMMARY

IV.1 STORM WATER CAPITAL IMPROVEMENTS

The Comprehensive Stormwater Management Plan (CSWMP) has been developed, in collaboration with the Town of Somerset, as a component of the Integrated Water Resources Management Plan and is included as an Appendix of this report. The goal of the CSWMP was to evaluate and prioritize the most economical and environmentally beneficial means for addressing current and future stormwater needs. Recommendations of the CSWMP are intended to be assessed alongside those of wastewater and drinking water/water supply to create a simple and effective Capital Improvement Plan that weighs timeliness, coordination with other projects, regulatory concerns, environmental and public health concerns, community impacts, and budgetary constraints.

The scope of this effort was comprised of:

1. Assessment of the Stormwater System and identification of future needs.
2. Develop and Screen Alternatives
3. Evaluate and Rank Preferred Alternatives
4. Develop a Comprehensive Stormwater Management Plan (CSWMP)

IV.2 ASSESSMENT OF EXISTING CONDITIONS AND IDENTIFICATION OF FUTURE NEEDS

Stormwater infrastructure and related needs were identified through discussions with the Town's Highway and Planning Departments and review of previous studies and reports. The results indicated flooding and problem areas due to lack of or undersized stormwater infrastructure, mainly culverts, which are often overwhelmed during large rain events and/or are in poor condition structurally. To better understand culvert structural and capacity concerns, a two-day, initial culvert inventory was conducted in October 2018, which identified several alternatives for inclusion in the list. Some capacity issues are related to overflow emergencies associated with the Somerset Reservoir dam and are also attributed to tidal restrictions and structures along the coastline are vulnerable to erosion and sea level rise. Particular areas of concern include:

- Almy Road and Riverside Avenue Culverts over Buffington Brook
- Several culverts over Labor In Vain Brook (North Street, Whetstone Hill Road, Route 138, Dublin Street, South Street)
- Lack of or undersized stormwater management infrastructure in Elm Street and Buffinton Street

In addition to infrastructure needs, planning and environmental needs are a concern. The level of effort and associated cost to meet EPA's stormwater requirements under the 2016 MS4 General Permit are substantial and have been identified as an MS4 compliance assessment. The results have been incorporated into the Stormwater Management Program (SWMP) guiding the Town's activities under the MS4 General Permit. The SWMP has been developed as part of the CSWMP planning effort to satisfy the year one requirements of the MS4 General Permit and to lay out the plan and tools for future compliance. The SWMP is comprised of four volumes, with Volumes 1 & 2 completed, and should be expanded on by the Town with Volumes 3 & 4 as they continue to fulfill the requirements of the MS4 General Permit as follows:

- SWMP Volume 1 **–** Stormwater Management Plan
- SWMP Volume 2 **–** Illicit Discharge Detection and Elimination (IDDE) Plan
- SWMP Volume 3 **–** Operations and Maintenance (O&M) Plan
- SWMP Volume 4 **–** Annual Reporting

IV.3 DEVELOP AND SCREEN ALTERNATIVES

Candidate stormwater projects were identified as potential alternatives based on the assessment of existing conditions and identification of future needs. These projects were vetted to come up with a total of 35 candidate stormwater projects identified as preferred alternatives and classified into one of three categories:

- Capital (C) Projects – Construction projects
- Evaluation (E) Projects and Programs – Studies and nonstructural measures
- Operations (O) Projects and Programs – Operations and maintenance programs

Project descriptions and planning level capital costs have been estimated for each candidate project and below is a listing of the projects broken down by category. A description of each alternative and tables with estimated costs can be found in Section 3.0 of the CSWMP.

TABLE IV-1

CAPITAL CONSTRUCTION PROJECTS

PROJECT ID	ALTERNATIVES (NOT PRIORITIZED)
SW-C1	Elm Street Stormwater Infrastructure Construction
SW-C2	Almy Road Culvert Replacement
SW-C3	Riverside Avenue Culvert Short-Term Repair
SW-C4	Riverside Avenue Culvert Long-Term Repair
SW-C5	Buffington Brook Culvert Improvements
SW-C6	Additional Culvert Improvements from Condition and Capacity Analysis
SW-C7	Whetstone Hill Road Culvert Resizing
SW-C8	Route 138 Culvert (downstream of Whetstone Hill Road) Resizing
SW-C9	Dublin Street Culvert Resizing
SW-C10	South Street Culvert Resizing
SW-C11	Adding/Retrofitting Stormwater Management Facilities
SW-C12	System-Wide Stormwater Upgrades
SW-C13	Illicit Connection Removal
SW-C14	North Street Culvert Resizing
SW-C15	BMP Installations Town Properties

TABLE IV-2

EVALUATIONS AND OTHER PROJECTS/PROGRAMS

PROJECT ID	ALTERNATIVES (NOT PRIORITIZED)
SW-E1	MS4 Requirements
SW-E2	Buffington Brook Capacity Analysis
SW-E3	Culvert Condition Analysis
SW-E4	Salt Marsh Sewer Investigation
SW-E5	Catch Basin Maintenance Program Development
SW-E6	Coastal Resilience Evaluation
SW-E7	Outfall Tidegate Evaluation

TABLE IV-3

OPERATIONS PROJECTS/PROGRAMS

PROJECT ID	ALTERNATIVES (NOT PRIORITIZED)
SW-O1	GIS updates (MS4)
SW-O2	Data Management
SW-O3	Catch Basin Maintenance Program
SW-O4	Stream, Swale & Drainage Channel Maintenance
SW-O5	Outfall Maintenance
SW-O6	Structural BMP Maintenance
SW-O7	Pipe Cleaning & TV Inspection
SW-O8	Street Sweeping
SW-O9	Salt Marsh Management
SW-O10	Staffing Increase
SW-O11	On-Call Contractor
SW-O12	Misc. Stormwater Reporting

IV.4 EVALUATE AND RANK PREFERRED ALTERNATIVES

Initial evaluation and ranking of identified alternatives was completed using the Water Resource Management Planning document prepared by Mass DEP with consultation from Town staff. The ranking considered various criteria for effectiveness in achieving sustainable and long-term water resource management improvements. Section 4.0 of the CSWMP details the evaluation and ranking framework used for this process. In regards to schedule, certain projects are regulatory or mandated actions for compliance with the EPA's stormwater requirements under the 2016 MS4 General Permit. Projects with mandates were given specific begin dates and ranked chronologically and those without mandates followed based on ranking framework scoring.

IV.5 RECOMMENDED PLAN

Since the objective of the CSWMP is to be used as one of the guidance documents larger planning efforts, general rankings and implementation schedules were established for the stormwater alternatives to give weight to projects as they were incorporated into the IWRMP based on comparison with water and sewer priorities and opportunities. The final prioritized stormwater recommendations are summarized in **Table IV-4**.

TABLE IV-4

CAPITAL CONSTRUCTION PROJECTS

RANK	PROJECT ID	PROJECT NAME	CAPITAL COST	ONGOING COST	RECOMMENDED YEAR TO BEGIN	RELATED PROJECTS	POTENTIAL FUNDING	NOTES	RESPONSIBLE DEPARTMENT
1	SW-E1	MS4 Requirements (Year 1)	$15,000		FY2019		Utility Fees, CZM: CPR, 604b & 319		Hwy
2	SW-O5	Outfall Maintenance		$10,000	FY2020	SW-O10			Most of these fall under Hwy, unless otherwise stated.
3	SW-O8	Street Sweeping		$20,000	FY2020				Hwy
4	SW-O1	GIS updates (MS4)	$80,000	$5,000	FY2020		HMP		Hwy
5	SW-E5	Catch Basin Maintenance Program Development	$5,000		FY2020		Utility Fees		Hwy
6	SW-C10	South Street Culvert Resizing	$600,000		FY2019			This project is currently under construction	Hwy
7	SW-C3	Riverside Avenue Culvert (north of Intersection with Luther Ave) Short-Term Repair	$50,000		FY2020		HMP		Hwy
8	SW-O3	Catch Basin Maintenance Program		$20,000	FY2020	SW-O10			Hwy
9	SW-C2	Almy Road Culvert Replacement	$500,000				HMP, DOT Small Bridge	This was just recently awarded, under small bridge grant	Hwy
10	SW-E3	Culvert Condition Analysis	$30,000		FY2021		HMP, FEMA PDM		Hwy
11	SW-E1	MS4 Requirements (Sampling, Catchment Invest.)	$50,000	$20,000	FY2021			Total Cost Over 3 Years	All Dept
12	SW-C13	Illicit Connection Removal (est)		$20,000	FY2021	SW-O11	Utility Fees	Estimate Until Complete	Planning Bd
13	SW-E2	Buffington Brook Capacity Analysis	$40,000				HMP, FEMA PDM		Hwy
14	SW-O10	Staffing Increase		$100,000		SW-O4, SW-O7, SW-O9, SW-O5, SW-O3, SW-O6, SW-O2	Utility Fees		Admin
15	SW-O6	Structural BMP Maintenance		$5,000		SW-O10			Hwy
16	SW-O2	Data Management	$50,000	$10,000		SW-O10	Other Department Needs	Assuming all departments that are involved	All Dept
17	SW-O4	Stream, Swale & Drainage Channel Maintenance		$10,000		SW-O10			Hwy
18	SW-O7	Pipe Cleaning & TV Inspection		$20,000		SW-O10, SW-E1			Hwy/Sewer
19	SW-O9	Salt Marsh Management		$5,000		SW-O10	HMP, National Coastal Wetlands Conservation, Taunton Wild & Scenic, Taunton Watershed Alliance, Narragansett Bay Esturay program, EPA, EEOEA	Conservation	Conservation
20	SW-C15	BMP Installations Town Properties	$50,000				Utility Fees, CZM: CPR, 604b & 319	Total Cost Over 5 Years	All Dept
21	SW-C11	Adding/Retrofitting Stormwater Mgmt. Facilities		$10,000				Coordinate with Other Projects	All Dept
22	SW-C14	North Street Culvert Resizing	$500,000			Dam Compliance	MVP	Dam failure vulnerability	Water/Sewer, Hw
23	SW-C8	Route 138 Culvert (downstream of Whetstone Hill Road) Resizing	$500,000			DOT Road Work	HMP, DOT	Dam emergency release capacity issue	Water/Sewer, Hwy
24	SW-C7	Whetstone Hill Road Culvert Resizing	$500,000				HMP/MVP	Dam emergency release capacity issue	Water/Sewer, Hwy

RANK	PROJECT ID	PROJECT NAME	CAPITAL COST	ONGOING COST	RECOMMENDED YEAR TO BEGIN	RELATED PROJECTS	POTENTIAL FUNDING	NOTES	RESPONSIBLE DEPARTMENT
25	SW-E6	Coastal Resilience Evaluation	$25,000				HMP, Coastal Resilience Grant, MVP, CZM, EPA	We have applied for MVP	Hwy/Planner
26	SW-E7	Outfall Tidegate Evaluation	$20,000				HMP/MVP, Coastal Resilience Grant	We have applied for MVP	Hwy/Planner (assist)
27	SW-C4	Riverside Avenue Culvert (north of Intersection with Luther Ave) Long-Term Repair	$750,000				HMP, DOT Small Bridge, Culvert Replacement Grant		Hwy/DOT/Con
28	SW-C5	Buffington Brook Culvert Improvements	$2,000,000			SW-E2	HMP		Hwy/Conservation
29	SW-C1	Elm Street Stormwater Infrastructure Construction	$1,500,000				HMP/MVP, Ch 90	Coordinate with Other Projects	Hwy
30	SW-C9	Dublin Street Culvert Resizing	$750,000			SW-C10	HMP/MVP	New sleeve installed	Hwy
31	SW-C6	Additional Culvert Improvements from Condition and Capacity Analysis (SW-E2, SW-E3)	$1,500,000			SW-E2, SW-E3	HMP, Culvert Replacement Grant		Hwy
32	SW-E4	Salt Marsh Sewer Investigation	$15,000						Conservation/Sewer
33	SW-C12	System-Wide Stormwater Upgrades		$20,000			Ch 90	Coordinate with Other Projects	All Dept
34	SW-O11	On-Call Contractor		$40,000		SW-C13			
35	SW-O12	Misc. Stormwater Reporting		$10,000	FY2019	SW-E1	Utility Fee		

Section V
Integrated Capital Improvements Plan

SECTION V

INTEGRATED CAPITAL IMPROVEMENTS PLAN

V.1 INTRODUCTION

This section presents the integrated results of the Drinking Water, Wastewater, and Stormwater management plans that are included as appendices to this report. The recommended integrated capital improvements plan considers regulatory requirements, cost, condition of critical facilities, and the ranking of projects from the attached reports to create one integrated plan.

The recommended schedule for the capital improvements plan has been developed to evenly spread costs throughout the 20-year planning period.

V.2 RECOMMENDED INTEGRATED CAPITAL IMPROVEMENTS PLAN

The recommended Capital Improvements Plan is presented as a 20-year scheduled plan, to be used as a planning tool over the next 20 years. The plan presents the recommended capital improvements plans for Drinking Water, Wastewater, and Stormwater infrastructure. The total recommended cost of the plan is $237.36M or an annual average cost of $11.9M per year over the next 20 years. The recommended improvements for each department (drinking water, wastewater, and stormwater) are presented in **Table V-1**

TABLE V-1
20-YEAR CAPITAL COST PER DEPARTMENT

Department	20-Year CIP Cost
Drinking Water	$113.3M
Wastewater	$108.3M
Stormwater	$15.77M
Total	$237.36M

The Integrated Capital Improvements Plan is included in **Figure V-1**.

FIGURE V-1
INTEGRATED CAPITAL IMPROVMENTS PLAN

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
Yearly Cost ($M)	10.03	20.88	12.73	56.75	13.8	9.206	7.183	54.19	7.556	3.239	12.08	2.644	8.564	2.656	2.536	2.018	2.784	2.477	1.921	2.095	2.023	237.4
Segreganset River Pump Station Standby Generator (WS-1)						0.12																0.12
Segreganset River Pump Station Transmission Main Evaluation (WS-2)		0.107																				0.107
Segreganset River Pump Station Transmission Main Relining (WS-3)						4.777																4.777
Segreganset River Pump Station Pump Replacment (WS-4)																		0.5				0.5
Segreganset River Pump Station Dam Evaluation/ Improvemnts (WS-5)									0.653													0.653
FJM Well #2 Modify Piping to WTP (WS-6)				0.563																		0.563
Somerset Reservoir Bathymetric Survey/ Safe Yield Update (WS-7)	0.05																					0.05
Somerset Reservoir Intake Gate Replacement (WS-8)		0.531																				0.531
Somerset Reservoir Dam and Spillway Improvments (WS-9)		4.244																				4.244
Fall River Interconection (WS-10a)		0.637																				0.637
Swansea Interconection (WS-10b)			0.274																			0.274
Dighton Interconection (WS-10c)				0.226																		0.226
WTP Upgrades (WT-1)	6.695																					6.695
Replace WTP (WT-2)					0.5	0.5	1	51.21														53.21
Replace Booster Pumping Station (WD-1)			1.039																			1.039
Water Main Replacement Program (WD-2)	1.396	1.376	0.91	2.081	4.29	0.836	1.343	1.824	1.573	1.496	6.022	1.718	1.631	1.536	1.714	1.158	2.058	1.652	1.596	1.77	1.698	39.68
ANNUAL DRINKING WATER CIP:	**8.141**	**6.895**	**2.223**	**2.87**	**4.79**	**6.233**	**2.343**	**53.03**	**2.226**	**1.496**	**6.022**	**1.718**	**1.631**	**1.536**	**1.714**	**1.158**	**2.058**	**2.152**	**1.596**	**1.77**	**1.698**	**113.3**
Sewer System Evaluation Survey (CS-1)		0.318		0.395		0.328		0.328		0.219		0.601										2.189
Sewer System Rehabilation (CS-2)			6		7		4		4		4		6									31
Angus Street PS (PS-1)																	0.401					0.401
Cherry Street PS (PS-2)				0.944																		0.944
Dublin Street PS (PS-3)													0.608									0.608
Durfee Court PS (PS-4)		0.921																				0.921
Foley Avenue PS (PS-5)										1.189												1.189
Gay Street PS (PS-6)		0.913																				0.913
Grove Street PS (PS-7)														0.795								0.795
Lake Street PS (PS-8)															0.497							0.497
Lees River Avenue PS (PS-9)																0.535						0.535
Luther Avenue PS (PS-10)											0.972											0.972
Main Street PS (PS-11)			1.983																			1.983
Millers Lane PS (PS-12)				1.069																		1.069
Owen Avenue PS (PS-13)		0.933																				0.933
Pilot Drive PS (PS-14)					1.215																	1.215
Pleasant Street PS (PS-15)			1.226																			1.226
Route 6 PS (PS-16)	0.5					1.1																1.6
Wilbur Avenue PS (PS-17)		1.721																				1.721
WPCF Comprehensive Upgrade (WPCF-1)		8.905		48.68																		57.59
ANNUAL WASTEWATER CIP:	**0.5**	**13.71**	**9.209**	**51.09**	**8.215**	**1.428**	**4**	**0.328**	**4**	**1.408**	**4.972**	**0.601**	**6.608**	**0.795**	**0.497**	**0.535**	**0.401**	**0**	**0**	**0**	**0**	**108.3**
MS4 Requirements (W-E1)	0.05	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.45
Buffington Brook Capacity Analysis (SW-E2)	0.04																					0.04
Culvert Condition Analysis (W-E3)		0.03																				0.03
Salt Marsh Sewer Investigation (SW-E4)									0.015													0.015
Catch Basin Maintenance Program Development (SW-E5)	0.005																					0.005
Coastal Reslience Evaluation (SW-E6)							0.025															0.025
Outfall Backflow Evaluation (SW-E7)								0.02														0.02
Elm Street Stormwater Infrastructure Construction (SW-C1)				1.5																		1.5
Almy Road Culvert Replacement (SW-C2	0.5																					0.5
Riverside Avenue Culvert Short Term Repair (SW-C3)	0.05																					0.05
Riverside Avenue Culvert Long Term Repair (SW-C4)						0.75																0.75
Buffington Brook Culvert Improvements (SW-C5)			1	1																		2
Culvert Improvements (from SW-E2 and SW-E3) (SW-C6)					0.5	0.5	0.5															1.5
Whetstone Hill Road Culvert Resizing (SW-C7)									0.5													0.5
Route 138 Culvert Resizing (SW-C8)								0.5														0.5
Dublin Street Culvert Resizing (SW-C9)											0.75											0.75
South Street Culvert Resizing (SW-C10)	0.6																					0.6
Adding/ Retrofitting Stormwater Managemnt Facilities (SW-C11)							0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.15
System Wide Stormwater Upgrades (SW-C12)										0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.24
Illicit Connection Removal (SW-C13)		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.4
North Street Culvert Resizing (SW-C14)									0.5													0.5
BMP Installations Town Properties (SW-C15)							0.01	0.01	0.01	0.01	0.01											0.05
GIS Updates (MS4) (SW-O1)	0.08	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.18
Data Management (SW-O2)			0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.23
Catch Basin Maintenance Program (SW-O3)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.42
Stream, Swale & Drainage Channel Maintenance (SW-O4)				0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.18
Outfall Maintenance (SW-O5)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.21
Strucutural BMP Maintenance (SW-O6)			0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.095
Pipe Cleaning & TV Inspection (SW-O7)				0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.36
Street Sweeping (SW-O8)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.42
Salt Marsh Management (SW-O9)					0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.085
Staffing Increase (SW-O10)		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2
On-Call Contractor (SW-O11)		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.8
Misc. Stormwater Reporting (SW-O12)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.21
ANNUAL STORMWATER CIP:	**1.385**	**0.275**	**1.3**	**2.79**	**0.795**	**1.545**	**0.84**	**0.835**	**1.33**	**0.335**	**1.085**	**0.325**	**0.325**	**0.325**	**0.325**	**0.325**	**0.325**	**0.325**	**0.325**	**0.325**	**0.325**	**15.77**

In the development of the IWRMP the recommended projects that were evaluated were divided into 9 categories and are grouped together as follows:

- Drinking Water Sources (WS)
- Drinking Water Treatment (WT)
- Drinking Water Distribution System (WD)
- Collection System (CS)
- Wastewater Pump Stations (PS)
- Water Pollution Control Facility (WPCF)
- Stormwater Evaluation Projects (SW-E)
- Stormwater Construction Projects (SW-C)
- Stormwater Operations (SW-O)

Division of the recommended capital projects into the above categories aided in the prioritization of each category type given the specific nature of each.

Table V-2 summarizes the 20-year cost summary for each of the 9 categories.

TABLE V-2

20-YEAR CAPITAL COST PER CATEGORY

Department	20-Year CIP Cost
Drinking Water Sources (WS)	$12.68M
Drinking Water Treatment (WT)	$59.9M
Drinking Water Distribution System (WD)	$40.72M
Collection System (CS)	$33.19M
Wastewater Pump Stations (PS)	$17.52M
Water Pollution Control Facility (WPCF)	$57.59M
Stormwater Evaluation Projects (SW-E)	$0.58M
Stormwater Construction Projects (SW-C)	$9.99M
Stormwater Operations (SW-O)	$5.19M
Total	$237.36M

Table V-2 shows that the largest capital investment categories are at the Water Pollution Control Facility and the Drinking Water Treatment Plant. These facilities both require major upgrades to maintain regulatory compliance and update aging equipment. These upgrades are compliance driven and are therefore prioritized to be completed within the next 10-years based on the expected needed compliance dates. Improvements to the drinking water distribution system, rehabilitation of the collection system and pumping stations, and stormwater operations improvements are scheduled to be annual investments and will require ongoing improvements to maintain adequate condition.

SECTION VI

FUNDING/FINANCING OPTIONS

This IWRMP is funded 50 percent by the town, while the remaining 50 percent is provided by the US Economic Development Administration (EDA). This funding was secured through the Southeastern Regional Planning & Economic Development District (SRPEDD).

VI.1 STATE LEVEL FUNDING

The primary source of funding for water resource projects is the Massachusetts State Revolving Fund (SRF) Program. This program provides low interest loans (typically 2%) to communities to fund qualified projects. The Town is funding the IWRMP with Town and EDA resources, but intends to fund future upgrades to the drinking water, wastewater, and stormwater systems utilizing SRF loan funding.

The Drinking Water and Clean Water Programs provide low-cost financing to communities to improve water supply infrastructure, enhance drinking water safety and treatment, improve wastewater infrastructure, and to help comply with federal and state drinking water requirements.

The goal of the program is to protect public health and strengthen compliance with water requirements, while addressing the Commonwealth's water needs by making projects more affordable.

For wastewater projects, nutrient removal upgrades are eligible for a 0% interest loan. There are several requirements the Town will need to complete to qualify for 0% loan financing. The requirements are:

- The project is primarily intended to remediate or prevent nutrient enrichment of a surface water body or a source of water supply;
- The applicant is not currently subject, due to a violation of a nutrient-related total maximum daily load standard or other nutrient based standard, to a MassDEP enforcement order, administrative consent order or unilateral administrative order, enforcement action by the

United States Environmental Protection Agency or subject to a state or federal court order relative to the proposed project;

- The applicant has a Comprehensive Wastewater Management Plan (CWMP) approved pursuant to regulations adopted by MassDEP;
- The project has been deemed consistent with the regional water resources management plans if one exists;
- The applicant has adopted land use controls, subject to the review and approval of MassDEP in consultation with the Department of Housing and Economic Development and, where applicable, any regional land use regulatory entity, intended to limit wastewater flows to the amount authorized under the land use controls that were in effect on the date the Secretary of the Executive Office of Energy and Environmental Affairs issued a certificate for the CWMP pursuant to the Massachusetts Environmental Policy Act, M.G.L. c. 30, §§ 61-62H, and the MEPA regulations at 301 CMR 11.00.

The Town is taking the first step towards these requirements by completing the CWMP as part of the overall IWRMP.

For drinking water projects, another source of funding is the Water Infrastructure Finance and Innovation Act (WIFIA) Program. The Water Infrastructure Finance and Innovation Act of 2014 (WIFIA) established the WIFIA program, a federal credit program administered by EPA for eligible water and wastewater infrastructure projects. The WIFIA program accelerates investment in our nation's water infrastructure by providing long-term, low-cost supplemental loans for regionally and nationally significant projects. WIFIA works separately from, but in coordination with, the State Revolving Fund (SRF) programs to provide subsidized financing for large dollar-value projects.

VI.1.1 State Grants

The Drinking Water Supply Protection (DWSP) grant program provides financial assistance to public water systems and municipal water departments for the purchase of land or interests in land for the following purposes: 1) protection of existing DEP-approved public drinking water supplies; 2) protection of planned future public drinking water supplies; or 3) groundwater recharge. It is a reimbursement program whereby the community allocates and spends the funds to eventually be reimbursed by the program.

The Statewide Water Management Act Grant program is designed to assist eligible public water suppliers and municipalities with Water Management Act permits by providing funds for planning assistance, demand management, and withdrawal impact mitigation projects in local communities. MassDEP indicates that the focus of these grants will be for:

- Planning projects for specific watersheds or sub-watersheds to identify implementation projects to improve ecological conditions;
- Conservation projects aimed to reduce the demand for water within a municipality or a watershed, such as rate studies or drought resiliency planning; and
- Withdrawal mitigation projects that address the following: improve or increase instream flow, wastewater projects that keep water local, stormwater management projects that improve recharge, reduce impervious cover and/or improve water quality, water supply operational improvements, habitat improvement, demand management, reduction of wastewater inflow and infiltration, and other projects that can be demonstrated to mitigate the impacts of water withdrawals.

These grants require a 20 percent funding match from the local community.

A new source of potential funding is the Municipal Vulnerability Preparedness (MVP) Program Grant. The MVP grant provides support for cities and towns in Massachusetts to begin the process of planning for climate change resiliency and implementing priority projects. The state awards communities with funding to complete vulnerability assessments and develop action-oriented resiliency plans. The program helps communities to:

- Define extreme weather and natural and climate related hazards
- Understand how their community may be impacted by climate change with a Massachusetts specific climate change clearinghouse with the latest science and data
- Identify existing and future vulnerabilities and strengths
- Develop and prioritize actions for the community
- Identify opportunities to take action to reduce risk and build resilience

- Implement key actions identified through the planning process

Funding options for stormwater projects include CZM, HMP, DOT Small Bridge, FEMA PDM, MVP, Coastal Resiliency, Culvert Replacement Grants, and Chapter 90. For salt marsh management projects, there are several potential funding sources including NCWC, Taunton Wild & Scenic, Taunton Watershed Alliance, EPA, EEOEA, and the Narragansett Bay Estuary program.

VI.2 OTHER FUNDING SOURCES

There are several funding sources available that may apply to some projects recommended in this report. These programs include:

- MassDEP Asset Management Grants
- MassWorks Infrastructure
- CZM Resiliency
- FEMA/MEMA Hazard Mitigation

These avenues and other grant and loan options will be investigated prior to and/or during the preliminary design of each project to assist the Town with funding.

DWMP

Drinking Water Management Plan

TOWN OF SOMERSET, MA

JANUARY 2020

Drinking Water Management Plan

WRIGHT-PIERCE
Engineering a Better Environment

DRINKING WATER MANAGEMENT PLAN

FOR THE

TOWN OF SOMERSET, MA

JANUARY 2020

PREPARED BY:

WRIGHT-PIERCE

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10 Dorrance Street, Suite 840
Providence, RI 02903
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TOWN OF SOMERSET

DRINKING WATER MANAGEMENT PLAN

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SECTION 1

INTRODUCTION

1.1 BACKGROUND INFORMATION

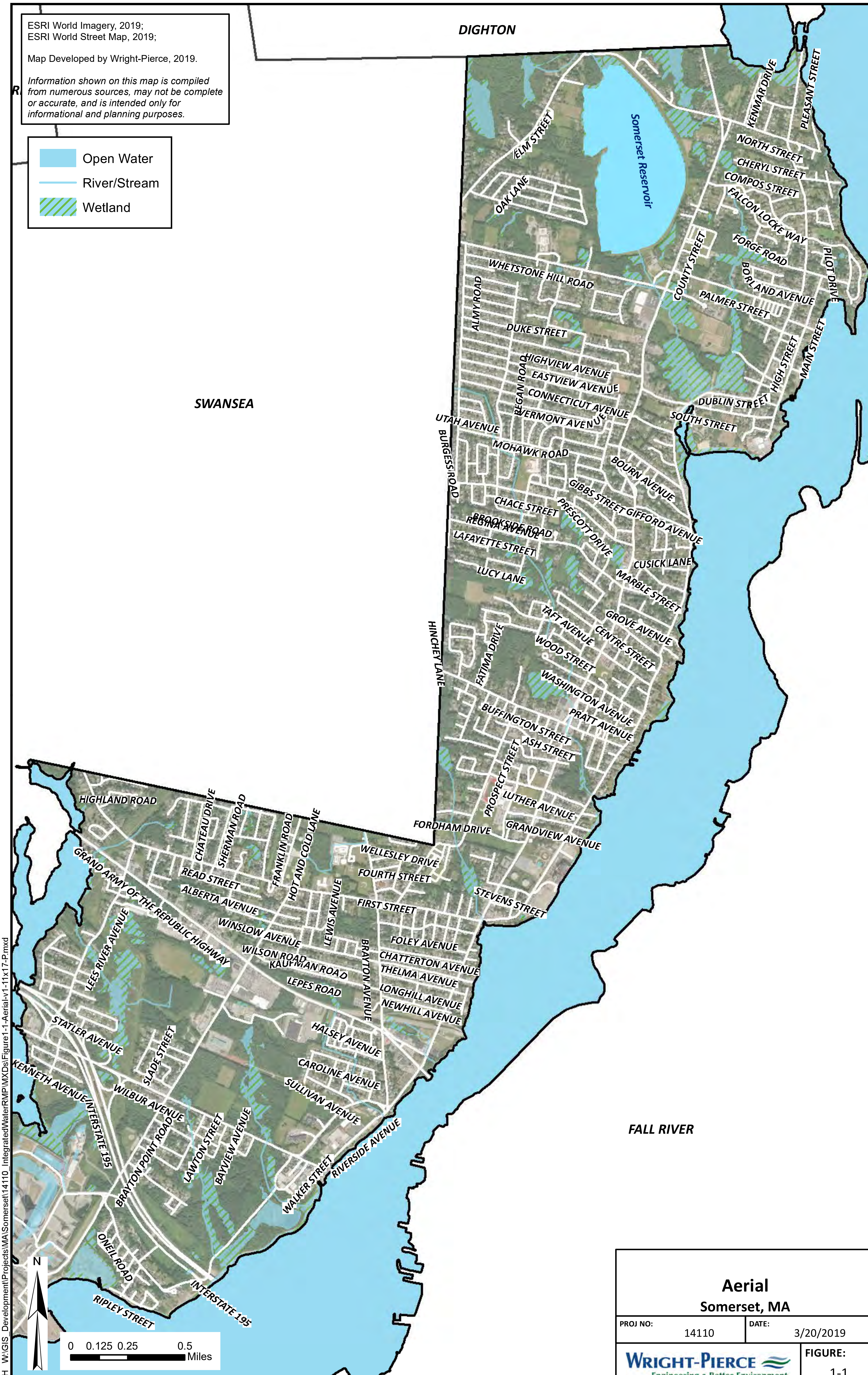
The Town of Somerset (Town) is a suburban community of about 18,000 people located in Bristol County, approximately 20 miles southeast of Providence, RI and 44 miles south of Boston. The Town is comprised of 8.11 square miles of land area and 1.2 square miles of water surface area. Somerset is bordered by Swansea to the northwest; Dighton to the north; The Taunton River to the east; Mt. Hope Bay to the south; and Lee's River to the southwest. Refer to **Figure 1-1** for an aerial view of Somerset and its surrounding communities.

There are three primary transportation routes accessed by the Town. Interstate 195 crosses the southern neck of the Town providing access to Providence, RI to the west and Fall River, MA to the East. Route 6 also travels east to west through the town to connect to the surrounding communities. Route 138 runs north to south, connecting the commercial center of the town, located in central Somerset.

1.2 PROJECT OBJECTIVES AND GOALS

In March 2018, the Town retained Wright-Pierce to prepare an Integrated Water Resource Management Plan (IWRMP), for use as a water, wastewater, and stormwater planning tool for the next 25 years. A copy of the scope of services is included in **Appendix A**. The primary tasks for this Drinking Water Management Plan (DWMP) include:

- An assessment of the existing Drinking Water Supply System and future needs consisting of descriptions of water sources, treatment facilities, residuals treatment and disposal practices, distribution and storage systems, and emergency procedures/operations.



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- Analyze existing water usage and patterns and existing water quality concerns. The goal of the assessment is to project future water demands over a 20-year planning period and the identification of future water system needs.

Using these assessments, the report will describe and outline alternatives to address the identified needs including an evaluation of water withdrawal volumes, and source management.

In addition, the alternatives evaluation will address the Administrative Consent Order (ACO) issued by MassDEP regarding the exceedance of the disinfection by-product regulations.

1. Review current operations regarding distribution system tank water levels, set-points for booster pumps and other operating conditions that might be influencing water age.

2. Perform a water age analysis using the Town's computerized hydraulic model to test operational changes that could reduce water age.

3. Summarize asset management findings regarding proper sizing of infrastructure in the south end of the water distribution system.

In future years the Town will continue its efforts to evaluate, update, and improve its water resources infrastructure to remain in compliance with regulatory requirements and meet the community's municipal services expectations.

1.3 REVIEW OF PRIOR PLANNING EFFORTS

The Town had last prepared a Water System Master Plan in 2003. Since this report, a number of significant changes have occurred with the Somerset Water System. The Segreganset Pumping Station was upgraded in 2012; two new water storage tanks at the Hot & Cold Lane were constructed in 2011-12 replacing the aging steel tank; and miles of water distribution main were replaced or relined.

Another significant change is the recent closure of the Brayton Point power generation facility. The facility was a significant water user, on average approximately 1 MGD, and the loss of this demand has had a major impact on the water system component evaluations and needs assessment.

1.4 FUNDING SOURCES

This Drinking Water Management Plan (DWMP), as part of the Integrated Water Resource Management Plan, is funded 50 percent by the town, while the remaining 50 percent is provided by the US Economic Development Administration (EDA). This funding was secured through the Southeastern Regional Planning & Economic Development District (SRPEDD) to assist in dealing with the impacts faced by the closure of the Brayton Point power generation facility.

The primary source of funding for drinking water projects is the Massachusetts State Revolving Fund (SRF) Program. This program provides low interest loans to communities to fund qualified projects. The Town is funding the IWRMP with Town and EDA resources, but intends to fund future upgrades to the drinking water system utilizing SRF loan funding.

The Drinking Water Program provides low-cost financing to communities to improve water supply infrastructure, enhance drinking water safety, and to help community public water suppliers comply with federal and state drinking water requirements.

The goal of the program is to protect public health and strengthen compliance with drinking water requirements, while addressing the Commonwealth's drinking water needs by making projects more affordable.

Another source of funding is the Water Infrastructure Finance and Innovation Act (WIFIA) Program. The Water Infrastructure Finance and Innovation Act of 2014 (WIFIA) established the WIFIA program, a federal credit program administered by EPA for eligible water and wastewater infrastructure projects. The WIFIA program accelerates investment in our nation’s water infrastructure by providing long-term, low-cost supplemental loans for regionally and nationally significant projects. WIFIA works separately from, but in coordination with, the State Revolving Fund (SRF) programs to provide subsidized financing for large dollar-value projects.

1.4.1 Grants

The Drinking Water Supply Protection (DWSP) grant program provides financial assistance to public water systems and municipal water departments for the purchase of land or interests in land for the following purposes: 1) protection of existing DEP-approved public drinking water supplies; 2) protection of planned future public drinking water supplies; or 3) groundwater recharge. It is a reimbursement program whereby the community allocates and spends the funds to eventually be reimbursed by the program.

The Statewide Water Management Act Grant program is designed to assist eligible public water suppliers and municipalities with Water Management Act permits by providing funds for planning assistance, demand management, and withdrawal impact mitigation projects in local communities. MassDEP indicates that the focus of these grants will be for:

- Planning projects for specific watersheds or sub-watersheds to identify implementation projects to improve ecological conditions;
- Conservation projects aimed to reduce the demand for water within a municipality or a watershed, such as rate studies or drought resiliency planning; and
- Withdrawal mitigation projects that address the following: improve or increase instream flow, wastewater projects that keep water local, stormwater management projects that improve recharge, reduce impervious cover and/or improve water quality, water supply operational improvements, habitat improvement, demand management, reduction of wastewater inflow and infiltration, and other projects that can be demonstrated to mitigate the impacts of water withdrawals.

These grants require a 20 percent funding match from the local community.

A new source of potential funding is the Municipal Vulnerability Preparedness (MVP) Program Grant. The MVP grant provides support for cities and towns in Massachusetts to begin the process of planning for climate change resiliency and implementing priority projects. The state awards communities with funding to complete vulnerability assessments and develop action-oriented resiliency plans. The program helps communities to:

- Define extreme weather and natural and climate related hazards
- Understand how their community may be impacted by climate change with a Massachusetts specific climate change clearinghouse with the latest science and data
- Identify existing and future vulnerabilities and strengths
- Develop and prioritize actions for the community
- Identify opportunities to take action to reduce risk and build resilience
- Implement key actions identified through the planning process

SECTION 2
Existing Drinking Water System

SECTION 2

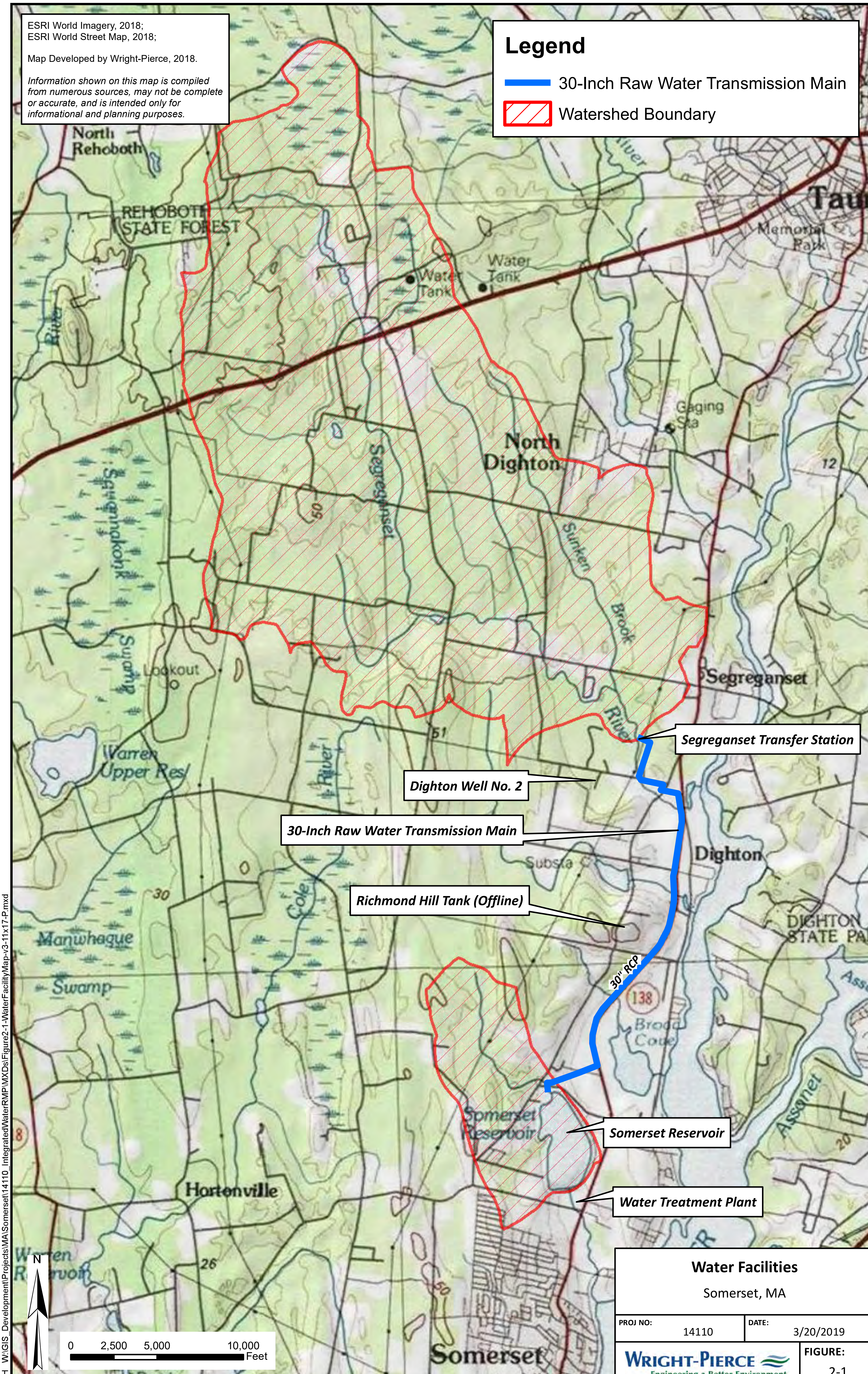
EXISTING DRINKING WATER SYSTEM

2.1 WATER SUPPLY AND INTERCONNECTIONS

The original Town of Somerset water supply consisted of several wells located in Dighton. In the 1950's, the Town had to find alternative sources of drinking water because of elevated levels of iron. The Town met their water demands by laying a 12-inch diameter pipeline across the Taunton River in 1958 to purchase water from the City of Fall River while plans for the construction of a dam for impounding surface water, as well as a filtration plant for treating the new surface water supply were developed. A dam and collecting reservoir on the Labor-in-Vain Creek were constructed in 1965. This reservoir was designated the Somerset Reservoir. Purchasing water from Fall River ceased, however, the Town still maintains a connection which gives the Town the option to purchase water if the need arises.

The Town of Somerset's raw water supply includes a diversion structure and pumping station on the Segreganset River, an intake structure at the surface water reservoir (Somerset Reservoir) and a gravel-packed well (Dighton Well No. 2) which also serves approximately 80 service connections in Dighton. These facilities are shown in Figure 2.1.

In accordance with the Water Withdrawal Permit (attached in Appendix B) issued by the Massachusetts Department of Environmental Protection (MassDEP), the Town is currently authorized to withdraw 3.82 million gallons per day (MGD) on average from all three sources. The well source is not to exceed 0.58 MGD. In addition to the 3.82 MGD, MassDEP has granted incremental increases in withdrawal to 3.92 MGD for 2020 to 2024 and 4.02 MGD for 2025 to 2029.



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2.1.1 Segreganset River and Pump Station

The Segreganset River is a significant source of supply for the Town of Somerset. The diversion structure and pumping station on the Segreganset River in Dighton were constructed in 1963 and rehabilitated and upgraded in 2012. The Segreganset River has a watershed area of 10.6 square miles and water from the river is pumped to the Somerset Reservoir for storage prior to treatment at the filtration plant.

The pump station includes two vertically mounted end-suction centrifugal pumps each with a capacity of 11 MGD. While pumping in parallel the two pumps can produce approximately 15 MGD. Data on the pumps are presented in Table 2-1.

TABLE 2-1

SEGREGANSET RIVER TRANSFER PUMP DESIGN PARAMETERS

Number of Units:	2
Type:	Centrifugal
Pump Manufacturer:	Allis Chalmers
Pump Model:	10x10x21, Type NSW
Pump Speed (rpm):	1190
Design Flow Rate (each unit):	5200 gpm
Design TDH (feet):	105
Year Installed – Pump:	2012*
Motor Manufacturer:	WEG
Motor Model:	20012O73GR447/9TD
Motor Horsepower (HP):	200
Volt/Phase/Cycle:	460/3/60
Motor Speed (rpm):	1185
Year Installed – Motor:	2012*

*The pumps were rebuilt and rebalanced in 2012. New motors were provided in 2012

These pumps are utilized to transfer water from the Segreganset River to the Somerset Reservoir through approximately 19,000 feet of a 30-inch diameter raw water transmission main constructed of reinforced concrete pressure pipe. The current condition of this pipeline is not certain and needs assessment. Pipeline assessment options for this transmission main are further discussed in Section 5. The Segreganset River is used for supplemental supply primarily during the colder months, from November to June. There is no emergency source of power at this transfer station.

The monthly total water transferred during 2014-2018 from the Segreganset River to the Somerset Reservoir are listed in Table 2-2.

TABLE 2-2

SEGREGANSET RIVER PUMP STATION TRANSFER VOLUMES

Month	2014 (MG)	2015 (MG)	2016 (MG)	2017 (MG)	2018 (MG)
January	93.71	57.60	77.00	194.40	-
February	134.28	0.00	117.00	166.40	61.20
March	13.00	179.10	174.90	121.60	-
April	104.01	192.00	128.50	97.30	-
May	51.84	19.20	57.60	-	-
June	-	-	-	-	-
July	-	-	-	-	-
August	-	-	-	-	-
September	-	-	-	-	-
October	-	-	-	-	-
November	-	-	4.80	-	-
December	-	5.60	49.50	-	-
TOTALS:	396.84	453.50	609.30	579.70	61.20

2.1.1.1 Observations and Assessment

The Segreganset Pump Station was rehabilitated and upgraded in 2012. The pumps were rebuilt, rebalanced and repainted. The pump motors were replaced with new energy efficient motors. The entire electrical distribution system, motor control center (MCC), lighting and ancillary electrical systems were replaced. Areas of the brick exterior of the building were repointed. The interior walls of the station were repainted. The new components installed in this facility have an expected service life of 25 years. The refurbished pump has an expected service life of 20 years. The only component of this building that may need to be considered for capital improvements within the next 20-years is the roof. Other potential capital improvements include replacement of the perimeter fence and security improvements.

The transfer volume accounted for approximately 35% to 55% of the water treated at the Somerset WTP between 2014 and 2017, however in 2018 it accounted for slightly less than 10%.

2.1.2 Somerset Reservoir and Water Treatment Plant

The Somerset Reservoir serves as the surface water supply source for water transferred from the Segreganset River. The reservoir has a holding capacity of approximately 1.4 billion gallons and a watershed area of about 1.5 square miles. The combined safe yield of the Somerset Reservoir and the Segreganset Transfer Station was determined to be 5 MGD (based upon the analysis conducted in 1988 by H_2O Engineering Consulting Associates, Inc.). The study suggested that an increase in safe yield of 1 MGD could be achieved if the elevation of the impoundment were increased and the pumping capacity was increased. These suggested modifications have to-date not been implemented.

Water from the Somerset Reservoir is drawn into the water treatment plant (WTP) located just to the southeast of the reservoir through an intake structure. The intake is a tower and bridge structure that was incorporated with the dam construction. The intake consists of a series of five sluice gates; three inlet and two outlet. There is a low-level intake gate at a depth of approximately 38-feet, a middle-level intake gate at a depth of approximately 21-feet, and a high-level intake gate at a depth of approximately 6-feet. There is a single outlet gate in the structure at a depth of 38-feet that feeds the WTP, and a second gate at a depth of 38-feet that discharges to the Labor-in-vain Brook which is used as a low-level outlet.

In the spring of 2018, the low-level outlet gate failed during a routine release of water from the dam. Emergency repairs were initiated, and the low-level outlet gate and the mid-level intake gate were replaced. A temporary plate was installed on the lower intake to prevent water entering the structure during repairs. This plate remains installed until the remaining sluice gates are also replaced. The stem for the high-level intake gate was also removed, and the gate presently acts as a plate as it cannot be operated. No repairs were made to the WTP inlet gate. Replacing the sluice gates is high priority and is part of the proposed capital improvements plan.

The treatment plant was originally placed online in 1968 with a capacity of 4 MGD using conventional flocculation, sedimentation and shallow-bed rapid sand filtration. In 1994, a new 6 MGD packaged Microfloc® Treatment Facility was constructed adjacent to the existing WTP to replace the conventional plant.

Chemical treatment at the facility includes the option of preoxidation of the raw water with potassium permanganate. The water is then treated with polyaluminum chloride followed by a cationic polymer for coagulation. The water then passes through the filtration process, which consists of three (3) 2 MGD capacity upflow clarification and filtration modules housed in a pre-engineered metal structure. The water is then injected with polyphosphate for corrosion control and disinfected with sodium hypochlorite as it enters clearwell 1. The water is injected with sodium fluoride for dental hygiene as it flows into clearwell 2. The two (2) clearwells are needed to meet the disinfection CT requirements of the Surface Water Treatment Rule. Disinfected and fluoridated water is then pumped to the distribution system. Prior to leaving the treatment plant, the addition of sodium hydroxide is applied for finish water pH adjustment.

TABLE 2-3

SOMERSET RESERVOIR RAW WATER VOLUMES

Month	2014 (MG)	2015 (MG)	2016 (MG)	2017 (MG)	2018 (MG)
January	91.827	89.47	89.574	108.702	60.643
February	85.969	91.794	84.09	82.451	52.851
March	107.079	92.91	70.983	83.534	52.32
April	89.586	78.322	70.491	70.619	50.692
May	83.993	91.622	70.099	75.426	59.684
June	96.304	81.358	94.002	80.679	69.606
July	111.292	98.54	117.797	69.44	80.275
August	101.02	92.482	107.724	67.189	73.9
September	95.001	87.575	80.3	51.773	62.788
October	75.4	88.881	73.599	55.85	55.554
November	80.105	81.283	65.6	53.904	55.886
December	87.839	91.831	84.78	53.954	72.264
TOTALS:	1,105.415	1,066.068	1,009.039	853.521	746.463

2.1.2.1 Observations and Assessment

The safe yield of the facility was last analyzed in 1996. Given the recent concerns with changes in the global environment, a reassessment of the safe yield for this water system should be performed. The dam is currently being assessed under a separate project. The intake structure for the WTP was inspected in May 2018. The middle intake gate and operator was removed and replaced. The high and low gates and operators were removed and plated in May 2018. The gate that discharges to the Labor-in-vain Brook was also removed and replaced. Replacing the three remaining original sluice gates is high priority and is part of the proposed capital improvements plan.

2.1.3 FJM Well No. 2

The third source of supply used by the Town of Somerset is the Gravel Packed Well No. 2 located in Dighton. This well was constructed in 1952 and has a safe yield of 0.58 MGD. The well is 12-inch diameter and 38-feet deep.

In 1996, the Town conducted upgrades to the Dighton Well facility which included redevelopment of the well and replacement of the well pump in kind. Due to issues encountered during the redevelopment of the well, the well facility was subsequently replaced in 2002 to rehabilitate the facility to proper condition. The 2002 replacement included the demolition of the existing structure and everything inside except for the well. The facility was replaced with a building that included a new well pump and motor for the existing well, a chemical storage room for sodium hydroxide, the installation of the UV disinfection unit, and a standby generator for back up power. In 2017, the well pump was replaced, and the well was cleaned through surging. In 2018, upgrades to the liquid chemical feed systems were completed.

This well supply is disinfected through a UV unit, and is then treated with sodium hydroxide for pH adjustment and sodium fluoride for dental hygiene. The water is then pumped directly to the distribution system through approximately 3.5 miles of 12-inch transmission line until it arrives in Somerset on County Street (Route 138). The well water primarily serves the north end and village area in the northeast section of the Town in addition to approximately 80 service connections within Dighton.

There is a propane fired standby generator that provides back up power to the well facility during a power outage. Propane is stored onsite of the facility in 2 -1,000-gallon storage tanks.

The well pump and well design parameters are listed in Table 2-4.

TABLE 2-4

WELL AND WELL PUMP DESIGN PARAMETERS

Number of Units:	1
Type:	Vertical Turbine
Pump Manufacturer:	Goulds
Pump Model:	
Design Flow Rate (each unit):	400 GPM
Design TDH (feet):	287
Stages	8
Pump Speed (rpm):	
Year Installed – Pump:	2017
Motor Manufacturer:	
Motor Model:	
Motor Horsepower (HP):	40
Volt/Phase/Cycle:	460/3/60
Motor Speed (rpm):	1770
Year Installed – Motor:	
Well Diameter (in)	12
Well Depth (ft)	38
Specific Capacity (gpm/ft)	39.6
Year Installed – Well:	1952

The well is capable of producing approximately 400 gpm, although it is currently run at a constant flow rate of approximately 200 gpm through throttling of valves within the facility to create backpressure. There is a VFD installed at the facility to drive the well pump that was repaired at the end of 2018. The well operates continuously to supply the north end and village area of the Town. The well previously pumped water to the Richmond Hill Tank, but since it has been taken offline the water is pumped directly into the distribution system with no storage.

Table 2-5 presents the total volume of water pumped from this well on a monthly basis from 2014 – 2018.

TABLE 2-5

FJM WELL #2 (DIGHTON WELL) VOLUMES

Month	2014 (MG)	2015 (MG)	2016 (MG)	2017 (MG)	2018 (MG)
January	7.471	8.947	9.23	9.22	9.239
February	6.556	7.8	8.662	8.202	8.359
March	7.222	8.998	9.177	8.887	9.403
April	7.223	9.135	9.373	9.133	8.811
May	7.15	9.34	9.94	9.675	8.608
June	6.648	8.817	9.444	2.399	8.322
July	6.412	9.653	9.218	9.799	8.702
August	6.836	9.985	9.279	9.497	8.828
September	8.28	9.341	9.041	9.119	8.761
October	9.247	9.305	9.079	9.422	8.964
November	9.269	9.019	8.882	8.872	2.457
December	9.395	9.151	9.27	9.11	0.00
TOTALS:	91.709	109.491	110.595	103.335	90.454

2.1.3.1 Observations and Assessment

While the well is original (constructed in 1952), the facility and all of the components within it was constructed in 2002. The well pump and some of the chemical feed equipment were upgraded in 2018. The well has been providing around 9 MG/month, which historically has been approximately 9-10% of the total system water demand. However, in 2017, the well has contributed over 13% of the system demand as a result of the elimination of the Brayton Point demand. No capital improvements for this facility are anticipated within the next 20-years.

2.1.4 Interconnections

The Town of Somerset is bordered by the Town of Dighton to the north, the Town of Swansea to the west, Mount Hope Bay to the South and the City of Fall River (across the Taunton River) to the east. There is an 8” interconnection with Dighton Water District on Chase Street near Route 138. There is a 6” interconnection with the Swansea Water District on Buffington Street. This interconnection has not been used. There is also a 12-inch diameter interconnection placed on the bottom of the Taunton River with the City of Fall River south of the old Route 6 bridge. This interconnection has not been used since 1994 during startup of the WTP upgrades.

2.1.4.1 Observations and Assessment

While not generally needed, the interconnections with both Swansea and Fall River should be maintained for emergency situations. The water main connecting to Fall River is over 50-years old and should be inspected to determine its condition.

2.1.5 Private Wells

The majority of residents within the Town of Somerset are provided water through the Town’s public water system. Although access to water is available on nearly every street, it is possible that there are still some homes that are served through private wells. Private wells are regulated through the Town’s Board of Health (BOH) and may be installed for drinking water or irrigation uses. The BOH does not keep an active database on wells within the town. The most recent inventory of private wells was taken in 2002, which summarized the location of known private wells to the BOH. In total the BOH identified 17 private wells, 5 of which were identified for irrigation use, the other 12 were not specified. Reference Appendix C for a full list of the identified addresses with private wells.

2.1.5.1 Observations and Assessment

All the private wells on the list are in areas that are currently serviced by the public water system.

2.2 WATER TREATMENT

2.2.1 Raw Water Pumping

The WTF is supplied by the surface water source known as the Somerset Reservoir, through a screened intake structure. This reservoir is a 1.4-billion-gallon reservoir constructed in 1965. It was constructed to store water and equalize flows pumped from the Town's primary source of water, the Segreganset River in Dighton, MA.

Raw water flows by gravity from the Somerset Reservoir to the filter building where treatment begins. The first step in the process is Raw Water pumping. Two raw water pumps are available in the filter building for use if reservoir levels drop too low. The raw water pumps start only if the reservoir levels drop below the HGL of the Microfloc® filter which is 35 feet National Geodetic Vertical Datum (NGVD). The pumps rarely, if ever, operate as raw water is typically able to enter the filtration units by gravity. The design parameters for the raw water pumps are summarized in Table 2-6:

TABLE 2-6

RAW WATER PUMP DESIGN PARAMETERS

Number of Units:	2
Type:	Horizontal Centrifugal
Pump Manufacturer:	Peerless Pumps
Pump Model:	
Design Flow Rate (each unit):	2,100 gpm
Design TDH (feet):	22
Speed (rpm):	860
Year Installed – Pump:	1994
Motor Manufacturer:	U.S. Motors
Motor Model:	678124
Motor Horsepower (HP):	20
Volt/Phase/Cycle:	460/3/60
Speed (rpm):	880
Year Installed – Motor:	1994

2.2.1.1 Observations and Assessments

The raw water pumps were installed as part of the 1994 system upgrade. The pumps have minimal wear and are not frequently used. It is likely that any upgrade to this facility would retain the existing pumps. There are no modifications necessary for the raw water pumping systems at this time. Raw water process piping shows signs of external corrosion. It is recommended that the piping surface be recoated with paint to remove and reduce additional superficial corrosion.

2.2.2 Chemical Pre-Treatment

Chemical pre-treatment for oxidation and coagulation is performed in the raw water process piping prior to the Microfloc® system. The facility has the ability to pre-treat with potassium permanganate ($KMnO_4$) intended for oxidation of iron, manganese, and color. The chemical is injected upstream of the raw water pumps in a buried vault near the dam. This location provides additional oxidation contact time. In 2002, modifications were made to the potassium permanganate and sodium hydroxide pre-treatment systems that included the installation of diffusers for both chemicals within the intake structure at the dam. These diffusers were cut and capped during the emergency repair of the intake structure in May 2018.

Potassium permanganate is no longer utilized due to inadequate detention time for effective oxidation and problems experienced with the clarifier media not working properly from manganese accumulation. The 2003 FST study reported that the buoyant clarifier media was accumulating manganese increasing media density causing the media to lose buoyancy.

After oxidation, the raw water is injected with a polyaluminum chloride (PACl)/cationic polymer (blended coagulant; Ultrion 8157) prior to a static mixer located inside the treatment facility. Following static mixing, the water is injected with a non-ionic polymer (Nalco 8170) prior to entering the Microfloc® system. Non-ionic polymer is a long-chain molecule that can degrade if subjected to intense mixing.

The facility has provisions to inject sodium hydroxide (NaOH) for pH adjustment in the raw water, but it has never been used. A carbon dioxide system was installed in the filter building after the 1994 upgrade, however it is also unused. The original intent of this system was to add alkalinity to the raw water with the addition of carbonic acid through a diffuser located in a buried vault near the dam, to improve buffering capacity and stabilize treatment chemistry. The design parameters for the pre-treatment chemicals are summarized in Table 2-7.

Chemical feed systems for sodium hydroxide and PACL/cationic polymer coagulant are located in the chemical room. The chemical feed system for potassium permanganate is located in the filter building. The PACL/cationic polymer coagulant system is a liquid feed system. The feed system has two 200-gallon day tanks and metering pumps located in the original treatment building. Two 4,500-gallon PACl bulk fiberglass storage tanks are located in a containment area within the open chemical room. A fill station is located on the north side of the building for bulk liquid chemical deliveries.

The non-ionic polymer system is a liquid feed system located in the filter building. The system includes a single 275-gallon mixing tank and two positive displacement chemical metering pumps. The nonionic polymer solution is mixed by operators, by adding 5 gallons of dry chemical to 50 gallons of water and mixing with an electric mixer installed within the 275-gallon mixing tank. A summary of the pre-treatment chemical equipment is provided in Table 2-7.

TABLE 2-7

PRE-TREATMENT CHEMICAL FEED EQUIPMENT

Potassium Permanganate	
Location:	Filter Room
Number/Type of Metering Pumps:	2 - Milton Roy Series A
Chemical Storage:	1 – 100-gallon mixing tank
PACl/Cationic Polymer Coagulant (Ultrion 8157)	
Location:	Chemical Room
Number/Type of Metering Pumps:	2 - Milton Roy Series A
Number/Type of Transfer Pumps:	1 - Sethco
Design Flow Feed Rate:	20 gph
Chemical Storage:	2 - 4,500-gallon fiberglass tanks
Number and Size of Day Tanks:	2 - 200 gallons each
Non-Ionic Polymer (Nalco 8170)	
Location:	Filter Room
Number/Type of Metering Pumps:	2 - Liquid Metronics, Inc. (LMI)
Design Flow Feed Rate:	10 gph @ 80 psi
Chemical Storage:	1 - 275-gallon mixing tank

2.2.2.1 Observations and Assessment

Existing chemical feed process piping, feed pumps also appear to be original to 1994 construction and are nearing the end of their useful life. These chemical feed pumps will likely need to be replaced within the planning period. The remaining pretreatment equipment including the raw water pumps, permanganate feed and carbon dioxide systems are not routinely used. It is recommended that unused chemical systems be disconnected and/or removed.

2.2.3 Clarification and Filtration

Following pre-treatment, water flows to three (3) Microfloc Trident® treatment trains. This system performs clarification and filtration in a single welded steel tank that is separated into two chambers. The tanks are supported on a concrete pad to elevate the tanks for piping located above the floor slab. The upflow clarifier uses buoyant media retained by a screen as the first step in the process. The proprietary name of this process is the Adsorption Clarifier™. Raw water from the reservoir has sufficient pressure to flow up through the clarifier, and down through the filters by gravity. Water enters the base of the clarifier, flows through the buoyant media before flowing into a collection trough to the filters. Run time is used to trigger the cleaning cycles that flush the clarifier with raw water. The Adsorption Clarifiers™ are upflow models using a 2.4 to 2.8 mm effective size polyethylene media. Each clarification-filtration vessel is rated for 2.0 MGD. The nominal plant capacity for the three units is 6.0 MGD, the clarifier and filter design parameters are summarized below in Table 2-8.

The filters are equipped with filter-to-waste provisions. After a filter backwash event, filtered water is directed to a tank below the floor slab to collect the diverted water. Filter-to-waste pumps located in the filter building recycle supernatant from this tank to the head of the plant for treatment. Solids from this tank are periodically removed.

TABLE 2-8

TRIDENT® PACKAGE TREATMENT SYSTEM DESIGN PARAMETERS*

Model	1 ½ TR-840A**
Trident Design Flow:	6.0 MGD (4,200 gpm)
Number of Units	3
Vessel Dimensions:	11'-11" wide x 39'-10" long
Clarifier Surface Area:	140 ft^2
Adsorption Clarifier Loading Rate:	10 gpm/ft^2
Adsorption Clarifier Water Flush Rate:	1,400 gpm
Adsorption Clarifier Air Flush Rate:	475 scfm
Adsorption Clarifier Media:	2.4-2.8 mm effective size polyethylene
Filter Area:	280 ft^2 per unit
Filter Loading Rate:	5 gpm/ft^2
Filter Media (Effective Size/Depth):	30-inches total
Anthracite Coal	1.0 to 1.1 mm / 18-inches
Silica Sand	0.35 to 0.45 mm / 9-inches
High Density Sand	0.18 to 0.28 mm / 3-inches
Backwash Method:	Air & Water
Low Rate Backwash Water Loading Rate:	5 gpm/ft^2
Low Rate Backwash Water Flow Rate:	1,400 gpm
High Rate Backwash Water Loading Rate:	15 gpm/ft^2
High Rate Backwash Water Flow Rate:	4,200 gpm
Backwash Duration:	7 min
Drain down Time	12 min
Airwash Loading Rate:	3.4 $scfm/ft^2$
Airwash Flow Rate:	950 scfm
Air Scour:	475 scfm at 5 psi
Air Scour Blower Motor:	40 HP
Valve Actuation:	Electric

**Design Criteria from Water Treatment Facility Operation and Maintenance Manual*
***Manufacturer's standard Model TR-840A consists of two vessels, so the three vessels are 1 ½ units.*

The filtration units have a nominal design capacity of 6.0 MGD. Each unit is a multi-media filter with a total depth of 30-inches consisting of anthracite coal, silica sand and high-density sand. Each filter is designed for a loading rate of 5 gpm/sf, for a flow rate of 2.0 MGD. Sample pumps draw water from each filter to monitor turbidity. An additional sample pump draws water from the clearwell to monitor for combined filter turbidity and pH.

Clarifiers are backwashed approximately every 6 hours and filters are backwashed approximately every 12-24 hours (24 hours is fairly normal). The system includes two backwash pumps and two air blowers located in the filter building. The air blowers are used to provide air scour for clarifier flushing as well as filter backwashing. The blowers are located on the floor in the open space of the filter building.

Backwash supply water is pumped from the 1994 clearwell via one of the two dedicated vertical turbine backwash pumps, also located in the filter building. After each backwash event, washwater flows by gravity to a holding tank before being pumped to the lagoon system. All large diameter waste lines are embedded in concrete below the finished floor. The filter process pumps have operating parameters listed in Table 2-9:

TABLE 2-9

FILTER PROCESS PUMPS

Pump Name	Filter-to-Waste	Backwash Pump	Sample Pump
Number of Pumps	2	2	4
Type	Vertical Turbine	Vertical Turbine	Horizontal Centrifugal
Manufacturer	Dempster Industries	Dempster Industries	MTH Pumps
HP	3.0	60	1.5
Capacity (GPM)	80	5,000	5
TDH (FT)	60	33	35
Speed (RPM)	1,770	870	1,800

2.2.3.1 Observations and Assessment

The existing filter piping, meters, bolts and valves were noted to be corroded, likely a result of the high moisture and humidity in the filter building. The base plates of the treatment tanks show signs of significant corrosion. The steel plates are delaminating. These tanks may need to be replaced. The Town is refreshing the media and replacing the air piping within the clarifiers and inspecting the interior of the treatment tanks (winter 2019).

The manufacturer recommended operating the filtration units at a minimum flow of 1.0 MGD to meet water quality objectives. However, records show that during low flow periods, operators often run two filters at 0.5 MGD each. With the reduced flow demand with the shut-down of the Brayton Point power generation facility operated by Dygeny, these low flows will likely be more common. It is recommended that operations be adjusted to maintain a minimum flow rate of 1.0 MGD per treatment unit. Standard practice is to operate only two units with one unit on stand-by at the lower flow rates.

Backwash pumps, filter to waste pumps, and air blowers are original to the 1994 upgrade and appear to be in fair condition. The blowers are centrifugal blowers located on the main floor of the filter building. This equipment does not have sound protection and likely violates current OSHA standards. This equipment should be located in a protected room with sound attenuation. The blowers are reported to work properly and have been reliable over the years. However, these systems are near the end of their useful life and will need replacement or rehabilitation within the planning period.

2.2.4 Chlorine Feed System

Post-filtration chemical treatment includes the addition of sodium hypochlorite for disinfection, sodium fluoride for dental hygiene, sodium hydroxide for pH adjustment, and phosphate for corrosion control and sequestration of iron and manganese. Additionally, at the time of the 2003 FST report, an ammonium sulfate solution chemical feed system was installed in the chemical storage room if future chloramination was needed to control disinfection by-products. This system has never been used.

EPA's Surface Water Treatment Rule (SWTR), requires all surface water treatment sources to provide disinfection contact time to inactivate Giardia and viruses. The MassDEP requires a 3-log (99.9 percent) inactivation profile for Giardia and a 4-log viral inactivation. The Microfloc® system receives a 2-log Giardia inactivation credit from MassDEP. The remaining 1-log inactivation credit is provided by disinfection. The 4-log viral credit is provided by disinfection.

The sodium hypochlorite system includes metering pumps, two 905-gallon High Density Polyethylene (HDPE) bulk storage tanks, a transfer pump and a day tank. The bulk tanks and transfer pump are located in a dedicated room constructed within the chemical room in the original building. The day tank and metering pumps are located in a dedicated room constructed around the former sodium hydroxide chemical containment area within the filter building. Sodium hypochlorite is injected into the water on the 20" finished water header on the finished water end of the filter units.

The sodium hydroxide system is located within the chemical storage building and consists of two bulk storage tanks, a transfer pump, day tank, and two metering pumps. The post-filtration chemical feed equipment is summarized in Table 2-10.

2.2.4.1 Observations and Assessment

The chlorine feed and sodium hydroxide systems were upgraded in 2017 and has an expected service life of 20 years. These systems will not need to be addressed except for routine maintenance for many years. The fluoride and phosphate equipment are in poor condition and should be replaced within the next 5-years.

TABLE 2-10

POST-FILTRATION CHEMICAL FEED EQUIPMENT

Sodium Hydroxide	
Location:	Chemical Room
Number/Type of Transfer Pumps:	1 – Seal-less Magnetic Drive Centrifugal
Number/Type of Metering Pumps:	2 – Watson-Marlow Qdos 30 Peristaltic
Design Flow Feed Rate:	12 gph @ 100 psi
Number and Size of Bulk Tanks:	2 – 1,105-gallon HDPE tanks
Number and Size of Day Tank:	1 – 230-gallon tank
Year Installed:	2017
Condition:	Excellent
Sodium Fluoride	
Location:	Chemical Room
Number/Type of Metering Pumps:	2 – Milton Roy Series A
Design Flow Feed Rate:	2.8 gph
Storage:	110-gallon saturator 6-gallon overflow tank
Year Installed:	1994
Condition:	Poor
Polyphosphate	
Location:	Chemical Room
Design Flow Feed Rate (Maximum):	60 gpd @ 100 psi
Number/Type of Metering Pumps:	2 – LMI
Number and Size of Storage/Mixing Tanks:	2 – 150-gallon mixing tanks
Year Installed:	1994
Condition:	Poor
Sodium Hypochlorite	
Location:	Sodium Hypochlorite Room/Chemical Storage Room
Number/Type of Transfer Pumps:	1 – Seal-less Magnetic Drive Centrifugal
Number/Type of Metering Pumps:	2 – Watson-Marlow Qdos 30 Peristaltic
Design Flow Feed Rate:	7.53 gph
Number and Size of Bulk Storage Tanks:	2 – 905 gallons each
Number and Size of Day Tanks:	1 – 230 gallons
Year Installed:	2017
Condition:	Excellent

2.2.5 Clearwells

After filtration, the remaining 1-log Giardia inactivation is achieved through disinfection within the two clearwells. The new clearwell has a nominal capacity of 145,000 gallons. The original clearwell, located under the old treatment plant, has a nominal capacity of 282,000 gallons. The two clearwells are connected by a buried 24-inch water main. A theoretical detention time through the combined clearwells of 102.5 minutes is available at the design flow rate of 6.0 MGD, however the effective detention time is 44.7 minutes. The design parameters for each clearwell are summarized below in Table 2-11. In addition to providing disinfection contact time for the filtered water, the new clearwell also serves as a wash water supply tank for filter backwashing.

TABLE 2-11

CLEARWELL DESIGN PARAMETERS

	Original Clearwell (1966)	**New Clearwell (1994)**
Material of Construction	Concrete	Concrete
Location	Under Old Treatment Building	Under Microfloc Trident® Filter Building
Volume/Foot	37,600 gallons/foot	19,300 gallons/foot
Design Water Depth	7.5 feet	7.5 feet
Total Volume	282,000 gallons	145,000 gallons
Baffling Factor	0.3 (unbaffled)	0.7 (baffled)
Based on 6.0 MGD (4,167 gpm)		
Theoretical Detention Time	67.7 minutes	34.8 minutes
Effective Detention Time	20.3 minutes	24.4 minutes

TABLE 2-12

REQUIRED CT AND CHLORINE RESIDUALS

		pH 6.5		pH 7.0	
Flow (MGD)	Contact Time Available (mins)	CT (required)	Chlorine Residual Required (mg/L)	CT (required)	Chlorine Residual Required (mg/L)
For Water Temperature @ 0.5° C					
6.0	44.7	61	1.4	77	1.8
5.5	48.7	61	1.4	75	1.6
5.0	53.6	60	1.2	74	1.4
4.5	59.5	60	1.2	74	1.4
4.0	66.0	59	1.0	72	1.2
For Water Temperature @ 20° C					
6.0	44.7	15	0.4	17	0.4
5.5	48.7	15	0.4	17	0.4
5.0	53.6	15	0.4	17	0.4
4.5	59.5	15	0.4	17	0.4
4.0	66.0	15	0.4	17	0.4

*Note: The Chlorine Residual required is significantly lower at higher water temperatures which are observed in the spring, summer and fall.

2.2.5.1 Observations and Assessment

The 1994 clearwell is in good physical condition. The original clearwell is in fair condition. The two clearwells operating together provide the contact time needed to meet disinfection CT requirements. There are no current needs for the clearwell system.

2.2.6 Fluoridation and Corrosion Control

Sodium fluoride is added for dental health and is injected in a diffuser located midway through the old clearwell. Sodium hydroxide for pH adjustment and polyphosphates are added for corrosion control. Polyphosphate is injected in the common filter outlet header prior to discharging into the new clearwell. Sodium hydroxide is injected at the end of the old clearwell before water enters the finished water pump chamber. Both the sodium fluoride and polyphosphate systems are located in the smaller chemical storage room of the original facility. The sodium fluoride system includes a saturator and metering pumps. The polyphosphate feed system includes a batch solution tank, and metering pumps. Chemical deliveries for both chemicals are located on the western side of the treatment facility.

2.2.6.1 Observations and Assessment

The sodium fluoride system was installed in 1994 and is in poor condition and should be replaced within 5-years. The fluoride solution is injected into the channel as the filtered water enters the original clearwell. A buildup of sodium fluoride precipitate has been observed in the channel/clearwell. Further evaluation is needed to determine the best solution to correcting this issue and may include adding a mechanical mixer to the channel, using tempered water for batching the sodium fluoride or replacing the feed equipment entirely.

The sodium hydroxide system was upgraded in 2017 and has an expected service life of 20 years. This system will not need to be addressed except for routine maintenance for many years.

The phosphate system was installed in 1994, is in poor condition and should be replaced within 5-years.

2.2.7 Finished Water Pumps

Finished water is pumped to the distribution system with three high service vertical turbine pumps located in the pump room. These pumps were installed in 1994. All three pumps are equipped with Variable Frequency Drives (VFDs). Pump speed is selected manually based on anticipated daily demands within the system and water levels in the Hot and Cold Lane tanks. The operating parameters for the finished water pumps are listed in Table 2-13.

TABLE 2-13

FINISHED WATER PUMPS

Pump Name	Finished Water (High Service)
Number of Pumps	3
Type	Vertical Turbine
Manufacturer	Dempster Industries
HP	250
Design Capacity (gpm)	2,400
Design TDH (ft)	295
Year Installed:	1994
Condition:	Fair

2.2.7.1 Observations and Assessment

Operators did report issues with the polyphosphate feed system. There is currently no way to measure the amount of polyphosphate being added into the clearwell and access to the injection point is limited. The polyphosphate chemical injection line was replaced and relocated to the filter outlet piping as part of the sodium hypochlorite conversion project in 2017.

Operators did not indicate any known structural issues with the physical condition of the clearwell, but cosmetic and surface repairs are most certainly a need in a facility of this age. A target chlorine residual of approximately 1.0 mg/L is typically maintained within the clearwell to maintain compliance with the SWTR requirements at the current and future flow rates. As indicated in Table 2-12, a higher chlorine residual will need to be maintained during worst case winter conditions. As indicated, the effective contact time available in the clearwells is adequate given the target chlorine residuals.

The facility's original sedimentation basins have been abandoned since the 1994 upgrade. Two flocculation and two sedimentation basins are located beneath the administrative and shop areas of the plant. Operators report water and residuals are present in the bottom of the tanks. Aluminum-based sludge is acidic, so the condition of the underlying concrete surface in the basins is suspect. Attempts have been made by staff to remove the water and residuals; however, foundation and masonry cracks appeared within the administrative area when a cleaning was last attempted. The remaining water may cause corrosion issues from potentially corrosive gas and high moisture in the basins.

The finished water pumps were last upgraded in 1994 as part of the plant upgrade. Due to the age of these pumps, it is likely they will need rehabilitation within the planning period including but not limited to replacement of the motor, seals and impellers. Possible revisions to the pump discharge head may also be needed. The total discharge of the two finished water pumps running concurrently at 100% speed would only be approximately 5.5 MGD. It was recommended that the two finished water pumps be replaced. The pumps have been well maintained over the years and provided good, reliable service, however at over 20 years of age, a major rehabilitation of all 3 pumps is recommended.

2.2.8 Residuals and Disposal

Washwater waste from the treatment process is discharged by gravity into one of three lagoons, selected by operators by manual positioning of a buried gate valve. After entering the lagoons, solids are accumulated as water filters through the underlying sand layers or by decanting at the outlet weir. From a gate structure, decanted water flows to the washwater recovery pumping station. The station is located below grade consisting of a concrete wetwell with solids handling pumps and a metering vault. The concrete wetwell contains two residuals centrifugal pumps, one active and one standby, located on slide rail assemblies. The wetwell and pumps were not inspected for this analysis. The original residuals handling system was designed to allow washwater to be recycled to the head of the plant. The current system pumps residuals directly to the Somerset sewer system. The washwater pumps have the operating parameters listed in Table 2-14.

TABLE 2-14

WASHWATER RESIDUALS PUMPS

Pump Name	Washwater Residuals Pumps
Number of Pumps	2
Manufacturer	Ebara
Type	Submersible Centrifugal
Model	80DLFU65.54
HP	7.5
Capacity (gpm)	165
TDH (ft)	50
Year Installed:	1994
Condition	Poor

2.2.8.1 Observations and Assessment

The Town did not note any current problems with the lagoons or sludge removal process equipment. It is recommended that all vegetation be removed, and the lagoons be cleaned to restore functionality (one of the lagoons was cleaned in the spring of 2018). Redundancy is available for the solids handling system via a second washwater recovery pump. The existing washwater recovery pumps are assumed to be in good working order, however as they are not intended to be running daily and were designed for periodic use only, it is likely they are past their useable service life and will likely need to be replaced within the planning period.

2.3 WATER DISTRIBUTION STORAGE

The Somerset Water system consists of three active water distribution storage tanks and one inactive storage tank. The active tanks include the two storage tanks on Hot and Cold Lane and the standpipe located on Read Street. The Richmond Hill Standpipe has been inactive since 2012.

The Hot & Cold Lane Tanks were constructed in 2012. The Read Street Tank was constructed in 1998.

The tank information is presented in Table 2-15.

TABLE 2-15

STORAGE FACILITIES

Storage Facility	Date Constructed	Total Storage Capacity (MG)	Tank Diameter (Feet)	Tank Height (Feet)	Base Elevation (Feet)	Overflow Elevation (Feet)
Hot and Cold Lane- East Tank	2012	3.0	82	77.7	178	255.7
Hot and Cold Lane – West Tank	2012	3.0	82	77.7	180.5	258.2
Richmond Hill Standpipe	1987	0.36	40	40	207	247
Read Street Standpipe	1998	0.64	31	114	187	301

Elevations based on 1988 National Geodetic Vertical Datum (NGVD).

2.3.1 Hot and Cold Lane Tanks

The Hot and Cold Lane Tanks (East and West) were constructed in 2012. The 3.0 million gallon (MG) pre-stressed concrete water storage tanks are on a lot secured by a chain link fence off Hot and Cold Lane. Both tanks are equipped with internal overflow structures, ventilation and drains. The tanks' overflow and drain lines are both directed to an overflow basin located between the two tanks for storage to prevent flooding during an overflow or tank draining event. There is a booster pumping station located in the same lot as the two tanks. The tanks serve the low service area of the distribution system. The tank uses a common in/out to fill and draw from the tank to the low service area. The tanks are operated between elevation 235' – 245' NGVD.

2.3.2 Read Street Tank

The Read Street Water Tank was constructed in 1998. The tank is a 31-foot diameter steel standpipe that provides 0.64 MG of storage. The tank is located on Reed Street in a lot secured by a chain link fence. The tank is equipped with a welded steel overflow, a vent, an 8" DI inlet pipe, and a 12" DI outlet pipe. Presently, the booster pumping station located at the Hot & Cold Lane Tank site pumps water to the Read Street tank to serve the high service area of the distribution system. It is reported that the booster station is not able to fill the tank, and the level within the tank is therefore equal to the HGL of the Hot and Cold Lane Tanks. The level transmitter communication to the plant is currently down, so level within the Read Street Tank was not able to be verified during a visit to the water treatment plant.

2.3.3 Richmond Hill Tank

The Richmond Hill Tank was installed in 1987. The tank is a 40-foot diameter steel standpipe that provides 0.36 MG of storage. The tank is located on an easement off of Elm Street in the town of Dighton. The tank is equipped with an overflow, a vent, drain, and a common 12" fill/draw pipe into the tank. Access to the valving and fill/draw piping is located in a vault south of the tank. The vault consists of an altitude valve, isolation gate valves, and a bypass to the gate valve, so that the tank can remain in service if the altitude valve needs to be serviced. The altitude valve is used to control level within the tank, and prevents the tank from overflowing, as the overflow elevation is below the operational HGL of the Hot and Cold Lane Tanks. The tank has been offline since 2012, when the tank was drained, and the gate valve was closed, and is now reportedly broken closed. The tank was filled from the Dighton well and served the Richmond Hill service area.

2.3.4 Observations and Assessment

The tanks at Hot & Cold Lane are fairly new and should not require any significant maintenance or capital improvements for many years. The Read Street Tank will need maintenance to remove and reapply the coating systems within the next 15-20 years. The Richmond Hill Tank is not connected to the distribution and should be demolished.

2.4 WATER DISTRIBUTION PUMPING AND PIPING

The distribution piping consists of approximately 95.4 miles of pipe ranging from 2-inch up to 20-inch diameter, approximately 20 percent of which was installed before 1940. The approximate overall lengths of each diameter pipe are summarized in Table 2-16. There were approximately 6,752 metered connections in 2018 and approximately 810 fire hydrants.

TABLE 2-16

WATER MAIN INVENTORY BASED ON PIPE SIZE

Diameter (in)	Length (feet)	Percent of Total
2	32,671	5.64
6	255,424	44.09
8	145,313	25.08
10	29,685	5.12
12	66,829	11.54
16	26,461	4.57
20	22,955	3.96
Total	579,338	100

The piping in the distribution system varies in age from less than a year to over 70 years old. Table 2-17 presents the length of pipe installed during the specified time period.

The distribution system is comprised of the various materials listed in Table 2-18.

TABLE 2-17

WATER MAIN INVENTORY BASED ON INSTALLATION DATE

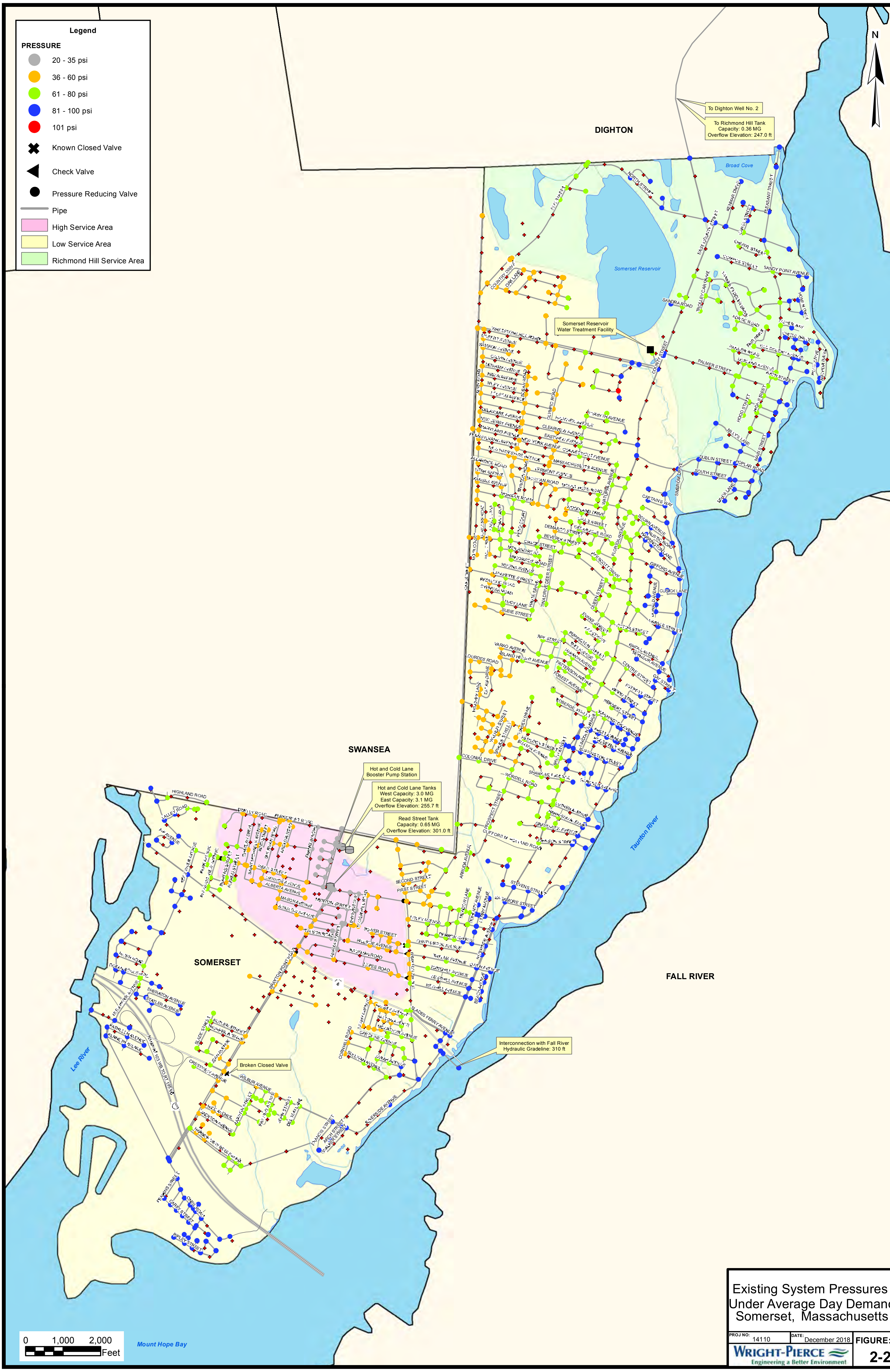
Year Built	Length (feet)	Percent of Total
1927-1939	113,560	19.60
1940-1949	43,149	7.45
1950-1959	90,554	15.63
1960-1969	141,085	24.35
1970-1979	79,681	13.75
1980-1989	16,013	2.76
1990-1999	27,612	4.77
2000-2009	56,936	9.83
2010-2018	10,748	1.86
Total	579,338	100

TABLE 2-18

WATER MAIN INVENTORY BASED ON PIPE MATERIAL

Pipe Material	Length (feet)	Percent of Total
Cast Iron (CI)	322,543	55.67
Cement Lined DI	74,490	12.86
Copper	248	0.04
Galvanized	31,237	5.39
PVC	54,982	9.49
Transite	94,595	16.33
PE	1,243	0.22
Total	579,338	100

The distribution system is segregated into three service areas based on elevation and water source as depicted in Figure 2-2.


Legend
PRESSURE
20 - 35 psi
36 - 60 psi
61 - 80 psi
81 - 100 psi
101 psi
Known Closed Valve
Check Valve
Pressure Reducing Valve
Pipe
High Service Area
Low Service Area
Richmond Hill Service Area
N
DIGHTON
To Dighton Well No. 2
To Richmond Hill Tank
Capacity: 0.36 MG
Overflow Elevation: 247.0 ft
Broad Cove
Somerset Reservoir
Somerset Reservoir
Water Treatment Facility
SWANSEA
Hot and Cold Lane
Booster Pump Station
Hot and Cold Lane Tanks
West Capacity: 3.0 MG
East Capacity: 3.1 MG
Overflow Elevation: 255.7 ft
Read Street Tank
Capacity: 0.65 MG
Overflow Elevation: 301.0 ft
Taunton River
SOMERSET
FALL RIVER
Interconnection with Fall River
Hydraulic Gradeline: 310 ft
Broken Closed Valve
Lee River
Mount Hope Bay
0 1,000 2,000
Feet
Existing System Pressures
Under Average Day Demand
Somerset, Massachusetts
PROJ NO: 14110
DATE: December 2018
FIGURE:
2-2
WRIGHT-PIERCE
Engineering a Better Environment

2.4.1 Low Service Area

The low service area is the area supplied by the treatment plant. The backbone of the distribution system consists of approximately 2 miles of 12-inch main in County Street, which runs north and south through the Town. An additional critical pipeline is the 20-inch water main installed in the 1970's that generally runs in parallel with the main in County Street but follows the Somerset/Swansea border. This 20-inch water main carries water from the treatment plant approximately 4 miles to the Hot and Cold Lane Tank located in the southern section of the Town near the Swansea border. The Hot and Cold Lane tanks generally maintains a hydraulic grade line (HGL) of about 240 feet NGVD. Although the Hot and Cold Lane tank has an overflow of 255.7 feet the tank level is maintained at a HGL of 240 feet in order to minimize the high operating pressures along the Taunton River. As a result of the variation in topography, distribution system pressures range from 25 psi near the storage tank to a range of 130 psi to 110 psi (HGL 313 to 267) near the treatment plant depending upon the demand condition. The highest service elevation for this zone is 194 in order to ensure the minimum 20 psi water pressure in the distribution system is maintained.

2.4.1.1 Observations and Assessment

While there are some relatively low pressures in the area surrounding the tanks, and somewhat excessive pressures in the low-lying areas near the river, the Low Service area generally provides pressures that are within acceptable limits. The Low Service area is generally meeting the fire flows recommended for adequate fire protection.

2.4.2 High Service Area and Booster Pumping Station

The high service area is located between Brayton Avenue, Grand Army of the Republic Highway and Travers Street and is supported by the Read Street storage tank at an operating HGL of 290 feet NGVD. Operating pressures are increased by a booster pump station which is located adjacent to the Hot and Cold Lane Tank at an elevation of approximately 180. This pump station has two (2) 420 gpm capacity pumps operated with variable frequency drives, which operate to maintain a pressure setpoint. This section of Town is isolated from the rest of the distribution system via two pressure reducing valves (one on Brayton Point Road at Route 6, and one on Read Street at Bertram

Street), two check valves (one on Lepes Road at Brayton Avenue, and one on Hillside Street at Brayton Avenue), and one control valve (on Read Street at Brayton Avenue). The booster pump station was installed in 1995 and was designed to serve the high service area. In 1998, a new storage tank was installed in place of the old Read Street Tank and it was designed to serve the high service area at an HGL of approximately 290 feet. The highest service elevation for this zone is 244 in order to ensure the minimum 20 psi water pressure in the distribution system is maintained. Currently the booster pump station only increases pressures approximately 5 psi and is unable to fill the Read Street Tank. The booster pump design parameters are presented in Table 2-19.

TABLE 2-19
BOOSTER PUMP STATION PUMP DESIGN PARAMETERS

Number of Units:	2
Type:	Centrifugal
Manufacturer:	Namco
Design Flow Rate (each unit):	420
Design TDH (feet):	65
Motor Horsepower (HP):	10
Volt/Phase/Cycle:	460/3/60
Speed (rpm):	1760
Install Year:	1995
Present Condition:	Poor

2.4.2.1 Observations and Assessment

The booster pump station servicing the high service area is reported to not be operating correctly. Further investigation as to the issues in its operation are needed.

2.4.3 Richmond Hill Service Area

Richmond Hill service area includes the village section of Somerset along with the area located to the west of County Street (Route 138), north of the treatment plant. This area was the original water system for the Town. It is primarily supplied by Dighton Well No. 2 and the offline Richmond Hill Storage tank. This area was established when the treatment plant was put online in 1967 to isolate this well system from the distribution system served by the treatment plant. To accomplish this separation, valves were closed on Elm Street, County Street and South Street.

The only interconnection between the two systems is a 12-inch line on South Street near Riverside Avenue/Dublin Street. At Well No. 2 there is one 350 gpm vertical turbine pump. This pump is operated 24 hours a day, 7 days a week to supply water to the village section of the Town. Flow within this section of town is generally unidirectional and solely supplied by the well in Dighton, given the constant operation of the well. If there is a high demand within this service area, treated water from the treatment plant will migrate to this service area through the 12” main on South Street

2.4.3.1 Observations and Assessment

The Village Area of Somerset is primarily served by the Dighton Well No. 2. This well is not currently treated with chlorine. It appears that under certain hydraulic conditions, water from the WTP blends with the well water and results in discolored water complaints. Further discussions are needed to determine how to address the particular issues within the Village area of the distribution system.

2.5 HISTORICAL WATER USE

Historical water usage in Somerset is presented in this section. Historical water use data was obtained from the Town's Annual Statistical Reports (ASRs) which are submitted each year to the MassDEP. Table 2-20 presents a summary of system-wide demand conditions from 2013 through 2017. Historical water demands will be examined in more detail in the Water Supply Needs section. Copies of Somerset’s most recent ASRs are included in Appendix D.

TABLE 2-20
HISTORICAL WATER DEMAND*

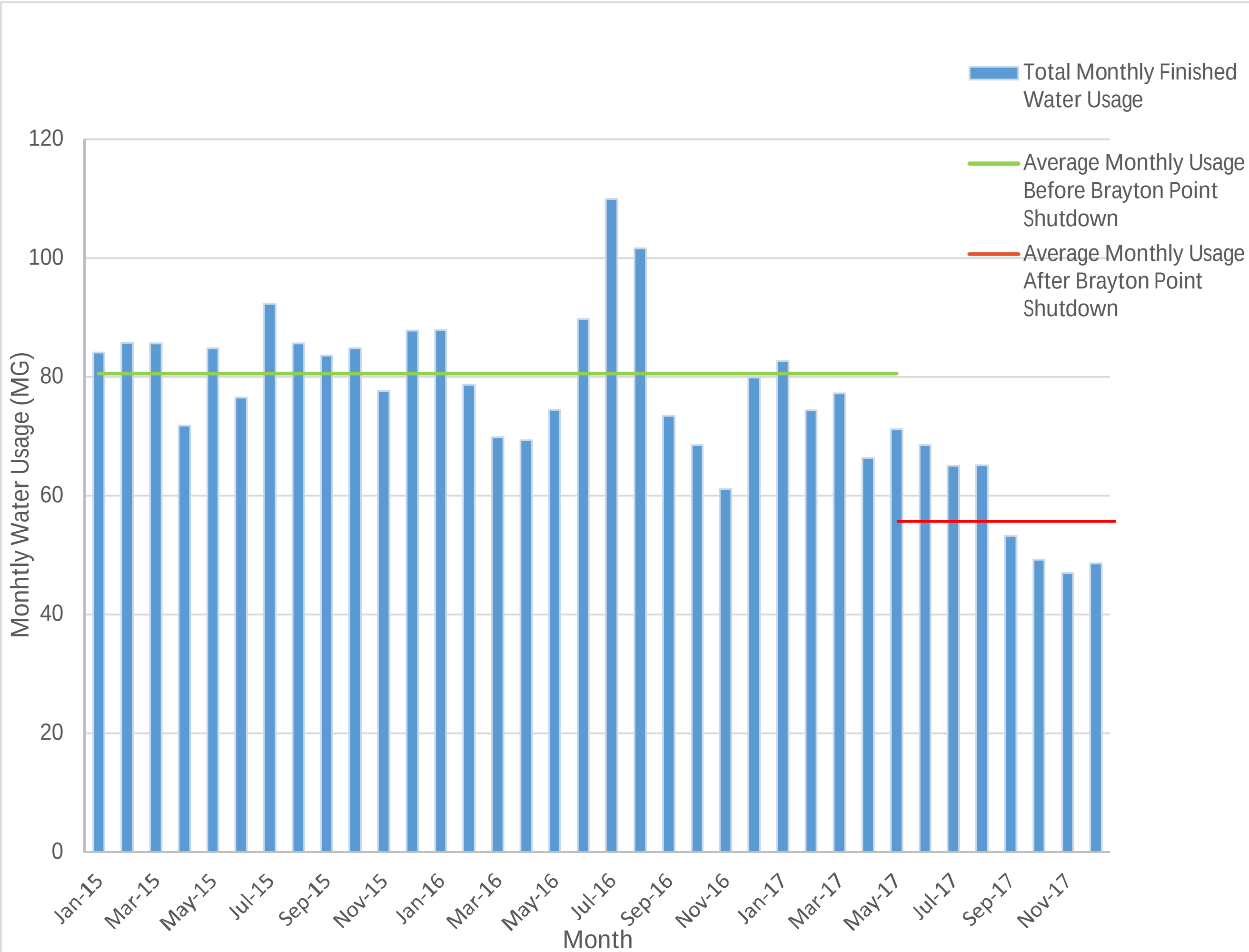
Year	Raw Water Usage from Somerset Reservoir	Finished Water from WTP	Finished Water from Dighton Well	Finished Water Total
2014	1105.415	845.426	91.709	937.135
2015	1064.597	890.736	109.491	1,000.227
2016	1128.395	964.144	110.595	1,074.739
2017	859.795	664.896	103.335	768.231
2018	746,463	580.793	90.458	671.251

* Data in MG as reported in the 2014 – 2018 MassDEP Annual Statistical Reports.

Historically, the Brayton Point Power Generating Facility has been the largest user of water since the facility's construction in the 1960s, with peak demands as high as 1,500 gpm, and an average daily demand of approximately 1 MGD. However, in recent years the plant has reduced its production, leading to the decommissioning of the plant in May of 2017. The loss of demand from this critical user has left a large impact on the water system, as the facility accounted for nearly a third of the water system's demand on an average day. The short-term effects can be seen in figure 2-3 which shows the monthly totals of water produced from the water system (Treatment Plant and Well) from 2015-2017. From 2015 – 2016 the production from the system follows a typical usage pattern with peak demands in summer months and reduced demands in the colder winter months. However, in 2017 it is clear from the figure that demands within the system have decreased as the expected summer peaks are nearly half of what they were the years before, due to the closure of the power generation facility in May of 2017.

FIGURE 2-3

2015-2017 TOTAL MONTHLY WATER SYSTEM PRODUCTION



The average total monthly water production was compared from before and after May 2017 to determine the average loss of demand within the system associated with the closure of the power generation facility. The total monthly average from January 2015 to May 2017 was 80.6 MG, while the total monthly average from June 2017 to December 2017 was 56.7 MG. As a result, there is a loss of demand of 24 million gallons per month, or 0.8 MGD, due to the closure of the facility. Analysis of the impact from the closure of the Brayton Point Facility is ongoing and further examined in the Water Supply Needs Section, as the Town continues to struggle with the reduced demands and uncertainty of future use at the Brayton Point site.

2.6 WATER QUALITY

The water in Somerset is generally of high quality, consistently meeting the regulatory requirements. Section 3 of this report discusses each of the regulations and presents the recent water quality results.

SECTION 3
Regulatory Requirements and Review

SECTION 3

REGULATORY REQUIREMENTS AND REVIEW

The Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) have issued a number of regulations to ensure safe and dependable water supply for all public water systems. The Safe Drinking Water Act Amendments of 1996 and subsequent amendments established stringent water quality and compliance standards for water supplies, treatment and distribution systems.

Rules resulting from 1996 Amendments to the Safe Drinking Water Act, which require simultaneous compliance and affect the operation of the Somerset Water Treatment Plant (WTP), Dighton Well 2 and the Somerset Water Distribution System include:

- Surface Water Treatment Rule (SWTR)
- Interim Enhanced Surface Water Treatment Rule (IESWTR)
- Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR)
- Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)
- Filter Backwash Recycling Rule (FBRR)
- Total Coliform Rule (TCR)
- Groundwater Rule (GWR)
- Lead and Copper Rule (LCR)
- Stage I Disinfectants/Disinfection By-Products Rule (Stage I DBPR)
- Stage II Disinfectants/Disinfection By-Products Rule (Stage II DBPR)
- Unregulated Contaminant Monitoring Rule (UCMR I)
- Unregulated Contaminant Monitoring Rule (UCMR II)
- Unregulated Contaminant Monitoring Rule (UCMR III)
- Unregulated Contaminant Monitoring Rule (UCMR IV)

Since the 1960s, the Somerset Water Department (SWD) has utilized a hybrid system which uses both groundwater and surface water supplies. The surface water is treated using an alternative filtration technology process (contact clarification followed by rapid sand filtration), corrosion control, and disinfection. Groundwater is supplied by a single well located in Dighton that is treated locally within the well house. The groundwater treatment includes UV disinfection, pH adjustment for corrosion control and fluoridation. The treated groundwater enters the distribution system directly from the wellhouse and primarily serves the Main Street village neighborhood in the northern portion of Somerset, while the treated surface water from the WTP primarily serves the rest of the town. There is no physical isolation to keep the two supplies separated, so they do blend somewhat within the village area. However, given the system hydraulics and the separate entry points of the two sources into the system, very little mixing actually occurs.

The following is a summary review of past, current and anticipated EPA and MassDEP regulations that apply to public drinking water systems.

3.1 WATER MANAGEMENT ACT

The Water Management Act (WMA) became effective in March 1986 and authorizes MassDEP to regulate the quantity of water withdrawn from both surface and groundwater supplies. The purpose of these regulations is to ensure adequate water supplies for current and future water needs. Water withdrawals fall under one of two categories; the registration program and the permit program.

3.1.1 Registration Program

Municipal water suppliers were given the opportunity to register their existing water withdrawals based on their water use between 1981-1985. The registration program established the renewable right of previously existing water withdrawals over 100,000 gallons per day (gpd) on average, per river basin, between the years of 1981-1985. MassDEP issued registration statements to document these withdrawal volumes. The Town of Somerset has a registered volume of 1.61 MGD from the Taunton River basin (Registration #42527301).

3.1.2 Permit Program

Water suppliers with a Water Management Registration do not need a permit if they do not increase withdrawals over their registered volumes or add any new withdrawal points to their system. Somerset has exceeded their registered volume and therefore has obtained a permitted withdrawal volume. Somerset has a permitted withdrawal of 2.41 MGD (Permit #9P-4-25-273.01) for a total authorized withdrawal of 4.02. The WMA Permit renewal issued to Somerset in 2010 was for the standard 20-year period with adjustments in 5-year increments as presented in Table 3-1.

TABLE 3-1
WATER MANAGEMENT ACT AUTHORIZED WITHDRAWALS

Year	AVERAGE DAILY WITHDRAWAL (MGD)
2010 – 2014	3.73
2015 – 2019	3.82
2020 – 2024	3.92
2025 – 2029	4.02

The Permit issued by MassDEP included conditions that Somerset has complied with including:

- installation of master meters
- delineation of the Zone II for the Dighton Well 2
- determination of the safe yield for the surface water supplies
- implementation of wellhead protection measures
- delineation of wetlands and annual monitoring
- implement withdrawal reductions during times of low streamflow
- establishment of summer outdoor water use restrictions
- development of fisheries protection measures

In addition to these conditions, MassDEP has set seasonal peaks including a maximum daily withdrawal of 6.0 MGD from the Somerset Reservoir and a maximum daily withdrawal of 0.58 MGD (400 gpm) from Dighton Well 2.

All Permit holders are required to submit annual reports with monthly withdrawal information.

3.2 SURFACE WATER TREATMENT RULE

The original SWTR became effective in 1990. This rule presented three requirements:

(1) combined filter effluent turbidity requirements for all filtered water supplies,

(2) filtration and/or disinfection of all surface water supplies to protect against the potential adverse health effects of exposure to *Giardia*, virus and other pathogenic organisms, and

(3) the maintenance of a disinfection residual in the distribution system.

The filter effluent turbidity requirements included in the original rule stated that all filtration facilities maintain a combined filter effluent turbidity less than 0.5 NTU in 95% of samples. The rule also required that systems using surface water achieve 3 log removal or inactivation of *Giardia* and maintain a chlorine residual in the distribution system. Somerset is compliant with these requirements. The Microfloc® treatment process is credited by MassDEP as providing 2-log removal/inactivation, and disinfection accounts for the remaining 1-log inactivation. The original SWTR was modified by the Interim Enhanced Surface Water Treatment Rule in 1998.

3.2.1 Interim Enhanced SWTR

The IESWTR was enacted in 1998 lowering the turbidity limits and requiring 2-log *Cryptosporidium* (Crypto) removal for filtered systems. The IESWTR requires that surface water treatment plants maintain a combined filter effluent turbidity less than 0.30 NTU in at least 95% of samples. The 95th percentile filter effluent turbidity results for 2014 – 2018 are provided in Table 3-2. Somerset is in compliance with the requirements of the IESWTR.

TABLE 3-2

FILTERED WATER TUBIDITY – 95TH PERCENTILE

Year	Turbidity (NTU)
2014	0.11
2015	0.12
2016	0.15
2017	0.17
2018	0.16

3.2.2 Long Term 1 Enhanced SWTR (LT 1)

This rule was promulgated in 2002 building upon the IESWTR and presents additional requirements for treatment techniques. LT 1 requires combined filter effluent turbidity recordings. All of the equipment required to provide continuous effluent turbidity recordings have been installed in Somerset.

3.2.3 Long Term 2 Enhanced SWTR (LT 2)

This rule was issued in 2006 and established additional treatment requirements for uncovered reservoirs under specific conditions depending on *Cryptosporidium* concentrations. Somerset conducted compliance testing between 2008 and 2010 that showed <0.075 oocysts/liter placing the system in Bin 1. As required under LT 2, in 2016 the Town conducted a second round of source water *Cryptosporidium* monitoring that provided similar results and the system maintain the Bin 1 classification.

3.2.4 Filter Backwash Recycle Rule (FBRR)

Promulgated in 2001, this rule required water suppliers to submit a form that included recycling information and a schematic of the recycling stream locations. The Somerset WTP currently discharges all filter backwash water and clarifier flushes/process water to settling lagoons; none of this wash water is recycled. Water from the filter-to-waste cycle of the backwash process is collected and recycled to the head of the WTP. The rate of recycle for this wash water is maintained at less than 10% of the incoming flow to comply with the recycling rule limit.

3.3 TOTAL COLIFORM RULE

The Total Coliform Rule (TCR) was promulgated in June 1989. The TCR established a maximum contaminant level (MCL) for total coliforms, and modified monitoring requirements for fecal coliforms or E. Coli. The TCR applied to all public water systems with the purpose to improve public health protection by reducing fecal pathogens to minimal levels through control of total coliform bacteria. In compliance with the rule, the Somerset Water Department collects weekly total coliform and e. coli samples of the Somerset Reservoir influent and effluent, the well influent and effluent, and at 10 routine sites throughout the distribution system. Bacteriological reports from 2015 – 2018 indicated that there were no e. coli positive samples, or repeat total coliform positive samples collected within the distribution system. Somerset is in compliance with the TCR.

3.3.1 Revised Total Coliform Rule

The Revised Total Coliform Rule was enacted in 2013 to establish an MCL for E. Coli and make modifications to the original TCR to increase public health protection through the reduction of potential pathways of entry for fecal contamination into the distribution system. One of the main provisions of the RTCR requires public water systems to conduct a level 1 or level 2 assessment in response to a violation of the rule. The Somerset Water Department has maintained compliance with the RTCR and therefore has not had to complete any level 1 or 2 assessments.

3.4 GROUNDWATER RULE

The Groundwater Rule (GWR) was first enacted in 2006, with the purpose to reduce the risk of illness caused by microbial contamination in public groundwater systems. The Somerset Water Department is subject to this rule, as the Dighton Well serves a portion of the distribution system, The GWR requires monitoring of fecal coliform indicators in the groundwater source and requires 4-log inactivation for systems with positive fecal coliform indicators. The GWR also requires that sanitary surveys are done every three years. Somerset completed sanitary surveys in 2013 and 2016. This rule requires source water monitoring if a TCR compliance sample is positive. If a fecal indicator is detected in the source water, then a 4-log removal will likely be required. Although no fecal indicators have been detected in this well, Somerset pro-actively installed ultraviolet (UV) disinfection equipment as an additional safeguard against microbial contamination. Somerset is in compliance with this rule as the UV disinfection unit provides 4-log inactivation.

3.5 LEAD AND COPPER RULE

The Lead and Copper Rule (LCR) was promulgated in June 1991. Since its' incorporation, the LCR has been revised several times including in 1998, 2000, 2004, and 2007. The LCR requires that 90% of lead and copper samples tested fall below the respective action levels of 0.015 mg/L for lead and 1.3 mg/L for copper. Somerset had historical exceedances of the lead action level in 1999 and 2000. In these years, the 90^{th} percentiles were 0.023 mg/L and 0.024 mg/L, respectively. The following year in 2001, the 90^{th} percentile for lead results dropped to 0.010 mg/L, likely due to pipe lining and pipe replacement activities within the distribution system. Based on a successful history of meeting LCR requirements, Somerset was granted reduced monitoring, changing the frequency of testing from every year, to once every three years, and the required number of sample sites from the original 60 to 30. Results for the last two LCR sampling rounds in 2014 and 2017 are presented in Table 3-3.

TABLE 3-3

LEAD AND COPPER RESULTS

Sample Year	Lead (mg/L)	Copper (mg/L)
2014	0.0069	0.248
2017	0.006	0.495

Sample results for both years were below the action levels for both Lead and Copper. SWD will collect its next round of lead and copper samples in 2020.

In 2014, there was one individual excursion of 0.154 mg/L lead at 54 Hawthorne Street. The lead at this site was 0.012 mg/L in 2017. In 2017, there was one individual excursion of 0.13 mg/L Pb at 40 Tina Drive. This was determined to be a sampling error, and resampling was below the action level of 0.015 mg/L.

The EPA is currently in the process of revising the LCR with “long-term revisions,” which could impact Somerset.

3.6 DISINFECTANTS AND DISINFECTION BYPRODUCTS RULES (D/DBPR)

Regulations establishing limits for the level of disinfectant applied as well as the by-products that are created from the various disinfectants commonly used in drinking water were established over several years.

3.6.1 Stage I D/DBPR

The Stage I rule was first enacted in 1998 and established a maximum level of 4.0 mg/L for both chlorine and chloramines, and a maximum of 0.8 mg/L for chlorine dioxide. This rule also included MCLs of 0.080 mg/L for total trihalomethanes (TTHMs), 0.060 mg/L for five haloacetic acids (HAA5), 0.010 mg/L for bromate, and 1.0 mg/L for chlorite. The MCLs were based on system-wide running annual average of four distribution system samples per quarter. The Stage II rule was later enacted in 2006, which revises the rule to make the MCLs based on locational running annual average (LRAA), rather than a system wide average. Compliance with the Disinfectant By-Product Rule is based on the newer stage II DBPR MCLs.

3.6.2 Stage II D/DBPR

The Stage II rule was enacted in 2006 and maintains the MCLs of 0.080 mg/L for TTHMs and 0.060 mg/L for HAA5. The primary change under this rule is that these MCLs are based on the location specific running annual average at the designated distribution system sample sites each quarter. Sample locations were chosen throughout the distribution system and include Lil Audries Convenience Store [1159 Read Street], the Town Hall [140 Wood Street], Riverside Auto [1771 Grand Army Highway – Route 6] (this site replace the 7-11 Market sampling location #10397 in the third quarter of 2016 when that facility closed), and the Shell Station [1833 Wilbur Avenue]. The Town collects samples from these sites for DBP analysis every quarter.

Table 3-4 presents the TTHM results and Table 3-5 presents the HAA5 results for 2016 through 2018. The LRAA in Q1 of 2018 at both Lil Audries and Riverside Auto exceeded 80 µg/L for TTHMs. Somerset had previously exceeded the LRAA at the Lil Audries site in Q4 of 2014 and was issued an administrative consent order from MassDEP in 2015. Somerset developed a plan and returned to being in compliance from 2015 through 2017.

TABLE 3-4

TOTAL TRIHALOMETHANE RESULTS (µg/L)

	Atlantic Gas (10383)		**Town Hall (10385)**		**Lil Audries (10396)**		**Riverside Auto (10938)**	
Quarter	**TTHM**	**LRAA**	**TTHM**	**LRAA**	**TTHM**	**LRAA**	**TTHM**	**LRAA**
2015-Q3	68.10		55.50		68.80			
2015-Q4	66.00		45.80		74.20			
2016-Q1	58.10		44.00		59.80			
2016-Q2	75.60	66.95	40.00	46.33	49.40	63.05		
2016-Q3	92.20	72.98	73.90	50.93	97.40	70.20	91.70	
2016-Q4	40.00	66.48	32.10	47.50	59.40	66.50	42.50	
2017-Q1	39.30	61.78	29.40	43.85	32.60	59.70	38.30	
2017-Q2	88.80	65.08	63.90	49.83	87.00	69.10	88.80	65.30
2017-Q3	86.00	63.53	71.00	49.10	87.00	66.50	86.00	63.90
2017-Q4	63.00	69.28	37.00	50.33	77.00	70.90	70.00	70.80
2018-Q1	72.00	77.45	41.00	53.23	75.00	81.50	80.00	81.20
2018-Q2	74.00	73.75	39.00	47.00	45.00	71.00	75.00	77.80
2018-Q3	94.00	76	69.00	47	83.00	70	93.00	80
2018-Q4	80.00	80	49.00	50	61.00	66	69.00	79

TABLE 3-5

HALOACETIC ACID RESULTS (µg/L)

	Atlantic Gas (10383)		Town Hall (10385)		Lil Audries (10396)		Riverside Auto (10938)	
Quarter	**HAA5**	**LRAA**	**HAA5**	**LRAA**	**HAA5**	**LRAA**	**HAA5**	**LRAA**
2015-Q3	17.20		32.80		25.50			
2015-Q4	17.70		24.90		24.10			
2016-Q1	20.40		40.80		45.30			
2016-Q2	20.90	19.05	38.60	34.28	23.70	29.65		
2016-Q3	13.30	18.08	25.60	32.48	18.60	27.93	19.40	
2016-Q4	29.20	20.95	21.40	31.60	12.90	25.13	31.30	
2017-Q1	41.20	26.15	54.60	35.05	54.60	27.45	31.10	
2017-Q2	42.90	31.65	61.90	40.88	63.00	37.28	46.60	32.10
2017-Q3	9.30	30.65	59.00	49.23	6.60	34.28	3.10	28.03
2017-Q4	39.00	33.10	33.00	52.13	29.00	38.30	40.00	30.20
2018-Q1	35.00	31.55	39.00	48.23	55.00	38.40	48.00	34.43
2018-Q2	11.00	23.58	32.00	40.75	35.00	31.40	4.10	23.80
2018-Q3	6	23	27	33	17	34	2	24
2018-Q4	32	21	32	33	19	32	15	17

As seen in Table 3-4 the individual quarterly results for TTHMs exceeded 80 µg/L at Atlantic Gas, Lil Audries and Riverside Auto during Q3 2016, Q2 2017, and Q3 2017. These recent elevated levels of DBPs are believed to be the result of reduced water use within the distribution system from the closure of the Brayton Point power generating facility. In response to the recent violations of the rule the town prepared an ACO compliance feasibility study in September 2018, which investigated various means of compliance including:

- Assessment of the chlorine residual management and automatic flushing system installed in early 2018
- Possible activation of a chloramine system
- A long-term asset management plan that will evaluate infrastructure size supplying the Brayton Point area of the Somerset Water distribution system.

3.7 UNREGULATED CONTAMINANT MONITORING RULES (UCMRS)

UCMR I was promulgated in 1999 for the three-year cycle running from 2001 to 2003. The Town completed its testing between July 2001 and April 2002 with test results non-detectable for all 12 contaminants.

UCMR II began the second three-year cycle running from 2008 to 2010. The Town completed testing between January 2010 and October 2010. The test results were non-detectable for all 10 contaminants.

UCMR III began the third three-year cycle running from 2013 to 2015. The Town completed testing between September 2013 and June 2014. Table 3-6 presents the results for the UCRM III sampling.

TABLE 3-6

UNREGULATED CONTAMINANT MONITORING PROGRAM III RESULTS

Unregulated Contaminant	Average (µg/L)	Range (µg/L)
Chlorate	18.83	<20 – 67
Chromium-6	0.029	<0.03 – 0.08
Chromium (Total)	0.308	0.2 – 2.7
Cobalt	0.100	<1 – 1.1
Strontium	51.25	40.3 – 69.4
Vanadium	0.015	<0.2 – 0.2

UCMR IV will begin the fourth three-year cycle running from 2018 to 2020. In August 2019, the Town is anticipating the start of sampling for 30 additional contaminants; 10 Cyanotoxins, 2 metals, 3 additional HAAs, 3 semi-volatile compounds, 3 solvents, and 9 pesticides.

3.8 OTHER RULES

- Arsenic Rule (2001) – This rule reduced the allowable level of arsenic from 50 µg/L to 10 µg/L. Somerset has not had arsenic detected in either water supply source.
- Radionuclides Rule (December 2000) – This rule included the regulation of uranium for the first time in addition to retaining the limits on combined radium (5 pCi/L), gross alpha particle radioactivity (15 pCi/L) and beta particle activity (4 mrems/yr). The Somerset Reservoir has had very low levels of Radium (0.1 – 0.12 pCi/L) and gross alpha particles (0.0 – 0.47 pCi/L). The Dighton Well 2 has very low levels of Radium (0.04 – 0.8 pCi/L) and gross alpha particles (0.0 – 0.50 pCi/L).
- Public Notification Rule (2000) – This rule sets new requirements and timing for notices and simplifies the required language for these notifications in the event of a violation.
- Consumer Confidence Report Rule (1998) – This rule requires water suppliers to provide an annual report to its water users. While this rule doesn't directly establish monitoring or treatment requirements, it does require water suppliers to keep the public informed of water quality.
- Phase II/V Rule – These rules establish the regulatory limits for most of the volatile, semi-volatile and inorganic compounds.

3.9 FUTURE REGULATIONS

As more information is collected on the presence and potential harm of various compounds in the environment, the EPA through MassDEP will continue to develop regulatory limits for drinking water supplies. Some regulations that are already being considered include:

- UCMR V – This list of compounds will be published in 2022 with sampling running from 2023 to 2025. Future lists can be expected every five years.
- If Somerset ultimately converts to chloramination to address their THM issues, additional disinfection byproduct will need to be monitored. It has been shown that chloraminated water may form nitrosamines, which EPA is currently looking at for potential regulation.
- Pharmaceuticals and Personal Health Care Products (PPCPs) – PPCPs are a fairly new family of contaminants under consideration for regulation in drinking water. PPCPSs are

any product used by individuals for personal health or cosmetic purposes or used by agribusiness to enhance growth or health of livestock. PPCPs include thousands of substances including prescription drugs, cosmetics, fragrances, lotions and veterinary drugs. These substances can enter the water supply through human activity such as swimming, through groundwater flow from disposal of these products in landfills and through waste discharges.

PPCPs are presently being considered for regulation in industrial discharges. The risk from human ingestion of these substances is still under study. PPCPs are primarily a concern from wastewater discharges and are present in any river system where industrial or municipal wastewater is discharged. Somerset should monitor EPA's development documents on PPCPs over the next 5-10-year period.

Because there are no known direct discharges of wastewater entering either Segreganset River or the watershed around the Somerset Reservoir, the presence of these substances in measurable concentrations is expected to be minimal. Somerset should continue to strive to purchase, preserve or protect land in the watershed to minimize exposure to these potentially regulated compounds in the future.

SECTION 4
Drinking Water System Needs Analysis

SECTION 4

WATER SYSTEM NEEDS ANALYSIS

4.1 INTRODUCTION

This section outlines the various needs related to water system in Somerset. Future water demands are developed based upon existing water supply and usage. Challenges facing the current water system are also identified. Defining the Town's water needs provides the basis for determining future operational and capital improvement alternatives.

4.2 WATER NEEDS ASSESSMENT METHODOLOGY

The major component to determining water supply needs in Somerset is identifying future water demands. To determine future water needs, population projections were estimated for the twenty-year planning period. Historical water demand trends were applied to the population projection to refine estimated future water demands.

Population and future water demand projections are based on available current population projection studies, annual statistical reports, and input from the Town. This data was applied to historical water demands.

In addition to determining future water needs, the Town seeks also to reduce system complexity, and simplify and reduce operations and maintenance.

4.3 PROJECTED WATER DEMAND

Projected water demands for Somerset are determined based on future population projections and historical water demands.

4.3.1 Population Projections

To determine future water needs, population projections developed by a variety of planning organizations were used as a basis for making water demand projections. Data was obtained from the US Census Bureau, SRPEDD, and the UMASS Donahue Institute (UMDI). The projections provided by these agencies relied on the 2010 US Census Bureau populations as a starting point for making their future projections.

TABLE 4-1

POPULATION PROJECTIONS

	Published		**Wright-Pierce Estimated**	
Year	**UMDI**	**SRPEDD[1]**	**UMDI**	**SRPEDD**
2010	18,165	18,165	-----	----
2015	18,078	*18,360*	----	----
2020	17,870	*18,555*	18,154	18,396
2025	17,613	*18,750*	17,897	18,591
2030	17,325	18,945	17,609	18,786
2035	17,045	*19,140*	17,329	18,981
2040	----	*19,335*	17,049	19,176

1. SRPEDD published estimates for 2020 and 2030. The intermediate and subsequent years were calculated based on a linear population increase of 39 people per year shown in italic.

SRPEDD developed projections in 10-year intervals for the years 2020 and 2030. The SRPEDD projections indicate a population growth of 39 people per year. Table 4-1 includes population projections for the intermediate years as well as subsequent years using the SRPEDD estimate. The UMDI developed projections in five-year intervals, ranging from 2015-2035. Conversely from the SRPEDD projections, the UMDI is projecting a decline in population over the 20-year planning period. The 2017 population is estimated to be 18,279, which falls between the estimated populations of the two agencies. Using this as a starting point, Wright-Pierce calculated estimated populations projections using the same projected population changes from each agency and extended them to 2040. The estimated population in Somerset could range from 17,049 to 19,176. This potential population range will be used in calculating the future water supply needs to ensure that the impacts of an increasing and a decreasing population are considered in evaluating water needs.

Discussions with the Somerset Planning Department have indicated that there is a desire in Town to encourage growth. While the desire for growth does not necessarily drive a need for water, the population projection for future use should take the potential growth into account. In addition, Wright Pierce recognizes that the closure of the Brayton Point plant has left the Town with reduced water demands in their system, and more water available than they would have expected in previous years. The reduced demands have been considered in the future demand projections to reflect the Town's current situation.

4.3.2 Water Demand Trends

Historical water usage in Somerset was evaluated to determine past water usage trends and characteristics. An analysis of water consumption in Somerset from 2014 through 2018 was made and used to forecast future demands. Historical water use data was obtained from the Town's Annual Statistical Report (ASR) which is submitted each year to the MassDEP.

The table below shows Average Day Demands (ADD) and Maximum Day Demands (MDD) in Somerset from 2014 to 2018. ADD is defined as the total water used over a year divided by 365 days. The ADD is useful in estimating total annual water demand. MDD is defined as the maximum day of water use that occurs over a given year and typically occurs during a prolonged high usage period. MDD is considered the single most critical water-use component used to evaluate a system as treatment, pumping and transmission capacity must be adequate to provide the MDD. The ratio of the maximum to average-day demand (MDD/ADD), or the peaking factor, provides an indication of the degree of fluctuation of demands throughout the year. Table 4-2 shows the total volume of finished water pumped from Town sources.

Based on this analysis, it was determined that data from the year 2018 is the best representation of Somerset at the moment and data from this year was used for projection purposes. The data from 2018 was chosen for future projections because the largest water user within the system closed in 2017 and the effects were obvious in 2018. Future demand patterns will be more similar to the demands seen in 2018, rather than the higher demands seen in previous years.

TABLE 4-2

HISTORICAL WATER DEMAND[1]

Year	Total Production (Town Sources) (MG/year)	ADD (MGD)	MDD (MGD)	Ratio of MDD/ADD
2014	946.2	2.59	4.2	1.62
2015	1,000.2	2.74	4.08	1.49
2016	964.2	2.64	4.27	1.62
2017	768.2	2.1	3.32	1.58
2018	671.3	1.84	2.92	1.58
Average	870.02	2.38	3.76	1.58

1. Data as reported in the 2014 – 2018 MassDEP Annual Statistical Reports.

4.3.3 Residential Water Demand Trends

To best account for future growth in the water demand projection, it is important to analyze residential and non-residential flow trends independently.

Analysis of water usage trends on a “gallons per capita” basis is another important tool used to evaluate past trends and project future demands. Per the Water Management Act (WMA) guidelines, communities are encouraged to meet specific residential per capita thresholds through water conservation efforts.

The Town monitors water usage annually based on several customer categories. Table 4-3 presents historical use figures for each customer category from 2014 through 2018. These numbers are based on metered finished water usage as reported in the Town’s ASRs.

TABLE 4-3

HISTORICAL WATER USAGE BY CUSTOMER CATEGORY (MGD)

Year	Residential	Commercial/ Industrial	Municipal	Other[1]	Unaccounted-for Water
2014	1.49	0.57	0.09	0.08	0.36
2015	1.50	1.04	0.06	0.07	0.08
2016	1.42	0.79	0.06	0.04	0.34
2017	1.46	0.45	0.05	0.04	0.10
2018	1.15	0.19	0.28	0.01	0.21

1. Reported differently from year to year in ASRs, the category "Other" can include residential institutions, agricultural, institutional, and non-profits.

Industrial demands have decreased since 2014 due to the reduced production and eventual closure of the Brayton Point power generation facility in 2017. In 2017, the industrial demand accounted for only 0.45 MGD. Water usage from Brayton Point during 2017 was analyzed, and usage at the BP site accounted for 88% of the industrial usage in this year, due to operations remaining online until May 2017. The 2018 and near future industrial demands will be significantly lower than in the past, as 2018 will be the first full year with no operations at the BP site. Due to the uncertainty of the future use of the site, future demand projections will reflect more typical demands experienced throughout Town.

Residential flows are often presented in term of use per person, or Gallons per Capita per Day (gpcd). As shown in Table 4-4 the average residential water demand in gallons per capita per day between 2014 and 2018 was 76.2 gpcd.

The residential per capita usage is an important trend used by the WMA for water supply permitting, as well as for projecting future water supply needs. The WMA recommended per capita use of 65 gpcd has been an established goal for water suppliers throughout Massachusetts.

The Town's residential per capita usage ranged from 63 gpcd to 81 gpcd between 2014 and 2018 as reported in the Town's ASR. We recommend that the Town implement public education and conservation measures to meet the 65 gpcd goal. A reduction from approximately 80 gpcd could take some time. For determining future water demands, we will assume that the Town can achieve an average reduction of 1 gpcd per year over 15 years until the goal of 65 gpcd is reached.

TABLE 4-4
PER CAPITA WATER USAGE

Year	Gallons per Capita per Day-Residential Only
2014	80
2015	81
2016	77
2017	80
2018	63
Average	**76.2**

4.3.4 Non-Residential Water Demand Trends

Non-residential water demand does not necessarily correlate with population growth, or residential water demand. Table 4-5 shows the combined agricultural, commercial, institutional, industrial, and municipal water use between 2014 and 2018. As shown in Table 4-5 non-residential use has been on the decline since 2015.

TABLE 4-5
NON-RESIDENTIAL WATER DEMAND (MGD)

Year	Total
2014	0.65
2015	1.10
2016	0.83
2017	0.49
2018	0.20

The most significant reasons for loss of non-residential water use is the closing of the Brayton Point power generation facility. While there have been a couple non-residential development proposals within Somerset, including a potential marijuana growing facility and redevelopment of portions of the Brayton Point area, there are no significant or actual non-residential water needs in the foreseeable future. Therefore, a modest one percent (1%) increase in non-residential flow per year will be used for estimating future flows.

4.3.5 Maximum Daily Demand

The Maximum Daily Demand (MDD) is the highest daily demand that occurs in the water system over the course of a calendar year. While evaluation of the ADD is important, the system experiences demand both lower and higher than the ADD from day to day. It is important to evaluate the impact higher demand has on the water system; therefore, the MDD is often used for planning and design of water infrastructure.

The MDD often correlates to the ADD for a given system. Therefore, the MDD is often represented as a ratio or peaking factor to the ADD. To determine the appropriate MDD peaking factor for the Somerset system, the relationship of ADD and MDD was analyzed for the last six years. The MDD/ADD ratio for Somerset ranged from 1.49 to 1.62 with an average of 1.58 between 2014 and 2018, as shown in Table 4-2 (historical water demand table). There was not an apparent upward or downward trend with the ratio; therefore, the average value experienced over the period (1.58) will be used for projections.

4.3.6 Future Requirements

Future water demand requirements are based on a number of factors including:

- Per capita water use
- Residential and non-residential average day demand
- Municipal water use
- Unaccounted for water use
- Residential and non-residential maximum day demand
- Peak hourly demand

This section presents a summary of calculating these factors as well as a total projected flow.

4.3.6.1 Per Capita Water Use and Residential Demand

As described previously, the residential per capita usage is an important trend used by MassDEP in administering the WMA for water supply permitting, as well as for projecting future water supply needs. The WMA recommended per capita use of 65 gpcd has been generally accepted by the water supply industry. Somerset has historically exceeded this level. However, many communities have been able to reduce residential water use through public education and conservation measures. A reduction from approximately 80 gpcd could take some time, however we recommend that Somerset use the 65 gpcd as a goal. For determining future water demands, we will assume that the Town can achieve an average reduction of 1 gpcd per year over 15 years until the goal of 65 gpcd is reached.

The projected residential demand will be based on gpcd and population. Table 4-6 presents the potential projected residential water demands using the two divergent population projections and the desired reduction to 65 gpcd from the approximate 80 gpcd. The projected residential water demand could range from a low of 1.108 MGD to a high of 1.257 MGD during the study period.

4.3.6.2 Commercial/Industrial and Other Non-Residential Demands

The projected commercial/industrial demands are determined using a baseline from 2018 of 0.19 MGD. In addition to these demands, there are other non-residential demands including agricultural, institutional, and non-profits. These other demands accounted for approximately 0.019 MGD in 2018. For projecting future demands, we have assumed a 5% increase over each 5-year period for both commercial/industrial and other non-residential demands.

TABLE 4-6

PROJECTED RESIDENTIAL DEMANDS

Year	2020	2025	2030	2035	2040
	Population Based on UMDI Projections				
Population	18,154	17,897	17,609	17,329	17,049
gpcd	80	75	70	65	65
Residential Demand (MGD)	1.452	1.342	1.233	1.126	1.108
	Population Based on SRPEDD Projections				
Population	18,555	18,750	18,945	19,140	19,335
gpcd	80	75	70	65	65
Residential Demand (MGD)	1.484	1.406	1.326	1.244	1.257

TABLE 4-7

PROJECTED COMMERCIAL/INDUSTRIAL DEMANDS (MGD)

Year	2020	2025	2030	2035	2040
Commercial/Industrial Demand	0.19	0.20	0.21	0.22	0.23
Other Non-Residential Demand	0.050	0.053	0.055	0.058	0.061

4.3.6.3 Municipal Water Use

Confidently estimated municipal water use (CEMU) is also an important factor to consider. As shown in Table 4-8, the CEMU estimated for Somerset in 2018 was 102.26 million gallons, or 0.28 MGD. Values have ranged from 0.048 MGD to 0.055 MGD between 2014 and 2017. The significant increase in 2018 is an outlier as a significant amount of water was wasted in attempts to address elevated levels of DBPs. Based on the data prior to 2018, 0.05 MGD will be used as a representative estimate of municipal water use moving forward. Table 4-8 shows a breakdown of municipal water use.

TABLE 4-8

CONFIDENTLY ESTIMATED MUNICIPAL USE MG/YEAR

Year	2014	2015	2016	2017	2018
Fire Protection and Training	0.33	0.08	0	0.84	0
Hydrant/Water Main Flushing, Main Construction	22.85	13.85	12.31	3.9	102.221
Flow testing	0.42	0	0	0.02	0.034
Bleeders/blow offs	9.07	6.95	8.06	12.78	0
Tank overflow and drainage	0	0	0	0	0
Sewer and Stormwater system flushing	0.02	0	0	0	0
Street Cleaning	0.03	0.03	0.02	0.02	0.0022
Source Meter Calibration Adjustments	0	0	0	0	0
Major water main breaks	1.88	0	0	0	0
Total	**34.60**	**20.91**	**20.39**	**17.56**	**102.2572**

For projecting future demand, we have assumed that there will be no growth or increase in water demand for these municipal services.

4.3.6.4 Unaccounted for Water Use

All water systems include a percentage of water that is produced but not accounted for through meters; defined as the unaccounted-for water (UAW) that needs to be accounted for in projections. Historically, a range of 15 to 20 percent for UAW had been an acceptable performance in the water industry. Massachusetts, under the Water Management Act, has established a performance standard for UAW of 10 percent. Many organizations and permitting agencies, including the MWRA and Water Resources Commission, have adopted this guideline. Therefore, Somerset should work towards maintaining a maximum of 10% UAW.

In 2006, the MassDEP developed and implemented a standard methodology for water systems to calculate UAW. The formula gives communities credit for various categories of non-metered uses such as water used for flushing and fire flow testing, treatment plant process water, mains and service leakage, inaccuracies in meters, etc.

Sources of unaccounted-for water use reported by Somerset between 2014 and 2018 include:

- Lost water from water main leaks.
- Losses due to under and over registering water service and master meters.
- Fire protection.

Table 4-9 presents the estimates of UAW as reported by Somerset in the ASRs between 2014 and 2018. The data shows that the Town's UAW has been highly variable. Though the data shows the UAW has exceeded the recommended standard of 10 percent, demand projections for the future will use a 10 percent UAW use as the town works towards that goal. In addition, the Somerset Water Department is undertaking a meter replacement program that should improve the metering accuracy of residential and commercial accounts and reduce unaccounted for water.

TABLE 4-9

UNACCOUNTED FOR WATER USE

Year	Total (MG/Yr)	% of Total Production
2014	129.96	13.7
2015	28.82	2.9
2016	123.19	12.8
2017	37.37	4.9
2018	75.92	11.3

4.3.6.5 Maximum Day Demand

As discussed previously, the MDD/ADD ratio for Somerset averaged 1.58 between 2014 and 2018. This value was applied to the ADD to come up with a projected MDD presented in Table 4-10.

TABLE 4-10

PROJECTED MAXIMUM DAY DEMANDS

Year	2020	2025	2030	2035	2040
	Population Based on UMDI Projections				
Residential Demand (MGD)	1.452	1.342	1.233	1.126	1.108
Commercial/ Industrial (MGD)	0.190	0.200	0.210	0.220	0.231
Municipal (MGD)	0.050	0.050	0.050	0.050	0.050
Other Non-Residential (MGD)	0.050	0.053	0.055	0.058	0.061
Unaccounted-for Water (MGD)	0.174	0.164	0.155	0.145	0.145
ADD Total (MGD)	1.917	1.809	1.702	1.600	1.595
MDD Total (MGD)	3.028	2.858	2.689	2.527	2.520
	Population Based on SRPEDD Projections				
Residential Demand (MGD)	1.484	1.406	1.326	1.244	1.257
Commercial/ Industrial (MGD)	0.190	0.200	0.210	0.220	0.231
Municipal (MGD)	0.050	0.050	0.050	0.050	0.050
Other Non-Residential (MGD)	0.050	0.053	0.055	0.058	0.061
Unaccounted-for Water (MGD)	0.177	0.171	0.164	0.157	0.160
ADD Total (MGD)	1.952	1.879	1.805	1.729	1.758
MDD Total (MGD)	3.084	2.969	2.852	2.732	2.778

The projected ADD is highest at the start of the planning period ranging from 1.917 – 1.952 in 2020 and reducing to 1.595 – 1.758 in 2040. Subsequently, the projected maximum day demands are highest in 2020 ranging from 3.028 – 3.084 and reducing to 2.520 – 2.778 MGD in 2040.

4.3.6.6 Peak Hourly Demand

The peak hourly demand (PHD) is the highest demand that occurs in the water system during a single hour. The peak-hour demand is satisfied from the supply and storage in the system. Water supply systems should be designed to handle the peak hourly demand or maximum day demand plus fire flows, whichever is greater. Thus, PHD is an important demand component and is used for evaluation and sizing of:

- Water storage facilities
- Booster pumps in service areas without storage
- Transmission and distribution water mains

Using available pumping information and distribution system storage tank levels, a peak hour water demand factor of 2.63 was calculated for Somerset.

The peak hour demand is a rate that occurs typically twice a day and will vary from day to day and season to season. For analysis of the distribution system and storage facilities, the peak hour demand during maximum day will be used as presented in Table 4-11.

TABLE 4-11

2040 PROJECTED PEAK HOUR WATER DEMANDS IN MGD

	UMDI	**SRPEDD**
ADD	1.595	1.758
MDD	2.520	2.778
PH Factor	2.63	2.63
Maximum Day PHD	**4.195**	**4.624**

4.4 WATER SUPPLY

As stated in the Water Management Act discussion in Section 3 of this report, the Town is potentially authorized for an average daily withdrawal rate of 4.02 MGD from their local water supplies.

4.4.1 Local Sources

The Town is authorized to withdraw 3.82 in 2018 and potentially 4.02 MGD in 2040 from its local sources. The Town has filed a withdrawal permit (which is pending) that requests 4.02 MGD in 2029. Although Well 2 has a permitted capacity of 0.58 MGD (400 gpm), flow is currently restricted to 0.288 MGD (200 gpm) due to operational conditions. Table 4-12 shows the designed treatment capacity of Town-owned sources and the current capacities as reported in the ASR. It is important to note that these current capacities are maximum single day pumped volumes, while the average annual flows pumped are lower.

TABLE 4-12

ANNUAL TOWN SUPPLY WITHDRAWAL AMOUNTS (MGD)

Source	Treatment Design Capacity	2018 Maximum Single Day Pumped*	2018 Average Flows
Reservoir	6.0	3.937	2.355
Well 2	0.58	0.113	0.248
Total	**6.58**	**4.050**	**2.603**

* Current Capacity based on operator records and/or ASR pumping data. Peak withdrawals did not occur on the same days.

Operators report that Well 2 can only produce approximately 0.288 MGD or water quality is negatively impacted. The 2018 ASR reported that the WTP pumped a total of 859.795 MG, or an average of 2.355 MGD of raw water. The maximum single day pumped raw water volume was 3.937 MG.

The average amount of water pumped by the Town's sources was about 2.603 MGD. This amounts to 68 percent (2.603/3.82) of the Town's permitted withdrawal. Somerset currently has a surplus in supply of approximately 1.217 MGD (3.82 – 2.603), and an anticipated surplus of 2.262 MGD (4.02 – 1.758) in the future.

4.4.2 Interconnections

The Town has emergency interconnections with Fall River and Swansea. There is currently no indication that either of those communities are in need of supplemental water that Somerset would be able to provide. For Somerset to continuously supply water to either of these communities, a permit through the Inter-Basin Transfer Act would need to be obtained.

4.5 WATER SYSTEM NEEDS ANALYSIS

Like many communities in New England, the Town of Somerset is faced with aging water infrastructure. The Town has done a number of upgrades to the water system in recent years including the Dighton Well 2, the Segreganset Pump Station, the Hot and Cold Lane Water Storage Tanks, and a number of pipe relining and replacement projects. With these and future improvements to the water system, the Town seeks to:

- Reduce water system complexity
- Keep capital, operations, and maintenance costs to manageable levels
- Improve water quality including reduce water quality complaints in the Village Area and reduce water age
- Maintain a high level of service to its customers

4.5.1 Water Capacity, Quality, and Treatment Needs

Water Supply Capacity: Based on comparison of the future water supply needs and existing conditions, it is clear that Somerset has sufficient supply for its residential and non-residential customers. Table 4-13 outlines the current and future water supply surplus.

TABLE 4-13

WATER SUPPLY NEEDS SUMMARY (MGD)

	2018	2040
Withdrawal Capacities	3.82	4.02
MDD	2.603	2.520-2.778
Surplus	**1.217**	**1.5-1.242**

As shown above, there is an anticipated future water supply surplus of between 1.242 and 1.5 MGD.

The surface water supply system is reported to have a safe yield of 5.0 MGD. This is based on the evaluation completed in 1988. New methods of calculating safe yield are available as well as more recent meteorological and hydrological data which would be more reflective of recent changes in climate. While it is believed that there is sufficient supply from the surface water system, a recalculation of the safe yield is warranted and should be completed in the near future. This recalculation would require the collection of more recent meteorological and hydrological data, documentation of changes to the watersheds feeding into the Segreganset River and the Somerset Reservoir, as well as documenting the capacity of the Somerset Reservoir through a bathymetric survey.

The Dighton Well 2 supply is providing significantly less than its permitted capacity because of operational concerns with the removal of the Richmond Hill Tank and water quality concerns. While the capacity of this well is not critical to supporting the future water supply needs, operating this well at the lower capacity is inefficient. Alternative approaches for utilizing this well should be considered to improve efficiency and water quality in the distribution system.

The water system needs with regard to supply include the need to confirm the safe yield of the Somerset Reservoir and the need to determine the most effective use of the Dighton Well 2.

Water Quality and Treatment Needs: Somerset is facing two primary needs with regard to drinking water quality. One of the needs is to address the water quality complaints in the Village area/North End of the distribution system. The second water quality issue is the elevated levels of trihalomethanes (THMs) in the distribution system.

The dirty water complaints in the Village area stem from the convergence of the well water, which is unchlorinated, and the treated surface water from the WTP, which is chlorinated. The manganese in Dighton Well 2 is likely being oxidized and forming particulate that settles in the water mains. When there are changes in flow direction, the particulate is suspended causing dirty water complaints. Alternative approaches for utilizing this well should be considered to improve water quality in this region of the distribution system.

The elevated levels of THMs are a result of the limited capability of the existing water treatment processes for removing Total Organic Carbon (TOC), the precursor to THM formation, and the increasing water age in the distribution system as a result of the declining water use. Testing was conducted at the WTP to determine if there were modifications that could be implemented at the

WTP to improve TOC removal. This testing showed that the existing treatment processes were optimized and would not likely be able to remove more TOC.

In addition to the performance issues with the WTP, there are numerous issues with regard to the aging infrastructure at the WTP as described in the 2017 evaluation completed by Wright-Pierce. The summary of this evaluation is included in Appendix G. In order to retain the existing WTP, renovations would need to be completed for modernizing and protecting pumping and electrical systems, and bringing the current building envelop into compliance with the current electrical and building codes which could require replacing the HVAC, Plumbing, and Electrical systems with code compliant new equipment. Addressing the issues with the physical condition of the equipment will require significant capital investment. The alternative to retaining the existing WTP would be to construct a new WTP with a more robust treatment process that could improve TOC removal. Pilot testing would need to be conducted to determine the best available treatment processes for Somerset's water.

The other component to the elevated levels of THMs is water age. Water age can be impacted by the size of the piping in the distribution system as well as the size of the storage tanks. Water infrastructure sizing has competing goals in that larger components are desired to provide fire-fighting capabilities as well as available water supply under emergency situations. Meeting these goals can significantly increase water age. This topic is addressed further in the discussion of distribution system needs.

The water system needs with regard to water quality and treatment include the need to reassess how the Dighton Well 2 is utilized and the need to conduct pilot testing to support the treatment process selection for modifying the existing WTP or for a new WTP.

4.5.2 Distribution System Needs

The approach used to evaluate the needs of the distribution system was to first, identify the hydraulic requirements of the system, and secondly to identify the adequacy and limitations of the system under the existing and projected demand conditions.

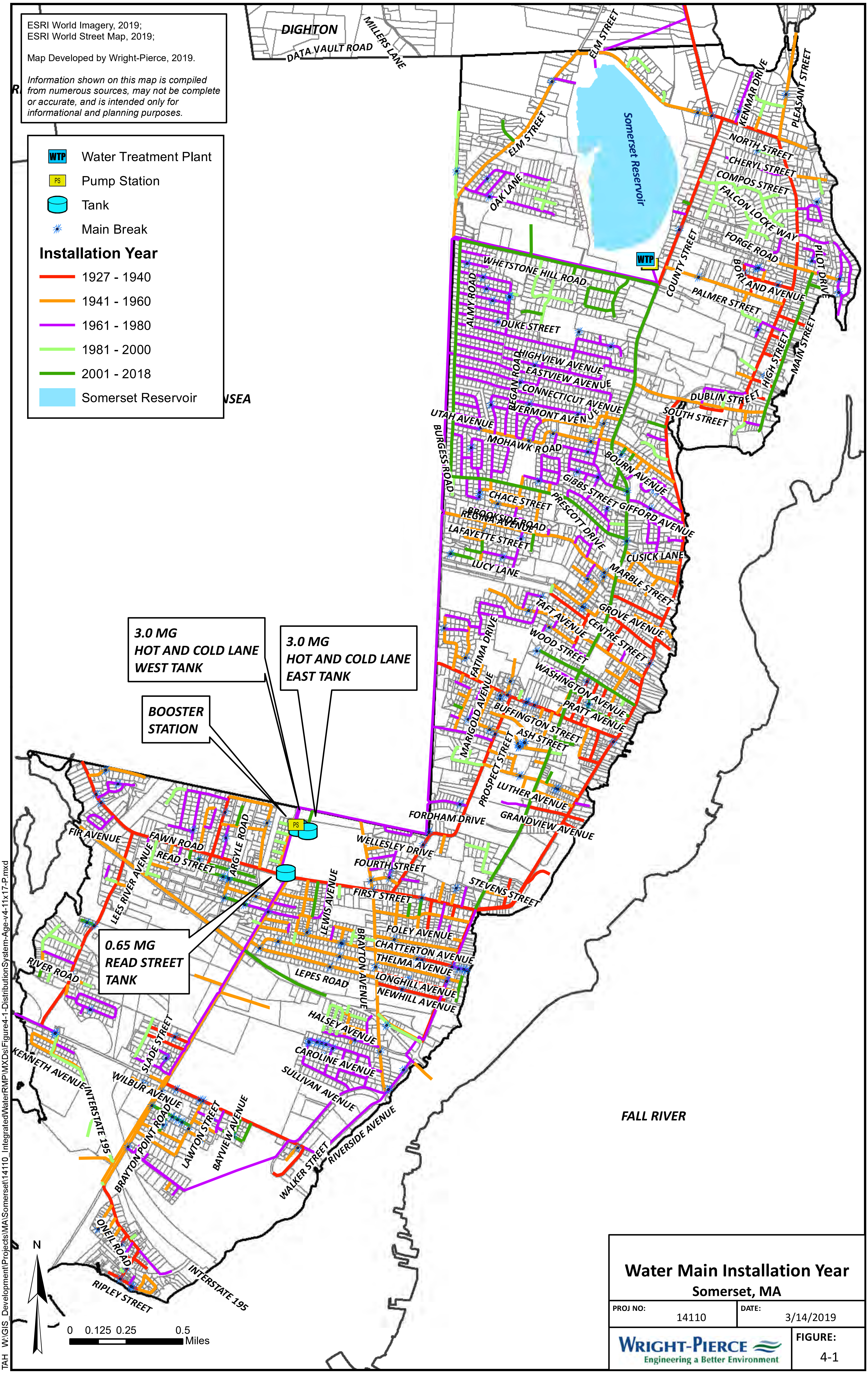
Several factors are normally considered in the evaluation of the adequacy of a water distribution system. These include; system pressures, velocity of water in the pipelines, headloss, pipe looping, redundancy, piping reliability and adequacy, and future fire flow capabilities. The following is a discussion of several of these factors, as well as how they apply to both existing and projected demand conditions.

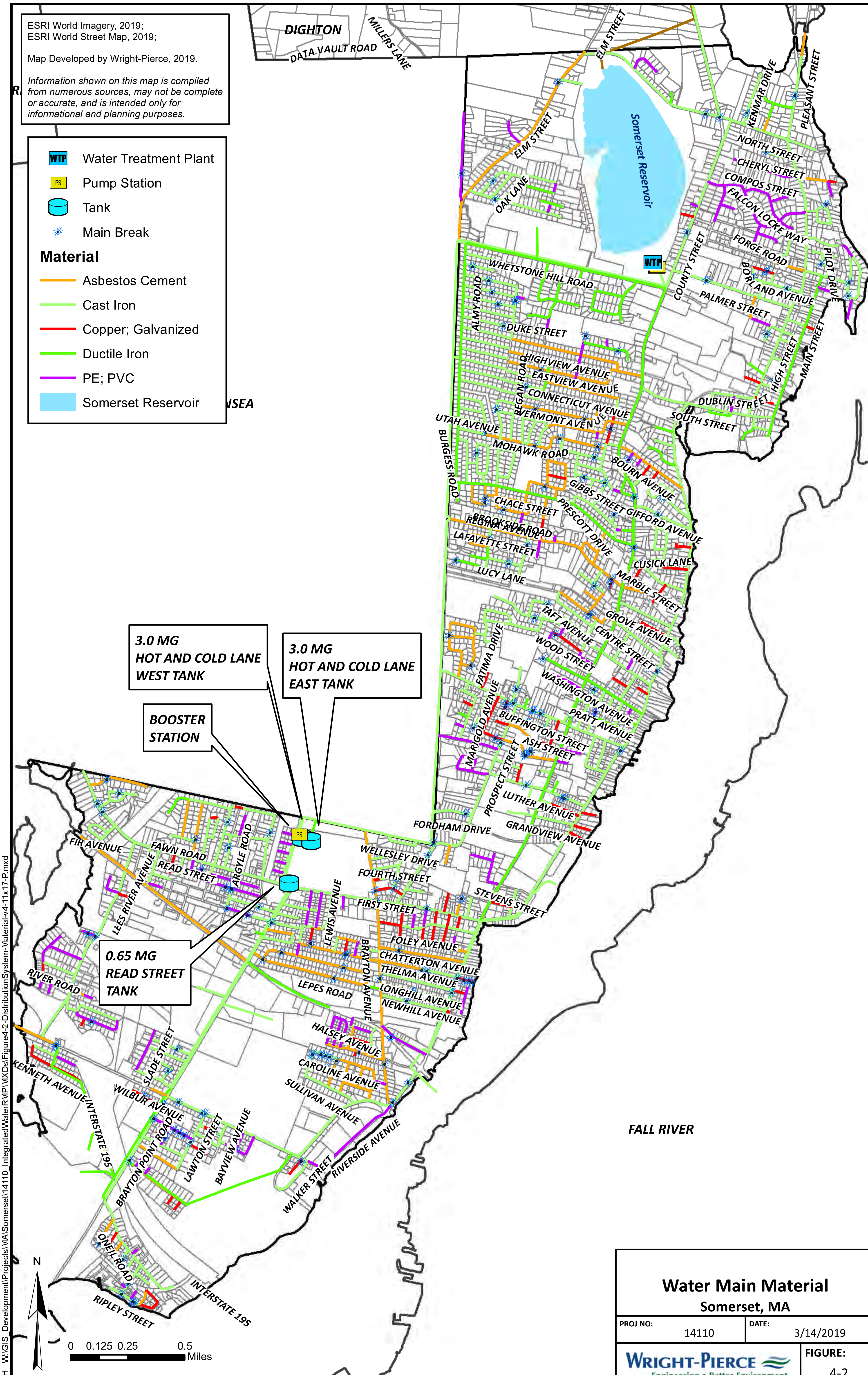
4.5.2.1 Water Mains

Piping Reliability and Adequacy: Piping ***reliability*** is defined as the ability of the piping network to supply service to all areas of the system in the event of isolated or catastrophic disruptions. Isolated disruptions include shutdowns required to repair main breaks, replace valves or services, flush hydrants, etc. Measures used to quantify piping reliability should include pipe age and material, as differing pipe materials have a differing expected service life and can be assumed to be reliable for this span of time.

In general, ferrous metal water main, such as cast iron or ductile iron, has a service life of approximately 100 years. Poly-vinyl chloride (PVC) and high-density polyethylene (HDPE) piping may have a similar longevity, while other obsolete materials like asbestos cement (AC, Transite) or steel have a significantly shorter service life. As these mains approach their service life, their reliability begins to become of concern.

Figures 4-1 and 4-2 have been included to display water main age and material in the Somerset Distribution system. The figures also display locations of water main breaks that have occurred from 2014-2018.


ESRI World Imagery, 2019;
ESRI World Street Map, 2019;
Map Developed by Wright-Pierce, 2019.
Information shown on this map is compiled from numerous sources, may not be complete or accurate, and is intended only for informational and planning purposes.
Water Treatment Plant
Pump Station
Tank
Main Break
Installation Year
1927 - 1940
1941 - 1960
1961 - 1980
1981 - 2000
2001 - 2018
Somerset Reservoir
DIGHTON
DATA VAULT ROAD
MILLERS LANE
ELM STREET
Somerset Reservoir
WTP
KENMAR DRIVE
PLEASANT STREET
NORTH STREET
CHERYL STREET
COMPOS STREET
FALCON LOCKE WAY
FORGE ROAD
BORLAND AVENUE
PILOT DRIVE
COUNTY STREET
PALMER STREET
HIGH STREET
MAIN STREET
DUBLIN STREET
SOUTH STREET
OAK LANE
WHETSTONE HILL ROAD
ALMY ROAD
DUKE STREET
HIGHVIEW AVENUE
EASTVIEW AVENUE
REGAN ROAD
CONNECTICUT AVENUE
VERMONT AVENUE
UTAH AVENUE
BURGESS ROAD
MOHAWK ROAD
BOURN AVENUE
GIBBS STREET
GIFFORD AVENUE
CHACE STREET
PRESCOTT DRIVE
BROOKSIDE ROAD
REGINA AVENUE
LAFAYETTE STREET
LUCY LANE
CUSICK LANE
MARBLE STREET
GROVE AVENUE
TAFT AVENUE
CENTRE STREET
WOOD STREET
FATIMA DRIVE
WASHINGTON AVENUE
PRATT AVENUE
MARIGOLD AVENUE
BUFFINGTON STREET
ASH STREET
PROSPECT STREET
LUTHER AVENUE
GRANDVIEW AVENUE
FORDHAM DRIVE
3.0 MG HOT AND COLD LANE WEST TANK
3.0 MG HOT AND COLD LANE EAST TANK
BOOSTER STATION
PS
FIR AVENUE
FAWN ROAD
READ STREET
ARGYLE ROAD
LEES RIVER AVENUE
WELLESLEY DRIVE
FOURTH STREET
FIRST STREET
LEWIS AVENUE
STEVENS STREET
0.65 MG READ STREET TANK
FOLEY AVENUE
CHATTERTON AVENUE
THELMA AVENUE
LONGHILL AVENUE
NEWHILL AVENUE
BRAYTON AVENUE
LEPES ROAD
RIVER ROAD
HALSEY AVENUE
CAROLINE AVENUE
SULLIVAN AVENUE
KENNETH AVENUE
SLADE STREET
WILBUR AVENUE
INTERSTATE 195
BRAYTON POINT ROAD
LAWTON STREET
BAYVIEW AVENUE
WALKER STREET
RIVERSIDE AVENUE
FALL RIVER
ONEIL ROAD
RIPLEY STREET
N
0 0.125 0.25 0.5
Miles
TAH W:\GIS_Development\Projects\MA\Somerset\14110_IntegratedWaterRMP\MXDs\Figure4-1-DistributionSystem-Age-v4-11x17-P.mxd
Water Main Installation Year
Somerset, MA
PROJ NO: 14110
DATE: 3/14/2019
WRIGHT-PIERCE
Engineering a Better Environment
FIGURE: 4-1



Water Main Material

Somerset, MA

PROJ NO: 14110

DATE: 3/14/2019

WRIGHT-PIERCE
Engineering a Better Environment

FIGURE: 4-2

The locations of breaks have been included to highlight areas of unreliable piping that should be considered for replacement. The figures indicate that many of the main breaks that have occurred in the last 5 years have been on asbestos cement and original unlined cast-iron water mains within the distribution system. These areas with a history of water main breaks are included and prioritized in the piping replacement program.

A recent study published by Utah State University titled “Water Main Break Rates in the US and Canada: A Comprehensive Study” (Folkman, 2018) indicates that water main breaks have increased 27% since 2012 to 50.7 breaks/ 100 miles of pipe/ year. Based on Digsafe tickets compiled from 2014-2018, the Somerset Water Department has experienced approximately 449 breaks on water mains and services that they were responsible to repair. This is equivalent to approximately 102 breaks/ 100 miles of pipe/ year, which is more than twice the national average. This statistic highlights the need for piping replacement or improvements on the aging pipe and obsolete pipe materials within the distribution system.

Table 4-14 includes the watermain break information and is organized by water main material and installation year. Review of this data shows that Cast Iron water main installed between 1920 and 1929 had the most frequent number of breaks, with 81 breaks occurring from 2014-2018.This table highlights pipe materials and installation dates that should be targeted for replacement based on their break history.

Piping Adequacy relates to the ability of the network piping to convey the required demands under all conditions. Piping adequacy can be directly quantified by pipe diameter size. In many cases, older small diameter pipe, (6-inch diameter or less) should be replaced with a minimum of 8-inch diameter piping as opportunities arise (i.e. local road projects, new developments etc.). However, in many cases it may be acceptable to maintain a limited network of 2 to 6-inch pipe, depending on the number of services on each segment, and the proximity of fire hydrants to the homes. Generally, the maximum distance recommended for fire hydrants from structures is between 500 and 1,000 feet. Provided that this criterion can be met or as established by the local Fire Department, smaller distribution piping is often acceptable. There are several areas in the Somerset distribution system that consist of small diameter mains, often having several homes supplied off each line.

TABLE 4-14

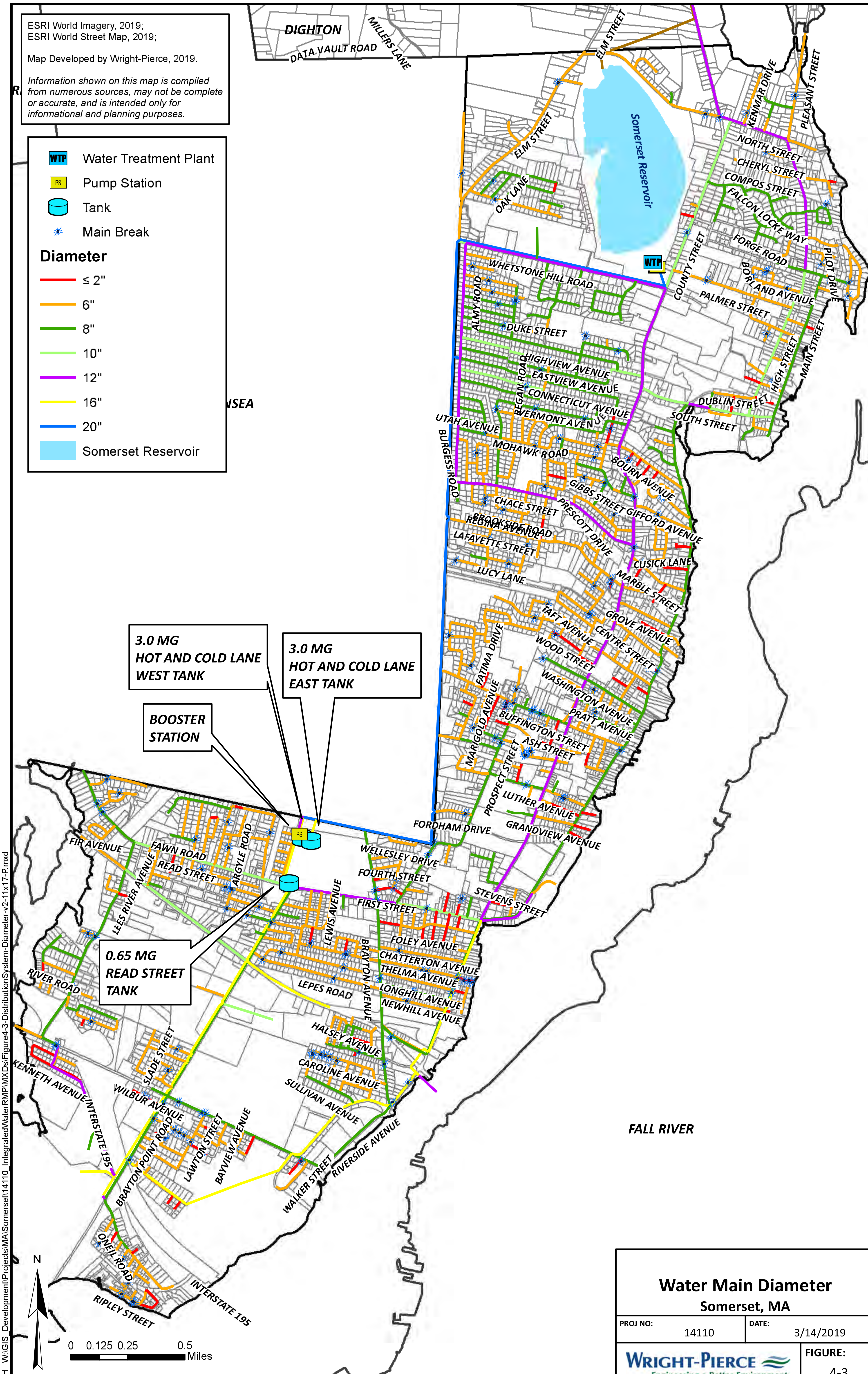
WATER MAIN BREAK HISTORY BASED ON WATER MAIN MATERIAL AND DECADE OF INSTALLATION

Material	Installation Year	Length (feet)	No. of Breaks	Breaks/ 1,000 feet
Asbestos Cement	1940-1949	10,881	13	1.2
	1950-1959	28,913	32	1.1
	1960-1969	47,049	39	0.83
	1970-1979	7,508	6	0.8
	1980-1989	245	0	0
Cast Iron	1920-1929	92,513	81	0.88
	1930-1939	17,898	18	1.0
	1940-1949	25,427	34	1.3
	1950-1959	41,729	29	0.69
	1960-1969	79,704	50	0.63
	1970-1979	59,886	42	0.7
	1980-1989	1,779	1	0.55
	1990-1999	891	0	0
Ductile Iron	1950-1959	3,659	0	0
	1960-1969	7,586	7	0.92
	1970-1979	4,237	0	0
	1980-1989	6,962	1	0.15
	1990-1999	51,527	20	0.39
	2000-2010	825	0	0
	2010-2019	1,188	0	0
Galvanized	1920-1929	11,589	0	0
	1930-1939	35,048	0	0
	1940-1949	16,359	20	1.22
	1950-1959	2,988	7	2.4
	1960-1969	1,898	2	1.05
	1970-1979	2,601	1	0.38
PVC	1960-1969	7,943	4	0.50
	1970-1979	9,752	14	1.44
	1980-1989	19,371	3	0.15
	1990-1999	5,014	3	0.60
	2000-2009	9,464	21	2.21

It is also important that a water main is not significantly oversized to maintain adequate movement and velocities within the main. Oversized water mains are a potential water quality concern as the reduced velocities can lead to excess sedimentation within the main, and the larger storage volume within the main can increase the water's age which can possibly increase the concentration of disinfection byproducts in the system. Oversized water mains are also more prone to freezing in winter months due to the lack of flow within the main and can therefore lead to costly repairs to large diameter piping. Figure 4-3 displays the diameter of all the water main in the Somerset distribution system. Older distribution system mains that are possibly undersized (less than 6-inch diameter) or oversized (greater than 12-inch diameter) should be considered as a priority for replacement with the appropriate sized water wain that will deliver adequate flow and pressure while reducing the storage volume in the distribution system to improve water quality and operations.

Dead-End Mains and Pipe Looping: Dead-end mains present several operational issues. First, because water cannot pass through a dead-ended pipe, velocities in these pipes tend to be very low. This condition can cause sediment build-up and contributes to poor water quality. In winter months, pipes having low velocities can be prone to freezing. Generally, the only way to improve this condition is to regularly flush the ends of these pipes, add bleeders or loop the pipe into another location in the distribution system.

Flushing can be labor intensive and if not done on a regular basis and will have little effect in improving conditions. Bleeders can be effective in improving water quality and help prevent freezing but increase the unaccounted-for component of water demand and increases water production and associated costs. Looping requires capital investment in new piping, and it may not be practical to loop pipes.



TAH W:\GIS_Development\Projects\MA\Somerset\14110_IntegratedWaterRMP\MXDs\Figure4-3-DistributionSystem-Diameter-v2-11x17-P.mxd

The Somerset distribution system contains a fair number of dead-end mains throughout the service area, as there are a considerable number of cul-de-sac developments within the distribution system. Measurable improvements in pressure and flow characteristics can be made by eliminating dead-ends. Not only would pipe looping improve hydraulics, it would also provide redundancy to certain areas of the system. The Town understands the value of eliminating dead-end mains and strives to do so whenever feasible. The opportunities for pipe looping were considered as part of the alternative's analysis in Section 5.

Fire Flow: The ability to provide fire protection is a valuable asset for a community. Guidelines for fire flow requirements are provided by the Insurance Services Office (ISO). ISO is an insurance organization responsible for evaluating and classifying communities for insurance rating purposes. Periodically, the ISO will visit a community, perform fire flow tests and develop a fire insurance rate for that community. The rate assigned ranges from 1 to 10 with 1 being the best rating. The rating is based on the total fire-fighting capability of the community including such factors as water supply, fire department structure/organization and available communication systems. Somerset was recently awarded a three as an ISO rating. This positive rating will help keep insurance costs down in the town and could possibly be better with the completion of piping improvements that would improve available fire flows within the distribution system.

Specific fire protection requirements at a given locale vary with the physical characteristics of a building. The ISO assigns a required fire flow based on the worst-case premise in a general location using the following factors: (1) materials of construction, (2) occupancy use, (3) proximity to other structures, (4) height and size of building, (5) existence of fire walls within the structure, (6) presence or absence of sprinklers, as well as other factors. The needed fire flows established by ISO vary from 500 to 3,500 gpm depending on location and type of structure. ISO also recommends water systems to provide a maximum flow rate of 3,500 gpm for a duration of 3 hours for rating purposes. Table 4-15 presents typical fire flow requirements assigned by the ISO for various building types and uses.

TABLE 4-15

FIRE FLOW CRITERIA ESTABLISHED BY THE ISO

Land-Use or Building Type	Required Fire Flow and Duration
Single and Two-Family Dwellings	
Over 100 feet Building Separation	500 gpm for 2 hours
31 to 100 feet Building Separation	700 gpm for 2 hours
11 to 30 feet Building Separation	1,000 gpm for 2 hours
10 feet or less Building Separation	1,500 gpm for 2 hours
Multiple Family Residential Complexes	2,000 to 3,000 gpm for 2-3 hours
Average Density Commercial	1,500 to 2,500 gpm for 2-3 hours
High Value Commercial	2,500 to 3,500 gpm for 2-3 hours
Light Industrial	2,000 to 3,500 gpm for 2-3 hours
Heavy Industrial	2,500 to 3,500 gpm for 2-3 hours

Municipal fire insurance ratings are partially based on a water utility's ability to provide needed fire flows up to a maximum flow of 3,500 gpm. The ISO requirement of 3,500 gpm is the criteria used for most non-residential land uses. This is the largest fire flow that the ISO recognizes as necessary for a system to provide even if a specific building within the community requires a greater fire flow. Many areas within the Somerset service area will have fire flow requirements of 500 gpm.

Table 4-16 presents the ISO designated fire flows for several locations throughout Somerset. Also presented in the table are the model results for those locations indicating the available fire flow under several conditions. The first condition is the existing condition with both Hot & Cold Lane Tanks online. The other conditions are to show the impact of placing one or the other tank off-line. The locations where the available fire flow does not meet the needed fire flow as determined by ISO are highlighted.

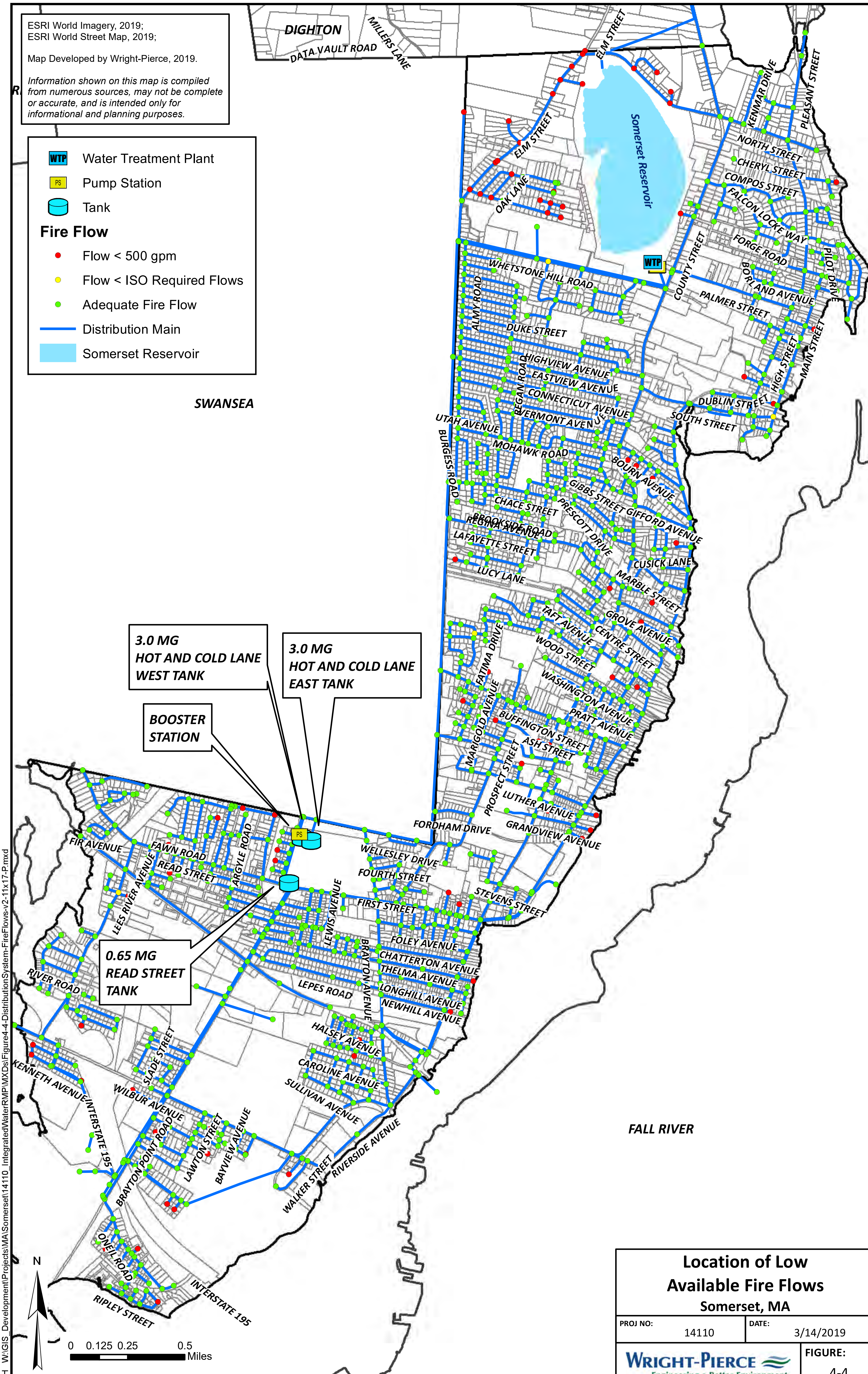
Figure 4-4 is included to highlight areas of available fire flows less than 500 gpm. The areas with available fire flows less than 500 gpm are generally due to low operating pressure or small diameter water mains in that area. Water main upgrade options and system operations to improve fire flows in these areas as well as in the locations that currently do not meet the ISO designated fire flows are included in the alternatives analysis included in Section 5.

TABLE 4-16

ISO DESIGNATED AND AVAILABLE FIRE FLOWS

	Needed Fire Flow	Available Fire Flow - gpm				
		Both On[a]	WTP On West On East Off	WTP Off West On East Off	WTP On West Off East On	WTP Off West Off East On
Brayton Ave/4th St (Middle School)	3,500	4,000	4,000	2,786	4,000	2,042
County St/Luther Ave (Regional HS)	3,500	4,000	4,000	3,148	4,000	2,042
Brayton Point Rd (near DPW)	3,500	4,000	4,000	4,000	4,000	2,042
Alden Place	3,500	3,993	4,000	3,729	3,989	2,042
Whetstone Hill Rd/Windward (N. Elem.)	3,500	3,104	4,000	2,799	3,914	2,042
Main St/Poplar St	3,500	899	1,146	892	1,141	884
Chace St/Briar Rd	3,000	4,000	4,000	2,818	4,000	2,042
Lees River Ave/Harvey Ln	2,500	2,207	2,226	2,203	2,210	2,042
County St/Wood St (Town Hall)	2,250	4,000	4,000	2,988	4,000	2,042
Wilbur Ave/Brayton Point Rd	2,250	3,904	3,966	3,874	3,850	2,042
Riverside Ave/Desmond Ave	1,750	4,000	4,000	3,371	4,000	2,042
County St/Whetstone Hill Rd	1,750	3,651	4,000	2,800	4,000	2,042
County St/Gibbs St	1,000	4,000	4,000	2,846	4,000	2,042
Fatima Dr/Shay Ave	1,000	674	707	671	705	666
O'Neill Rd/Perkins St	1,000	1,066	1,069	1,065	1,066	1,060
Pleasant St/Compos St	750	579	766	575	764	571
Elm St/Old North St	750	162	185	161	185	160

[a]Baseline analysis/comparison is with both tanks on-line and WTP off-line.



Location of Low Available Fire Flows
Somerset, MA

PROJ NO:	DATE:
14110	3/14/2019

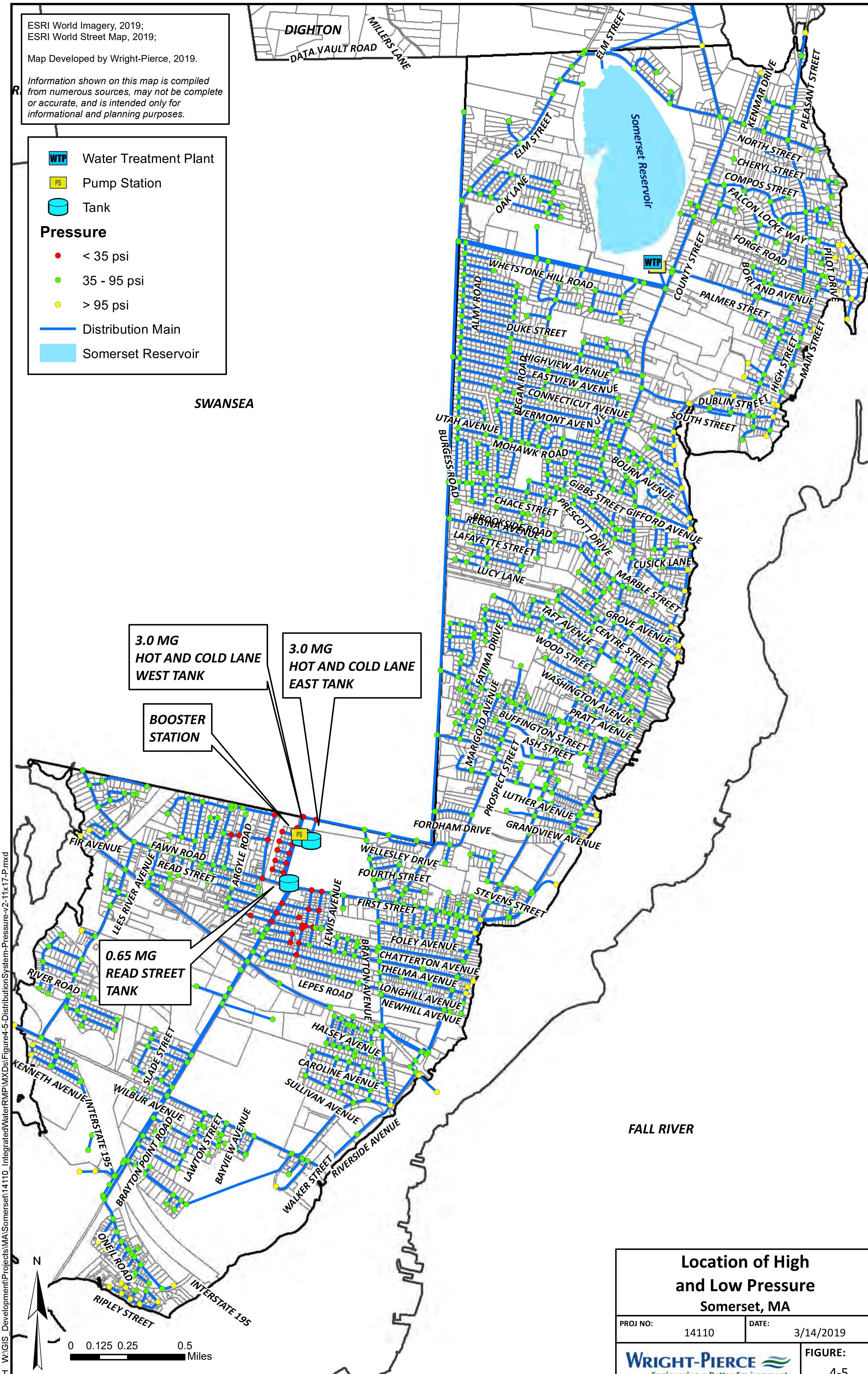
WRIGHT-PIERCE
Engineering a Better Environment

FIGURE: 4-4

TAH W:\GIS_Development\Projects\MA\Somerset\14110_IntegratedWaterRMP\MXDs\Figure4-4-DistributionSystem-FireFlows-v2-11x17-P.mxd

Water System Pressure: Pressures in the Somerset Water System range from just above 20 psi at the highest elevations in Town near the Read Street standpipe, to over 100 psi at lower elevations along the Taunton River. The variation in pressures in the system present a challenge to the Town, as low system pressures and high system pressures each have their associated challenges that a properly designed water system must balance. Low system pressure can result in customer complaints; compromise water quality from cross connections; and can restrict available flows for firefighting. High system pressures can lead to an increased number of water main and service breaks (especially on aging infrastructure), as well as increased water loss from leakage, increased maintenance on equipment, and higher energy costs. The Somerset Water Department has established a low service zone and a high service zone as an attempt to balance the system pressures throughout the system. Pressures within the high and low service zones have been analyzed as part of the distribution system evaluation. Figure 4-5 displays system pressures within Somerset, and highlights areas that regularly experience pressures of less than 35 psi, and those that exceed 95 psi.

Standard water works practice is for municipal water systems to be designed with minimum and maximum operating pressure ranges of approximately 35 – 120 psi at all locations in the distribution system under normal operating conditions. State rules require water utilities to not extend mains or render service to new customers in areas where substantially uniform system pressure at the connection of the water service to the main may be expected to fall below 20 psi, except for periods of fire flow or system maintenance. Pressures throughout the system during fire flow events should be maintained above 20 psi at all locations. Customers located in areas where pressures exceed 80 psi should install private pressure reducing valves. The areas with low pressure concerns are located in the high service area, near the Read Street tank. This condition exists because the booster pumping station is not operating properly and the water elevation in the Read Street tank is not being maintained at the desired level. The areas with high normal operating pressures are located in the lower elevations of the distribution system which are located along Riverside Avenue, and on County Street in Dighton. Pipelines under high operating pressure should be considered in the pipe replacement program, as the high pressures can lead to an increased likelihood of failure of the water main.



Location of High and Low Pressure
Somerset, MA

PROJ NO: 14110
DATE: 3/14/2019

WRIGHT-PIERCE
Engineering a Better Environment

FIGURE: 4-5

A general water works goal is to maintain an on-going replacement program whereas 1% of the total system length is replaced each year. This assures that the distribution system is fully replaced every 100 years. This goal has proven to be difficult for many utilities due to cost. The ASCE 2017 Infrastructure Report Card states that utilities are averaging a pipe replacement rate of 0.5% per year. In order for the Somerset Water Department to reach this 1% goal, approximately 5,800-feet of water main should be replaced per year. To achieve this goal, potential water main replacement projects of this scale have been considered for inclusion in the alternative's analysis in Section 5. Prioritization of water main improvements will consider all factors included in this section; including:

- Improved system reliability
- Replacement of obsolete and maintenance intensive piping
- Improved hydraulic capacity
- Improved pipe looping
- Improved fire flows

4.5.2.2 Storage Tanks

The main purposes of distribution system storage tanks are:

- provide a volume of water that can meet demands when the source water is not available
- provide a volume of water to meet peak demands (which are often much higher than source capacity)
- provide a volume of water in order to fight a fire

The available storage tanks and their capacities are presented in Table 4-17. The assessment of the storage tanks is based on the available storage capacity and the required or needed storage capacity. The following assumptions are made to establish the needed storage capacity:

- The Tank volume will be depleted after one hour of peak demand
- Maximum day demand is needed throughout the duration of the fire flow
- Sources are off-line
- Fire flow of 3,500 gpm for 3 hours

TABLE 4-17

DISTRIBUTION STORAGE TANK AVAILABLE VOLUME

	Hot and Cold Lane East	Hot and Cold Lane West	Read Street
Base Elevation	178.0	180.5	187.0
Minimum Elevation*	227.0	227.0	259.0
Usable Depth (ft)	28.7	31.2	42.0
Usable Volume (gal)	1,133,674	1,232,426	237,111
Total Usable Volume	2,603,211		

***Minimum elevation to maintain at least 20 psi in the service zone.**

Table 4-18 presents the calculated storage tank volumes needed to meet the established criteria for the current flow conditions and the two projected populations, as well as the available volume.

TABLE 4-18

TANK STORAGE NEEDS - MG

	2018	2040 UMDI	2040 SRPEDD
Average Day Demand – MGD	1.839	1.595	1.758
Maximum Day Demand – MGD	2.906	2.520	2.778
Peak Hour Demand – MGD	4.837	4.195	4.625
Depletion Due to Peak Hour	0.202	0.175	0.193
MDD During Fire (3 hours)	0.363	0.315	0.347
Fire Flow – 3500 gpm for 3 hours	0.630	0.630	0.630
Supply Available During Fire	0.000	0.000	0.000
Total Storage Required	1.195	1.12	1.17
Total Storage Available	2.603	2.603	2.603
Additional Needed (Excess Available)	(1.408)	(1.483)	(1.433)

This analysis indicates that there is currently an excess amount of storage in the existing tanks, and there will continue to be an excess in the future. The excess volume is slightly more than the available volume of one of the Hot and Cold Lane tanks. The volume of the Read Street tank is included in this excess and is available for firefighting in the low-pressure zone through pressure reducing valves. This analysis is fairly conservative since we have assumed that the sources are off-line. Flow from the WTP would provide a significant contribution to meeting fire flow requirements.

The water distribution system model was used to assess the impacts of placing one of the Hot and Cold Lane tanks off-line. Distribution system pressures would not be impacted. With one of the Hot and cold Lane tanks off-line, the average water age in the on-line tank would be reduced from the current 19 days to approximately 12.5 days (which would also be less than when Brayton Point was on-line).

Available fire flows would be impacted if one of the Hot and Cold Lane tanks were placed off-line. While the volume of water available would not negatively impact the fire flows, the loss of one tank with a large pipe connection feeding back into the system does make a difference. All of the areas that require a minimum of 500 gpm fire flow are not impacted with one tank off-line. Table 4-19 presents the locations in the distribution system that require higher than 500 gpm fire flow and the change to the available fire flow with each of the Hot and Cold Lane tanks placed off-line.

The locations where the available fire flow is considerably lower with one tank off-line when compared to both tanks being online and at a level that does not satisfy the needed fire flow are highlighted in the table. For a majority of the locations, the reduction in available fire flow is either not significant or does not reduce the available flow below the needed fire flow. The data in Table 4-19 indicate that available fire flows are better when the West Tank is on-line while the East Tank if off-line than vice-versa.

TABLE 4-19

FIRE FLOWS WITH WTP OFF-LINE – GPM

	Needed Fire Flow	Available Fire Flow - gpm				
		Both On	West On East Off	% Decrease	West Off East On	% Decrease
Brayton Ave/4th St (Middle School)	3,500	4,000	2,786	30.35	2,042	48.95
County St/Luther Ave (Regional HS)	3,500	4,000	3,148	21.30	2,042	48.95
Brayton Point Rd (near DPW)	3,500	4,000	4,000	0.00	2,042	48.95
Alden Place	3,500	3,993	3,729	6.61	2,042	48.86
Whetstone Hill Rd/Windward (N. Elem.)	3,500	3,104	2,799	9.83	2,042	34.21
Main St/Poplar St	3,500	899	892	0.78	884	1.67
Chace St/Briar Rd	3,000	4,000	2,818	29.55	2,042	48.95
Lees River Ave/Harvey Ln	2,500	2,207	2,203	0.18	2,042	7.48
County St/Wood St (Town Hall)	2,250	4,000	2,988	25.30	2,042	48.95
Wilbur Ave/Brayton Point Rd	2,250	3,904	3,874	0.77	2,042	47.69
Riverside Ave/Desmond Ave	1,750	4,000	3,371	15.73	2,042	48.95
County St/Whetstone Hill Rd	1,750	3,651	2,800	23.31	2,042	44.07
County St/Gibbs St	1,000	4,000	2,846	28.85	2,042	48.95
Fatima Dr/Shay Ave	1,000	674	671	0.45	666	1.19
O’Neill Rd/Perkins St	1,000	1,066	1,065	0.09	1,060	0.56
Pleasant St/Compos St	750	579	575	0.69	571	1.38
Elm St/Old North St	750	162	161	0.62	160	1.23

TABLE 4-20

FIRE FLOWS WITH WTP ONLINE – GPM

	Needed Fire Flow	Available Fire Flow - gpm				
		Both On[a]	West On East Off	% Decrease	West Off East On	% Decrease
Brayton Ave/4th St (Middle School)	3,500	4,000	4,000	0.00	4,000	0.00
County St/Luther Ave (Regional HS)	3,500	4,000	4,000	0.00	4,000	0.00
Brayton Point Rd (near DPW)	3,500	4,000	4,000	0.00	4,000	0.00
Alden Place	3,500	3,993	4,000	(0.18)	3,989	0.10
Whetstone Hill Rd/Windward (N. Elem.)	3,500	3,104	4,000	(28.87)	3,914	(26.10)
Main St/Poplar St	3,500	899	1,146	(27.47)	1,141	(26.92)
Chace St/Briar Rd	3,000	4,000	4,000	0.00	4,000	0.00
Lees River Ave/Harvey Ln	2,500	2,207	2,226	(0.86)	2,210	(0.14)
County St/Wood St (Town Hall)	2,250	4,000	4,000	0.00	4,000	0.00
Wilbur Ave/Brayton Point Rd	2,250	3,904	3,966	(1.59)	3,850	1.38
Riverside Ave/Desmond Ave	1,750	4,000	4,000	0.00	4,000	0.00
County St/Whetstone Hill Rd	1,750	3,651	4,000	(9.56)	4,000	(9.56)
County St/Gibbs St	1,000	4,000	4,000	0.00	4,000	0.00
Fatima Dr/Shay Ave	1,000	674	707	(4.90)	705	(4.60)
O'Neill Rd/Perkins St	1,000	1,066	1,069	(0.28)	1,066	0.00
Pleasant St/Compos St	750	579	766	(32.30)	764	(31.95)
Elm St/Old North St	750	162	185	(14.20)	185	(14.20)

Values in parentheses represent an increase in available fire flow with the WTP on-line.
[a]Baseline analysis/comparison is with both tanks on-line and WTP off-line.

With the WTP on-line, the needed fire flow was satisfied at the same locations with one tank off-line as with both tanks on-line. Regardless if the WTP is on or off-line, or if a tank is off-line, there are a couple locations in the distribution system that don't satisfy the needed fire flows. This is due to limitations in the distribution system piping. These locations are identified and included in the alternatives analysis in Section 5.

The excess storage capacity may be contributing to the formation of THMs. One of the Hot and Cold Lane tanks could be placed offline under average day conditions without significantly impacting water service to customers. The water storage provided in one of the Hot and Cold Lane tanks is sufficient to handle a 3-hour fire with the sources off-line. While some areas could see reduced levels of fire flow available, making sure the WTP is available to be activated in the event of a fire should compensate for these needs. The Town could consider placing the Hot and Cold Lane East Tank off-line.

The water system needs with regard to storage is to reduce storage volume to reduce water age.

4.5.2.3 Booster Pumping Station

The main purpose of the booster pumping station is to deliver water from the Hot and Cold Lane Tanks in the low service area to the Read Street Tank in the high service area. The existing pumping equipment does not appear to be working correctly. The current operation of the booster pumping station only increases the hydraulic grade line from the low service area by about 5 psi (~12-feet) of lift. This is only enough lift to move water into the high service area. The water elevation in the Read Street Tank is essentially the same water elevation in the Hot and Cold Lane Tanks, resulting in low water pressures in the high service area.

Power to the station is fed with a single-phase electrical service. The single-phase electricity is converted to three-phase using variable frequency drives (VFDs) to operate the pumps. While this pumping station worked initially, it is unclear as to the reason that it is not functioning properly at this time. Since the high service area is not being operated effectively, it is recommended that the booster pumping station be upgraded or replaced.

SECTION 5
Drinking Water System Alternatives Analysis

SECTION 5

DRINKING WATER SYSTEM ALTERNATIVES

5.1 INTRODUCTION

In the previous section, a comprehensive evaluation was performed of the water system to determine the operational and capital needs over the next 25-year planning period. In this section a list of recommended alternatives is provided to address each of these needs as they relate to the water supply, treatment and the distribution system. With these alternatives outlined, a comprehensive improvements plan will be developed to ensure the quality and reliability of the Town of Somerset Drinking Water System in an efficient and cost-effective way.

5.2 WATER SUPPLY

The previous needs assessment section determined that the existing water supply sources are adequate for the projected planning period. While this is certainly an excellent situation, there are a number of operational and capital improvements that require consideration in order to maintain continued water supply reliability.

5.2.1 Segreganset River Transfer Station

The Segreganset River is a significant part of the surface water supply safe yield and therefore a vital component of the Somerset water system. It is important that the pumping system is available at all times during the late fall, through the winter and into early spring to ensure adequate supply in maintained.

The Segreganset River Transfer Station was rehabilitated in 2012. This work included building renovations; installation of new valves; rebuild of the raw water pumps; a new electrical service; and replacement of the motor control center. The mechanical and electrical components will require reassessment within the 25-year planning period.

There are other features of the transfer station and transmission main that require consideration for future upgrades in order to enhance reliability of this water supply source, particularly between November and May when the transfer station is operational. The transfer station does not currently have standby power; which for an asset of its significance, is a notable vulnerability. Providing standby power at the Station can be provided either by two straightforward means; (1) installation of a permanent (fixed) generator located adjacent to the transfer station or, (2) a trailer-mounted, portable generator that can be brought onsite during an extended outage.

Two other infrastructure components of the Segreganset River system that require consideration are the transmission main that delivers water from the Segreganset to the Somerset Reservoir and the dam that controls the flow of water down the river.

The 3-mile 30-inch transmission main is the singular conduit for transporting water from the Segreganset to the Somerset Reservoir, making it a critical infrastructure asset. Should the transmission main fail due to a large break or other interruption of service, the town could potentially face a water supply emergency. The structural condition of the transmission main is not known and therefore a pipeline condition assessment is highly recommended. There are several techniques and methods for pipeline condition assessment ranging from traditional CCTV visual inspection to more advanced acoustic and electromagnetic investigations. Once the transmission main is evaluated a specific plan for repair or replacement can be designed. For the purposes of this report, we have assumed that either the entire length of the transmission main would need to be lined or replaced.

The Segreganset Dam is also a critical asset that the Somerset Water Department maintains. The dam creates a barrier to separate freshwater (upstream water from Segreganset) and brackish water (downstream from Segreganset and Taunton Rivers). The dam also creates a pool from which the pump station draws water. Routine maintenance of this dam is critical to the operation of the Segreganset transfer station and the Somerset water supply in order to maintain safe drinking water.

The alternatives for the Segreganset River Transfer Station are listed in Table 5-1.

TABLE 5-1

ALTERNATIVES FOR THE SEGREGANSET RIVER TRANSFER STATION

Project Identifier	Capital Improvement	Estimated Cost of Improvement
WS-1	Install Standby Generator	$100,000
WS-2a	Evaluate the 30-inch Transmission Main Condition	$100,000
WS-2b	Line the entire length of Transmission Main (3.8 miles)	$4,000,000
WS-2c	Replace the entire length of Transmission Main (3.8 miles)	$6,000,000
WS-3	Dam Evaluation & Improvements	$500,000
WS-4	Replace/rehabilitate pumps in 2032	$500,000

5.2.2 FJM Well #2 (Dighton Well)

The FJM Well # 2 has been inactive since improvements to the chemical storage areas were completed in Fall 2018. As previously discussed in this report, there have been numerous water quality complaints in recent years within the FJM Well #2 service area. Water quality complaints in the area of the FJM Well #2 have been significantly reduced since the well has been taken offline.

In the past the FJM Well # 2 and its service area experience water quality complaints during periods of high demand, likely due to the groundwater (containing slightly elevated levels of manganese) blending with chlorinated water from the WTP. Samples collected from the well in 2017 had manganese levels ranging from 0.14 mg/L to 0.48 mg/L.

EPA has regulated Manganese as a secondary contaminant with a secondary maximum contaminant level (SMCL) of 0.05 mg/L. In addition, MassDEP has established a Health Advisory (HA) level for Manganese at 0.3 mg/L. The SMCL is a non-enforceable level, however if concentrations are in excess of 1.0 mg/L MassDEP will require removal of Manganese, and if levels are above the HA level of 0.3 mg/L, MassDEP will require an assessment from MassDEP's Office of Research and Standards to determine whether removal is required. Because the manganese level in the FJM Well #2 has been detected above the SMCL with a few results above the HA level, it is recommended that Manganese removal be considered, and may be required by MassDEP in the future.

There are three alternatives considered most feasible for the future of FJM Well#2; (1) install a Manganese treatment system and reactivate the well, (2) convert the well to a raw water supply pumping directly to the reservoir or, (3) a long-term lease agreement with the Dighton Water District for them to use this water supply to meet their water demands.

The operation and maintenance of this remote station is a moderate expense which adds to the water department's overall annual operating budget. The estimated annual cost to operate and maintain the FJM Well #2 is $72,000 which includes approximately 400 hours of labor. This cost equates to about $685/MG. For comparison, if the FJM Well #2 were to be operated only as a raw water pumping station with no chemical addition or disinfection, the estimated annual cost is $40,000 or $365/MG.

Supplying water from the Well to the reservoir can either be achieved by the construction of a new transmission main, or by constructing an interconnection to the existing 30-inch Segreganset River Transmission Main. By pumping the raw water supply directly to the reservoir, the current treatment and chemical addition can be eliminated. The primary operations and maintenance costs would only include periodic visits, electricity costs, building heat and routine maintenance. Because of the elevated levels of manganese in the ground water, the impact to manganese levels within the reservoir, and subsequent treatment facility, would need to be monitored and assessed.

The alternatives for the FJM Well #2 are listed in Table 5-2.

TABLE 5-2

ALTERNATIVES FOR THE FJM WELL #2

Project Identifier	Capital Improvement	Estimated Cost of Improvement
WS-5	Install treatment for Manganese removal	$3,000,000
WS-6	Modify piping to pump water to Reservoir	$500,000
WS-7	Lease agreement with Dighton Water District	TBD

5.2.3 Somerset Reservoir & Dam

The Somerset Reservoir and dam were constructed in 1965. The reservoir has an estimated storage capacity of 1,400 MG. A 1988 study estimated the safe yield of the reservoir, including the transfer from the Segreganset River, to be 5 MGD. Since this last study MassDEP has developed an advanced software package for determining safe yield. Weather patterns have been changing as a result of climate change, and this information should be incorporated into the safe yield analysis. A safe yield analysis should include a bathymetric survey to also update information relating to the reservoir characteristics including the stage-storage relationship. Updates to the safe yield can be completed with the use of grant money made available from MassDEP. Applicable grant programs could include the Municipal Vulnerability Preparedness (MVP) program, as well as the Water Management Act (WMA) Grant. The WMA Grant program includes safe yield studies for the first time in 2019 and will likely be included in future funding years. The WMA Grant includes an 80% grant that requires a 20% match from the municipality.

In the Spring of 2018, emergency repairs needed to be made to the reservoir intake structure due to the failure of the mid-level intake gate. The intake structure is a critical asset, and if the structure fails, delivering water to the water treatment plant becomes very difficult. The low-level and high-level inlet gates and operators should be considered for replacement to avoid future failure of these items. The outlet pipe gate, valve operator, and pipe should also be assessed and considered for replacement to avoid future failure of these critical items as well. To ensure a reliable water supply is maintained, the Town should continue with annual dam inspections.

Repairs and improvements to the dam have also been designated as a primary project under the Town's Municipal Vulnerability Preparedness (MVP) effort. With the assistance of their dam consultant, the Town identified improvements to the reservoir and dam to withstand a ½ probable maximum flood (PMF). The Town is planning to apply for MVP grants for design and construction of these improvements.

The alternatives for the Somerset reservoir and dam are listed in Table 5-3.

TABLE 5-3

ALTERNATIVES FOR THE SOMERSET RESERVOIR AND DAM

Project Identifier	Capital Improvement	Estimated Cost of Improvement
WS-8	Bathymetric Survey and Safe Yield update	$50,000*
WS-9	Replace gates, valve operators, and piping at intake structure	$500,000
WS-10	Somerset Reservoir Spillway and Dam Improvements	$4,000,000

*There is a new grant available for projects that address climate change under which this work may be eligible for funding.

5.2.4 Interconnections

Somerset has existing interconnections with the neighboring communities of Dighton, Fall River, and Swansea. These interconnections are aging and in need of replacement. Several emergency situations have occurred in the last several years which could have benefitted from more reliable interconnections, but due to the uncertainty of the integrity of the connections, supplemental water was not provided. Replacement of these interconnections would increase the reliability and redundancy for Somerset.

Interconnections with each town should be metered with capability to send water in either direction. Reestablishing interconnections will require review of water quality compatibility, especially with regard to the Lead and Copper Rule. Rates for water purchase will also need to be established. Somerset may want to initiate discussion with each of the municipalities to investigate the possibility of cost sharing as these interconnections would be mutually beneficial.

5.2.4.1 Fall River

The existing interconnection with the City of Fall River was installed in 1958 and is a 12" Cast Iron water main located beneath the Taunton River where the former Route 6 Bridge was located. The hydraulic grade line (HGL) for Somerset is approximately 245 feet while the HGL in Fall River is 310 feet. Water can flow by gravity from Fall River, but a booster station would be needed for water to be delivered from Somerset to Fall River. The existing interconnection has not been used in the past 20 years and is not in usable condition. The interconnection will need to be repaired or replaced if it is to be reliably used in the future. The alternatives for the Fall River Interconnection are:

Replace with new 12-inch diameter pipe Interconnection

This option would require geotechnical investigation and installation of a new subaqueous watermain under the Taunton River. The watermain would be installed using trenchless methods such as horizontal directional drilling and would install a new 12-inch HDPE water main.

Slip-line Existing Interconnection with 8-inch diameter pipe

As an alternative option the existing 12" interconnection could be slip-lined with a smaller 8-inch HDPE water main. Prior to slip-lining the existing water main, the main should be inspected using a camera to verify that it is in good condition to use for the sleeve of the slip-lined pipe. This alternative would limit the capacity of the interconnection versus the other alternatives.

Clean and Line Existing 12-inch diameter pipe Interconnection

Another alternative option is to clean and line the existing interconnection. This alternative would require a visual and structural inspection of the watermain to ensure that the existing interconnection still has structural integrity.

5.2.4.2 Dighton Water District

There is an existing 8-inch interconnection installed at the intersection of Chase Street and Route 138 in Dighton. The interconnection was installed in 1927 and is in need of replacement. The Dighton Water District operates at a slightly lower HGL than Somerset, so a booster pump station would be required to send water from Dighton to Somerset.

5.2.4.3 Swansea Water District

The existing 6-inch interconnection with Swansea is located on Buffington Street and is in need of replacement. In recent years the Swansea Water District has faced challenges with potential water supply shortages, and an active emergency interconnection between the two Towns could help eliminate this emergency situation. The original water main installed on Buffington Street is a 6-inch cast iron main that was installed in 1927. It is recommended that this interconnection be replaced with a 10-inch interconnection (possibly at the end of Whetstone Avenue) to increase available flows between the systems. The HGL of the Swansea Water District system is approximately 252-feet, which is several feet below the low service zone in Somerset. A pumping station would likely be needed to provide water from Swansea to Somerset or the Town would need to operate at a lower HGL. A temporary pump could be used to pump water from one hydrant to another hydrant. The interconnection should be located at the intersection of Whetstone Hill Road and Millers Lane to connect to the 10-inch distribution main in Swansea on Bank Street.

The alternatives for the interconnections are listed in Table 5-4.

TABLE 5-4

ALTERNATIVES FOR INTERCONNECTIONS

Project Identifier	Capital Improvement	Estimated Cost of Improvement
WS-11	Replace Fall River Interconnection	$600,000
WS-12	Replace Dighton Water District Interconnection	$200,000
WS-13	Replace Swansea Water District Interconnection	$300,000

5.3 WATER TREATMENT

The water treatment plant is designed for a maximum capacity of 6.0 MGD. The current average day demand within the Town is approximately 1.9 MGD. The treatment plant staff are challenged in operating the treatment plant at this reduced flow. The treatment system is not recommended for operation at less than 1 MGD per unit and 2 MGD with two units. Operation with just one unit is not desirable because of the frequent clarifier flushes that stop forward flow. To maintain steady flow with consistent and reliable treatment, a minimum of 2 units need to be in operation.

The facility addition was constructed in 1994, and many of the components are approaching the end of their service life unless upgrades are implemented to extend the service life another 10-15 years. Alternatives to consider include near-term improvements to the existing facility to improve the operations, safety, and drinking water quality, and replacement of the entire plant with a new treatment plant that is more robust and provides greater flexibility in operations.

5.3.1 Upgrade Existing Water Treatment Plant

An evaluation of the existing WTP was completed in 2016. A number of recommended upgrades were presented in that report to extend the service life of the facility.

Raw Water Pumping: The two raw water pumps are rarely operated, as the clarification units can almost always be supplied raw water from the Somerset Reservoir by gravity. The raw water pumps, piping, valves, and appearances should be recoated with fresh paint to remove and reduce any future surficial corrosion.

Pre-treatment Chemical Addition: The PACl and Non-Ionic Polymer feed pumps are original to the 1994 facility and need replacement. The unused potassium permanganate and carbon dioxide systems should be disconnected and removed from the facility.

Process Equipment: The Trident contact clarifier units were rehabilitated in 2019 including removal and replacement of the clarifier media, replacement of air scour piping in the clarifier section, and assessment and repair of the clarifier and filter components. The backwash pumps and filter-to-waste pumps are original to the 1994 plant upgrade, are near the end of their expected service life and should be replaced. One new blower was installed in 2019 and the other was rehabilitated.

Post Treatment Chemical Addition: The sodium hypochlorite system was installed in 2017. The sodium fluoride and polyphosphate chemical feed systems are original to the 1994 water treatment plant upgrade. These systems are in need of replacement, including metering pumps, mixers, controls, and chemical storage tanks.

Finished Water Pumps: The three finished water pumps are original to the 1994 water treatment plant upgrade and in need or replacement. Replacement of the finished water pumps should include not only the replacement of the pumps and motors, but new VFDs as well.

Residuals and Disposal: Lagoons 2 and 3 have overgrown vegetation and are in need of maintenance to restore capacity of the lagoons. The washwater residuals pumps that pump the lagoon supernatant to the sanitary sewer system are also in need of replacement, as they have experienced operational issues in recent history and are nearing the end of their service life.

Building: The building has been well maintained, but it is aging infrastructure that would need upgrades. The upgrades recommended in the 2016 report include concrete repairs, door upgrades, new floor finishes, adding insulation, roof repairs and other general architectural repairs, HVAC system upgrades, security improvements, lighting improvements and other general electrical equipment upgrades.

5.3.2 New Water Treatment Plant

Portions of the existing water treatment plant are 25 years old and others are over 50 years old. Replacement of the existing water treatment plant should be designed as a 6 MGD plant based on the current population projections and demand trends. Piloting different technologies will need to be considered to determine which treatment technology will be the most appropriate for the system. Technologies to consider include rapid clarification technologies including DAF (dissolved air flotation) and ballasted sand flocculation. The treatment plant would primarily be designed for turbidity, TOC and microbial removal, but should also consider iron and manganese removal. The SWD has faced challenges in the past with high TTHM levels, and increased TOC removal would help lower TTHM levels in the distribution system. The addition of chloramines or post-filtration GAC adsorbers could be considered for inclusion in the project to aid in reduced TTHM concentrations.

The timeline for a new water treatment plant from design to start-up of the facility is expected to require 5-6 years, consisting of piloting (1.5 years), design and permitting (1.5 years), and construction (2-3 years).

The alternatives for water treatment are listed in Table 5-5.

TABLE 5-5
ALTERNATIVES FOR WATER TREATMENT

Project Identifier	Capital Improvement	Estimated Cost of Improvement
WT-1	Upgrades to existing WTP	$6.5M
WT-2	New WTP with more robust treatment and flexibility	$36-$42M

5.4 WATER DISTRIBUTION SYSTEM

The distribution system needs identified in Section 4 include programs and infrastructure projects that address:

- operational and infrastructure changes to address areas with low fire flows
- operational and infrastructure changes to address areas with low pressures
- high water age resulting in water quality issues
- a water main replacement program

5.4.1 Areas with Low Fire Flow

The Somerset hydraulic model was used to evaluate available fire flows under existing conditions. In addition to the Insurance Services Office (ISO) designated fire flows for specific locations, a minimum fire flow of 500 gpm should be available at every hydrant within the distribution system. A list of locations (nodes in the hydraulic model) that do not meet the 500 gpm requirement was compiled and is included in Appendix H. Most of these locations are located at the end of dead-end streets and are supplied by small diameter water mains (2-inch and less). Although these locations are not able to provide 500 gpm due to the restriction of their small diameter, they do not pose an immediate concern as they are all located within 500 – 1,000 feet of a hydrant capable of providing 500+ gpm. In the event that the fire flow was needed, a fire truck would be able to connect to the nearby hydrant and be supplied with adequate flow.

One area with adequately sized pipe that is not able to supply 500 gpm is in the north-end of Somerset. This area of the distribution system is somewhat isolated (using closed valves) in that it is primarily served by the FJM Well #2 only. Valves on County Street, Elm Street, Yankee Peddler Drive, Old Colony Avenue and Palmer Street are closed to create this isolated zone. These valve closures also restrict the fire flow availability in this area. The hydraulic model was used to assess fire flow availability with the current valves closed and opened. Opening the valves increased the available fire flow above 500 gpm for all of the locations (other than the dead-ends) that were not meeting the minimum 500 gpm.

Another area with adequately sized pipe that is not able to supply 500 gpm is near the water storage tanks on Hot and Cold Lane. This is the highest elevation within the high service zone of the distribution system, and routinely sees low pressures (around 20 psi) due to the elevation. System pressures and available fire flows in this area should be increased once the poor performance of the booster station is addressed and the HGL in the High Service Zone is increased to operate between 280-300 feet. See Section 5.4.2 for more information regarding these improvements.

In addition to the base 500 gpm requirements, there are several locations within Somerset where ISO required fire flows are not being met. A summary of the ISO fire flow locations, the required flows, and the available flows under existing operating conditions is presented in Table 5-6.

Table 5-6 shows that most locations are able to provide the ISO required fire flow when the WTP is online except for the three following locations:

- Intersection of Lees River Avenue and Harvey Lane
- Intersection of Fatima Drive and Shay Drive
- Intersection of Elm Street and Old North Street

TABLE 5-6

ISO FIRE FLOW LOCATIONS – GPM

ISO Locations	Needed Fire Flow	WTP Off	WTP On
Brayton Ave/4th St (Middle School)	3,500	2,274	4,000
County St/Luther Ave (Regional HS)	3,500	2,447	4,000
Brayton Point Rd (near DPW)	3,500	4,000	4,000
Alden Place	3,500	2,633	3,666
Whetstone Hill Rd/Windward (N. Elem.)	3,500	2,289	4,000
Main St/Poplar St	3,500	2,798	3,674
Chace St/Briar Rd	3,000	2,300	4,000
Lees River Ave/Harvey Ln	2,500	2,165	2,178
County St/Wood St (Town Hall)	2,250	2,381	4,000
Wilbur Ave/Brayton Point Rd	2,250	3,821	4,000
Riverside Ave/Desmond Ave	1,750	2,529	4,000
County St/Whetstone Hill Rd	1,750	2,289	4,000
County St/Gibbs St	1,000	2,313	4,000
Fatima Dr/Shay Ave	1,000	643	690
O'Neill Rd/Perkins St	1,000	1,978	1,991
Pleasant St/Compos St	750	2,043	2,456
Elm St/Old North St	750	634	721

5.4.2 Areas with Low Pressure

The hydraulic model was used to identify areas with low pressure under existing conditions. As previously discussed in this report, the high service booster station located near the Hot and Cold

Lane west tank is not able to operate as designed and does not increase the level of the Read Street Standpipe sufficiently to raise the HGL of the High Service Zone.

Water system needs include addressing the improper performance of the pump station. Alternatives include rehabilitation of the existing pump station, installing a new BPS at the existing site and relocating the BPS to the Read Street Tank site.

The booster station needs to be upgraded/rehabilitated to operate more effectively and efficiently or replaced. The pump station could be upgraded with a new electrical system, pumps, motors and drives within the existing building. This would be the least costly alternative, but it may not improve the efficiency and reliability of the pump station. The pump station could be replaced with a new pumping station at the current site. This alternative would be somewhat more costly and may not address the concerns with converting single-phase power to three-phase power using VFDs and the limitations due to the piping configuration of the Hot and Cold Lane Tanks. A third alternative would be to relocate the pump station to the Read Street Tank site. The Read Street Tank site has three phase power available, which would increase the reliability of the booster station operation. Relocation of the pump station would also change the suction piping configuration such that the station could draw form either the West or East Hot and Cold Lane tank. The ability to use either tank would improve reliability and increase flexibility in the distribution system.

The other aspect of the improvements needed for the booster pump station is to increase the HGL of the High Service Zone. The booster station should be operated to maintain a HGL of 280-300 within the Read Street tank. The higher HGL will improve available fire flows, especially for those locations previously identified. In addition to increasing the HGL, the discharge from the booster pump station should connect to an existing pipe that extends to the top of the Read Street Tank to aid in turn-over of the water in the tank and reduce water age.

The high service area has valves located at the following locations and elevations in order to create the high service zone.

- Read Street & Travers Street (Elev. 91.0)

- Brayton Point Road (Elev. 145.0)
- Read Street & Brayton Avenue Control Valve (Elev. 118.0)
- Hillside Avenue Check Valve (Elev. 114.0)
- Lepes Road Check Valve (Elev. 97.0)

The elevations at the PRVs represent the lowest elevations in the zone, while the highest elevation in the zone is approximately at 190.0-feet. Based on the differences in elevations within the zone, the pressures would be increased to operate between 38 – 90 psi. Due to the age of the PRV valves and their criticality in operating the high service zone, it is also recommended that these valves are replaced as part of the booster station replacement to ensure that the zones will function properly and reliably.

The booster station would have a design operating point of 420 gpm @ 100 ft TDH with 15 HP motors. The estimated costs for the booster pump station alternatives are presented in Table 5-7.

TABLE 5-7

ALTERNATIVES FOR WATER DISTRIBUTION BOOSTER PUMP STATION

Project Identifier	Capital Improvement	Estimated Cost of Improvement
WD-1	Rehabilitate Existing Pump Station	$450,000
WD-2	Replace Pump Station at Existing Site	$750,000
WD-3	Relocate New Pump Station at Read Street Tank Site	$950,000

5.4.3 Water Age

The hydraulic model was used to identify water age within the distribution system under existing conditions. The average water age in the Hot and Cold Lane Tanks with both tanks online is estimated to be 19 days. The water age could be reduced to an average of 12.5 days by placing one of the tanks off-line. This can be done without significantly impacting the available fire flows. Reducing the water age should be a benefit in reducing THM levels.

The Town of Somerset has petitioned the Massachusetts Department of Environmental Protection Drinking Water Program and received approval to place a tank off-line. The Town can monitor the quarterly THM sampling to assess the impact of the reduced water age.

5.4.4 Water Main Replacement Program

As previously detailed in the existing conditions section of this report, more than 20% of the existing distribution system was installed prior to 1940, and approximately 16% of the distribution system is comprised of water mains constructed of Asbestos Cement. These pipelines are approaching the end of their expected service life, and as a result the number of water main breaks and water quality complaints are increasing. The recommended goal for a water main replacement program is to replace all watermains before their expected service life is exceeded.

Because of the magnitude of the water main replacement program, a method to prioritize specific pipelines was developed. Projects consisting of multiple pipelines were first identified by creating clusters of watermains with similar characteristics (material, remaining service life, break history) and when appropriate adjacent locations. The size of each project was intended to replace approximately one (1) mile of pipe each year. These projects were prioritized based on the following criteria:

- Year Installed
- Diameter
- Material
- Remaining Service Life
- Break History
- Pressure
- Available Fire Flow

The method of prioritizing the projects is described in Appendix I. Also included in this appendix is a detailed listing of the water mains included in each project. In total, 43 projects were identified to be prioritized for replacement. The projects listed in order of priority for the 25-year planning period are included in the Table 5-8. The projects are also shown in:

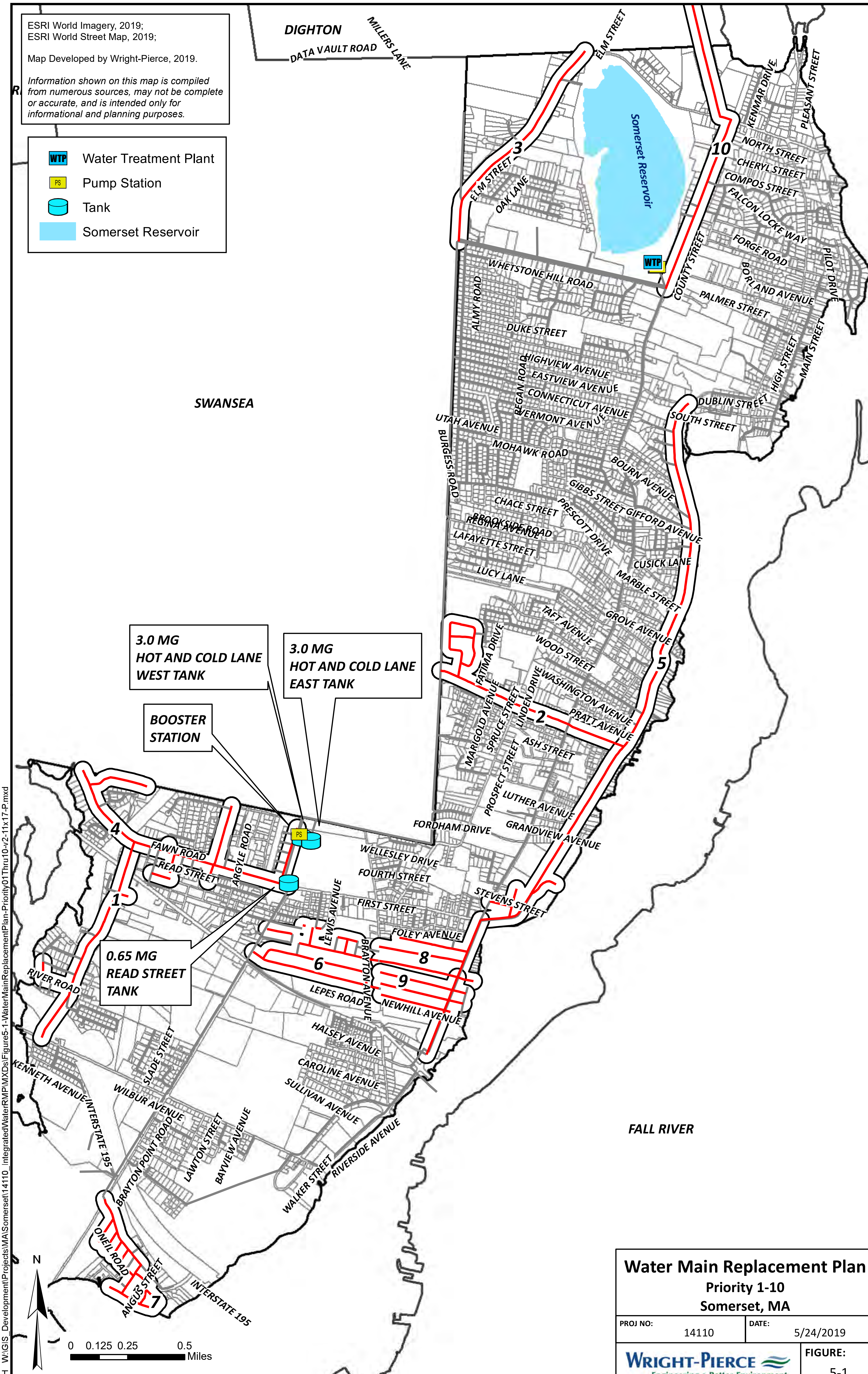
- Figure 5-1 Priority Projects 1 – 10
- Figure 5-2 Priority Projects 11 – 20
- Figure 5-3 Priority Projects 21 – 30
- Figure 5-4 Priority Projects 31 - 43

TABLE 5-8

WATER MAIN REPLACEMENT PROJECTS BY PRIOIRTY

Project	Location	Reason	Cost
1	Lees River Avenue, Ocean Boulevard, Milton Avenue and Enterprise Drive	Age, AC, FF	$1,355,000
2	Buffington Street, Hichney Lane, Fatima Drive, Lourdes Road, and Apostle Road	Age, FF	$1,297,000
3	Elm Street	Age, AC, FF	$832,500
4	Read Street, Highland Road, Hot and Cold Lane, Travers Street, Seaver Street, and Bertram Road	Age, FF	$1,849,000
5	Riverside Avenue	Age	$3,700,000
6	Lepes Road, Kaufman Road, Hillside Avenue, Sherman Road, Mellen Avenue, Bower Street, Bodwell Street, Blossom Avenue	Age, AC, Breaks	$1,440,000
7	O'Neil Road, Ripley Street, Angus Street, Perkins Street, Massasoit Street, Keene Street, Carey Street, Burrows Street, Stoddard Street, Pocasset Street, Farren Street, and Anawam Street	Age, Breaks	$1,092,000
8	Chatterton Avenue, Thelma Avenue, Perron Avenue, Riverside Avenue, and Owen Avenue	Age, AC, Breaks	$1,113,000
9	Westhill Avenue, Riverside Avenue, Newhill Avenue, and Longhill Avenue	Age	$1,205,000
10	County Street from North Street to FJM Well #2	Age, WQ	$4,350,000
11	Linden Drive, Hemlock Street, Birch Street, West County Street, Ash Street, Pine Street, Judy Lane, Lorraine Avenue, and Violet Avenue	Age	$700,000
12	Wilbur Avenue, Walker Street, Arch Street, and Alden Place	Age	$1,205,000
13	Read Street, Meadow Lane, and Doherty Avenue	Age	$1,110,000
14	Pleasant Street, Old Colony Avenue, and Sandy Point Avenue	Age, WQ	$1,245,000
15	High Street, Cherry Street, Clark Street, School Street, Poplar Road, Avon Street, Church Street, and Pleasant Street	Age, WQ	$1,100,000

Project	Location	Reason	Cost
16	Centre Street, Lincoln Avenue, Grant Avenue, Hargreaves Avenue, Gay Street, Garfield Avenue, Tyler Avenue, Everett Street, Sanford Avenue, and McKinley Avenue	Age, Breaks	$970,000
17	Palmer Street, Borland Avenue, Seward Avenue, Ranger Street, Davis Street, and Richmond Street	Age	$910,000
18	Pleasant Street, North Street, and Carol Street	Age	$860,000
19	Vermont Avenue, Massachusetts Avenue, and Watuppa Avenue	Age, AC, Breaks	$800,000
20	Prospect Street, Luther Avenue, Wordell Road, and at Berkeley Regional HS		$930,000
21	Shawomet Avenue, Marigold Avenue, Buxton Avenue, Spruce Street, Prospect Street, Shove Street, Dias Terrace, and Bowker Terrace	Age, Breaks	$1,015,000
22	Wilbur Avenue, Kathleen Avenue, Kenneth Avenue, and Randolph Street	Age, AC, Breaks	$721,500
23	Brayton Avenue, Slades Ferry Avenue	Age, AC	$750,000
24	Mohawk Road, Mount Hope Road, Bourn Avenue, Watuppa Avenue, Eddy Lane, and Stetson Lane	Age, AC	$1,240,000
25	Grandview Avenue, Luther Avenue, Harrison Avenue, Johnson Street, Berube Avenue, Meribah Street, Gardner Avenue, Durfee Court, Annette Avenue, and Roland Avenue		$980,000



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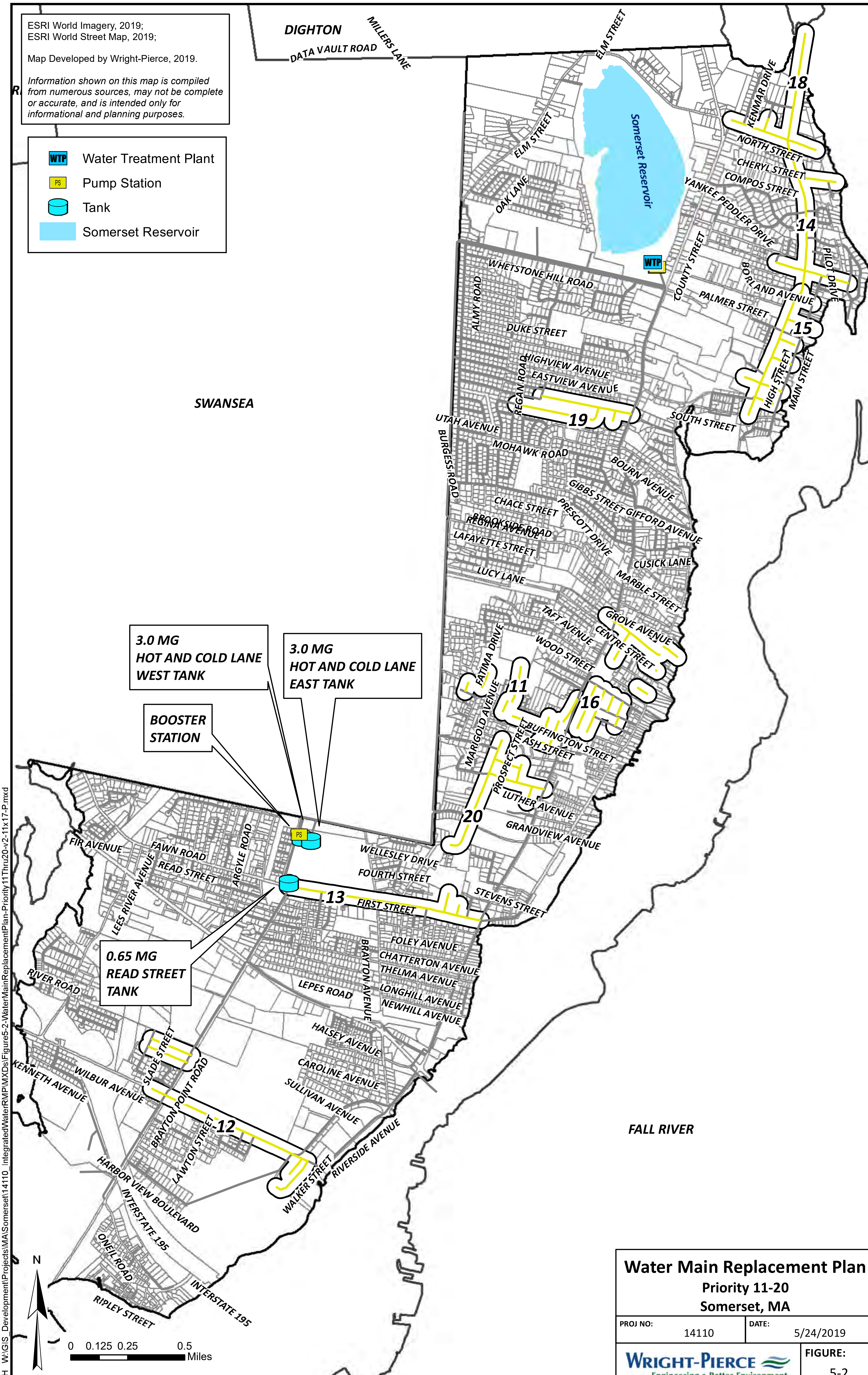

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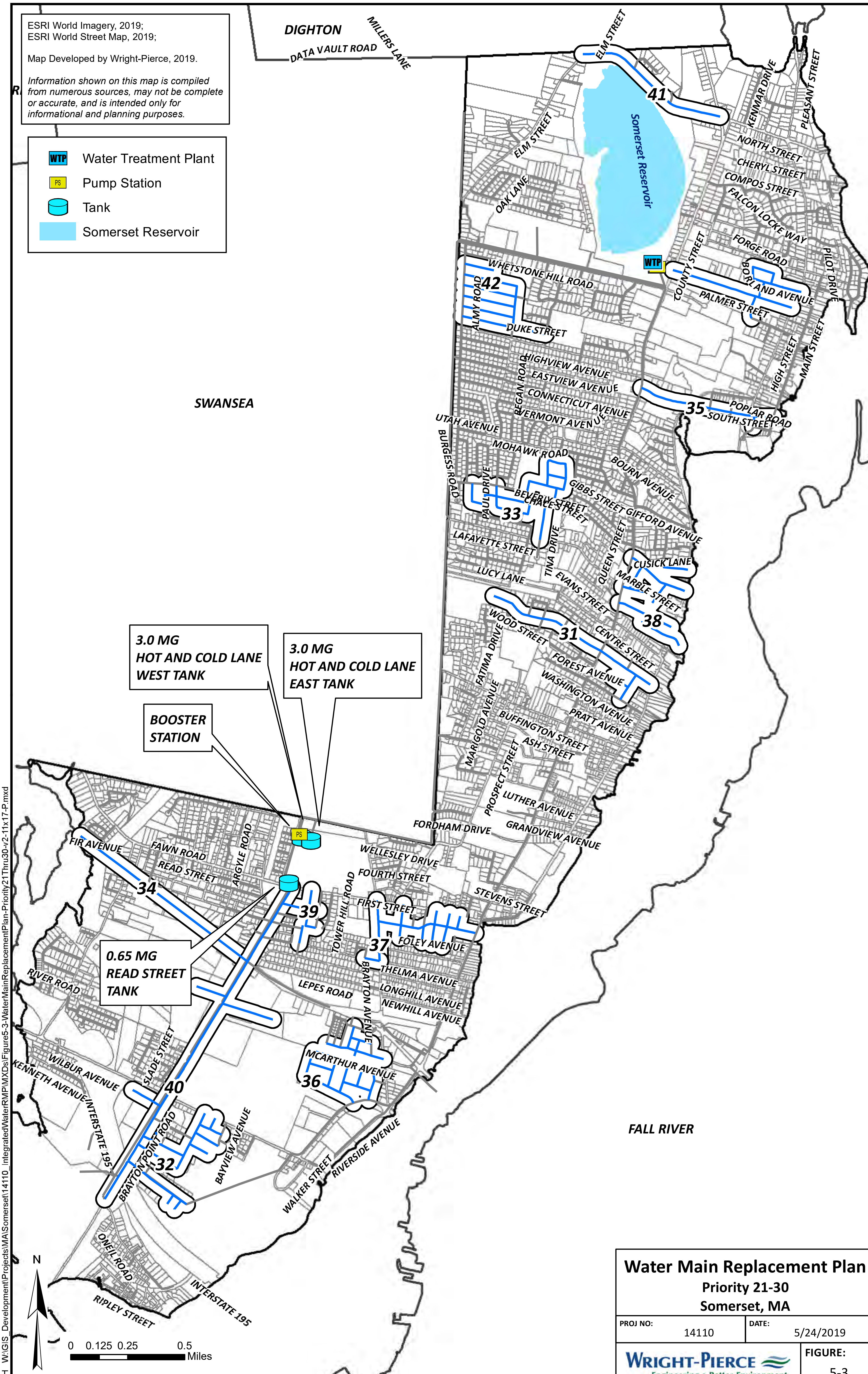
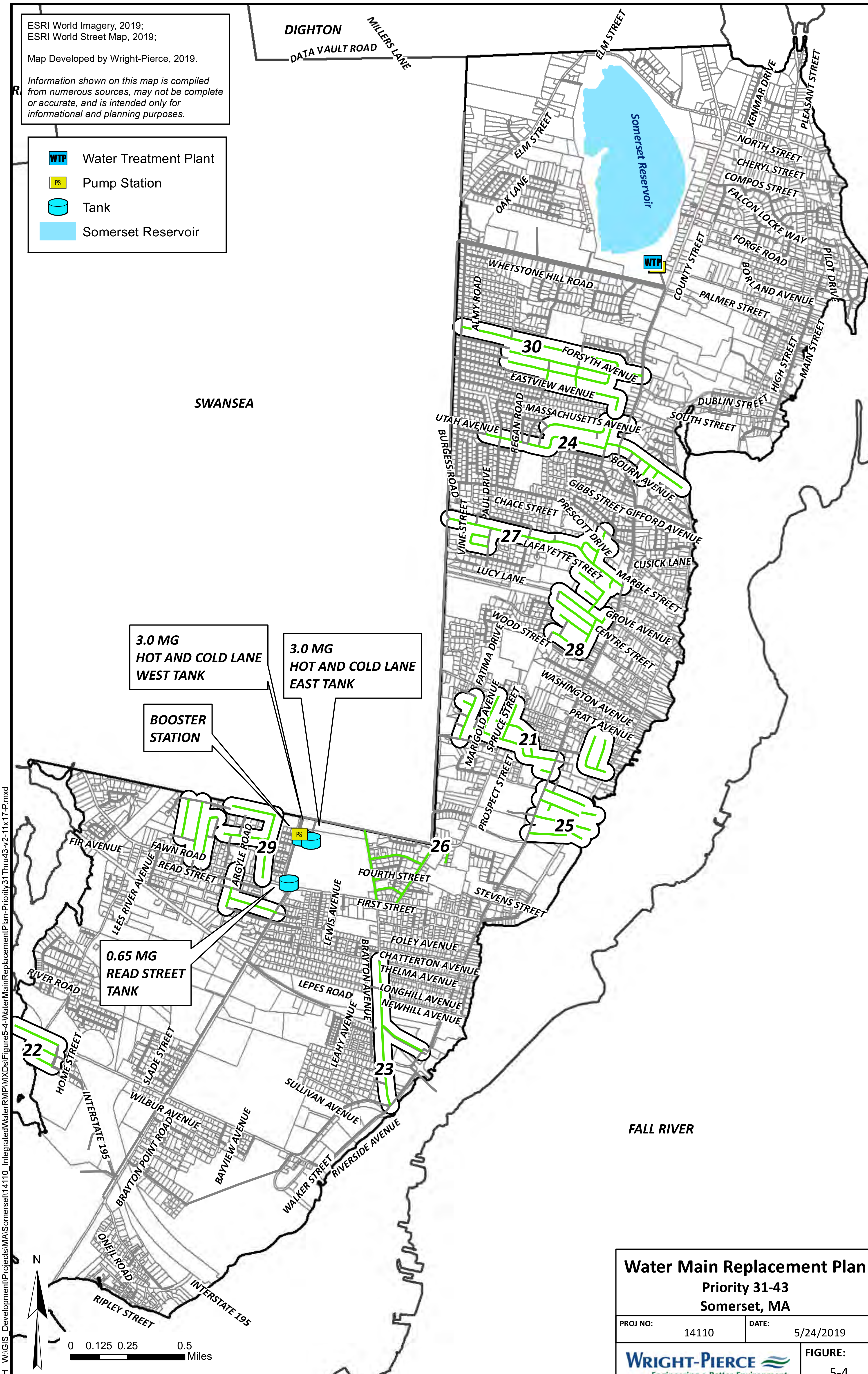


Water Main Replacement Plan
Priority 21-30
Somerset, MA

PROJ NO:	DATE:
14110	5/24/2019

WRIGHT-PIERCE
Engineering a Better Environment

FIGURE:
5-3



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SECTION 6
Recommended Plan

SECTION 6

RECOMMENDED PLAN

Like many communities with aging infrastructure, the Town of Somerset will need to commit a considerable amount of funds over the planning period to maintain the high quality of water service that residents expect. This plan is a guide to prioritize the capital improvements and will aid the Town in spending the necessary funds wisely.

Estimates of probable construction costs are developed in current dollars. Since not all of the improvements have a high priority or urgency, the projects are projected to occur in the future based on an implementation schedule. Using this implementation schedule, the costs will be projected out to the approximate years that the funds would be needed/requested for the development of a financing plan.

6.1 WATER SYSTEM RECOMMENDED PLAN

The capital improvements plan consists of projects that address water supply, water treatment and water distribution needs.

6.1.1 Water Supply Recommended Plan

The capital improvements for the Segreganset Transfer Pumping Station include the addition of a standby power generation system (WS-1), evaluation of the transmission main condition (WS-2a), lining of the transmission main (WS-2b), evaluation of and improvement to the dam structure for the Segreganset River (WS-3), and replacement/rehabilitation of the transfer pump after 20-years of operation (WS-4). Because this facility was upgraded in 2012, these projects are proposed to be conducted more than 5-years in the future.

The capital improvements for the FJM Well #2 (Dighton Well) include modifying the piping to pump this water directly to the Somerset Reservoir (WS-6). This would include the elimination of chemical treatment of the raw water which is estimated to reduce operating costs by approximately $30,000/yr. This project should be considered a higher priority based on the cost savings and should be implemented within a couple years.

The capital improvements for the Somerset Reservoir include the performance of a bathymetric survey and safe yield analysis (WS-8), replacement of gates and piping in the intake structure (WS-9) and maintenance of the dam (WS-10). These projects have a high priority and should be implemented within a couple years.

The capital improvements for the interconnections include pipe replacement for connection to the City of Fall River, the Swansea Water District and the Dighton Water District. The interconnection with Fall River is a high priority as this water system has the greatest water supply capacity should Somerset ever need it. The interconnection with the Dighton Water District is a second priority as the FJM Well #2 is transitioned from pumping to the distribution system to pumping to the reservoir. There are a few residences that are currently served off the discharge from the FJM Well #2 that could be transitioned to the Dighton Water District. The interconnection with Swansea Water District, while not critical to the Town of Somerset, does represent a potential water user which would help with Somerset's excess supply. All of the recommended interconnection work should be implemented within 5-years.

6.1.2 Water Treatment Recommended Plan

The water treatment capital improvements include short-term upgrades to improve water quality and ensure a safe working environment as well as the long-term replacement of the water treatment plant. The short-term upgrades include chemical addition modifications to address disinfection by-product issues and building systems upgrades. These improvements should be implemented within a couple years. The long-term goal is to replace the water treatment plant with a more robust and flexible treatment system. The process of piloting alternative treatment technologies, designing and permitting a new plant and constructing the new plant will take 4-5 years. The Town should consider starting this process within 5-years so that the new facility (whether at the existing WTP site or at the property acquired across County Street) can be activated within 10-years which would be the end of the expected service life for the existing treatment system.

6.1.3 Water Distribution Recommended Plan

Distribution system capital improvements include replacement of the booster pumping station for the high service area and water main replacement. The booster pumping station is not efficient or effectively operated and should be replaced within a couple years. The water distribution system piping replacement plan was developed based on prioritizing old mains, under-sized mains, and pipes with a history of leaks/breaks. This program should be implemented on an annual basis.

6.2 WATER SYSTEM PROJECT COST ESTIMATES

The planning level cost estimates for the recommended capital improvements are presented in **Table 6-1**. These planning-level costs were developed using standard cost estimating procedures consistent with industry standards utilizing unit cost information. The project cost information presented herein is in current dollars and is based on the *Engineering News-Record* (ENR) Index of 11,292 (July 2019).

6.3 WATER SYSTEM PROJECTS IMPLEMENTATION PLAN

As previously indicated, implementation of the recommended projects should be done based on priority. An implementation schedule is presented in **Table 6-2** with the estimated costs distributed in **Table 6-3**.

This capital improvement projects with the greatest priority and should be implemented within 5-years include the standby generator for the Segreganset Transfer Station (WS-1), modifying the piping to pump the FJM Well #2 to the reservoir (WS-6), conducting the bathymetric survey and safe yield update for the reservoir (WS-8), replacing the gates and piping for the reservoir intake (WS-9), replacing the interconnections with Fall River, Swansea Water District and Dighton Water District, upgrades to the water treatment plant to address water quality issues and improve staff safety and comfort (WT-1), relocating the booster pumping station for the high service zone (WD-3) and the priority water main replacement projects (WD-4).

TABLE 6-1

WATER SYSTEM CAPITAL IMPROVEMENTS COST ESTIMATES

Project Identifier	Capital Improvement	Estimated Cost of Improvement
WS-1	Install Standby Generator	$100,000
WS-2a	Evaluate the 30-inch Transmission Main Condition	$100,000
WS-2b	Line the entire length of Transmission Main (3.8 miles)	$4,000,000
WS-3	Dam Evaluation & Improvements	$500,000
WS-4	Replace/rehabilitate pumps in 2032	$500,000
WS-5	Install treatment for Manganese Removal	Not Selected
WS-6	Modify piping to pump water to Reservoir	$500,000
WS-7	Sell well to Dighton	Not Selected
WS-8	Bathymetric Survey and Safe Yield update	$50,000
WS-9	Replace gates, valve operators, and piping at intake structure	$500,000
WS-10	Somerset Reservoir Spillway and Dam Improvements	$4,000,000
WS-11	Replace Fall River Interconnection	$600,000
WS-12	Replace Dighton Water District Interconnection	$200,000
WS-13	Replace Swansea Water District Interconnection	$250,000
WT-1	Upgrades to existing WTP	$6,500,000
WT-2	New WTP with more robust treatment and flexibility	$42,000,000
WD-1	Rehabilitate Existing Pump Station	Not Selected
WD-2	Replace Pump Station at Existing Site	Not Selected
WD-3	Relocate New Pump Station to Read Street Tank Site	$950,000
WD-4	Water Main Replacement Program (1% Annually)	$34,000,000

TABLE 6-2

WATER SYSTEM PROJECTS IMPLEMENTATION SCHEDULE

Project		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
WS-1	Install Standby Generator																									
WS-2a	Evaluate Transmission Main																									
WS-2b	Line Transmission Main																									
WS-3	Segreganset River Dam Evaluations/Improvements																									
WS-4	Replace/Rehab Pumps																									
WS-5	Install Manganese Treatment	(a)																								
WS-6	Modify Piping to Reservoir																									
WS-7	Lease well to Dighton	(a)																								
WS-8	Bathymetric Survey																									
WS-9	Replace Gates/Operators at Intake																									
WS-10	Somersert Reservoir Dam Improvements/Maintenance																									
WS-11	Fall River Interconnection																									
WS-12	Dighton Interconnection																									
WS-13	Swansea Interconnection																									
WT-1	Upgrade Existing WTP																									
WT-2	New WTP					(b)	(b)	(b)																		
WD-1	Rehabilitate Existing Pump Station	(a)																								
WD-2	Replace Pump Station at Existing Site	(a)																								
WD-3	New Pump Station at Read Street																									
WD-4	Water Main Replacement Program																									

(a) Not Selected
(b) Piloting and Design, followed by Construction

TABLE 6-3

WATER SYSTEMS PROJECTS IMPLEMENTATION SCHEDULE DISTRIBUTED COSTS

ID	Asset	Description	Benchmark 2019	Planning Year Implementation (including 3% annual inflation)												
				2020	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030 - 2034**	**2035 - 2039**	**2040 - 2044**
WS-1	Segreganset	Generator	$100,000						$119,400							
WS-2a	Segreganset	30" Transmission Main Evaluation	$100,000		$106,100											
WS-2b	Segreganset	30" Transmission Main Reline	$4,000,000						$4,776,200							
WS-3	Segreganset	Dam Evaluation/ Improvements	$500,000									$652,400				
WS-4	Segreganset	Pump Rehab/ Replacement	$500,000											$146,900		
WS-5	FJM Well #2	Manganese Treatment	Not Selected													
WS-6	FJM Well #2	Reservoir Pipe Interconnection	$500,000				$562,800									
WS-7	FJM Well #2	Lease to Dighton	Not Selected													
WS-8	Reservoir	Bathymetric Survey/Safe Yield	$50,000	$51,500												
WS-9	Reservoir	Intake Gate Replacement	$500,000		$530,500											
WS-10	Reservoir	Dam Improvements/ Annual Maintenance	$4,000,000.00		$4,243,600											
WS-11	Interconnections	Fall River Replacement	$600,000		$636,540											
WS-12	Interconnections	Dighton Replacement	$200,000				$225,100									
WS-13	Interconnections	Swansea Replacement	$250,000			$273,200										
WT-1	WTP	Upgrade Existing WTP	$6,500,000	$6,695,000												
WT-2	WTP	New WTP	$42,000,000					$500,000	$500,000	$1,000,000	$51,204,400					
WD-1	Distribution	Rehab Existing PS	Not Selected													
WD-2	Distribution	Replace Existing PS	Not Selected													
WD-3	Distribution	New Booster PS	$950,000			$1,039,000										
WD-4	Distribution	Water Main Replacement Program	$33,720,000	$1,395,700	$1,376,000	$909,700	$2,081,100	$4,289,300	$835,900	$1,343,000	$1,824,200	$1,572,300	$1,495,800	$12,618,000	$8,233,000	$9,477,000
		Yearly Total		**8,144,220**	**$6,892,740**	**$2,221,900**	**$2,869,000**	**$4,789,300**	**$6,231,500**	**$2,343,000**	**$53,028,600**	**$2,224,700**	**$1,495,800**	**$12,764,900**	**$8,233,000**	**$9,477,000**

APPENDIX A
Scope of Services

Scope of Services

Wright-Pierce will complete all tasks as required by the Town's RFP. As requested by the Town, we have elaborated on several items in the scope of services. At the end of each task and/or subtask as appropriate, any scope of services additions and/or clarifications have been added using **bold text**.

TASK 1: ASSESSMENT OF EXISTING CONDITIONS

Discuss and describe what kind of information, data, planning documents (federal. state, local and regional), mapping and other tools that will be used to conduct assessments and provide an outline to analyze and evaluate each of the following:

A. *Description of Man-Made Environment*

B. *Description of Natural Environment* - Development of maps using existing federal, state and local GIS data to present overview of existing conditions and environmental features.

   Review and document water quality data available from the Town and state resources. Review census data, geographical land use information and zoning regulations to describe population growth and development patterns within the town. Review assessor data and mapping. Coordinate with the Southeast Regional Planning and Economic Development District. Coordinate with planning staff to update the information and refine estimates with specific focus on potential redevelopment opportunities that could impact water resources. Review existing environmental databases to identify existing or potentially contaminated sites (e.g., Chapter 21E oil and hazardous material sites with MassDEP AUL's, underground storage tanks). Identify locations and character of undeveloped land and any conservation efforts to preserve open space using the most recent master plan or open space and recreation plan.

C. *Description of anticipated growth* – Project anticipated population and economic growth through the 20-year planning period. Data from the Massachusetts Institute for Social and Economic Research (MISER), regional planning agencies, and other data sources can be used to develop economic and population projections. Any master plans or open space plans done by the community will be considered in developing growth projections.

D. *Conformance with other town planning documents* - Identify important components of recent planning documents that may impact the IWRMP. Findings, recommendations, or conclusions will be referenced from recent planning studies conducted by or for the Town of Somerset.

   At the outset of Task 1, Wright-Pierce will collect all relevant water, wastewater, stormwater and other information/data/reports necessary to assess existing conditions and properly develop the Town's IWRMP. This will include careful coordination with SRPEDD and Town departments to make sure all relevant information is collected, reviewed and utilized for this effort.

TASK 2: ASSESSMENT OF EXISTING WASTEWATER MANAGEMENT SYSTEMS

Identify and discuss information, data and other resources that will be used to conduct assessments and provide an outline to analyze and evaluate each of the following:

A. *Description of on-site systems* - review and analyze septic system data and evaluate performance.

Water Pollution Control facility - Evaluate buildings, structures, equipment electrical systems, controls piping and treatment processes, and identify facility deficiencies. Provide a condition and performance evaluation, which will include a review of the existing system with respect to design points.

- Provide an energy evaluation, which will review the facilities for opportunities to improve energy efficiency.
- Assess existing flows andloads through a 4-month sampling program.
- Identify potential alternative uses and /or elimination of the current tankage/processes, and assess the impact of potential future permit changes for nitrogen and other conventional pollutants.
- Identify alternative equipment and process improvements and/or replacements.
- Determine the most cost-effective improvements based on a total life cycle cost. Develop non-monetary screening criteria to evaluate alternatives. Apply criteria and rank advantageous alternatives to establish preferred alternatives for evaluation.

Perform a comprehensive site investigation of the WPCF with its building disciplines. Evaluate all buildings and structures, processes/systems, operations, and other components as needed. Each discipline will develop a technical memo of their site visit.

B. ***Wastewater collection system*** - Condition assessment of the ***pump stations*** located within the collection system, which will include an assessment of each station, including process, mechanical, electrical and structural elements. Provide capacity assessment to focus on empirical evidence of capacity deficiencies, such as historic backups or overflows. Review current operation and maintenance practices in the context of industry standards and best management practices.

Wright-Pierce will also assess architectural (as appropriate), instrumentation and control, and code related items at each pumping station. Perform pump draw-down testing at stations, as necessary to fully evaluate station capacity.

C. *Residuals treatment, handling and disposal.*

Perform a thorough assessment of the Town's current screenings, grit and biosolids systems.

D. *Operation and maintenance of existing treatment works* - Identify and rate deficiencies based on a level of severity, or threat of failure or regulatory violation.

E. *Identification of future needs* - Evaluate the need or potential to expand the existing sewer collection system. Review potential for inter-municipal connections and agreements. Estimate future pollutant loadings (BOD, TSS, N, and P) for the current and future sewer system.

Perform a town-wide "Needs Assessment" by dividing the Town into study areas; developing wastewater assessment criteria; evaluating, scoring and ranking each area; and ultimately determining what areas (if any) are "needs areas" and require further evaluation to develop an off-site solution (onsite treatment and disposal systems are not sustainable long-term).

TASK 3: ASSESSMENT OF EXISTING DRINKING WATER SUPPLY SYSTEM AND FUTURE NEEDS

A. Description of treatment facilities

B. Description of distribution and storage system

C. Description of residuals treatment and disposal practices

D. Description of emergency procedures

E. *Description of water use patterns* - Analyze existing water usage and patterns, including overview of water balance. Summarize existing water quality concerns.

F. *Identification of future needs*- Project future demands over a 20- year planning period. Discuss water conservation and demand management.

Perform a complete assessment of the Town's existing water system infrastructure. Identify and evaluate future water system needs.

TASK 4: ASSESSMENT OF STORMWATER SYSTEM AND IDENTIFICATION OF FUTURE NEEDS

A. *Identify priority stormwater problems* - Collect existing information on the waters that receive stormwater discharges. Review and document surface water quality data available from the Town and state resources. Identify areas in the community with the potential to generate stormwater with higher than average pollutant loads. Identify critical areas that may be impacted by stormwater discharges, such as outstanding resource waters, bathing beaches, cold water fisheries and recharge areas for public water supplies. Identify water bodies that have been classified by the Water Resource Commission (WRC) as being under high or medium stress or that have localized low flow or flooding problems.

B. *Assessment of public education and outreach*

C. *Assessment of public participation program*

D. *Assessment of Illicit Discharge Detection and Elimination (IDDE) Program* - Assess existing efforts toward meeting IDDE program requirements, including review of existing information and mapping for NPDES compliance.

Develop inventory of stormwater assets based on available information, including NPDES MS4 outfall and system maps, GIS databases, technical reports, video and/or anecdotal information provided by the town staff. Review existing outfall inspection data.

Complete IDDE dry weather inspections for up to ten days in the field. No sample collection is required under this scope of work.

Review/update existing IDDF Program; Review/draft legal authority; Review/update written protocol for IDDE responsibilities.

Develop systematic procedures for locating and removing illicit connections. Develop illicit discharge prevention procedures. Define indicators of IDDE program progress.

Prepare written IDDE Program document.

E. *Assessment of construction runoff program*

F. *Assessment of post construction run-off program*

G. *Assessment of good housekeeping/pollution prevention practices for municipal facilities* - Review existing operations and maintenance procedures. Inventory town- owned parcels and evaluate parcels for use as potential mitigation offsets, BMP retrofit sites, or resources otherwise applicable to stormwater management practices.

H. *Identification of Future Needs* - Estimate level of effort and associated costs to meet EPA's future stormwater requirements under the MS4 General permit, including public education, public involvement, IDDE, construction and post construction stormwater runoff, good housekeeping, and water quality issues. This task should include understanding how to manage future development and redevelopment projects and identifying needed modifications to the stormwater management program, including staffing and funding.

Below are listed more specific tasks that will be completed as part of this task:

<u>*Mapping and Data Collection*</u>

Research and compile available mapping information, which will form the basis of documenting the current situation and identifying areas of critical concern using the latest Town, Mass GIS, and EPA information. Information will include:

<u>*Mapping information*</u>

a. ***Urban areas established by 2010 census***
b. ***Topography***
c. ***Drainage system information and outfalls, and identified by ownership***
d. ***Sewer system***
e. ***NHESP mapped endangered and rare species habitat areas***
f. ***Historic properties and structures***
g. ***Aquifer and watershed protection zones***
h. ***Waters of the United States (wetlands)***
i. ***Waters with TMDLs***
j. ***Water quality limited waters***
k. ***FEMA mapped flood zones***
l. ***Town owned properties***
m. ***Land use***
n. ***NRCS soils data with hydrologic group ratings***

Existing reports

Research and compile available reports and previously generated documents relative to permit compliance. These documents include (if available):

- *a.* ***2003 Stormwater Management Program***
- *b.* ***MS4 Annual Reports (last 3 years)***
- *c.* ***Town SWPPP information***
- *d.* ***All Town Bylaws and Regulations***
- *e.* ***List of Town-owned Properties with Addresses***
- *f.* ***Operations and Maintenance Plans for Town Facilities***
- *g.* ***Stormwater Pollution Prevention Plans (SWPPP) for Town Facilities***
- *h.* ***Available Watershed Association information***
- *i.* ***Street Sweeping and catch basin cleaning Information***
- *j.* ***Illicit connection and outfall sampling information***
- *k.* ***Title 5 Information***

MS4 Component Assessment and Future Needs

Assess each of the components of the MS4 program both for the past and to look at the future. Develop an MS4 Permit Status and Compliance Strategy Matrix - which will be used as an outline for the new stormwater management plan (SWMP).

1. ***Current status of all required tasks including the six minimum control measures will be assessed:***
    1) ***Public Education and Outreach***
    2) ***Public Involvement and Participation***
    3) ***Illicit Discharge Detection and Elimination Program***
    4) ***Construction Site Stormwater Runoff Control***
    5) ***Post Construction Stormwater Management (New & Re Developments)***
    6) ***Good Housekeeping including inventorying Town-owned parcels***
2. ***Identify areas with potential to generate higher than average pollutant loads***
3. ***Identify critical areas impacted by stormwater discharge***
4. ***Identify future needs***
5. ***Develop a plan for compliance with the new permit***
    - a. ***Responsible party***
    - b. ***Schedule***
    - c. ***Budget (planned/available)***
    - d. ***Funding sources – if applicable***

Illicit Discharge Detection and Elimination (IDDE) Program

Assess the current status of the Town's IDDE program. Meet with Town staff to review the program and obtain insights about the Town and stormwater system and overall

drainage patterns and pollutions sources. Take the information collected above to further develop a complete understanding of the issues.

Provide outfall screening. As noted in the RFP, we will perform up to 10 days of Dry Weather outfall screening. Coordinate with Town to visit outfalls during wet weather events in accordance with EPA guidelines. Screening will include:

- ***a. Using existing GIS mapping***
- ***b. Data will be collected using our standard tablet and data collection menus***
- ***c. Missing outfalls, if found, will be located manually using existing orthophotography***

Review and update (as necessary) IDDE related documents.

TASK 5: DEVELOP AND SCREEN ALTERNATIVES

A. ***Wastewater*** - Describe and outline process for assessment of alternatives to address identified needs.

1. Baseline conditions
2. Wastewater alternatives
3. Regulatory standards and water quality goals
4. Facilities requiring groundwater discharge permits
5. Evaluate wastewater collection system alternatives
6. Evaluate residuals management alternatives
7. Evaluate regional solutions

B. ***Water*** - Describe and outline process for assessment of alternatives to address identified needs.

1. Evaluate need for additional withdrawal volumes
2. Evaluate source management
3. Evaluate sources outside basin
4. Evaluate proposal to create new public water system

C. ***Stormwater*** - Describe and outline process for assessment of stormwater alternatives to address the following needs.

1. Additional actions to control groundwater

Typical groundwater control strategies to accomplish these goals include:

- ***Promotion of Infiltration/groundwater recharge where feasible***
- ***Disconnection of impervious areas***
- ***Reuse of stormwater on-site***
- ***Stormwater management on a watershed scale***
- ***Stormwater regulations***
- ***LID/BMP implementation for both public and private parties***

Alternatives will be developed with the Town and each alternative will be screened against the factors outlined in the RFP.

At a minimum, assessments should address evaluation of "no-action alternative" and "fix-it-first" alternative. The screening and evaluation of alternatives should use the following factors:

a. environmental benefits and impacts of selected alternatives

b. impacts on sensitive environmental receptors

c. cost-effectiveness evaluation

d. institutional arrangements

Identify, evaluate and screen alternatives for the Town's water, wastewater and stormwater infrastructure systems. The result will be a short-list of alternatives to further develop and rank in order of priority.

TASK 6: EVALUATE AND RANK PREFERRED ALTERNATIVES

Describe and outline process for ranking and evaluating recommended preferred alternatives for ***water, wastewater and stormwater***, addressing the following considerations:

- public participation
- recommended plan
- necessary institutional arrangements
- preliminary design and scheduling for implementation
- financial arrangements for implementing plan

Perform a detailed evaluation of the preferred (short-listed) alternatives for water, wastewater and stormwater system upgrades/improvements. Address all the items noted above and present a prioritized recommended plan for each discipline.

TASK 7: PUBLIC PARTICIPATION AND OUTREACH PROGRAM

Describe and outline a public participation program to focused on keeping interested stakeholders informed at key project planning milestone dates and events to solicit input for the public include briefings, public meetings, workshops, media release/public information coordinated with the IWRMP project schedule.

The development of a public outreach program is to keep interested stakeholders informed at key project planning milestone dates and events, and to rely on knowledgeable residents and business owners to contribute to the planning process through structured forums and solicit input. A schedule of public meetings, project updates and anticipated media releases/public information coordinated with the IWRMP project schedule should be developed. The program should include the following:

A. Develop a work plan that describes the public participation program, its schedule and budget, initial communication, and how communication of public information meetings will take place.

B. Develop information on posting on the Town's web site and update with project and meeting announcements.

C. Prepare and disseminate information to the public for public information meetings and hearings. Communication methods appropriate lo the purpose will be developed and may include project brochures, meeting notices, agendas, flyers, advertisements, informational fact sheets, press releases and bulletins.

D. Provide six (6) briefings to the Board of Water and sewer Commissioners throughout the assumed twenty (20) month process.

E. Conduct four (4) workshops and provide graphic support for these meetings in the way of handouts, and PowerPoint presentations. Coordinate the recording and distribution of meeting minutes. These workshops will be scheduled at the appropriate project milestones and will be coordinated with the Town.

F. Conduct one (1) public hearing (meeting) at the conclusion of the "draft" IWRMP and provide graphic support for this meeting and coordinate the recording and distribution of meeting minutes.

Work closely with the Town to develop a thoughtful, interactive and effective public outreach program.

TASK 8: COMPREHENSIVE WASTEWATER MANAGEMENT PLAN (CWMP) REPORT

A. Summarize in written document

B. Meet with Town representatives

C. Conduct a meeting to summarize <u>draft</u> report

D. Issue <u>final</u> CWMP report (concurrent with the IWRMP)

Develop a <u>draft</u> CWMP report and transmit to Town for review. Meet with the Town to review and discuss comments regarding the <u>draft</u> report. Incorporate comments on the draft report and issue a <u>final</u> report. Solicit and incorporate draft report comments from SRPEDD and DEP.

TASK 9: COMPREHENSIVE STORMWATER MANAGEMENT SYSTEM PLAN (CSWMP)

A. Review and update stormwater management plan for compliance with NPDES MS4 Program

B. Meet with Town and other stakeholders to review

C. Develop program updates to meet goals of improving water quality and meeting the requirements of the NPDES MS4

D. Develop/update written Comprehensive Stormwater Management Plan (CSWMP)

Develop/update the CSWMP first as a draft for review and comment, then finalize based on Town and stakeholders review.

Meet with Town staff to review and update the existing stormwater management plan (SWMP), to determine current status, schedule, responsible party, methodology for compliance and budget requirements for each task in the MS4 permit and IWRMP. Information gathered in related tasks will be compiled and summarized and reviewed against the existing SWMP.

In reviewing the existing SWMP, the following specific information will be assessed in detail:

1. ***Required documentation:***
    a. ***Identification of people responsible for implementation of program***
    b. ***Compliance regarding endangered species***
    c. ***Compliance regarding historic properties***
    d. ***Authorization of new or increased discharges***
    e. ***Annual program evaluation***
2. ***Inventory of the following:***
    a. ***Listing of all discharges to waters with TMDLs***
    b. ***Listing of all discharges to water quality limited waters***
    c. ***Sanitary sewer overflows (SSOs)***
3. ***Written procedures or description for the following:***
    a. ***Practices for achieving reduction in pollutants to the maximum extent practicable (MEP) through the six minimum control measures***
    b. ***Illicit discharge detection and elimination (IDDE) program***
    c. ***Site inspection procedures and enforcement of sediment and erosion control***
    d. ***Minimizing impacts to drinking water supply sources***
    e. ***Measurers to avoid impacts to surface drinking water supplies and their tributaries***

    Developing the CSWMP will be a key element in the final integrated plan. The integration of competing needs within the system will be balanced in the final integration.

TASK 10: INTEGRATED CAPITAL IMPROVEMENT PLAN

A. Develop prioritized capital improvement plan

B. Compile the recommended alternatives

C. Adjust the preliminary list of capital improvement projects based on timeliness, coordination with other project, regulatory or political concerns, environmental and public health concerns, community impacts, and budgetary constraints.

Integrate the water, wastewater and stormwater recommendations into one complete and holistic capital improvements plan (CIP).

One of the major goals of the integrated capital improvement plan is to develop an economically feasible Capital Improvements Plan (CIP) to address known water, wastewater and stormwater deficiencies. The total capital cost of all identified projects will be established and presented in a flexible strategy over a period of time deemed affordable through close analysis with the Town.

A financial capability evaluation will be performed. The integrated CIP will identify potential grants and other funds (for implementation of the recommended plan) available to the Town. Once the funding/financing options are fully vetted, a rate of spending will be established using a combination of project priorities, costs, and potential funding sources.

TASK 11: IWRMP REPORT

A. Document and summarize all work conducted under the forgoing tasks into a draft integrated water resources management plan report

B. Submit draft report to the Town of Somerset and the Massachusetts Department of Environmental Protection for review and comment

C. Conduct a public meeting to discuss report findings.

D. Submit final report to the Town and MassDEP

Similar to the CWMP and CSWMP, submit a draft report, review comments with the Town, DEP, SRPEDD (and others) and then complete and submit final IWRMP report.

TASK 12: FILE ENVIRONMENTAL NOTIFICATION FORM (ENF)

A. Prepare and file an Environmental Notification Form with MEPA

B. Conduct a public hearing on the IWRMP report and notification form

C. Address MEPA comments and update IWRMP

Below is an added task for project administration and additional project related meetings.

TASK 13: PROJECT ADMINISTRATION AND ADDITIONAL MEETINGS

A. Provide project administration services for the entire duration of this project. This will include project management, coordination with the Town, SRPEDD, DEP and other entities as needed.

B. For all meetings noted above in Tasks 1 through 12, Wright-Pierce will prepare agenda's and other meeting information as appropriate. We will attend in person all meetings and document such with written minutes of each meeting.

C. We recommend additional meetings as detailed below:

   a. Project kick-off meeting with the Town and SRPEDD.

   b. Four (4) meetings with the Town to be scheduled as needed during Tasks 1 through 6.

   c. It is assumed all project meetings will be held in Somerset.

The following <u>water system</u> tasks have been added to the IWRMP based on MassDEP ACO requirements:

1. Review current operations with regard to target tank water levels, set-points for booster pumps and other operating conditions that might be influencing water age.

2. Perform a water age analysis using the Town's computerized hydraulic model to test operational changes that could reduce water age. The following simulations are envisioned:
   a. Changes in operating level setpoint for the Hot and Cold Lane tanks
   b. Changes in pump operation and flow rate at the treatment facility
   c. Benefits of reducing tank volume during summer months when TTHMs are highest
   d. Changes in control for booster pumps for high zone

3. Summarize asset management findings regarding proper future sizing of infrastructure in the south end of the water distribution system. Analysis will include:
   a. Developing a pipe replacement plan for the system consistent with reduction of DBPs in the system
   b. Identifying piping that is too large for the reduced demands in the system
   c. Reconfiguring piping and services to reduce water age
   d. Possible abandonment of certain pipelines no longer of value.

APPENDIX B
Water Management Act Permit

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
SOUTHEAST REGIONAL OFFICE
20 RIVERSIDE DRIVE, LAKEVILLE, MA 02347 508-946-2700

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

February 26, 2010

Robert Lima
Somerset Water Department
~~3249 County~~ Street
Somerset, MA 02726

RE: SOMERSET - BRP\WMA
Interim Water Management Act
Permit #I9P42527301

INTERIM WATER MANAGEMENT ACT PERMIT

Dear Mr. Lima:

This letter will serve as your interim permit for water withdrawal under the Water Management Act, MGL c. 21G, pursuant to 310 CMR 36.34(6) and shall become effective on February 28, 2010.

This interim permit #I9P42527301 authorizes the continued withdrawal of the previously permitted volume on the condition that you complete the process for permit renewal and otherwise comply with 310 CMR 36.00 and all permit conditions in Permit #9P42527301, which is scheduled to expire on February 28, 2010. The interim permit may be terminated by your failure to comply with the provisions of MGL c. 21G and the regulations adopted thereunder by the Massachusetts Department of Environmental Protection (MassDEP) at 310 CMR 36.00, or by failure to comply with the conditions of Permit #9P42527301.

The interim permit shall be valid until MassDEP approves or denies your request for a permit renewal but in no case shall it be valid for more than one (1) year from the date of issuance. Interim permits may be renewed by MassDEP if a permit renewal application has not been either approved or denied at the time of expiration of the interim permit. This interim permit may be terminated by MassDEP pursuant to 310 CMR 36.21(4)(a) and will terminate automatically on approval or denial of your application for water withdrawal by MassDEP.

If you have any questions regarding the interim permit or the WMA permit renewal process, please contact Allison Rescigno O'Shea at (508) 946-2763.

Very truly yours,

Richard J. Rondeau, Chief
Drinking Water Program
Bureau of Resource Protection

Y:\DWP Archive\SERO\Somerset-WMA–Interim Permit #I9P42527301-2010-02-26
ecc: Duane LeVangie, DEP

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Water Management Act Program

20-Year Permit Renewal Application

A. Facility Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

1. Permittee Contact Information:

Somerset Water Department
Facility Name

3249 County Street
Street Address

City	State	Zip Code
Somerset	MA	02726

Contact Person Name/Title	Phone #
Robert E. Lima	508-674-4215

Fax #	Email
508-677-9691	

Water Management Act Permit #	Watershed
42527301	Taunton

2. Consultant Contact:

None at this time.
Consultant Company Name

Street Address

City	State	Zip Code

Contact Person Name/Title	Phone #

Fax #	Email

3. Existing Permit and Registration Information

Complete the following table for your existing Water Management registration(s) and permit(s).

Watershed Name(s)	Registration(s)	Permit(s)	Total Authorized Volume(s)
Watershed: Taunton	Registration #: 42527301	Permit #: 9P-4-25-273.01	
	Registered Volume (mgd): 2.81	Year 20 Permit Volume (mgd): 1.61	Total Authorized Volume: 4.42
Watershed:	Registration #:	Permit #:	
	Registered Volume (mgd):	Year 20 Permit Volume (mgd):	Total Authorized Volume:
Watershed:	Registration #:	Permit #:	
	Registered Volume (mgd):	Year 20 Permit Volume (mgd):	Total Authorized Volume:

20-Year Permit Renewal Application

B. Water Withdrawal Information

1. Is this a public water supply? ☒ Yes ☐ No If yes, PWS ID #: 4273000 (PWS ID #)

2. Number of permitted withdrawal points: Groundwater (G): 1 Surface Water (S): 2

Name and type of withdrawal points:

Name	Type	DEP Source ID # (if applicable)	Location (Street/Town)
(a) Somerset Reservoir	☐ G ☒ S	4273000-01S	3249 County Street Somerset, MA
(b) Segregansett River	☐ G ☒ S	4273000-02S	Brook Street Dighton, MA
(c) GP #2 Well	☒ G ☐ S	4273000-05G	581 Brook Street Dighton, MA
(d)	☐ G ☐ S		
(e)	☐ G ☐ S		
(f)	☐ G ☐ S		
(g)	☐ G ☐ S		

Photocopy this page and attach if you have more than seven withdrawal points.

3. Primary use category for this water withdrawal:

Public Water Supply	☒	Commercial	☐	Industrial	☐
Agriculture	☐	Cranberry	☐	Golf	☐
Other (please describe)	☐				

4. For public water suppliers, are you using Department of Conservation and Recreation (DCR) Office of Water Resources water needs forecasts?

☒ Yes ☐ No

Other (please describe): ______

5. For seasonal water users, have the number of days of operation for your water withdrawal changed from what is on your current permit?

☐ Yes ☐ No

If yes, number of days of operation on current permit: ______ # Days

Number of days of operation requested on renewed permit: ______ # Days

Please note that if there is an increase in total withdrawal volume, then a full permit application must be filed for the increase.

6. Permit length requested (number of years): 20 # Years

Permits cannot extend beyond the end of the 20-year permit cycle for your watershed. See the attached Permit Schedule for the watershed permitting and end date schedule.

20-Year Permit Renewal Application

B. Water Withdrawal Information (continued)

Wastewater Discharge

7. Where will the water withdrawn be discharged?

   100 % will be discharged to a public sewer system.

   Town of Somerset Water Pollution Control Facility
   Sewer System Name

   ___ % will be discharged to on-site disposal systems.

   ___ % will be discharged to another alternative (please describe).

   Alternative Discharge Description

8. Is some fraction of the water withdrawn to be discharged out of this watershed (include ocean discharge if appropriate)?

   ☐ Yes ☒ No If yes, what fraction of your total discharge and to which watersheds?

   ___ % will be discharged to the ___ Watershed

   ___ % will be discharged to the ___ Watershed

   ___ % will be discharged to the ___ Watershed

   ___ % will be discharged to the ___ Ocean discharge

9. Is there an NPDES discharge permit? ☒ Yes ☐ No MA0100676 NPDES Permit #

   What is the authorized NPDES daily discharge volume? 4.2 MGD (yearly daily average). Gallons per day

   Is the discharge volume metered? ☒ Yes ☐ No

   What is the location of the discharge point? Taunton River Discharge point location

10. Are there groundwater discharge permit(s)? ☐ Yes ☒ No ___ GW Discharge Permit #

    What is the authorized daily discharge volume? ___ Gallons per day

    Is the discharge volume metered? ☐ Yes ☐ No

    What is the location of the discharge point? ___ Discharge point location

    Please attach copies of any NPDES or groundwater discharge permits.

* We are awaiting new NPDES Permit.

20-Year Permit Renewal Application

C. Special Permit Conditions

Below is a list of special conditions that are often included in Water Management permits.

- Check all special permit conditions that appear in your Water Management permit;
- Provide a brief description how you have complied with the conditions; or
- If there have been unique circumstances that have affected your compliance with the conditions during the past five years, provide that information; and
- Attach additional sheets or additional information as needed.

☒ Maximum Authorized Daily Withdrawals from each Withdrawal Point

Source: GP #2 Well Replacement: 0.58 Approved Max (MGD)

Somerset Reservoir: 6.0 Approved Max (MGD

☒ Zone II Delineation (for Public Water Supplies only)

Completed by Earth Tech under DEP funding.

☒ Wellhead Protection (for Public Water Supplies only)

Best Effort Agreements with Town of Dighton in regards to Zone II and areas around Somerset Reservoir.

☒ Conservation

Please attach a copy of your Water Conservation Plan and provide a brief description of how the conservation plan has been implemented.

- For municipal public water suppliers, compliance with your conservation conditions is documented by completing the Commonwealth of Massachusetts Water Resources Commission Water Conservation Questionnaire for Public Water Suppliers, revised: March 11, 2008, which can be found on the MassDEP Website at http://www.mass.gov/dep/water/laws/outline.htm.

Resource Monitoring - please check all that apply:

☒ Streamflow ☐ Wetlands ☒ Pond or Lake ☐ Groundwater

☐ Other (please describe):

20-Year Permit Renewal Application

C. Special Permit Conditions (continued)

☐ Residential Gallons per Capita Day Performance Standard (for Public Water Supplies only)

☐ Unaccounted-for-Water Performance Standard (for Public Water Supplies only)

☐ Summer Limits on Nonessential Outdoor Water Use

☐ Baseline Withdrawal Volumes (for Public Water Supplies only)

☒ Reporting Raw and Finished Water Volumes

On ASR each year.

☐ Other

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Water Management Act Program

20-Year Permit Renewal Application

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

D1. Summary of 5-Year Historic Withdrawal Volumes

1. What is your current authorized withdrawal volume in this watershed? 2.81 (Registered Volume (mgd)) + 1.61 (Permit Volume (mgd)) = 4.42 (Total Authorized (mgd))

2. Fill in the total monthly historic withdrawals for the past five years in million of gallons (MG). NOTE 100,000 gallons = 0.10 MG.

Calendar Year	January	February	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Annual Total
2004	114,325	101,796	111.780	105.836	109.471	128.634	128,941	115,218	112,023	99.443	95.569	100.353	1,323.342
2005	104.425	100.342	109.699	104.177	101.392	132.274	150.854	151.598	114.525	109.129	92.611	103.960	1,379,986
2006	97.932	88.557	106.784	91.507	103.986	100.270	119.087	117.806	96.083	92.540	88.683	89.489	1,192.732
2007	94.893	99.238	103.828	91.786	107.999	121.993	122.522	119.527	110.980	100.474	90.075	90.817	1,253.945
2008	93.969	84.526	90.882	97.442	102.334	127.174	134.722	116.781	104.878	100.502	96.353	101.687	1,251.250

3. If your withdrawals have exceeded your total authorized withdrawal, or if you can identify unique circumstances that have affected your withdrawals during the past five years, please provide that information in the space below.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Water Management Act Program

20-Year Permit Renewal Application

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

D2. 20-Year Projection of Withdrawal Volume

1. Fill in the projected daily average water withdrawal in millions of gallons in Column 2. NOTE: 100,000 gallons = 0.10 MG
2. In Column 3, fill in the number of **days you expect to operate**. For **year-round withdrawals**, enter 365 days. For **seasonal withdrawals,** multiply the number of months that you will operate each year by 30 to get the days of operation (e.g., a golf course that irrigates during April, May, June, July, August and September would enter 6 months of operation x 30 days = 180 days of operation). Seasonal withdrawers must also complete Question 6 on page 8.
3. Multiply the **average daily water withdrawal** (Column 2) by the **days of operation** (Column 3) to get the **total annual water withdrawal.** Enter the number in Column 4.

	(1) Calendar Year	(2) Average Daily Withdrawal Volume (mgd)	(3) Days of Operation	(4) Total Annual Water Withdrawal (mgy)
	2010	3.73	365	1,361.5
	2011	3.73	365	1,361.5
	2012	3.73	365	1,361.5
	2013	3.73	365	1,361.5
Years 1-5	2014	3.73	365	1,361.5
	2015	3.82	365	1,394.3
	2016	3.82	365	1,394.3
	2017	3.82	365	1,394.3
	2018	3.82	365	1,394.3
Years 6-10	2019	3.82	365	1,394.3
	2020	3.92	365	1,430.8
	2021	3.92	365	1,430.8
	2022	3.92	365	1,430.8
	2023	3.92	365	1,430.8
Years 11-15	2024	3.92	365	1,430.8
	2025	4.02	365	1,467.3
	2026	4.02	365	1,467.3
	2027	4.02	365	1,467.3
	2028	4.02	365	1,467.3
Years 16-20	2029	4.02	365	1,467.3

* See DCR anticipated Water Demands

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Water Management Act Program

20-Year Permit Renewal Application

D2. 20-Year Projection of Withdrawal Volume (cont.)

* See DCR Anticipated water demands. *

4. The projected average daily withdrawal volume during Years 1-5, Years 6-10, Years 11-15 and Years 16-20 of the permit period is shown in the Table above.

   Average daily withdrawal volumes: ______ Years 1-5 ______ Years 6-10 ______ Years 11-15 ______ Years 16-20

5. If part of this volume is **registered**, subtract the registered volume from the average daily withdrawal volumes for Years 1-5, Years 6-10, Years 11-15 and Years 16-20.

Average daily withdrawal volume		Registered volume		Requested permit volume
3.73 (Average daily withdrawal volume for Years 1-5)	-	1.61 (Registered volume)	=	2.12 (Requested permit volume for Years 1-5)
3.82 (Average daily withdrawal volume for Years 6-10)	-	1.61 (Registered volume)	=	2.21 (Requested permit volume for Years 6-10)
3.92 (Average daily withdrawal volume for Years 11-15)	-	1.61 (Registered volume)	=	2.31 (Requested permit volume for Years 11-15)
4.02 (Average daily withdrawal volume for Years 16-20)	-	1.61 (Registered volume)	=	2.41 (Requested permit volume for Years 16-20)

For Seasonal Withdrawals operating less than 12 months per year

6. Seasonal withdrawals are often made at varying rates over the course of the season or year. For example, golf courses, ski areas or other seasonal suppliers do not need to withdraw water year round.

   If your withdrawal has large seasonal variations, please show the anticipated total monthly withdrawals for a typical year in the space below. The numbers you use can be actual projections for one year during the permit period. NOTE: 100,000 gallons = 0.10 MG

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.

   If you expect the seasonal variation in your withdrawal to change during the permit period, or if there is any unique aspect to the pattern of your withdrawal, please provide that information in the space below.

E. Certification

I certify, under penalty of law, that this application and all attachments were prepared under my supervision, in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information submitted in this application, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Signature of Applicant: [signature]

Title: Superintendent & Plant Manager

Printed Name: Robert E. Lima

Date: 11/07/2009

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Water Management Act Program

20-Year Permit Renewal Application

Attached you will find a copy of the "Massachusetts Department of Environmental Protection Water Management Act Program 20-Year Permit Renewal Application Form".

PLEASE NOTE - This application form is for Water Management permittees who do not anticipate needing more water during the upcoming 20-year permit period than they are currently permitted for in their Water Management Act permit. If you do not anticipate needing additional water, please complete this form and submit it to MassDEP, One Winter Street, 5th floor, Boston, MA 02108.

Permittees who anticipate needing additional water will need to file an application for a new Water Management permit. The application requirements and forms for a new Water Management permit can be found at http://www.mass.gov/dep/water/approvals/wmgforms.htm, BRP WM 03 - Water Management Withdrawal Permits.

Permittees who do not need to increase their authorized withdrawal volume now, but expect to need more water in five or ten years can either a) apply for a new 20-year permit for the anticipated additional withdrawal volumes now, or b) can apply for a permit renewal for the current authorized withdrawal volume now, and then file a full application for a new permit in five or ten years as their water withdrawals approach the authorized permit limit. Preparation and review of a full permit application can be time consuming. Permittees should allow ample time to prepare and submit a new permit application.

Demand Projections – Authorized withdrawal volumes in Water Management Act permits and permit renewals for public water supplies will be based on Department of Conservation and Recreation (DCR) Office of Water Resources 20-year demand projections. Please contact the Office of Water Resources if you are a public water supplier and you have any questions or concerns about the 20-year demand projections for your community and the data needed to complete the projections.

Non-public water supply Water Management permit holders and public water suppliers who do not have completed demand projections from DCR should request withdrawal volumes based on their best estimate of their water needs through the coming 20 years. In many cases, this will be the same as the amount in their current permit, is some cases where water demand has fallen, permittees will request less than the amount authorized in their current Water Management permit. Permittees who anticipated needing more water than their current permit authorizes will want to both renew their current Water Management Permit and file an application for a permit for the additional withdrawal volumes.

MassDEP is required to publish notice of all permit and permit renewal applications in the Environmental Monitor as part of the application review process and to accept public comment on the applications for 30 days after the notice appears in the Monitor. Because MassDEP relies on the public comment process to help identify potential environmental impacts from water withdrawals, we cannot issue Water Management permits or permit renewals for volumes greater than what is requested in the application and published in the Environmental Monitor.

Water Conservation for Public Water Suppliers – Water Conservation is an integral part of all Water Management permits. Public Water Suppliers must complete the "Commonwealth of Massachusetts Water Resources Commission Water Conservation Questionnaire for Public Water Suppliers". This questionnaire will document permittees' compliance with the conservation requirements in the current Water Management permit, and will outline permittees' plans for any additional conservation measures during the upcoming permit period. If you have any questions about the Water Conservation Questionnaire, please contact the DCR Office of Water Resources or the DEP Water Management Program.

Water Conservation for Other WMA Permittees – Non-public water supply permittees are required to provide a written description of their conservation program over the life of the current Water Management Permit in the "20-Year Permit Renewal Application, Section C, Special Permit Conditions". Permit renewal applicants must also provide a written plan for water conservation during the 2008-2028 permit period as part of their permit renewal application. At a minimum, applicants will be expected outline a program that meets the Massachusetts Water Conservation Standards (Executive Office of Environmental Affairs and Water Resources Commission. July 2006. Water Conservation Standards, available at http://www.mass.gov/envir/mwrc/pdf/Conservation_Standards.pdf). If you have any questions about documentation of your existing water conservation program or about the water conservation requirements for your permit renewal application, please contact the DEP Water Management Program.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Water Management Act Program

20-Year Permit Renewal Application

WATER MANAGEMENT ACT 20-YEAR PERMIT RENEWAL SCHEDULE

Watershed Number	Watershed Name	Renewal Application Filing Date	Permit Renewal Effective Date	20-Year Permit Term
1	Hudson River Basin	May 1-31, 2008	August 31, 2008	2008-2028
12 20	Blackstone River Basin Charles River Basin	November 1-30, 2008	February 28, 2009	2009-2029
17 18	Ipswich River Basin North Coastal Basin	May 1-May 31, 2009	August 31, 2009	2009-2029
19 25	Boston Harbor Basin Taunton River Basin	November 1-30, 2009	February 28, 2010	2010-2030
21	South Coastal Basin	May 1-31, 2010	August 31, 2010	2010-2030
22	Cape Cod Basin	August 1-31, 2010	November 30, 2010	2010-2030
23	Islands Basin	November 1-30, 2010	February 28, 2011	2011-2031
24	Buzzards Bay Basin	February 1-28, 2011	May 31, 2011	2011-2031
14	Concord River Basin	May 1- 31, 2011	August 31, 2011	2011-2031
27	Ten Mile River Basin	August 1-31, 2011	November 30, 2011	2011-2031
3	Deerfield River Basin	November 1-30, 2011	February 28, 2012	2012-2032
2	Housatonic River Basin	February 1-29, 2012	May 31, 2012	2012-2032
5	Farmington River Basin	May 1- 31, 2012	August 31, 2012	2012-2032
4	Westfield River Basin	August 1-31, 2012	November 30, 2012	2012-2032
7	Millers River Basin	November 1-30, 2012	February 28, 2013	2013-2033
8	Chicopee River Basin	February 1-28, 2013	May 31, 2013	2013-2033
9	Quinebaug River Basin	May 1- 31, 2013	August 31, 2013	2013-2033
6	Connecticut River Basin	August 1-31, 2013	November 30, 2013	2013-2033
11	Nashua River Basin	November 1-30, 2013	February 28, 2014	2014-2034
10	French River Basin	February 1-28, 2014	May 31, 2014	2014-2034
15	Shawsheen River Basin	May 1- 31, 2014	August 31, 2014	2014-2034
13	Merrimack River Basin	August 1-31, 2014	November 30, 2014	2014-2034
16	Parker River Basin	November 1-30, 2014	February 28, 2015	2015-2035
26	Narragansett River Basin	February 1-28, 2015	May 31, 2015	2015-2035

APPENDIX C
List of Private Wells

LIST OF PRIVATE WELLS
AS OF AUGUST 2002

SOMERSET, MA

Street/Location	Comment
1080 G.A.R. Highway	
1723 Brayton Avenue	
294 G.A.R. Highway	
164 Forrest Avenue	Irrigation
468 Fairway Drive	Irrigation
108 Warren Street	
26 Gertrude Street	
199 Lynch Avenue	Irrigation
2 O'Neil Road	
3 O'Neil Road	
5 O'Neil Road	
310 Olympic Road	
977 Lee's River Avenue	
80 Olympic Road	
Alberta Avenue (last house on right/East end of Street)	
105 Mayes Avenue	Irrigation
86 Carol Street	Irrigation

APPENDIX D
Annual Statistical Reports

OFFICE OF
THE BOARD OF
Water & Sewer Commissioners
3249 COUNTY STREET
P.O. BOX 35
SOMERSET, MASSACHUSETTS 02726
OFFICE (508) 679-2731
PLANT (508) 674-4215

SCOTT O'BRIEN, *CHAIRMAN*
STEPHEN J. RIVARD, *VICE-CHAIRMAN*
JOHN L. WALSH, *CLERK*

February 18, 2015

Massachusetts DEP
1 Winter Street
Boston, Massachusetts 02108

Attn: Water Management Act Program
Municipal Use Support Documents

Dear Sirs;

Enclosed are copies of all support documents required for determining the Confidently Estimated Municipal Use for the Town of Somerset Water Department which was submitted electronically on the 2014 ASR report on this date. I have also included the following raw water report for the Segregansett River Intake Station Source ID # 4273000 02-S which is located within the Taunton River Watershed:

January 2014	18 days in operation	93,714,000 gallons
February 2014	25 days in operation	134,284,000 gallons
March 2014	3 days in operation	13,003,000 gallons
April 2014	20 days in operation	104,012,000 gallons
May 2014	3 days in operation	51,843,000 gallons

Total Amount pumped: 396,866,000 gallons
Total Number of Days in operation: 61
Max. Single Day Volume Pumped: 5,806,000
Date Max. Amount Pumped: 02/23/2014

In the electronic report form there was no place to include this data for this water source.

If there is any additional support material which you need please contact me at any of the telephone numbers listed above.

Respectfully Submitted,

Robert E. Lima
Superintendent & Plant Manager

Receipt

Forms Attach Files Signature Receipt

Summary/Receipt

print receipt Exit

Your submission is complete. Thank you for using DEP's online reporting system. You can select "My eDEP" to see a list of your transactions.

DEP Transaction ID: 718461
Date and Time Submitted: 2/18/2015 5:18:37 PM
Other Email :

Form Name: Public Water System Annual Statistical Report

PWS ID: 4273000
PWS NAME: SOMERSET WATER DEPARTMENT
SIGNATURE: Robert E. Lima

System Information (COM/NTNC)(4273000)
Cross Connection Control Program (CCCP)(4273000)
Water Production & Consumption Information(4273000)
Source Protection - Watershed(4273000)
Source Protection - Zone II(4273000)
Water Management Act Annual Report - Distribution(4273000)
Water Management Act Annual Report - Basin Withdrawal(4273000)
Treatment Plants(4273000)
Pump Stations(4273000)
Storage Facilities(4273000)
Ground Water Sources(4273000)
Surface Water Sources(4273000)
Purchased Water Sources(4273000)

Ancillary Document Uploaded/Mailed
2014 ASR Report attachment

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2014

2014 Public Water Supply Verification

Please verify the information below and then click the Continue button.

PWS ID:	**4273000**
PWS Name:	**SOMERSET WATER DEPARTMENT**
PWS Street Address Line 1:	**3249 COUNTY ST**
PWS Street Address Line 2:	
City/Town:	**SOMERSET**
State:	**MA**
Zip Code:	**02726**
Class:	**COM**
Report Year:	**2014**

Legally Responsible Party Contact Information

The Legally Responsible Party is that individual who has the ultimate authority to ensure that your system is in compliance with the federal and state drinking water regulations. This may be the owner of a private facility, a town or school official or other similarly authorized person.

Book/Page:	
First Name	ROBERT
Middle Initial	E
Last Name	LIMA
Company Name	TOWN OF SOMERSET WATER DEPARTMENT
Phone Number	508-674-4215
Street Address 1	3249 COUNTY STREET
Street Address 2	
City/Town	SOMERSET
State	MASSACHUSETTS
Zip Code	02726

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2014

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

System Information (COM/NTNC)

1. PWS Street Address

SOMERSET WATER DEPARTMENT
PWS Name

3249 COUNTY ST
PWS Street Address Line 1

PWS Street Address Line 2

SOMERSET
City/Town

Massachusetts
State

02726
Zip Code

508-674-4215
Phone Number

508-677-9691
Fax Number (if available)

Web Site Address of PWS (if available)

2. PWS Mailing Address ☐ Same as street address

SOMERSET WATER DEPARTMENT
Mailing Name

3249 COUNTY ST
Mailing address Line 1

Mailing address Line 2

SOMERSET
City/Town

Massachusetts
State

02726
Zip Code

3. Is this a Seasonal System? (This question is not applicable to your PWS)

4. Owner/Responsible Person:

Owners Name - First, Middle Int, Last - one name only (if not municipal):

Phone Number

☐ This is a new owner.

5. Primary Contact:

ROBERT E
LIMA
Name (First, Middle Int, Last) • one name only•

508-674-4215
Phone Number

☐ This is a new contact.

rlma27351@yahoo.com
Email Address (For Emergency Purposes)

Re-enter the Email Address

6. Certified Drinking Water Operators employed by the PWS:

Name	Grade	License Number	Function	Begin-Date	End-Date
ROBERT , CYR	2T	22271	GENERAL OPERATOR	11/16/1992	
MICHAEL J, AGRESTI	2D	23599	SECONDARY DISTRIBUTION OPERATOR	2/10/2014	
IAN F, AMBROZIAK	2T OIT	24312	GENERAL OPERATOR	2/10/2014	
VASCO R, PACHECO	2D OIT/4T OIT	10024/20416	SECONDARY TREATMENT OPERATOR	6/21/2007	
SCOTT N, CHEETHAM	2T OIT	22583	GENERAL OPERATOR	1/12/2010	
GREGORY , HORDERN	2D	4885	PRIMARY DISTRIBUTION OPERATOR	2/28/2003	
GEORGE J, CARVALHO	C2	1967	GENERAL OPERATOR	6/1/1987	
ROBERT E , LIMA	C4	1562	PRIMARY TREATMENT OPERATOR	9/21/2007	
JONATHAN C, REBACK	3T	20737	GENERAL OPERATOR	3/10/2008	

To Add an operator, begin typing a license # in the field below. Pick the license number from the list and then click the "Add Operator" button.

License Number:

Add Operator

** Click on the Help button to get more information.

7. Primary Certified Operator Contact Information:

Primary Distribution Certified Operator Contact Information

Name Phone Number Fax Number

Mailing address information is provided to MassDEP by the Division of Professional Licensure

Mailing Address 1 Mailing Address 2

Alabama

Town/City State Zip Code E-Mail Address Re-Enter E-Mail Address

Primary Treatment Certified Operator Contact Information

Name Phone Number Fax Number

Mailing address information is provided to MassDEP by the Division of Professional Licensure

Mailing Address 1 Mailing Address 2

Alabama

Town/City State Zip Code E-Mail Address Re-Enter E-Mail Address

If you use a contract certified operator, does your system have a signed Public Water System Certified Operator Compliance Notice approved by the DEP

○ N/A ○ Yes ○ No

8. Names of Water Commissioners/Selectmen/Trustees/Association Board Members (if applicable). Please attach an organizational chart, if available. Check here to upload

Name	Phone	Title
Add Person		

9. Owner Type:

MUNICIPAL

Federal Employment Identification Number (FEIN):

(FEIN) - Do NOT provide SSN

10. Is this system a not-for-profit organization

◉ Yes ○ No

If yes, indicate Tax Exempt code (e.g., 501C):

11. Population Served(DailyAverage):

Winter Population (October March): 18554

Summer Population (April September): 18554

By what method was the population figured Census Type: Other Description:

12. Testing requirements for lead and copper and bacteria in your system is based on the population

	Number of Samples	Frequency of Samples
Lead and copper samples required:	30	3YEARS
Winter Bacteria samples required:	20	MONTH
Summer Bacteria samples required:	20	MONTH

13. Distribution Meter information:

a. Number of Service Connections: 6815

b. Percentage of service connections that are metered: 100 %

c. Are all publicly owned buildings metered? ○ Yes ○ No ○ N/A

d. If No, what percent are %

14. System Information

a. Number of Distribution Systems: 1

b. Finished Water Storage Capacity in Million Gallons (MG): 7.093

[Conversion factor is (# of gallons)/(1,000,000)= MG]

c. Pumping Capacity (GPM): 4450

15. Percentage of Source Types (must add up to 100%)

Ground Water	Surface Water	Purchased Ground	Purchased Surface
8 %	92 %	0 %	0 %

16. Emergency Response Actions:

a. Has your system completed an Emergency Response Plan (ERP).(DO NOT submit your ERP to MassDEP. MassDEP will review the ERP during your next sanitary survey.)

○ Yes ○ No

I have made changes to the ERP.

I have made no changes to the ERP.

b. Does your system have an Emergency Response (ER) annual training plan

Yes No

If Yes, please attach a copy of the plan. Describe the training performed during the reporting period, including the types of training, the date(s) of training, and number of staff and local officials trained on each date and their job titles.

c. Is your system registered for the Health and Homeland Alert Network (HHAN)

Yes No

d. Has your system signed the agreement and joined the Massachusetts Water and Wastewater Agency Response Network

Yes No

e. How often does your system test the following

Alarms: Other Frequency:

Interlocks: Other Frequency:

Back-up power sources: Other Frequency:

f. List and describe all Level 3 or higher ER incidents during the reporting period.

Date of ER incident	Level	Description
Add Incident		

17. Do you have an antenna or other appurtenance (not needed for drinking water purposes) attached to any of your storage tank(s)

Yes ● No No storage tanks

If Yes, list the antennae or other appurtenances, owner(s) names, and the date installed:

Storage Tank Name	Antennae or Appurtenance	Owner Name	Date (mm/dd/yyyy) Installed
Add Attachment			

18. Comments or additional information regarding this section:

Massachusetts Department of Environmental Protection PWSID#: 4273000
Bureau of Water Resources (BWR) – Drinking Water Program Name: SOMERSET WATER DEPARTMENT
Public Water Supply Annual Statistical Report City: SOMERSET
Reporting Year 2014 PWS Class: COM

1. Cross Connection Program Coordinator

ROBERT
Coordinator First Name

LIMA
Coordinator Last Name

3249 COUNTY STREET
Coordinator Street Address Line 1

Coordinator Street Address Line 2

SOMERSET
City/Town

Massachusetts
State

02726
Zip Code

508-674-4215
Phone Number

508-674-4215
Fax Number (if available)

RLMA27351@YAHOO.COM
Coordinator email

Surveyor Personnel Information :
To add a surveyor, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Surveyor" button.
MassDEP Certification ID Number

Add Surveyor

Tester Personnel Information :
To add a tester, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Tester" button.
MassDEP Certification ID Number

Add Tester

2. Did your system use the services of a third party/consultant for the implementation of your Cross-connection Control Program or a portion of i

(●) Yes ( ) No

JOHN
Contact First Name

ENLOE
Contact Last Name

JOHN ENLOE
Doing Business As
(Company/Individual Name)

150 DAVIS STREET
Consultant Street Address Line 1

Consultant Street Address Line 2

FALL RIVER
City/Town

Massachusetts
State

02720
Zip Code

774-644-1296
Phone Number

Fax Number (if available)

Consultant email

Third Party Consultant Surveyor Personnel Information:
To add a surveyor, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Surveyor" button.
MassDEP Certification ID Number

Add Consultant Surveyor

Third Party Consultant Tester Personnel Information:
To add a tester, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Tester" button..
MassDEP Certification ID Number

Add Consultant Tester

What services does the consultant perform for the town

- [x] Facilities Survey
- [x] Testing of Devices

[✓] Device Installation Plan Approval [ ] Program Management

[ ] Other(explain)

3. Complete the following table summarizing types and numbers of facilities surveyed during this reporting period.

Type of Facility	Total # of Facilities Served by PWS	# of Facilities Surveyed Prior to this reporting period	# of Facilities with first time surveys during this reporting period	# of Facilities Remaining to be Surveyed	# of Facilities Re-surveyed in this reporting period
	A	B	C	= A - (B+C)	
Commercial	206	206	0	0	1
Industrial	2	2	0	0	0
Institutional	3	3	0	0	0
Municipal	42	41	1	0	0
Residential (Optional)	0	0	0	0	0
Total	253	252	1	0	1

*Use Comment field at the end of this question set (question #17) to provide, clarifications, descriptions or explanations regarding the above data. Please reference the question number and table field in your description.

4. Are there any cross-connection(s) within your systems service area protected by:

Reduced Pressure Backflow Preventer (RPBP): (●) Yes ( ) No

Double Check Valve Assembly (DCVA): (●) Yes ( ) No

If the answer is No to both questions go to question 8. If the answer is yes please complete the appropriate section(s) of the following table.

Type of Facility	Total # of devices at the beginning of this reporting period	# of devices installed in this reporting period	# of devices removed & not replaced in this reporting period	Total # of devices	# of seasonal devices in Total
	A	B	C	= A +B-C	
RPBP					
Commercial	43	0	0	43	8
Industrial	43	0	0	43	10
Institutional	8	0	0	8	0
Municipal	37	6	2	41	1
Residential (Optional)	0	0	0	0	0

Total	131	6	2	135	19
DCVA					
Commercial	34	0	0	34	3
Industrial	10	0	0	10	0
Institutional	3	0	0	3	0
Municipal	4	1	0	5	0
Residential (Optional)	0	0	0	0	0
Total	51	1	0	52	3

*Use Comment field at the end of this question set (question #16) to provide, clarifications, descriptions or explanations regarding the above data. Please reference the question number and table field in your description.

*PWSs must maintain a list of ALL registered cross connections that are being protected by a RPBP or DCVA. The list must contain at a minimum the following information: owner/business name, Cross Connection ID#, types of protection (RPBP or DCVA), brand, model, serial # and exact location within th facility.

5. Provide information on the testing performed in this reporting period by the type of device/assembly.

Type of Protection	# of Initial tests	# of Routine tests	# of Failures	# of Repairs &Re-tests	# Not Tested
RPBP	6	259	3	3	0
DCVA	1	55	7	7	0

Describe any discrepancies between the expected number of tests, based on the total number of devices reported in question #5, and the actual number of tests reported in question #6. If you reported a value greater than 0 for "# Not Tested" in question #6 provide an explanation for why th devices were not tested.

3 DEVICES NOT TESTED IN 2ND ROUND BUT DID TEST AGAIN BUT ARE DATED IN 2015 BUT ARE COUNTED FOR 2014. BUILDINGS WERE NOT OPEN AT TIME OF 2ND ROUND OF TESTING

6. Can your PWS provide MassDEP with a copy of the list of RPBP and DCVA within 2 hours?

(●) Yes ( ) No

7. Does your PWS approve, permit and/or test PVB and/or SPPVB* devices?

PVB DEVICES: (●) Yes ( ) No

SPPVB DEVICES: ( ) Yes ( ) No

If Yes to either please provide the following details:

Type of Protection	# of Initial tests	# of Routine tests	# of Failures	# of Repairs &Re-tests
PVB	0	8	0	0
SPPVB				

*Use Comment field at the end of this question set (question #16) to provide, clarifications, descriptions or explanations regarding the above data. Please reference the question number and table field in your description.

8. What is the maximum time allowed to protect a cross connection after the discovery of a violation?

Check one: ( ) 14 days (●) 30 days ( ) 90 days ( ) Greater than 90 days

9. Do you have a fully implemented active cross-connection educational program directed toward residential customers?

(●) Yes ( ) No

If No, is there a date when you plan to have an educational program implemented?
NTNCs may skip this question.

Date(mm/dd/yyyy)

10. Do you have a fully implemented educational program for specific users (ex. Industrial, Commercial, Institutional, Municipal and Residential)?

(•) Yes ( ) No ( ) N/A

"N/A" should be selected only if your system does not have any Industrial, Commercial, Institutional, Municipal or Residential users.
If Yes, please list the types of users targeted through your education program. (Check all that apply):

[x] Industrial [x] Commercial [x] Institutional [x] Municipal [x] Residential

If No, when do you plan to have the educational program implemented? Date(mm/dd/yyyy)

11. Does your system have an atmospheric vacuum breaker (hose bib) program for your customers?

( ) Yes (•) No

If no do you plan to institute one in furure?
If yes go to question 13

( ) Yes (•) No

If yes When?
If no go to question 13.

Date(mm/dd/yyyy)

12. Does your system have a local ordinance, by-law or policy statement on cross-connection control?

(•) Yes ( ) No

If YES,and you already provided copy to MassDEP in 2008 (2007 ASR) no further action is required.

If YES,and you did not provide a copy to MassDEP please forward a copy to:

MassDEP Boston office, 1 Winter Street, 5th floor, Boston, MA 02108
Attn : Otavio DePaula-Santos

13. Does your water system have a total containment policy?

( ) Yes (•) No

Containment policy means ALL services connections have a device installed at the meter. Containment protects the water main by isolating each facility independently of its activity (residential, commertial, industrial, or municipal).

14. Has there been a cross-connection incident in your water system during the reporting period?

( ) Yes (•) No

If Yes, please provide infomation below:

Add Incident

15. Comments or additional information regarding this section

TWO DEVICES WERE TAKEN OUT OF THE SOMERSET HIGH SCHOOL BUILDING DEMOLISHED.

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2014

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Water Production & Consumption Information

How to report in Gallons vs. Million Gallons
When Converting gallons to Million gallons, decimal point moves 6 places to the left.

	If Reporting in Gallons (Gal)	If Reporting in Million Gallons (MG)
Example 1	45,562,100	45.5621
Example 2	340,212	0.340212
Example 3	631,020,000	631.02
Example 4	96,543	0.096543

(•) Gallons (GAL) ( ) Million Gallons (MG) ( ) No Meter

Volume Units

FINISHED Water Production and Consumption Summary for Reporting Year :

Finished Water means water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as treatment necessary to maintain water quality in the distribution system (e.g. booster disinfection, addition of corrosion control chemicals).

***Please do not enter commas(,) below.**

Month	(1) Amount of **finished** water from own sources (GAL)	(2) Amount of **finished** water purchased from other systems (GAL)	(3) Amount of **finished** water sold to other systems (GAL)	(4) Net **finished** Water that entered your distribution system (1) + (2) - (3)= (4) (GAL)
January	81217000	0	0	81217000
February	76292000	0	0	76292000
March	93252000	0	0	93252000
April	75217000	0	0	75217000
May	73876000	0	0	73876000
June	81782000	0	0	81782000
July	96377000	0	0	96377000
August	85549000	0	0	85549000
September	79801000	0	0	79801000
October	58872000	0	0	58872000
November	68472000	0	0	68472000
December	75428000	0	0	75428000
TOTAL	946135000	0	0	946135000

Maximum Daily Finished Water Consumption: Volume (GAL): 4196000 Date: 7/1/2014

RAW Water Production and Consumption Summary for Reporting Year :

Raw Water means water in its natural state, prior to treatment and is usually the water entering the first treatment process of a water treatment plant.

☐ Same as finished water (it is not necessary to complete Table if same volume as above)

***Please do not enter commas(,) below.**

Month	(1) Amount of **raw** water pumped from own sources (GAL)	(2) Amount of **raw** water purchased from other systems (GAL)	(3) Amount of **raw** water sold to other systems (GAL)	(4) Net **raw** Water Consumption (1) + (2) - (3) = (4) (GAL)

January	91827000	0	0	91827000
February	85969000	0	0	85969000
March	107079000	0	0	107079000
April	89586000	0	0	89586000
May	83993000	0	0	83993000
June	96304000	0	0	96304000
July	111292000	0	0	111292000
August	101020000	0	0	101020000
September	95001000	0	0	95001000
October	75400000	0	0	75400000
November	80105000	0	0	80105000
December	87839000	0	0	87839000
TOTAL	1105415000	0	0	1105415000

Maximum Daily Raw Water Pumping: Volume (GAL): 4485000 Date: 7/1/2014

Summary of Water Sold

Sold Water

System Name	PWS ID#	Total Volume Sold (GAL)	Water type
DIGHTON WATER DISTRICT	4076000		Finished

Metered Finished Water Consumption by Service Type

U.S. EPA requires every PWS to report what their water is used for in order to characterize each system. In this table, report the percentages of metered water for each category below, ONLY for those categories over 10%. For municipal water suppliers, most of the water will be reported as Residential Area. If any other categories are more than 10% of your metered use, report it in the appropriate category. If any category is less than 10%, do NOT report it. The precentage do NOT have to add to 100%, since water use in some categories will be less than 10% and therefore is not reported.

ONLY report uses for categories over 10% of total metered use. Report ALL metered water use in the Water Management Distribution System Form (if appropriate)

%	Primary Service Area	Type
	Yes	Day Care Center
	Yes	Dispenser
	Yes	Homeowners Association
	Yes	Hotel/Motel
	Yes	Highway Rest Area
50	Yes (selected)	Industrial/Agricultural
	Yes	Interstate Carrier
	Yes	Institution
	Yes	Medical Facility
	Yes	Mobile Home Park
	Yes	Mobile Home Park, Principal Residence
	Yes	Municipality
	Yes	Other Area
	Yes	Other Non-Transient Area
	Yes	Commercial

%	PrimaryType Service Area	
	Yes	Other Residential
	Yes	Other Transient
	Yes	Recreation Area
41	Yes	Residential Area
	Yes	Restaurant
	Yes	Retail Employees
	Yes	School
	Yes	Sanitary Improvement District
	Yes	Summer Camp
	Yes	Secondary Residences
	Yes	Service Station
	Yes	Subdivision
	Yes	Water Bottler
	Yes	Wholesaler

Summary of Treatment Plant Losses (complete only if finished water volume is less than raw water)

☐ No treatment plant losses (not applicable)

Treatment PlantID:	Total Raw Water into treatment plant last year (raw pumped + raw purchased - raw sold):	-	Total Finished Water from treatment plant last year:	=	Total Water Lost to Treatment Process last year:
4273000-01T	1105415000		854426000		250989000.00

Briefly describe the fate of the waste product (slurry or sludge) produced by your treatment process (discharge to sewer, groundwater discharge, settling lagoons, re-circulate back into treatment plant, etc.):

DISCHARGE TO SETTLING LAGOONS THEN DISCHARGED TO TOWN SEWER SYSTEM

X. Comments or additional information regarding this section

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PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Source Protection - Watershed

WaterShed

1. Mass DEP assigned WaterShed ID #: 14383

2. DEP Source IDs and Names of the withdrawal points in WaterShed.

SourceID	Source Name	Comments
4273000-01S	SOMERSET RES.	

3. MassDEP SWAP Program Identified Potential Sources of Contamination (PSC), please update with current water supply protection area inventory information.

PSC Description	Quantity	Ground Threat	Comments
AQUATIC WILDLIFE	1	H	SEASONAL
CLANDESTINE DUMPING	1	H	UNAUTHORIZED OFF-ROAD VEHICLES
LARGE QUANTITY HAZARDOUS WASTE GENERATORS	1	H	
21E OIL OR HAZARDOUS MATERIALS RELEASE	2	-	
CHEMICAL MANUFACTURE	2	H	
RESIDENTIAL FUEL OIL STORAGE	25	M	
RESIDENTIAL LAWN CARE/GARDENING	25	M	
RESIDENTIAL SEPTIC/CESSPOOL	25	M	
TRANSMISSION LINE	2	H	
TRANSPORTATION CORRIDOR	5	H	
FERTILIZER STORAGE AND USE	5	M	
PESTICIDE STORAGE OR USE	5	H	

Select Edit to Answer Questions 4-6:

4. Did your inspections of the WaterShed identify any new land uses or activities that pose a threat to drinking water quality? *

○ Yes ◉ No

If YES, please describe:

5. Did your inspection identify any violations of state or local land use controls? *

○ Yes ◉ No

If YES, please describe the violation(s), reporting and resolutions:

6. If YES, did you report those violations to the municipality (i.e. building inspector, board of health, planning board)?

○ Yes ○ No

Comments or Additional Information regarding this section:

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Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Source Protection - Zone II

Zone

1. **Mass DEP assigned Zone II ID #:** 503

2. **DEP Source IDs and Names of the withdrawal points in Zone II.**

SourceID	Source Name	Zone I Radius(ft)	Zone I Control	Pollution Sources
4273000-04G	GP WELL # 2	400	Y	
4273000-05G	FJM 2 WELL	400	Y	

3. **MassDEP SWAP Program Identified Potential Sources of Contamination (PSC), please update with current water supply protection area inventory information.**

PSC Description	Quantity	Ground Threat	Comments
CLANDESTINE DUMPING	1	H	UNAUTHORIZED OFF-ROAD VEHICLES
21E OIL OR HAZARDOUS MATERIALS RELEASE	2	-	
RESIDENTIAL FUEL OIL STORAGE	25	M	
RESIDENTIAL LAWN CARE/GARDENING	25	M	
RESIDENTIAL SEPTIC/CESSPOOL	25	M	
TRANSMISSION LINE	2	L	
TRANSPORTATION CORRIDOR	5	M	

Select Edit to Answer Questions 4-6:

4. **Did your inspections of the Zone II identify any new land uses or activities that pose a threat to drinking water quality? ***

○ Yes ◉ No

If YES, please describe:

5. **Did your inspection identify any violations of state or local land use controls? ***

○ Yes ◉ No

If YES, please describe the violation(s), reporting and resolutions:

6. **If YES, did you report those violations to the municipality (i.e. building inspector, board of health, planning board)?**

○ Yes ○ No

Comments or Additional Information regarding this section:

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City: SOMERSET
PWS Class: COM

Water Management Act Annual Report - Distribution

All public water suppliers distributing 100,000 gallons per day or more must complete Tables DS-1 through DS-5 and Tables DS-7 and DS-8. Tables DS-6 and DS-9 are optional. Instructions for completing Tables DS-1 through DS-8 are included in the ASR Instructions available at MassDEP's website. If you have any questions concerning completion of the Distribution System Report, please contact Richard Friend with the WMA Program at (617) 654-6522 or email him at richard.friend@state.ma.us

Table DS-1 Summary of Leak Detection Activities During the Reporting Year

1. Total miles of water mains *	95.26
2. Miles of mains surveyed this year	95.26
3. Number of leaks found	13
4. Number of leaks repaired	13
5. Estimated volume lost (mg) if a reliable estimate can be made	
6. Date of last leak detection survey of entire system: *	3/4/2014 (mm/dd/yyyy)

Table DS-2 Water Conservation - Limits on Withdrawals

1. **Did your PWS implement mandatory nonessential outdoor water use restrictions in the reporting year? ***

   ☐ Yes ◉ No

2. **If yes,why did you institute mandatory restrictions (check all that apply)?**

   a. ☐ Required by WMA permit

      ☐ Calendar trigger in permit

      ☐ Streamflow trigger in permit

      ☐ Other trigger in permit — If "Other Trigger" then describe:

   b. ☐ Reason other than permit requirement

      Describe:

3. **Please characterize the type of mandatory restrictions that were in place (Check all that apply)**

   ☐ Total outdoor ban

   ☐ Hand-held only

   ☐ Hourly

Describe:

Daily: Odd/Even Twice/Week Once/Week Other Daily If "Other Daily" then describe:

4. **If you instituted mandatory restrictions, on what dates were restrictions in place? (you may have had only one period of restriction)**

	Start Date	End Date
Period 1	(mm/dd/yyyy)	(mm/dd/yyyy)
Period 2	(mm/dd/yyyy)	(mm/dd/yyyy)
Period 3	(mm/dd/yyyy)	(mm/dd/yyyy)

5. **Indicate if you plan or expect to institute nonessential outdoor water use restrictions in the upcoming summer. If you hold a WMA permit with Seasonal Limits on Nonessential Outdoor Water Use conditions, indicate whether you plan on instituting calendar-based or streamflow trigger-based outdoor water use restrictions. Remember that if you plan on instituting calendar restrictions, they must be in place by May 1. Streamflow-based restrictions must be in place once the trigger specified in your WMA permit has been reached for three consecutive days. Refer to your permit for specific nonessential outdoor water use requirements. Indicate if you plan on instituting restrictions even though you do not hold a WMA permit with outdoor water use restriction or do not hold a permit at all.**

- [ ] Planning to institute calendar-based nonessential outdoor water use restrictions per WMA permit.
- [ ] Planning to institute streamflow-based nonessential outdoor water use restrictions per WMA permit.
- [ ] Planning to institute nonessential outdoor water use restrictions for reasons other than WMA permit requirements.
- [x] Do not intend on instituting nonessential outdoor water use restrictions.

Please Note: Enter volumes in Tables DS-3, DS-4, DS-5 and DS-6 in million gallons per year (mgy).
Example 1: if a volume is 654,120,152 gallons, enter 654.120152 mgy.
Example 2: if a volume is 580,123 gallons, enter 0.580123 mgy.
Example 3: if a volume is 86,000 gallons, enter 0.086 mgy.

Table DS-3 Metered Finished Water Use Complete Table DS-3 to account for all of your metered water volumes (e.g. permanent and temporary; private and municipal/government; billed and non-billed). Do not include water sold to other PWSs, which is reported on the Water Production & Consumption Information form

Use Category	No. of Service Connections	Total Volume (mgy)	Category Description
Residential *	6307	543.324	Water provided to residences in your distribution system, including for-profit apartments, condos, and seasonal homes. All water used for lawn watering at residential buildings belongs in this category.
Residential Institutions	5	18.012	Water provided to institutions with residential population such as colleges. It is optional to account institutions volumes separately (may be included in Residential above - see instructions).
Commercial/Business	331	39.892	Water served to businesses and other commercial entities.

Agricultural	7	1.148	Water used mainly to grow food, raise animals, or run a garden center.
Industrial	6	168.077	Water used mainly for industrial purposes.
Municipal/Institutional/Non-profits	63	11.123	Water used for municipal purposes, including schools, playing fields, municipal buildings, treatment plant; non-profits such as churches; non-residential institutions such as private schools.
Other*			Water used for purposes not included in above categories.
TOTALS	6719	781.576	Total number of service connections and metered volume.

* If you include a volume under "Other", list the use(s):

UNACCOUNTED FOR WATER (UAW)

Table DS-4 Confidently Estimated Municipal Use volume To qualify as confidently estimated municipal use calculations/documentation for each estimated use must be attached to this ASR or mailed to MassDEP. If no documentation is provided, DEP will count the volumes as unaccounted for water. See ASR Instructions for more detail. Leak detection volumes are not counted as a confidently estimated municipal use. Optional Excel spreadsheets for calculating confidently estimated use can be found at the MADEP website at http://www.mass.gov/eea/agencies/massdep/water/approvals/drinking-water-forms.html#16

Confidently Estimated Municipal Use (CEMU)		**Estimated million gallons per year**
Fire protection & training		0.330
Hydrant/water main flushing/main construction	+	22.853
Flow testing	+	0.417
Bleeders/ Blow offs	+	9.066
Tank overflow & drainage	+	
Sewer & stormwater system flushing	+	0.0174
Street cleaning	+	0.0306
Source meter calibration adjustments	+	
Major water main breaks (not leak detection)	+	1.88105
Total Confidently Estimated Municipal Use	=	34.59505

YOU MUST PROVIDE DOCUMENTATION FOR ALL OF YOUR CEMU VOLUMES.
Are you attaching electronic files to the eASR that document your CEMU volumes?

○ Yes ◉ No

Paper copies of CEMU volumes may be mailed to:
Mass DEP
1 Winter St.
Boston MA 02108
Attn: Water Management Act Program

Table DS-5 Unaccounted for Water To calculate UAW, subtract total metered use and confidently estimated municipal use volumes from the total volume of finished water entering your distribution system.

% of Total Water Available for Distribution

	Million Gallons/Year (MGY)	
Total Finished Water Available for Distribution **(Total Net Finished Water from Production Form)**	946.135	100%
Total Metered Use **(System Total Metered Use from Table DS-3)**	- 781.576	- 82.6 %
Total Confidently Estimated Municipal Use **(Total from Table DS-4)**	- 34.59505	- 3.7 %
Unaccounted for Water (UAW)	= 130.0	= 13.7 %

Table DS-6 Sources of Unaccounted for Water (Optional) Use this table to provide estimated volumes of your unaccounted for water.

Known or Suspected Source of Unaccounted for Water	**Estimated Volume (MGY)**
Leak Detection	0
Water Theft	0
Meter Malfunction/mis-registration	0
Other (specify):	0
Other (specify):	0
Total:	0

RESIDENTIAL GALLONS PER CAPITA DAY (RGPCD)

RGPCD is a performance standard for public water suppliers serving municipalities and is a measure of the average amount of water a resident uses each day during the reporting period. High RGPCD values are associated with unrestricted outdoor water use, especially lawn watering. See ASR Instructions for further explanation and examples. There are two steps to determine your RGPCD number: Step 1: Determine the residential population served by your system (2 options to choose from). Step 2: Calculate RGPCD from population served and residential metered water volume.

RGPCD Step 1 - Choose one of two options to determine Population Served

Population Option 1: Accurate Count (census data): If your PWS serves an entire municipality, then use the most recent local or Federal census number for the total residential population. Click Here for 2010 U.S. census populations for MA cities and towns. Partially served communities can use the most recent local or Federal census if private well users and/or those served by other PWS systems are subtracted out (attach documentation to this ASR). Communities with high seasonal fluctuations can pro-rate the population for the duration of the influx. See ASR Instructions for further detail and examples.

Population Option 2: Estimate from Households Served If your PWS serves a portion of one or more communities and you cannot obtain a reliable census, click on the following link to open an excel spreadsheet for estimating your population. Click Here. This estimate is calculated from the number of households connected to your distribution system and the average household size. Save the spreadsheet onto your computer for use in subsequent years' reporting. If you are using a spreadsheet from your assessor's office or planning board to estimate number of households served, attach the spreadsheet or mail it to DEP and report the population served on Table DS-7 below.

If mailing Population Calculations or documentation send to:
Mass DEP
1 Winter St.
Boston MA 02108
Attn: Water Management Act Program

Table DS-7 Residential Population Served

Community(ies) served by PWS is (are) :	Fully Served
Method of Determining Population Served:	Option 1(Census)
Census Type (Federal or Local):	Local
Census year:	2014
Population Served:	18554

RGPCD Step 2 – Calculate RGPCD

Table DS-8 Residential Gallons per Capita Day To determine RGPCD, your metered residential volume (million gallons/year) is divided by 365 days. The result in then divided by the population served and multiplied by 1,000,000 to obtain gallons per person per day. If you include Residential Institutions volume in your RGPCD volume, also include the Residential Institutions population. See ASR instructions

Residential Water Use (million gallons)	/ 365	/ Population Served	X 1,000,000	=	Residential Gallons per Capita Day (gallons/person/day)
543.324	/ 365	/ 18554	X1,000,000	=	80

Table DS-9 Use this table to provide comments or additional information regarding this section of the ASR. You may explain discrepancies, provide supplemental information, or provide any other information to assist MassDEP in processing the data in your ASR.

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City: SOMERSET
PWS Class: COM

Water Management Act Annual Report - Basin Withdrawal

Instructions for completing Tables BW-1 through BW-4 are included in the ASR Instructions available at MassDEP's website. If you have any questions concerning completion of the Water Management Act Annual Report, please contact Richard Friend with the WMA Program at (617) 654-6522 or email him at richard.friend@state.ma.us

Table BW-1 Permit & Registration Information

River Basin (Watershed)	Registration Number	Permit Number
25-TAUNTON	42527301	9P42527301

Water Withdrawal by Watershed

Calculation of Daily Average Withdrawal: Use Table BW-2 to document the reporting year withdrawal volume(s) by watershed. Table BW-3 compare's the reporting year actual withdrawal volume(s) to the volume(s) authorized under your WMA registration(s) and/or permit(s). The total volumes for each source and their respective watershed are reported in the Ground Water Sources and for Surface Water Sources report forms. Enter the total of all sources for each watershed in Table BW-2.

Enter volumes in million gallons per year(MGY). Example: If you pumped 400,512,000 gallons in the year, enter 400.512.

Table BW-2 Average Daily Withdrawal by Watershed

River Basin	*Total Raw Water Pumped in the reporting year (mgy)	/ 365 =	Watershed Average Daily Withdrawal (mgd)
25-TAUNTON	1105.415	/ 365 =	3.03

Table BW-3 WMA Authorized Volume vs. Actual Withdrawal Volume

River Basin	Registered Volume (mgd)	+	Permitted Volume (mgd)	=	WMA Authorized Withdrawal Volume (mgd)	-	Daily Avg. Water Use (mgd) (from Table BW-2 above)	=	Difference*
25-TAUNTON	2.81	+	1.61	=	4.42	-	3.03	=	1.39

*** A positive difference indicates that the volume withdrawn is less than the authorized volume. A negative value indicates that more water was pumped than is authorized and that your PWS may be out of compliance.**

Table BW-4 Permit Special Conditions

Review your WMA permit and list any Special Conditions of your WMA permit that require submission of an annual report to MassDEP. If the required report is being submitted with this ASR, please note in Table BW-4. If a required report was submitted earlier in the year, please provide the date submitted.

WMA Permit Special Condition Requiring

Annual Report to MassDEP	Report Attached to ASR	If not attached, date submitted to MassDEP
Add Special Condition		

If mailing annual report, send to:
MADEP

1 Winter St.
Boston MA 02108
Attn: Water Management Act Program

Table BW-5 Use this table to provide comments or additional information regarding this section of the ASR. You may explain discrepancies, provide supplemental information, or provide any other information to assist MassDEP in processing the data in your ASR.

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PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Treatment Plants

Treatment Plant

1. Plant Information

Plant ID# : 4273000-03T
Plant Name: FJM 2 WELL TREATMENT PLANT
Street Address Line 1: 581 BROOK STREET
Street Address Line 2:
City/Town: SOMERSET
State(2 letter abbreviation): MA
Zip: 02726
Status: ACTIVE
Availability: ACTIVE
Class: I-T
Capacity (MGD): .58
Contact: ROBERT E LIMA
Phone: 508-674-4215
Fax: 508-672-1272

2. Related Sources Table

4273000-05G	FJM 2 WELL

3. Treatment Table(s)

Click to Expand/Collapse

Treatment Plant

1. Plant Information

Plant ID# : 4273000-01T
Plant Name: TREATMENT PLANT
Street Address Line 1: 3249 COUNTY ST
Street Address Line 2:
City/Town: SOMERSET
State(2 letter abbreviation): MA
Zip: 02726
Status: ACTIVE
Availability: ACTIVE
Class: III-T
Capacity (MGD): 6
Contact: ROBERT E LIMA
Phone: 508-674-4215
Fax: 508-672-1272

2. Related Sources Table

4273000-01S	SOMERSET RES.

3. Treatment Table(s)

Click to Expand/Collapse

Comments or additional information regarding this section

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2014

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Pump Stations

Pump

1. Pump Information

HOT AND COLD LANE BOOSTER PUMP STATION
Pump Station Name

HOT AND COLD
Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	2	Number of Emergency Pumps:	
Raw or Finished Water:	F	Maximum Aggregate Capacity (Gallons per Minute):	200
Standby/Emergency Power:	N		
Primary Pump Details			
Suction Type:		Suction Head (ft.):	
Suction Size (inches):	2	Motor Horse Power:	25
Motor Type:	CENTRIFUGA	Motor Control:	A
Discharge Type:		Discharge Size (inches):	2
Installation Date	05/01/1995	Model #:	
Pump Manufacturer:	PEARLESS		

2. Related Sources Table (if applicable)

4273000-01S	SOMERSET RES.
4273000-05G	FJM 2 WELL

Pump

1. Pump Information

SOMERSET FILTRATION PLANT
Pump Station Name

3249 COUNTY
Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	3	Number of Emergency Pumps:	
Raw or Finished Water:	F	Maximum Aggregate Capacity (Gallons per Minute):	3800
Standby/Emergency Power:	Y		
Primary Pump Details			
Suction Type:		Suction Head (ft.):	
Suction Size (inches):	10	Motor Horse Power:	200
Motor Type:		Motor Control:	
Discharge Type:	S	Discharge Size (inches):	12
Installation Date	01/01/1993	Model #:	
Pump Manufacturer:	DEMPSTER		

2. Related Sources Table (if applicable)

4273000-01S	SOMERSET RES.

Pump

1. Pump Information

FJM #2 WELL PUMPING STATION
Pump Station Name

581 BROOK STREET
Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	1	Number of Emergency Pumps:	
Raw or Finished Water:	R	Maximum Aggregate Capacity (Gallons per Minute):	400
Standby/Emergency Power:	Y		
Primary Pump Details			
Suction Type:		Suction Head (ft.):	

Suction Size (inches):	4	Motor Horse Power:	40
Motor Type:	VT	Motor Control:	
Discharge Type:		Discharge Size (inches):	6
Installation Date	09/01/2000	Model #:	
Pump Manufacturer:	FLOWAY		

2. Related Sources Table (if applicable)

4273000-05G	FJM 2 WELL

Pump

1. Pump Information

SEGREGANSET RIVER PUMPING STATION
Pump Station Name

SOMERSET
Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	2	Number of Emergency Pumps:	0
Raw or Finished Water:	R	Maximum Aggregate Capacity (Gallons per Minute):	10416
Standby/Emergency Power:	N		
Primary Pump Details			
Suction Type:		Suction Head (ft.):	0
Suction Size (inches):	12	Motor Horse Power:	250
Motor Type:		Motor Control:	A
Discharge Type:		Discharge Size (inches):	12
Installation Date	01/01/1962	Model #:	
Pump Manufacturer:	ALLIS-CHALMERS		

2. Related Sources Table (if applicable)

Pump

1. Pump Information

RAW WATER INTAKE PUMPS
Pump Station Name

TREATMENT PLANT REAR
Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	2	Number of Emergency Pumps:	
Raw or Finished Water:	R	Maximum Aggregate Capacity (Gallons per Minute):	4800
Standby/Emergency Power:			
Primary Pump Details			
Suction Type:	C	Suction Head (ft.):	
Suction Size (inches):	10	Motor Horse Power:	20
Motor Type:	CENTRIFUG	Motor Control:	M
Discharge Type:	S	Discharge Size (inches):	10
Installation Date	01/01/1993	Model #:	
Pump Manufacturer:	PEERLESS		

2. Related Sources Table (if applicable)

4273000-01S	SOMERSET RES.

Comments or additional information regarding this section

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2014

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Storage Facilities

Storage Facility

RICHMOND HILL
Storage Facility Name

DISTR. SYSTEM ELM STREET IN DIGHTON
Location

Status:	ACTIVE	Availability:	ACTIVE
Storage Type:	GROUND LEVEL STORAGE TANK	Capacity (MG):	.38
Material:	STEEL	Installation Date	

Storage Facility

READ ST.
Storage Facility Name

DISTR. SYSTEM
Location

Status:	ACTIVE	Availability:	ACTIVE
Storage Type:	GROUND LEVEL STORAGE TANK	Capacity (MG):	.643
Material:	STEEL	Installation Date	10/13/1998

Storage Facility

EAST TANK @ HOT AND COLD LANE
Storage Facility Name

HOT AND COLD LANE W/SOLARBEE MIX. SYSTEM
Location

Status:	ACTIVE	Availability:	ACTIVE
Storage Type:	GROUND LEVEL STORAGE TANK	Capacity (MG):	3
Material:	CONCRETE	Installation Date	06/15/2011

Storage Facility

WEST TANK @ HOT AND COLD LANE
Storage Facility Name

HOT AND COLD LANE W/SOLARBEE MIX. SYSTEM
Location

Status:	ACTIVE	Availability:	ACTIVE
Storage Type:	GROUND LEVEL STORAGE TANK	Capacity (MG):	3.07
Material:	CONCRETE	Installation Date	07/01/2012

Comments or additional information regarding this section

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2014

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Ground Water Sources

Individual Ground Water Source Statistics

Source ID: 4273000-05G
Source Name: FJM 2 WELL
Location: BROOK ST 581

Status: A
Source Availability: ACTIVE

Latitude: 41.824569
Longitude: -71.134841
Source Watershed: TAUNTON
Well Type: GRAVEL-PACKED
Well Depth (ft.): 39
Well Casing Height (ft.): 0
Well Casing Depth (ft.): 0
Screen Length (ft.): 7.5

Pump Setting (ft): 0

Approved Daily Pumping Volume (MGD): .576
Source Metered: Yes *This is a Required field.
Date of Meter Installation: 11/9/2004
Type of water metered for source: FINISHED

Last Meter Calibration: 12/1/2014

Withdrawal Units: GAL
January: 7,471,000
February: 6,556,000
March: 7,222,000
April: 7,223,000
May: 7,150,000
June: 6,648,000
July: 6,412,000
August: 6,836,000
September: 8,280,000
October: 9,247,000
November: 9,269,000

December: 9,395,000
Total Amount Pumped: 91,709,000

Total # of Days Pumped: 364
Maximum Single Day Pumped Volume: 337,000
Date of Maximum Amount Pumped: 11/11/2014

Comments or additional information regarding this section

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2014

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Surface Water Sources

Individual Surface Water Source Statistics

Source ID: 4273000-01S
Source Name: SOMERSET RES.
Location: SOMERSET
Location (Line2):
Status: A
Source Availability: ACTIVE

Latitude: 41.777569
Longitude: - 71.137337
Source Watershed: TAUNTON

Terminal Reservoir: Y
Watershed Area (Miles^2): .39
USGS Elevation (ft.):
Surface Area (Acres): 175
Storage Capacity (MG): 1400
Watershed Plan?: Y
SWTR Waiver Granted?: Y
Safe Yield (MGD): 5
Source Metered: Yes
Date of Meter Installation: 7/25/1999
Type of water metered for source: RAW
Last Meter Calibration: 12/1/2014

Withdrawal Units: GAL
January: 84,365,000
February: 79,413,000
March: 99,857,000
April: 82,363,000
May: 76,843,000
June: 89,656,000
July: 104,880,000
August: 94,184,000
September: 86,721,000
October: 66,153,000
November: 70,836,000
December: 78,444,000
Total Amount Pumped: 1,013,715,000

Total # of Days Pumped: 365
Maximum Single Day Pumped Volume: 4,485,000
Date of Maximum Amount Pumped: 7/1/2014

Comments or additional information regarding this section

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2014

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Purchased Water Sources

Comments or additional information regarding this section

2015 ASR

MassDEP's Online Filing System

Receipt

Forms Attach Files Signature Receipt

print receipt Exit

Summary/Receipt

Your submission is complete. Thank you for using DEP's online reporting system. You can select "My eDEP" to see a list of your transactions.

DEP Transaction ID: 807388
Date and Time Submitted: 2/22/2016 2:47:40 PM
Other Email :

Form Name: Public Water System Annual Statistical Report

PWS ID: 4273000
PWS NAME: SOMERSET WATER DEPARTMENT
SIGNATURE: Robert E. Lima

1 - System Information (COM/NTNC)(4273000)
2 - Cross Connection Control Program (CCCP)(4273000)
3 - Water Production & Consumption Information(4273000)
4 - Source Protection - Watershed(4273000)
5 - Source Protection - Zone II(4273000)
6 - Water Management Act Annual Report - Distribution(4273000)
7 - Water Management Act Annual Report - Basin Withdrawal(4273000)
8 - Treatment Plants(4273000)
9 - Pump Stations(4273000)
10 - Storage Facilities(4273000)
11 - Ground Water Sources(4273000)
12 - Surface Water Sources(4273000)
13 - Purchased Water Sources(4273000)

Ancillary Document Uploaded/Mailed
2015 ASR Letter

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2015

2015 Public Water Supply Verification

Please verify the information below and then click the Continue button.

PWS ID:	**4273000**
PWS Name:	**SOMERSET WATER DEPARTMENT**
PWS Street Address Line 1:	**3249 COUNTY ST**
PWS Street Address Line 2:	
City/Town:	**SOMERSET**
State:	**MA**
Zip Code:	**02726**
Class:	**COM**
Report Year:	**2015**

Legally Responsible Party Contact Information

The Legally Responsible Party is that individual who has the ultimate authority to ensure that your system is in compliance with the federal and state drinking water regulations. This may be the owner of a private facility, a town or school official or other similarly authorized person.

Book/Page:	
First Name	ROBERT
Middle Initial	E
Last Name	LIMA
Company Name	TOWN OF SOMERSET WATER DEPARTMENT
Phone Number	508-674-4215
Street Address 1	3249 COUNTY STREET
Street Address 2	
City/Town	SOMERSET
State	Massachusetts
Zip Code	02726

Please be patient while the form loads.

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2015

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

System Information (COM/NTNC)

1. PWS Street Address

SOMERSET WATER DEPARTMENT
PWS Name
3249 COUNTY ST
PWS Street Address Line 1
PWS Street Address Line 2
SOMERSET
City/Town
Massachusetts
State
02726
Zip Code
508-674-4215
Phone Number
508-677-9691
Fax Number (if available)
Web Site Address of PWS (if available)

2. PWS Mailing Address ☐ Same as street address

SOMERSET WATER DEPARTMENT
Mailing Name
3249 COUNTY ST
Mailing address Line 1
Mailing address Line 2
SOMERSET
City/Town
Massachusetts
State
02726
Zip Code

3. Is this a Seasonal System? (This question is not applicable to your PWS)

4. Owner/Responsible Person:

☐ This is a new owner.
Owners Name - First, Middle Int, Last - one name only (if not municipal):
Phone Number

5. Primary Contact:

ROBERT E
LIMA
Name (First, Middle Int, Last) • one name only•
508-674-4215
Phone Number
☐ This is a new contact.
rlma27351@yahoo.com
Email Address (For Emergency Purposes)
Re-enter the Email Address

6. Certified Drinking Water Operators employed by the PWS:

Name	Grade	License Number	Function	Begin-Date	End-Date
MICHAEL J, AGRESTI	2D	23599	SECONDARY DISTRIBUTION OPERATOR	2/10/2014	
IAN F, AMBROZIAK	2T OIT	24312	GENERAL OPERATOR	2/10/2014	
VASCO R, PACHECO	2D OIT/4T OIT	10024/20416	SECONDARY TREATMENT OPERATOR	6/21/2007	6/30/2015
ROBERT , CYR	2T	22271	GENERAL OPERATOR	11/16/1992	12/31/2015
GEORGE J, CARVALHO	C2	1967	GENERAL OPERATOR	6/1/1987	10/3/2014
JONATHAN C, REBACK	3T	20737	SECONDARY TREATMENT OPERATOR	3/10/2008	
ROBERT E , LIMA	C4	1562	PRIMARY TREATMENT OPERATOR	9/21/2007	
GREGORY , HORDERN	2D	4885	PRIMARY DISTRIBUTION OPERATOR	2/28/2003	
SCOTT N, CHEETHAM	2T OIT	22583	GENERAL OPERATOR	1/12/2010	

To Add an operator, begin typing a license # in the field below. Pick the license number from the list and then click the "Add Operator" button.

License Number:

Add Operator

** Click on the Help button to get more information.

7. Primary Certified Operator Contact Information:

Primary Distribution Certified Operator Contact Information

GREGORY HORDERN 508-674-4215

Name | Phone Number | Fax Number

Mailing address information is provided to MassDEP by the Division of Professional Licensure

170 BURNSIDE DR

Mailing Address 1 | Mailing Address 2

SWANSEA | Massachusetts | 02777

Town/City | State | Zip Code | E-Mail Address | Re-Enter E-Mail Address

Primary Treatment Certified Operator Contact Information

ROBERT E | LIMA | 508-674-4215 | 508-672-1272

Name | Phone Number | Fax Number

Mailing address information is provided to MassDEP by the Division of Professional Licensure

220 CONNECTICUT AVE

Mailing Address 1 | Mailing Address 2

SOMERSET | Massachusetts | 02726

Town/City | State | Zip Code | E-Mail Address | Re-Enter E-Mail Address

If you use a contract certified operator, does your system have a signed Public Water System Certified Operator Compliance Notice approved by the DEP

○ N/A ○ Yes ◉ No

8. Names of Water Commissioners/Selectmen/Trustees/Association Board Members (if applicable). Please attach an organizational chart, if available. ☐ Check here to upload

Name			Phone	Title	
SCOTT		O'BRIEN	508-674-4215	CHAIRMAN	Delete
JOHN	L	WALSH	508-674-4215	VICE-CHAIRMAN	Delete
ROGER		BENEVIDES	508-674-4215	CLERK	Delete

Add Person

9. Owner Type:

MUNICIPAL

Federal Employment Identification Number (FEIN):

(FEIN) - Do NOT provide SSN

10. Is this system a not-for-profit organization

◉ Yes ○ No

If yes, indicate Tax Exempt code (e.g., 501C): 501C

11. Population Served(DailyAverage):

Winter Population (October March): 17237

Summer Population (April September): 17237

By what method was the population figured — Census Type: City/Town Annual — Other Description:

12. Testing requirements for lead and copper and bacteria in your system is based on the population .

	Number of Samples	Frequency of Samples
Lead and copper samples required:	30	3YEARS
Winter Bacteria samples required:	20	MONTH
Summer Bacteria samples required:	20	MONTH

13. **Distribution Meter information:**

a. Number of Service Connections: 6729

b. Percentage of service connections that are metered: 100 %

c. Are all publicly owned buildings metered? ◉ Yes ○ No ○ N/A

d. If No, what percent are %

14. System Information

a. Number of Distribution Systems: 1

b. Finished Water Storage Capacity in Million Gallons (MG): 7.093

[Conversion factor is (# of gallons)/(1,000,000)= MG]

c. Pumping Capacity (GPM): 4450

15. Percentage of Source Types (must add up to 100%)

Ground Water	Surface Water	Purchased Ground	Purchased Surface
8 %	92 %	0 %	0 %

16. Emergency Response Actions:

a. Has your system completed an Emergency Response Plan (ERP).(DO NOT submit your ERP to MassDEP. MassDEP will review the ERP during your next sanitary survey.)

(●) Yes ( ) No

( ) I have made changes to the ERP.

(●) I have made no changes to the ERP.

b. Does your system have an Emergency Response (ER) annual training plan

( ) Yes (●) No

If Yes, please attach a copy of the plan. Describe the training performed during the reporting period, including the types of training, the date(s) of training, and number of staff and local officials trained on each date and their job titles.

c. Is your system registered for the Health and Homeland Alert Network (HHAN)

( ) Yes (●) No

d. Has your system signed the agreement and joined the Massachusetts Water and Wastewater Agency Response Network

( ) Yes (●) No

e. How often does your system test the following

Alarms:	Quarterly	Other Frequency:	
Interlocks:	Quarterly	Other Frequency:	
Back-up power sources:	Other	Other Frequency:	WEEKLY

f. List and describe all Level 3 or higher ER incidents during the reporting period.

Date of ER incident	Level	Description
Add Incident		

17. Do you have an antenna or other appurtenance (not needed for drinking water purposes) attached to any of your storage tank(s)

(●) Yes ( ) No ( ) No storage tanks

If Yes, list the antennae or other appurtenances, owner(s) names, and the date installed:

Storage Tank Name	Antennae or Appurtenance	Owner Name	Date (mm/dd/yyyy) Installed	
EAST TANK @ HOT AND COLD LANE	ANTENNAE	SPRINT	9/7/2012	Delete
WEST TANK @ HOT AND COLD LANE	ANTENNAE	T-MOBILE	2/5/2016	Delete
READ ST.	ANTENNAE	AT&T	12/18/2000	Delete
READ ST.	ANTENNAE	TOWN OF SOMERSET	10/1/1999	Delete
Add Attachment				

18. Comments or additional information regarding this section:

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2015

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

1. Cross Connection Program Coordinator

ROBERT
Coordinator First Name

LIMA
Coordinator Last Name

3249 COUNTY STREET
Coordinator Street Address Line 1

Coordinator Street Address Line 2

SOMERSET
City/Town

Massachusetts
State

02726
Zip Code

508-674-4215
Phone Number

508-674-4215
Fax Number (if available)

RLMA27351@YAHOO.COM
Coordinator email

Surveyor Personnel Information :

To add a surveyor, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Surveyor" button.

MassDEP Certification ID Number

Surveyor's FirstName	Surveyor's LastName	MassDEP Certification ID Number	Expiration Date	Phone Number	Reviewer Surveyor	
SEAN P	ANDERSON	4485	11/1/2018	570-977-0486	☐	Delete
Add Surveyor						

Tester Personnel Information :

To add a tester, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Tester" button.

MassDEP Certification ID Number

Tester's FirstName	Tester's LastName	MassDEP Certification ID Number	Expiration Date	Phone Number	
SEAN P	ANDERSON	4485	11/1/2018	570-977-0486	Delete
Add Tester					

2. Did your system use the services of a third party/consultant for the implementation of your Cross-connection Control Program or a portion of i

◉ Yes ○ No

SEAN
Contact First Name

ANDERSON
Contact Last Name

WHITEWATERINC.
Doing Business As
(Company/Individual Name)

253B WORCESTER RO.
Consultant Street Address Line 1

Consultant Street Address Line 2

CHARLTON
City/Town

Massachusetts
State

01507
Zip Code

774-644-1296
Phone Number

Fax Number (if available)

Consultant email

Third Party Consultant Surveyor Personnel Information:

To add a surveyor, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Surveyor" button.

MassDEP Certification ID Number

Add Consultant Surveyor

Third Party Consultant Tester Personnel Information:

To add a tester, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Tester" button..

MassDEP Certification ID Number

Add Consultant Tester

What services does the consultant perform for the town

- [x] Facilities Survey
- [x] Testing of Devices
- [x] Device Installation Plan Approval
- [ ] Program Management
- [ ] Other(explain)

3. Complete the following table summarizing types and numbers of facilities surveyed during this reporting period.

Type of Facility	Total # of Facilities Served by PWS	# of Facilities Surveyed Prior to this reporting period	# of Facilities with first time surveys during this reporting period	# of Facilities Remaining to be Surveyed	# of Facilities Re-surveyed in this reporting period
	A	B	C	= A - (B+C)	
Commercial	206	206	0	0	0
Industrial	2	2	0	0	0
Institutional	3	3	0	0	0
Municipal	42	42	0	0	0
Residential (Optional)	0	0	0	0	0
Total	253	253	0	0	0

*Use Comment field at the end of this question set (question #17) to provide, clarifications, descriptions or explanations regarding the above data. Please reference the question number and table field in your description.

4. Are there any cross-connection(s) within your systems service area protected by:

Reduced Pressure Backflow Preventer (RPBP): (x) Yes ( ) No

Double Check Valve Assembly (DCVA): (x) Yes ( ) No

If the answer is No to both questions go to question 8. If the answer is yes please complete the appropriate section(s) of the following table.

Type of Facility	Total # of devices at the beginning of this reporting period	# of devices installed in this reporting period	# of devices removed & not replaced in this reporting period	Total # of devices	# of seasonal devices in Total
	A	B	C	= A +B-C	
RPBP					
Commercial	43	1	0	44	0
Industrial	43	0	0	43	0

Institutional	8	0	0	8	0
Municipal	37	6	0	43	5
Residential (Optional)	0	0	0	0	0
Total	131	7	0	138	5
DCVA					
Commercial	34	1	0	35	0
Industrial	10	0	0	10	0
Institutional	3	0	0	3	0
Municipal	4	0	0	4	0
Residential (Optional)	0	0	0	0	0
Total	51	1	0	52	0

*Use Comment field at the end of this question set (question #16) to provide, clarifications, descriptions or explanations regarding the above data. Please reference the question number and table field in your description.

*PWSs must maintain a list of ALL registered cross connections that are being protected by a RPBP or DCVA. The list must contain at a minimum the following information: owner/business name, Cross Connection ID#, types of protection (RPBP or DCVA), brand, model, serial # and exact location within th facility.

5. Provide information on the testing performed in this reporting period by the type of device/assembly.

Type of Protection	# of Initial tests	# of Routine tests	# of Failures	# of Repairs &Re-tests	# Not Tested
RPBP	7	234	2	2	
DCVA	1	58	1	1	

Describe any discrepancies between the expected number of tests, based on the total number of devices reported in question #5, and the actual number of tests reported in question #6. If you reported a value greater than 0 for "# Not Tested" in question #6 provide an explanation for why th devices were not tested.

1 PVB DEVICE BUILDING CLOSED WATER OFF, 1 RPBP DEVICE REMOVED AND AIR GAP INSTALLED, 3 RPBP DEVICES OUT OF SERVICE WATER OFF TO BUILDINGS . ONE PORTABLE DEVICE USED BY INDUSTRIAL ACCOUNT WAS MISSING AND COULD NOT BE TESTED, PRIOR TO ITS USE, IF FOUND IT WILL BE TESTED.

6. Can your PWS provide MassDEP with a copy of the list of RPBP and DCVA within 2 hours?

◉ Yes ○ No

7. Does your PWS approve, permit and/or test PVB and/or SPPVB* devices?

PVB DEVICES: ◉ Yes ○ No   SPPVB DEVICES: ○ Yes ○ No

If Yes to either please provide the following details:

Type of Protection	# of Initial tests	# of Routine tests	# of Failures	# of Repairs &Re-tests
PVB	0	8	0	0
SPPVB				

*Use Comment field at the end of this question set (question #16) to provide, clarifications, descriptions or explanations regarding the above data. Please reference the question number and table field in your description.

8. What is the maximum time allowed to protect a cross connection after the discovery of a violation?

Check one: (●) 14 days ( ) 30 days ( ) 90 days ( ) Greater than 90 days

9. Do you have a fully implemented active cross-connection educational program directed toward residential customers?

(●) Yes ( ) No

If No, is there a date when you plan to have an educational program implemented? NTNCs may skip this question. Date(mm/dd/yyyy)

10. Do you have a fully implemented educational program for specific users (ex. Industrial, Commercial, Institutional, Municipal and Residential)?

(●) Yes ( ) No ( ) N/A

*"N/A" should be selected only if your system does not have any Industrial, Commercial, Institutional, Municipal or Residential users. If Yes, please list the types of users targeted through your education program. (Check all that apply):

[x] Industrial [x] Commercial [x] Institutional [x] Municipal [x] Residential

If No, when do you plan to have the educational program implemented? Date(mm/dd/yyyy)

11. Does your system have an atmospheric vacuum breaker (hose bib) program for your customers?

( ) Yes (●) No

If no do you plan to institute one in furure? If yes go to question 13

( ) Yes (●) No

If yes When? If no go to question 13. Date(mm/dd/yyyy)

12. Does your system have a local ordinance, by-law or policy statement on cross-connection control?

(●) Yes ( ) No

If YES,and you already provided copy to MassDEP in 2008 (2007 ASR) no further action is required.

If YES,and you did not provide a copy to MassDEP please forward a copy to:

MassDEP Boston office, 1 Winter Street, 5th floor, Boston, MA 02108

Attn : Otavio DePaula-Santos

13. Does your water system have a total containment policy?

( ) Yes (●) No

Containment policy means ALL services connections have a device installed at the meter. Containment protects the water main by isolating each facility independently of its activity (residential, commertial, industrial, or municipal).

14. Has there been a cross-connection incident in your water system during the reporting period?

( ) Yes (●) No

If Yes, please provide infomation below:

Add Incident

15. Comments or additional information regarding this section

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2015

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Water Production & Consumption Information

How to report in Gallons vs. Million Gallons
When Converting gallons to Million gallons, decimal point moves 6 places to the left.

	If Reporting in Gallons (Gal)	If Reporting in Million Gallons (MG)
Example 1	45,562,100	45.5621
Example 2	340,212	0.340212
Example 3	631,020,000	631.02
Example 4	96,543	0.096543

(●) Gallons (GAL) ( ) Million Gallons (MG) ( ) No Meter

Volume Units

FINISHED Water Production and Consumption Summary for Reporting Year :

Finished Water means water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as treatment necessary to maintain water quality in the distribution system (e.g. booster disinfection, addition of corrosion control chemicals).

***Please do not enter commas(,) below.**

Month	(1) Amount of **finished** water from own sources (GAL)	(2) Amount of **finished** water purchased from other systems (GAL)	(3) Amount of **finished** water sold to other systems (GAL)	(4) Net **finished** Water that entered your distribution system (1) + (2) - (3)= (4) (GAL)
January	84050000	0	0	84050000
February	85764000	0	0	85764000
March	85656000	0	0	85656000
April	71728000	0	0	71728000
May	84783000	0	0	84783000
June	76530000	0	0	76530000
July	92272000	0	0	92272000
August	85649000	0	0	85649000
September	83538000	0	0	83538000
October	84834000	0	0	84834000
November	77659000	0	0	77659000
December	87764000	0	0	87764000
TOTAL	1000227000	0	0	1000227000

Maximum Daily Finished Water Consumption: Volume (GAL): 4082000 Date: 7/20/2015

Calculate Net finished water

RAW Water Production and Consumption Summary for Reporting Year :

Raw Water means water in its natural state, prior to treatment and is usually the water entering the first treatment process of a water treatment plant.

☐ Same as finished water (it is not necessary to complete Table if same volume as above)

***Please do not enter commas(,) below.**

Month

(3) Amount of **raw** water sold to other systems (GAL)

	(1) Amount of **raw** water pumped from own sources (GAL)	(2) Amount of **raw** water purchased from other systems (GAL)		(4) Net **raw** Water Consumption (1) + (2) - (3) = (4) (GAL)
January	87959000	0	0	87959000
February	91794000	0	0	91794000
March	92910000	0	0	92910000
April	78322000	0	0	78322000
May	91622000	0	0	91622000
June	81353000	0	0	81353000
July	98540000	0	0	98540000
August	92482000	0	0	92482000
September	87575000	0	0	87575000
October	88881000	0	0	88881000
November	81328000	0	0	81328000
December	91831000	0	0	91831000
TOTAL	1064597000	0	0	1064597000

Maximum Daily Raw Water Pumping: Volume (GAL): 4333000 Date: 7/20/2015

Calculate Net raw water

Summary of Water Sold

Sold Water

System Name	PWS ID#	Total Volume Sold (GAL)	Water type
DIGHTON WATER DISTRICT	4076000		Finished
Add Sold Water			

Metered Finished Water Consumption by Service Type

U.S. EPA requires every PWS to report what their water is used for in order to characterize each system. In this table, report the percentages of metered water for each category below, ONLY for those categories over 10%. For municipal water suppliers, most of the water will be reported as Residential Area. If any other categories are more than 10% of your metered use, report it in the appropriate category. If any category is less than 10%, do NOT report it. The precentage do NOT have to add to 100%, since water use in some categories will be less than 10% and therefore is not reported.

ONLY report uses for categories over 10% of total metered use. Report ALL metered water use in the Water Management Distribution System Form (if appropriate)

%	Primary Service Area	Type
	Yes	Day Care Center
	Yes	Dispenser
	Yes	Homeowners Association
	Yes	Hotel/Motel
	Yes	Highway Rest Area
50	(selected) Yes	Industrial/Agricultural
	Yes	Interstate Carrier
	Yes	Institution
	Yes	Medical Facility
	Yes	Mobile Home Park
	Yes	Mobile Home Park, Principal Residence
	Yes	Municipality
	Yes	Other Area
	Yes	Other Non-Transient Area
	Yes	Commercial

%	PrimaryType Service Area	
	Yes	Other Residential
	Yes	Other Transient
	Yes	Recreation Area
41	Yes	Residential Area
	Yes	Restaurant
	Yes	Retail Employees
	Yes	School
	Yes	Sanitary Improvement District
	Yes	Summer Camp
	Yes	Secondary Residences
	Yes	Service Station
	Yes	Subdivision
	Yes	Water Bottler
	Yes	Wholesaler

Summary of Treatment Plant Losses (complete only if finished water volume is less than raw water)

☐ No treatment plant losses (not applicable)

Treatment PlantID:	Total Raw Water into treatment plant last year (raw pumped + raw purchased - raw sold):	-	Total Finished Water from treatment plant last year:	=	Total Water Lost to Treatment Process last year:
4273000-01T	1064597000		890736000		173861000.00
Add Treatment losses					

Briefly describe the fate of the waste product (slurry or sludge) produced by your treatment process (discharge to sewer, groundwater discharge, settling lagoons, re-circulate back into treatment plant, etc.):

X. Comments or additional information regarding this section

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
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PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Source Protection - Watershed

WaterShed

1. Mass DEP assigned WaterShed ID #: 14383

2. DEP Source IDs and Names of the withdrawal points in WaterShed.

SourceID	Source Name	Comments
4273000-01S	SOMERSET RES.	

3. MassDEP SWAP Program Identified Potential Sources of Contamination (PSC), please update with current water supply protection area inventory information.

PSC Description	Quantity	Ground Threat	Comments
RESIDENTIAL LAWN CARE/GARDENING	25	M	
RESIDENTIAL SEPTIC/CESSPOOL	25	M	
TRANSMISSION LINE	2	H	
TRANSPORTATION CORRIDOR	5	H	
FERTILIZER STORAGE AND USE	5	M	
PESTICIDE STORAGE OR USE	5	H	
AQUATIC WILDLIFE	1	H	SEASONAL
CLANDESTINE DUMPING	1	H	UNAUTHORIZED OFF-ROAD VEHICLES
LARGE QUANTITY HAZARDOUS WASTE GENERATORS	1	H	
21E OIL OR HAZARDOUS MATERIALS RELEASE	2	-	
CHEMICAL MANUFACTURE	2	H	
RESIDENTIAL FUEL OIL STORAGE	25	M	

Select Edit to Answer Questions 4-6:

4. Did your inspections of the WaterShed identify any new land uses or activities that pose a threat to drinking water quality? *

○ Yes ◉ No

If YES, please describe:

5. Did your inspection identify any violations of state or local land use controls? *

○ Yes ◉ No

If YES, please describe the violation(s), reporting and resolutions:

6. If YES, did you report those violations to the municipality (i.e. building inspector, board of health, planning board)?

○ Yes ○ No

Comments or Additional Information regarding this section:

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2015

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Source Protection - Zone II

Zone

1. Mass DEP assigned Zone II ID #: 503

2. DEP Source IDs and Names of the withdrawal points in Zone II.

SourceID	Source Name	Zone I Radius(ft)	Zone I Control	Pollution Sources
4273000-04G	GP WELL # 2	400	Y	
4273000-05G	FJM 2 WELL	400	Y	

3. MassDEP SWAP Program Identified Potential Sources of Contamination (PSC), please update with current water supply protection area inventory information.

PSC Description	Quantity	Ground Threat	Comments
RESIDENTIAL LAWN CARE/GARDENING	25	M	
RESIDENTIAL SEPTIC/CESSPOOL	25	M	
TRANSMISSION LINE	2	L	
TRANSPORTATION CORRIDOR	5	M	
CLANDESTINE DUMPING	1	H	UNAUTHORIZED OFF-ROAD VEHICLES
21E OIL OR HAZARDOUS MATERIALS RELEASE	2	-	
RESIDENTIAL FUEL OIL STORAGE	25	M	

Select Edit to Answer Questions 4-6:

4. Did your inspections of the Zone II identify any new land uses or activities that pose a threat to drinking water quality? *

○ Yes ◉ No

If YES, please describe:

5. Did your inspection identify any violations of state or local land use controls? *

○ Yes ◉ No

If YES, please describe the violation(s), reporting and resolutions:

6. If YES, did you report those violations to the municipality (i.e. building inspector, board of health, planning board)?

○ Yes ○ No

Comments or Additional Information regarding this section:

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2015

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Water Management Act Annual Report - Distribution

All public water suppliers distributing 100,000 gallons per day or more must complete Tables DS-1 through DS-5 and Tables DS-7 and DS-8. Tables DS-6 and DS-9 are optional. Instructions for completing Tables DS-1 through DS-8 are included in the ASR Instructions available at MassDEP's website. If you have any questions concerning completion of the Distribution System Report, please contact Richard Friend with the WMA Program at (617) 654-6522 or email him at richard.friend@state.ma.us

Table DS-1 Summary of Leak Detection Activities During the Reporting Year

1. Total miles of water mains *	95.26
2. Miles of mains surveyed this year	95.26
3. Number of leaks found	11
4. Number of leaks repaired	11
5. Estimated volume lost (mg) if a reliable estimate can be made	
6. Date of last leak detection survey of entire system: *	4/2/2015 (mm/dd/yyyy)

Table DS-2 Water Conservation - Limits on Withdrawals

1. **Did your PWS implement mandatory nonessential outdoor water use restrictions in the reporting year? ***
   ○ Yes ◉ No

2. **If yes,why did you institute mandatory restrictions (check all that apply)?**

   a. ☐ Required by WMA permit

      ☐ Calendar trigger in permit
      ☐ Streamflow trigger in permit
      ☐ Other trigger in permit — If "Other Trigger" then describe:

   b. ☐ Reason other than permit requirement

      Describe:

3. **Please characterize the type of mandatory restrictions that were in place (Check all that apply)**

   ☐ Total outdoor ban
   ☐ Hand-held only
   ☐ Hourly

Describe:

Daily: ○ Odd/Even ○ Twice/Week ○ Once/Week ○ Other Daily If "Other Daily" then describe:

4. **If you instituted mandatory restrictions, on what dates were restrictions in place? (you may have had only one period of restriction)**

	Start Date	End Date
Period 1	(mm/dd/yyyy)	(mm/dd/yyyy)
Period 2	(mm/dd/yyyy)	(mm/dd/yyyy)
Period 3	(mm/dd/yyyy)	(mm/dd/yyyy)

5. **Indicate if you plan or expect to institute nonessential outdoor water use restrictions in the upcoming summer. If you hold a WMA permit with Seasonal Limits on Nonessential Outdoor Water Use conditions, indicate whether you plan on instituting calendar-based or streamflow trigger-based outdoor water use restrictions. Remember that if you plan on instituting calendar restrictions, they must be in place by May 1. Streamflow-based restrictions must be in place once the trigger specified in your WMA permit has been reached for three consecutive days. Refer to your permit for specific nonessential outdoor water use requirements. Indicate if you plan on instituting restrictions even though you do not hold a WMA permit with outdoor water use restriction or do not hold a permit at all.**

- ☐ Planning to institute calendar-based nonessential outdoor water use restrictions per WMA permit.
- ☐ Planning to institute streamflow-based nonessential outdoor water use restrictions per WMA permit.
- ☐ Planning to institute nonessential outdoor water use restrictions for reasons other than WMA permit requirements.
- ☑ Do not intend on instituting nonessential outdoor water use restrictions.

Please Note: Enter volumes in Tables DS-3, DS-4, DS-5 and DS-6 in million gallons per year (mgy).
Example 1: if a volume is 654,120,152 gallons, enter 654.120152 mgy.
Example 2: if a volume is 580,123 gallons, enter 0.580123 mgy.
Example 3: if a volume is 86,000 gallons, enter 0.086 mgy.

Table DS-3 Metered Finished Water Use Complete Table DS-3 to account for all of your metered water volumes (e.g. permanent and temporary; private and municipal/government; billed and non-billed). Do not include water sold to other PWSs, which is reported on the Water Production & Consumption Information form

Use Category	No. of Service Connections	Total Volume (mgy)	Category Description
Residential *	6317	547.347	Water provided to residences in your distribution system, including for-profit apartments, condos, and seasonal homes. All water used for lawn watering at residential buildings belongs in this category.
Residential Institutions	5	13.539	Water provided to institutions with residential population such as colleges. It is optional to account institutions volumes separately (may be included in Residential above - see instructions).
Commercial/Business	331	53.624	Water served to businesses and other commercial entities.

Agricultural	7	1.031	Water used mainly to grow food, raise animals, or run a garden center.
Industrial	6	325.573	Water used mainly for industrial purposes.
Municipal/Institutional/Non-profits	63	9.371	Water used for municipal purposes, including schools, playing fields, municipal buildings, treatment plant; non-profits such as churches; non-residential institutions such as private schools.
Other*			Water used for purposes not included in above categories.
TOTALS	6729	950.485	Total number of service connections and metered volume.

Calculate Total

* If you include a volume under "Other", list the use(s):

UNACCOUNTED FOR WATER (UAW)

Table DS-4 Confidently Estimated Municipal Use volume To qualify as confidently estimated municipal use calculations/documentation for each estimated use must be attached to this ASR or mailed to MassDEP. If no documentation is provided, DEP will count the volumes as unaccounted for water. See ASR Instructions for more detail. Leak detection volumes are not counted as a confidently estimated municipal use. Optional Excel spreadsheets for calculating confidently estimated use can be found at the MADEP website at http://www.mass.gov/eea/agencies/massdep/water/approvals/drinking-water-forms.html#16

Confidently Estimated Municipal Use (CEMU)		**Estimated million gallons per year**
Fire protection & training		0.08
Hydrant/water main flushing/main construction	+	13.8534
Flow testing	+	
Bleeders/ Blow offs	+	6.94751
Tank overflow & drainage	+	
Sewer & stormwater system flushing	+	
Street cleaning	+	0.034
Source meter calibration adjustments	+	
Major water main breaks (not leak detection)	+	
Total Confidently Estimated Municipal Use	=	20.91491

Calculate Total

YOU MUST PROVIDE DOCUMENTATION FOR ALL OF YOUR CEMU VOLUMES.

Are you attaching electronic files to the eASR that document your CEMU volumes?

○ Yes ◉ No

Paper copies of CEMU volumes may be mailed to:
Mass DEP
1 Winter St.
Boston MA 02108
Attn: Water Management Act Program

Table DS-5 Unaccounted for Water To calculate UAW, subtract total metered use and confidently estimated municipal use volumes from the total volume of finished water entering your distribution system.

% of Total Water Available for Distribution

	Million Gallons/Year (MGY)		
Total Finished Water Available for Distribution **(Total Net Finished Water from Production Form)**	1000.227	100%	
Total Metered Use **(System Total Metered Use from Table DS-3)**	- 950.485	- 95.0	%
Total Confidently Estimated Municipal Use **(Total from Table DS-4)**	- 20.91491	- 2.1	%
Unaccounted for Water (UAW)	= 28.8	= 2.9	%

Calculate Total

Table DS-6 Sources of Unaccounted for Water (Optional) Use this table to provide estimated volumes of your unaccounted for water.

Known or Suspected Source of Unaccounted for Water	Estimated Volume (MGY)
Leak Detection	
Water Theft	
Meter Malfunction/mis-registration	
Other (specify):	
Other (specify):	
Total:	0

Calculate Total

RESIDENTIAL GALLONS PER CAPITA DAY (RGPCD)

RGPCD is a performance standard for public water suppliers serving municipalities and is a measure of the average amount of water a resident uses each day during the reporting period. High RGPCD values are associated with unrestricted outdoor water use, especially lawn watering. See ASR Instructions for further explanation and examples. There are two steps to determine your RGPCD number: Step 1: Determine the residential population served by your system (2 options to choose from). Step 2: Calculate RGPCD from population served and residential metered water volume.

RGPCD Step 1 - Choose one of two options to determine Population Served

Population Option 1: Accurate Count (census data): If your PWS serves an entire municipality, then use the most recent local or Federal census number for the total residential population. Click Here for 2010 U.S. census populations for MA cities and towns. Partially served communities can use the most recent local or Federal census if private well users and/or those served by other PWS systems are subtracted out (attach documentation to this ASR). Communities with high seasonal fluctuations can pro-rate the population for the duration of the influx. See ASR Instructions for further detail and examples.

Population Option 2: Estimate from Households Served If your PWS serves a portion of one or more communities and you cannot obtain a reliable census, click on the following link to open an excel spreadsheet for estimating your population. Click Here. This estimate is calculated from the number of households connected to your distribution system and the average household size. Save the spreadsheet onto your computer for use in subsequent years' reporting. If you are using a spreadsheet from your assessor's office or planning board to estimate number of households served, attach the spreadsheet or mail it to DEP and report the population served on Table DS-7 below.

If mailing Population Calculations or documentation send to:
Mass DEP
1 Winter St.
Boston MA 02108
Attn: Water Management Act Program

Table DS-7 Residential Population Served

Community(ies) served by PWS is (are) :	Combination
Method of Determining Population Served:	Combination
Census Type (Federal or Local):	Local
Census year:	2015
Population Served:	18554

RGPCD Step 2 – Calculate RGPCD

Table DS-8 Residential Gallons per Capita Day To determine RGPCD, your metered residential volume (million gallons/year) is divided by 365 days. The result in then divided by the population served and multiplied by 1,000,000 to obtain gallons per person per day. If you include Residential Institutions volume in your RGPCD volume, also include the Residential Institutions population. See ASR instructions

Residential Water Use (million gallons)	/ 365	/ Population Served	X 1,000,000	=	Residential Gallons per Capita Day (gallons/person/day)
547.347	/ 365	/ 18554	X1,000,000	=	81

Table DS-9 Use this table to provide comments or additional information regarding this section of the ASR. You may explain discrepancies, provide supplemental information, or provide any other information to assist MassDEP in processing the data in your ASR.

#7

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
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Reporting Year 2015

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Water Management Act Annual Report - Basin Withdrawal

Instructions for completing Tables BW-1 through BW-4 are included in the ASR Instructions available at MassDEP's website. If you have any questions concerning completion of the Water Management Act Annual Report, please contact Richard Friend with the WMA Program at (617) 654-6522 or email him at richard.friend@state.ma.us

Table BW-1 Permit & Registration Information

River Basin (Watershed)	Registration Number	Permit Number
25-TAUNTON	42527301	9P42527301

Water Withdrawal by Watershed

Calculation of Daily Average Withdrawal: Use Table BW-2 to document the reporting year withdrawal volume(s) by watershed. Table BW-3 compare's the reporting year actual withdrawal volume(s) to the volume(s) authorized under your WMA registration(s) and/or permit(s). The total volumes for each source and their respective watershed are reported in the Ground Water Sources and for Surface Water Sources report forms. Enter the total of all sources for each watershed in Table BW-2.

Enter volumes in million gallons per year(MGY). Example: If you pumped 400,512,000 gallons in the year, enter 400.512.

Table BW-2 Average Daily Withdrawal by Watershed

River Basin	*Total Raw Water Pumped in the reporting year (mgy)	/ 365 =	Watershed Average Daily Withdrawal (mgd)
25-TAUNTON	1073.748	/ 365 =	2.93
Calculate			

Table BW-3 WMA Authorized Volume vs. Actual Withdrawal Volume

River Basin	Registered Volume (mgd)	+	Permitted Volume (mgd)	=	WMA Authorized Withdrawal Volume (mgd)	-	Daily Avg. Water Use (mgd) (from Table BW-2 above)	=	Difference*
25-TAUNTON	2.81	+	1.61	=	4.42	-	2.93	=	1.49

*** A positive difference indicates that the volume withdrawn is less than the authorized volume. A negative value indicates that more water was pumped than is authorized and that your PWS may be out of compliance.**

Table BW-4 Permit Special Conditions

Review your WMA permit and list any Special Conditions of your WMA permit that require submission of an annual report to MassDEP. If the required report is being submitted with this ASR, please note in Table BW-4. If a required report was submitted earlier in the year, please provide the date submitted.

WMA Permit Special Condition Requiring

Annual Report to MassDEP	Report Attached to ASR	If not attached, date submitted to MassDEP
Add Special Condition		

If mailing annual report, send to:
MADEP

1 Winter St.
Boston MA 02108
Attn: Water Management Act Program

Table BW-5 Use this table to provide comments or additional information regarding this section of the ASR. You may explain discrepancies, provide supplemental information, or provide any other information to assist MassDEP in processing the data in your ASR.

Massachusetts Department of Environmental Protection
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Reporting Year 2015

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Treatment Plants

Treatment Plant

1. Plant Information

4273000-01T:		TREATMENT PLANT	
Plant ID# :		Plant Name:	
3249 COUNTY ST			
Street Address Line 1:		Street Address Line 2:	
SOMERSET		MA	02726
City/Town:		State(2 letter abbreviation)	Zip:
ACTIVE	ACTIVE	III-T	6
Status:	Availability:	Class:	Capacity (MGD):
ROBERT E	LIMA	508-674-4215	508-672-1272
Contact:		Phone:	Fax:

2. Related Sources Table

4273000-01S	SOMERSET RES.

3. Treatment Table(s)

Click to Expand/Collapse

Treatment Plant

1. Plant Information

4273000-03T:		FJM 2 WELL TREATMENT PLANT	
Plant ID# :		Plant Name:	
581 BROOK STREET			
Street Address Line 1:		Street Address Line 2:	
SOMERSET		MA	02726
City/Town:		State(2 letter abbreviation)	Zip:
ACTIVE	ACTIVE	I-T	.58
Status:	Availability:	Class:	Capacity (MGD):
ROBERT E	LIMA	508-674-4215	508-672-1272
Contact:		Phone:	Fax:

2. Related Sources Table

4273000-05G	FJM 2 WELL

3. Treatment Table(s)

Click to Expand/Collapse

Comments or additional information regarding this section

Massachusetts Department of Environmental Protection
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Reporting Year 2015

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Pump Stations

Pump

1. Pump Information

RAW WATER INTAKE PUMPS
Pump Station Name

TREATMENT PLANT REAR
Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	2	Number of Emergency Pumps:	
Raw or Finished Water:	R	Maximum Aggregate Capacity (Gallons per Minute):	4800
Standby/Emergency Power:			
Primary Pump Details			
Suction Type:	C	Suction Head (ft.):	
Suction Size (inches):	10	Motor Horse Power:	20
Motor Type:	CENTRIFUG	Motor Control:	M
Discharge Type:	S	Discharge Size (inches):	10
Installation Date	01/01/1993	Model #:	
Pump Manufacturer:	PEERLESS		

2. Related Sources Table (if applicable)

4273000-01S	SOMERSET RES.

Pump

1. Pump Information

HOT AND COLD LANE BOOSTER PUMP STATION
Pump Station Name

HOT AND COLD
Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	2	Number of Emergency Pumps:	
Raw or Finished Water:	F	Maximum Aggregate Capacity (Gallons per Minute):	200
Standby/Emergency Power:	N		
Primary Pump Details			
Suction Type:		Suction Head (ft.):	
Suction Size (inches):	2	Motor Horse Power:	25
Motor Type:	CENTRIFUGA	Motor Control:	A
Discharge Type:		Discharge Size (inches):	2
Installation Date	05/01/1995	Model #:	
Pump Manufacturer:	PEARLESS		

2. Related Sources Table (if applicable)

4273000-01S	SOMERSET RES.
4273000-05G	FJM 2 WELL

Pump

1. Pump Information

SEGREGANSET RIVER PUMPING STATION
Pump Station Name

SOMERSET
Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	2	Number of Emergency Pumps:	0
Raw or Finished Water:	R	Maximum Aggregate Capacity (Gallons per Minute):	10416
Standby/Emergency Power:	N		
Primary Pump Details			
Suction Type:		Suction Head (ft.):	0

Suction Size (inches):	12	Motor Horse Power:	250
Motor Type:		Motor Control:	A
Discharge Type:		Discharge Size (inches):	12
Installation Date	01/01/1962	Model #:	
Pump Manufacturer:	ALLIS-CHALMERS		

2. Related Sources Table (if applicable)

Pump

1. Pump Information

SOMERSET FILTRATION PLANT — Pump Station Name

3249 COUNTY — Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	3	Number of Emergency Pumps:	
Raw or Finished Water:	F	Maximum Aggregate Capacity (Gallons per Minute):	3800
Standby/Emergency Power:	Y		
Primary Pump Details			
Suction Type:		Suction Head (ft.):	
Suction Size (inches):	10	Motor Horse Power:	200
Motor Type:		Motor Control:	
Discharge Type:	S	Discharge Size (inches):	12
Installation Date	01/01/1993	Model #:	
Pump Manufacturer:	DEMPSTER		

2. Related Sources Table (if applicable)

4273000-01S	SOMERSET RES.

Pump

1. Pump Information

FJM #2 WELL PUMPING STATION — Pump Station Name

581 BROOK STREET — Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	1	Number of Emergency Pumps:	
Raw or Finished Water:	R	Maximum Aggregate Capacity (Gallons per Minute):	400
Standby/Emergency Power:	Y		
Primary Pump Details			
Suction Type:		Suction Head (ft.):	
Suction Size (inches):	4	Motor Horse Power:	40
Motor Type:	VT	Motor Control:	
Discharge Type:		Discharge Size (inches):	6
Installation Date	09/01/2000	Model #:	
Pump Manufacturer:	FLOWAY		

2. Related Sources Table (if applicable)

4273000-05G	FJM 2 WELL

Comments or additional information regarding this section

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2015

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Ground Water Sources

Individual Ground Water Source Statistics

Source ID: 4273000-05G
Source Name: FJM 2 WELL
Location: BROOK ST 581

Status: A
Source Availability: ACTIVE

Latitude: 41.824569
Longitude: -71.134841
Source Watershed: TAUNTON
Well Type: GRAVEL-PACKED
Well Depth (ft.): 39
Well Casing Height (ft.): 0
Well Casing Depth (ft.): 0
Screen Length (ft.): 7.5

Pump Setting (ft): 0

Approved Daily Pumping Volume (MGD): .576
Source Metered: Yes *This is a Required field.
Date of Meter Installation: 11/9/2004
Type of water metered for source: FINISHED

Last Meter Calibration: 12/1/2014

Withdrawal Units: GAL
January: 8,947,000
February: 7,800,000
March: 8,998,000
April: 9,135,000
May: 9,340,000
June: 8,817,000
July: 9,653,000
August: 9,985,000
September: 9,341,000
October: 9,305,000
November: 9,019,000

December: 9,151,000
Total Amount Pumped: 109,491,000

Total # of Days Pumped: 365
Maximum Single Day Pumped Volume: 351,000
Date of Maximum Amount Pumped: 7/19/2015

Comments or additional information regarding this section

#12

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2015

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Surface Water Sources

Individual Surface Water Source Statistics

Source ID: 4273000-01S
Source Name: SOMERSET RES.
Location: SOMERSET
Location (Line2):
Status: A
Source Availability: ACTIVE
Latitude: 41.777569
Longitude: - 71.137337
Source Watershed: TAUNTON
Terminal Reservoir: Y
Watershed Area (Miles^2): .39
USGS Elevation (ft.):
Surface Area (Acres): 175
Storage Capacity (MG): 1400
Watershed Plan?: Y
SWTR Waiver Granted?: Y
Safe Yield (MGD): 5
Source Metered: Yes
Date of Meter Installation: 7/25/1999
Type of water metered for source: RAW
Last Meter Calibration: 12/1/2014

Withdrawal Units: GAL
January: 87,959,000
February: 91,794,000
March: 92,910,000
April: 78,322,000
May: 91,622,000
June: 81,353,000
July: 98,540,000
August: 92,482,000
September: 87,575,000
October: 88,881,000
November: 81,328,000
December: 91,831,000
Total Amount Pumped: 1,064,597,000
Total # of Days Pumped: 365
Maximum Single Day Pumped Volume: 4,333,000
Date of Maximum Amount Pumped: 7/20/2015

Comments or additional information regarding this section

#13

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2015

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Purchased Water Sources

Comments or additional information regarding this section

2016 ASR

MassDEP's Online Filing System

Receipt

Forms Attach Files Signature Receipt

Summary/Receipt

print receipt Exit

Your submission is complete. Thank you for using DEP's online reporting system. You can select "My eDEP" to see a list of your transactions.

DEP Transaction ID: 905505
Date and Time Submitted: 3/9/2017 6:35:44 PM
Other Email :

Form Name: Public Water System Annual Statistical Report

PWS ID: 4273000
PWS NAME: SOMERSET WATER DEPARTMENT
SIGNATURE: Robert E. Lima

1-System Information (COM/NTNC)(4273000)
2-Cross Connection Control Program (CCCP)(4273000)
3-Water Production & Consumption Information(4273000)
4-Source Protection - Watershed(4273000)
5-Source Protection - Zone II(4273000)
6-Water Management Act Annual Report - Distribution(4273000)
7-Water Management Act Annual Report - Basin Withdrawal(4273000)
8-Treatment Plants(4273000)
9-Pump Stations(4273000)
10-Storage Facilities(4273000)
11-Ground Water Sources(4273000)
12-Surface Water Sources(4273000)
13-Purchased Water Sources(4273000)

Ancillary Document Uploaded/Mailed
Emergency Response (ER) Annual Training Plan. - By Mail

Town/City State Zip Code E-Mail Address Re-Enter E-Mail Address

Primary Treatment Certified Operator Contact Information

CHRISTOPHER E WICKMAN

Name Phone Number Fax Number

Mailing address information is provided to MassDEP by the Division of Professional Licensure

718 PEARSE ROAD

Mailing Address 1 Mailing Address 2

SWANSEA Massachusetts 02777

Town/City State Zip Code E-Mail Address Re-Enter E-Mail Address

If you use a contract certified operator, does your system have a signed Public Water System Certified Operator Compliance Notice approved by the DEP

○ N/A ○ Yes ◉ No

8. Names of Water Commissioners/Selectmen/Trustees/Association Board Members (if applicable). Please attach an organizational chart, if available. ☐ Check here to upload

Name			Phone	Title	
SCOTT		O'BRIEN	508-674-4215	CHAIRMAN	Delete
ROGER		BENEVIDES	508-674-4215	VICE-CHAIRMAN	Delete
JOSEPH		BEDNARIK	508-674-4215	CLERK	Delete

Add Person

9. Owner Type:

MUNICIPAL

Federal Employment Identification Number (FEIN):

(FEIN) - Do NOT provide SSN

10. Is this system a not-for-profit organization

◉ Yes ○ No

If yes, indicate Tax Exempt code (e.g., 501C): 501C

11. Population Served(DailyAverage):

Winter Population (October March): 17237

Summer Population (April September): 17237

By what method was the population figured Census Type: City/Town Annual

Other Description:

12. Testing requirements for lead and copper and bacteria in your system is based on the population .

	Number of Samples	Frequency of Samples
Lead and copper samples required:	30	3YEARS
Winter Bacteria samples required:	20	MONTH
Summer Bacteria samples required:	20	MONTH

13. Distribution Meter information:

a. Number of Service Connections: 6734

b. Percentage of service connections that are metered: 100 %

c. Are all publicly owned buildings metered? ◉ Yes ○ No ○ N/A

d. If No, what percent are %

14. System Information

a. Number of Distribution Systems: 1

b. Finished Water Storage Capacity in Million Gallons (MG): 7.093

[Conversion factor is (# of gallons)/(1,000,000)= MG]

c. Pumping Capacity (GPM): 4450

15. Percentage of Source Types (must add up to 100%)

Ground Water	Surface Water	Purchased Ground	Purchased Surface
8 %	92 %	0 %	0 %

16. Emergency Response Actions:

a. Has your system completed an Emergency Response Plan (ERP).(DO NOT submit your ERP to MassDEP. MassDEP will review the ERP during your next sanitary survey.)

◉ Yes ○ No

○ I have made changes to the ERP.

◉ I have made no changes to the ERP.

b. Does your system have an Emergency Response (ER) annual training plan

#1

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2016

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

System Information (COM/NTNC)

1. PWS Street Address

SOMERSET WATER DEPARTMENT
PWS Name

3249 COUNTY ST
PWS Street Address Line 1

PWS Street Address Line 2

SOMERSET
City/Town

Massachusetts
State

02726
Zip Code

508-674-4215
Phone Number

508-677-9691
Fax Number (if available)

Web Site Address of PWS (if available)

2. PWS Mailing Address ☐ Same as street address.

SOMERSET WATER DEPARTMENT
Mailing Name

3249 COUNTY ST
Mailing address Line 1

Mailing address Line 2

SOMERSET
City/Town

Massachusetts
State

02726
Zip Code

3. Is this a Seasonal System? (This question is not applicable to your PWS)

4. Owner/Responsible Person:

Owners Name - First, Middle Int, Last - one name only (if not municipal):

Phone Number

☐ This is a new owner

5. Primary Contact:

ROBERT E
LIMA
Name (First, Middle Int, Last) • one name only•

508-674-4215
Phone Number

☐ This is a new contact.

rlma27351@yahoo.com
Email Address (For Emergency Purposes)

Re-enter the Email Address

6. Certified Drinking Water Operators employed by the PWS:

Name	Grade	License Number	Function	Begin-Date	End-Da
MICHAEL J, AGRESTI	2D	23599	SECONDARY DISTRIBUTION OPERATOR	2/10/2014	
IAN F, AMBROZIAK	2T OIT	24312	GENERAL OPERATOR	2/10/2014	
JONATHAN C, REBACK	3T	20737	GENERAL OPERATOR	3/10/2008	
JONATHAN C, REBACK	3T	20737	SECONDARY TREATMENT OPERATOR	3/10/2008	
ROBERT E , LIMA	C4	1562	PRIMARY TREATMENT OPERATOR	9/21/2007	
GREGORY , HORDERN	2D	4885	PRIMARY DISTRIBUTION OPERATOR	2/28/2003	
SCOTT N, CHEETHAM	2T OIT	22583	GENERAL OPERATOR	1/12/2010	

Name	Grade	License Number	Function	Begin-Date	End-Date
CHRISTOPHER E, WICKMAN	4T/4D	12709/12729	PRIMARY TREATMENT OPERATOR	2/27/2017	

To Add an operator, begin typing a license # in the field below. Pick the license number from the list and then click the "Add Operator" button.

License Number:

Add Operator

** Click on the Help button to get more information.

7. Primary Certified Operator Contact Information:

Primary Distribution Certified Operator Contact Information

GREGORY HORDERN
Name

508-674-4215
Phone Number

Fax Number

Mailing address information is provided to MassDEP by the Division of Professional Licensure

170 BURNSIDE DR
Mailing Address 1

Mailing Address 2

SWANSEA Massachusetts 02777

◉ Yes ○ No

If Yes, please attach a copy of the plan. Describe the training performed during the reporting period, including the types of training, the date(s) of training, and number of staff and local officials trained on each date and their job titles.

c. Is your system registered for the Health and Homeland Alert Network (HHAN)

○ Yes ◉ No

d. Has your system signed the agreement and joined the Massachusetts Water and Wastewater Agency Response Network

○ Yes ◉ No

e. How often does your system test the following

Alarms:	Quarterly	Other Frequency:	
Interlocks:	Quarterly	Other Frequency:	
Back-up power sources:	Other	Other Frequency:	WEEKLY

f. List and describe all Level 3 or higher ER incidents during the reporting period.

Date of ER incident	Level	Description
Add Incident		

17. Do you have an antenna or other appurtenance (not needed for drinking water purposes) attached to any of your storage tank(s)

◉ Yes ○ No ○ No storage tanks

If Yes, list the antennae or other appurtenances, owner(s) names, and the date installed:

Storage Tank Name	Antennae or Appurtenance	Owner Name	Date (mm/dd/yyyy) Installed	
EAST TANK @ HOT AND COLD LANE	ANTENNAE	SPRINT	9/7/2012	Delete
WEST TANK @ HOT AND COLD LANE	ANTENNAE	T-MOBILE	2/5/2016	Delete
READ ST.	ANTENNAE	AT&T	12/18/2000	Delete
READ ST.	ANTENNAE	TOWN OF SOMERSET	10/1/1999	Delete
Add Attachment				

18. Comments or additional information regarding this section:

#2

Massachusetts Department of Environmental Protection PWSID#: 4273000
Bureau of Water Resources (BWR) – Drinking Water Program Name: SOMERSET WATER DEPARTMENT
Public Water Supply Annual Statistical Report City: SOMERSET
Reporting Year 2016 PWS Class: COM

1. Cross Connection Program Coordinator

ROBERT	LIMA	
Coordinator First Name	Coordinator Last Name	
3249 COUNTY STREET		
Coordinator Street Address Line 1	Coordinator Street Address Line 2	
SOMERSET	Massachusetts	02726
City/Town	State	Zip Code
508-674-4215	508-674-4215	
Phone Number	Fax Number (if available)	
RLMA27351@YAHOO.COM		
Coordinator email		

Surveyor Personnel Information :
To add a surveyor, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Surveyor" button.
MassDEP Certification ID Number

Surveyor's FirstName	Surveyor's LastName	MassDEP Certification ID Number	Expiration Date	Phone Number	Reviewer Surveyor	
KURT W	LAVERTUE	4281	11/1/2017	781-878-6470	☐	Delete
Add Surveyor						

Tester Personnel Information :
To add a tester, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Tester" button.
MassDEP Certification ID Number

Tester's FirstName	Tester's LastName	MassDEP Certification ID Number	Expiration Date	Phone Number	
KURT W	LAVERTUE	4281	11/1/2017	781-878-6470	Delete
Add Tester					

2. Did your system use the services of a third party/consultant for the implementation of your Cross-connection Control Program or a portion of i

◉ Yes ○ No

ERIC	BURKETT	WHITEWATERINC.
Contact First Name	Contact Last Name	Doing Business As (Company/Individual Name)
253B WORCESTER RO.		
Consultant Street Address Line 1	Consultant Street Address Line 2	
CHARLTON	Massachusetts	01507
City/Town	State	Zip Code
774-644-1296		
Phone Number	Fax Number (if available)	
EBURKETT@RHWHITE.COM		
Consultant email		

Third Party Consultant Surveyor Personnel Information:
To add a surveyor, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Surveyor" button.
MassDEP Certification ID Number

Add Consultant Surveyor

Third Party Consultant Tester Personnel Information:

To add a tester, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Tester" button..

MassDEP Certification ID Number

Add Consultant Tester

What services does the consultant perform for the town

- [x] Facilities Survey
- [x] Testing of Devices
- [x] Device Installation Plan Approval
- [ ] Program Management
- [ ] Other(explain)

3. Complete the following table summarizing types and numbers of facilities surveyed during this reporting period.

Type of Facility	Total # of Facilities Served by PWS	# of Facilities Surveyed Prior to this reporting period	# of Facilities with first time surveys during this reporting period	# of Facilities Remaining to be Surveyed	# of Facilities Re-surveyed in this reporting period
	A	B	C	= A - (B+C)	
Commercial	206	206	0	0	0
Industrial	2	2	0	0	0
Institutional	3	3	0	0	0
Municipal	42	42	0	0	0
Residential (Optional)	0	0	0	0	0
Total	253	253	0	0	0

*Use Comment field at the end of this question set (question #17) to provide, clarifications, descriptions or explanations regarding the above data. Please reference the question number and table field in your description.

4. Are there any cross-connection(s) within your systems service area protected by:

Reduced Pressure Backflow Preventer (RPBP): (●) Yes ( ) No

Double Check Valve Assembly (DCVA): (●) Yes ( ) No

If the answer is No to both questions go to question 8. If the answer is yes please complete the appropriate section(s) of the following table.

Type of Facility	Total # of devices at the beginning of this reporting period	# of devices installed in this reporting period	# of devices removed & not replaced in this reporting period	Total # of devices	# of seasonal devices in Total
	A	B	C	= A +B-C	
RPBP					
Commercial	42	3	2	43	6
Industrial	79	0	0	79	3

Institutional	13	4	1	16	1
Municipal	40	5	6	39	6
Residential (Optional)	0	0	0	0	0
Total	174	12	9	177	16
DCVA					
Commercial	34	1	0	35	4
Industrial	16	0	0	16	0
Institutional	4	1	0	5	0
Municipal	5	0	0	5	1
Residential (Optional)	0	0	0	0	0
Total	59	2	0	61	5

*Use Comment field at the end of this question set (question #16) to provide, clarifications, descriptions or explanations regarding the above data. Please reference the question number and table field in your description.

*PWSs must maintain a list of ALL registered cross connections that are being protected by a RPBP or DCVA. The list must contain at a minimum the following information: owner/business name, Cross Connection ID#, types of protection (RPBP or DCVA), brand, model, serial # and exact location within th facility.

5. Provide information on the testing performed in this reporting period by the type of device/assembly.

Type of Protection	# of Initial tests	# of Routine tests	# of Failures	# of Repairs &Re-tests	# Not Tested
RPBP	7	252	1	1	3
DCVA	2	57	0	0	0

Describe any discrepancies between the expected number of tests, based on the total number of devices reported in question #5, and the actual number of tests reported in question #6. If you reported a value greater than 0 for "# Not Tested" in question #6 provide an explanation for why th devices were not tested.

THREE DEVICES WERE NOT TESTED THEY ARE PORTABLE DEVICES AND WERE NOT USED DURING 2016

6. Can your PWS provide MassDEP with a copy of the list of RPBP and DCVA within 2 hours?

◉ Yes ○ No

7. Does your PWS approve, permit and/or test PVB and/or SPPVB* devices?

PVB DEVICES	◉ Yes ○ No	SPPVB DEVICES	○ Yes ◉ No

If Yes to either please provide the following details:

Type of Protection	# of Initial tests	# of Routine tests	# of Failures	# of Repairs &Re-tests
PVB	0	8	0	0
SPPVB				

*Use Comment field at the end of this question set (question #16) to provide, clarifications, descriptions or explanations regarding the above data. Please reference the question number and table field in your description.

8. What is the maximum time allowed to protect a cross connection after the discovery of a violation?

Check one: (●) 14 days ( ) 30 days ( ) 90 days ( ) Greater than 90 days

9. Do you have a fully implemented active cross-connection educational program directed toward residential customers?

(●) Yes ( ) No

If No, is there a date when you plan to have an educational program implemented? Date(mm/dd/yyyy)

NTNCs may skip this question.

10. Do you have a fully implemented educational program for specific users (ex. Industrial, Commercial, Institutional, Municipal and Residential)?

(●) Yes ( ) No ( ) N/A

"N/A" should be selected only if your system does not have any Industrial, Commercial, Institutional, Municipal or Residential users.

If Yes, please list the types of users targeted through your education program. (Check all that apply):

[x] Industrial [x] Commercial [x] Institutional [x] Municipal [x] Residential

If No, when do you plan to have the educational program implemented? Date(mm/dd/yyyy)

11. Does your system have an atmospheric vacuum breaker (hose bib) program for your customers?

( ) Yes (●) No

If no do you plan to institute one in furure?

If yes go to question 13

( ) Yes (●) No

If yes When?

If no go to question 13.

Date(mm/dd/yyyy)

12. Does your system have a local ordinance, by-law or policy statement on cross-connection control?

(●) Yes ( ) No

If YES,and you already provided copy to MassDEP in 2008 (2007 ASR) no further action is required.

If YES,and you did not provide a copy to MassDEP please forward a copy to:

MassDEP Boston office, 1 Winter Street, 5th floor, Boston, MA 02108

Attn : Otavio DePaula-Santos

13. Does your water system have a total containment policy?

( ) Yes (●) No

Containment policy means ALL services connections have a device installed at the meter. Containment protects the water main by isolating each facility independently of its activity (residential, commertial, industrial, or municipal).

14. Has there been a cross-connection incident in your water system during the reporting period?

( ) Yes (●) No

If Yes, please provide infomation below:

Add Incident

15. Comments or additional information regarding this section

#3

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2016

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Water Production & Consumption Information

How to report in Gallons vs. Million Gallons
When Converting gallons to Million gallons, decimal point moves 6 places to the left.

	If Reporting in Gallons (Gal)	If Reporting in Million Gallons (MG)
Example 1	45,562,100	45.5621
Example 2	340,212	0.340212
Example 3	631,020,000	631.02
Example 4	96,543	0.096543

◉ Gallons (GAL) ○ Million Gallons (MG) ○ No Meter

Volume Units

FINISHED Water Production and Consumption Summary for Reporting Year :

Finished Water means water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as treatment necessary to maintain water quality in the distribution system (e.g. booster disinfection, addition of corrosion control chemicals).

***Please do not enter commas(,) below.**

Month	(1) Amount of **finished** water from own sources (GAL)	(2) Amount of **finished** water purchased from other systems (GAL)	(3) Amount of **finished** water sold to other systems (GAL)	(4) Net **finished** Water that entered your distribution system (1) + (2) - (3)= (4) (GAL)
January	85872000	0	0	85872000
February	78613000	0	0	78613000
March	69804000	0	0	69804000
April	69263000	0	0	69263000
May	74441000	0	0	74441000
June	89710000	0	0	89710000
July	109890000	0	0	109890000
August	101604000	0	0	101604000
September	75395000	0	0	75395000
October	68539000	0	0	68539000
November	61117000	0	0	61117000
December	79896000	0	0	79896000
TOTAL	964144000	0	0	964144000

Maximum Daily Finished Water Consumption: Volume (GAL): 4272000 Date: 7/28/2016

Calculate Net finished water

RAW Water Production and Consumption Summary for Reporting Year :

Raw Water means water in its natural state, prior to treatment and is usually the water entering the first treatment process of a water treatment plant.

☐ Same as finished water (it is not necessary to complete Table if same volume as above)

***Please do not enter commas(,) below.**

Month

(3) Amount of **raw** water sold to other systems (GAL)

	(1) Amount of **raw** water pumped from own sources (GAL)	(2) Amount of **raw** water purchased from other systems (GAL)		(4) Net **raw** Water Consumption (1) + (2) - (3) = (4) (GAL)
January	98807000	0	0	98807000
February	92752000	0	0	92752000
March	80160000	0	0	80160000
April	81864000	0	0	81864000
May	87039000	0	0	87039000
June	104043000	0	0	104043000
July	127015000	0	0	127015000
August	116503000	0	0	116503000
September	89341000	0	0	89341000
October	82678000	0	0	82678000
November	74482000	0	0	74482000
December	93711000	0	0	93711000
TOTAL	1128395000	0	0	1128395000

Maximum Daily Raw Water Pumping: Volume (GAL): 4815000 Date: 7/28/2016

Calculate Net raw water

Summary of Water Sold

Sold Water

System Name	PWS ID#	Total Volume Sold (GAL)	Water type
DIGHTON WATER DISTRICT	4076000		Finished

Add Sold Water

Metered Finished Water Consumption by Service Type

U.S. EPA requires every PWS to report what their water is used for in order to characterize each system. In this table, report the percentages of metered water for each category below, ONLY for those categories over 10%. For municipal water suppliers, most of the water will be reported as Residential Area. If any other categories are more than 10% of your metered use, report it in the appropriate category. If any category is less than 10%, do NOT report it. The precentage do NOT have to add to 100%, since water use in some categories will be less than 10% and therefore is not reported.

ONLY report uses for categories over 10% of total metered use. Report ALL metered water use in the Water Management Distribution System Form (if appropriate)

%	Primary Service Area	Type
	Yes	Day Care Center
	Yes	Dispenser
	Yes	Homeowners Association
	Yes	Hotel/Motel
	Yes	Highway Rest Area
31	Yes (selected)	Industrial/Agricultural
	Yes	Interstate Carrier
	Yes	Institution
	Yes	Medical Facility
	Yes	Mobile Home Park
	Yes	Mobile Home Park, Principal Residence
	Yes	Municipality
	Yes	Other Area
	Yes	Other Non-Transient Area
	Yes	Commercial

%	Primary Service Area	Type
	Yes	Other Residential
	Yes	Other Transient
	Yes	Recreation Area
63	Yes	Residential Area
	Yes	Restaurant
	Yes	Retail Employees
	Yes	School
	Yes	Sanitary Improvement District
	Yes	Summer Camp
	Yes	Secondary Residences
	Yes	Service Station
	Yes	Subdivision
	Yes	Water Bottler
	Yes	Wholesaler

Summary of Treatment Plant Losses (complete only if finished water volume is less than raw water)

☐ No treatment plant losses (not applicable)

Treatment PlantID:	Total Raw Water into treatment plant last year (raw pumped + raw purchased - raw sold):	-	Total Finished Water from treatment plant last year:	=	Total Water Lost to Treatment Process last year:
4273000-01T	1128395000		964144000		164251000.00

Add Treatment losses

Briefly describe the fate of the waste product (slurry or sludge) produced by your treatment process (discharge to sewer, groundwater discharge, settling lagoons, re-circulate back into treatment plant, etc.):

X. Comments or additional information regarding this section

#4

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2016

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Source Protection - Watershed

WaterShed

1. Mass DEP assigned WaterShed ID #: 14383

2. DEP Source IDs and Names of the withdrawal points in WaterShed.

SourceID	Source Name	Comments
4273000-01S	SOMERSET RES.	

3. MassDEP SWAP Program Identified Potential Sources of Contamination (PSC), please update with current water supply protection area inventory information.

PSC Description	Quantity	Ground Threat	Comments
RESIDENTIAL LAWN CARE/GARDENING	25	M	
RESIDENTIAL SEPTIC/CESSPOOL	25	M	
TRANSMISSION LINE	2	H	
TRANSPORTATION CORRIDOR	5	H	
FERTILIZER STORAGE AND USE	5	M	
PESTICIDE STORAGE OR USE	5	H	
AQUATIC WILDLIFE	1	H	SEASONAL
CLANDESTINE DUMPING	1	H	UNAUTHORIZED OFF-ROAD VEHICLES
LARGE QUANTITY HAZARDOUS WASTE GENERATORS	1	H	
21E OIL OR HAZARDOUS MATERIALS RELEASE	2	-	
CHEMICAL MANUFACTURE	2	H	
RESIDENTIAL FUEL OIL STORAGE	25	M	

Select Edit to Answer Questions 4-6:

4. Did your inspections of the WaterShed identify any new land uses or activities that pose a threat to drinking water quality? *

○ Yes ◉ No

If YES, please describe:

5. Did your inspections identify violations of 310 CMR 22.20B or local land use controls (zoning, nonzoning or regulations) adopted for compliance with 310 CMR 22.20C or 310 CMR 22.21?

○ Yes ◉ No

If YES, please describe each violation and its resolution or current status.

6. If YES, did you report those violations to the municipality (i.e. building inspector, board of health, planning board)?

○ Yes ○ No

Comments or Additional Information regarding this section:

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2016

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Source Protection - Zone II

Zone

1. Mass DEP assigned Zone II ID #: 503

2. DEP Source IDs and Names of the withdrawal points in Zone II.

SourceID	Source Name	Zone I Radius(ft)	Zone I Control	Pollution Sources
4273000-04G	GP WELL # 2	400	Y	
4273000-05G	FJM 2 WELL	400	Y	

3. MassDEP SWAP Program Identified Potential Sources of Contamination (PSC), please update with current water supply protection area inventory information.

PSC Description	Quantity	Ground Threat	Comments
RESIDENTIAL LAWN CARE/GARDENING	25	M	
RESIDENTIAL SEPTIC/CESSPOOL	25	M	
TRANSMISSION LINE	2	L	
TRANSPORTATION CORRIDOR	5	M	
CLANDESTINE DUMPING	1	H	UNAUTHORIZED OFF-ROAD VEHICLES
21E OIL OR HAZARDOUS MATERIALS RELEASE	2	-	
RESIDENTIAL FUEL OIL STORAGE	25	M	

Select Edit to Answer Questions 4-6:

4. Did your inspections of the Zone II identify any new land uses or activities that pose a threat to drinking water quality? *

Yes No (No selected)

If YES, please describe:

5. Did your inspections identify violations of 310 CMR 22.20B or local land use controls (zoning, nonzoning or regulations) adopted for compliance with 310 CMR 22.20C or 310 CMR 22.21?

Yes No (No selected)

If YES, please describe each violation and its resolution or current status.

6. If YES, did you report those violations to the municipality (i.e. building inspector, board of health, planning board)?

Yes No

Comments or Additional Information regarding this section:

#6

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2016

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Water Management Act Annual Report - Distribution

All public water suppliers distributing 100,000 gallons per day or more must complete Tables DS-1 through DS-5 and Tables DS-7 and DS-8. Tables DS-6 and DS-9 are optional. Instructions for completing Tables DS-1 through DS-8 are included in the ASR Instructions available at MassDEP's website. If you have any questions concerning completion of the Distribution System Report, please contact Richard Friend with the WMA Program at (617) 654-6522 or email him at richard.friend@state.ma.us

Table DS-1 Summary of Leak Detection Activities During the Reporting Year

1. Total miles of water mains *	95.26
2. Miles of mains surveyed this year	95.26
3. Number of leaks found	9
4. Number of leaks repaired	9
5. Estimated volume lost (mg) if a reliable estimate can be made	
6. Date of last leak detection survey of entire system: *	3/29/2016 (mm/dd/yyyy)

Table DS-2 Water Conservation - Limits on Withdrawals

1. **Did your PWS implement mandatory nonessential outdoor water use restrictions in the reporting year? ***

   ○ Yes ◉ No

2. **If yes,why did you institute mandatory restrictions (check all that apply)?**

   a. ☐ Required by WMA permit

      ☐ Calendar trigger in permit

      ☐ Streamflow trigger in permit

      ☐ Other trigger in permit — If "Other Trigger" then describe:

   b. ☐ Reason other than permit requirement

      Describe:

3. **Please characterize the type of mandatory restrictions that were in place (Check all that apply)**

   ☐ Total outdoor ban

   ☐ Hand-held only

   ☐ Hourly

Describe:

Daily: Odd/Even Twice/Week Once/Week Other Daily If "Other Daily" then describe:

4. **If you instituted mandatory restrictions, on what dates were restrictions in place? (you may have had only one period of restriction)**

	Start Date	End Date
Period 1	(mm/dd/yyyy)	(mm/dd/yyyy)
Period 2	(mm/dd/yyyy)	(mm/dd/yyyy)
Period 3	(mm/dd/yyyy)	(mm/dd/yyyy)

5. **Indicate if you plan or expect to institute nonessential outdoor water use restrictions in the upcoming summer. If you hold a WMA permit with Seasonal Limits on Nonessential Outdoor Water Use conditions, indicate whether you plan on instituting calendar-based or streamflow trigger-based outdoor water use restrictions. Remember that if you plan on instituting calendar restrictions, they must be in place by May 1. Streamflow-based restrictions must be in place once the trigger specified in your WMA permit has been reached for three consecutive days. Refer to your permit for specific nonessential outdoor water use requirements. Indicate if you plan on instituting restrictions even though you do not hold a WMA permit with outdoor water use restriction or do not hold a permit at all.**

- [ ] Planning to institute calendar-based nonessential outdoor water use restrictions per WMA permit.
- [ ] Planning to institute streamflow-based nonessential outdoor water use restrictions per WMA permit.
- [ ] Planning to institute nonessential outdoor water use restrictions for reasons other than WMA permit requirements.
- [x] Do not intend on instituting nonessential outdoor water use restrictions.

Please Note: Enter volumes in Tables DS-3, DS-4, DS-5 and DS-6 in million gallons per year (mgy).
Example 1: if a volume is 654,120,152 gallons, enter 654.120152 mgy.
Example 2: if a volume is 580,123 gallons, enter 0.580123 mgy.
Example 3: if a volume is 86,000 gallons, enter 0.086 mgy.

Table DS-3 Metered Finished Water Use Complete Table DS-3 to account for all of your metered water volumes (e.g. permanent and temporary; private and municipal/government; billed and non-billed). Do not include water sold to other PWSs, which is reported on the Water Production & Consumption Information form

Use Category	No. of Service Connections	Total Volume (mgy)	Category Description
Residential *	6321	518.067	Water provided to residences in your distribution system, including for-profit apartments, condos, and seasonal homes. All water used for lawn watering at residential buildings belongs in this category.
Residential Institutions	5	10.09	Water provided to institutions with residential population such as colleges. It is optional to account institutions volumes separately (may be included in Residential above - see instructions).
Commercial/Business	332	33.13	Water served to businesses and other commercial entities.

Agricultural	7	0.88	Water used mainly to grow food, raise animals, or run a garden center.
Industrial	6	254.37	Water used mainly for industrial purposes.
Municipal/Institutional/Non-profits	63	4.02	Water used for municipal purposes, including schools, playing fields, municipal buildings, treatment plant; non-profits such as churches; non-residential institutions such as private schools.
Other*			Water used for purposes not included in above categories.
TOTALS	6734	820.557	Total number of service connections and metered volume.

Calculate Total

* If you include a volume under "Other", list the use(s):

UNACCOUNTED FOR WATER (UAW)

Table DS-4 Confidently Estimated Municipal Use volume To qualify as confidently estimated municipal use calculations/documentation for each estimated use must be attached to this ASR or mailed to MassDEP. If no documentation is provided, DEP will count the volumes as unaccounted for water. See ASR Instructions for more detail. Leak detection volumes are not counted as a confidently estimated municipal use. Optional Excel spreadsheets for calculating confidently estimated use can be found at the MADEP website at http://www.mass.gov/eea/agencies/massdep/water/approvals/drinking-water-forms.html#16

Confidently Estimated Municipal Use (CEMU)		**Estimated million gallons per year**
Fire protection & training		0
Hydrant/water main flushing/main construction	+	12.3144
Flow testing	+	0
Bleeders/ Blow offs	+	8.057029
Tank overflow & drainage	+	0
Sewer & stormwater system flushing	+	0
Street cleaning	+	0.02374
Source meter calibration adjustments	+	0
Major water main breaks (not leak detection)	+	
Total Confidently Estimated Municipal Use	=	20.395169

Calculate Total

YOU MUST PROVIDE DOCUMENTATION FOR ALL OF YOUR CEMU VOLUMES.

Are you attaching electronic files to the eASR that document your CEMU volumes?

○ Yes ◉ No

Paper copies of CEMU volumes may be mailed to:
Mass DEP
1 Winter St.
Boston MA 02108
Attn: Water Management Act Program

Table DS-5 Unaccounted for Water To calculate UAW, subtract total metered use and confidently estimated municipal use volumes from the total volume of finished water entering your distribution system.

% of Total Water Available for Distribution

	Million Gallons/Year (MGY)		
Total Finished Water Available for Distribution **(Total Net Finished Water from Production Form)**	964.144	100%	
Total Metered Use **(System Total Metered Use from Table DS-3)**	- 820.557	- 85.1	%
Total Confidently Estimated Municipal Use **(Total from Table DS-4)**	- 20.395169	- 2.1	%
Unaccounted for Water (UAW)	= 123.2	= 12.8	%

Calculate Total

Table DS-6 Sources of Unaccounted for Water (Optional) Use this table to provide estimated volumes of your unaccounted for water.

Known or Suspected Source of Unaccounted for Water	Estimated Volume (MGY)
Leak Detection	
Water Theft	
Meter Malfunction/mis-registration	
Other (specify):	
Other (specify):	
Total:	0

Calculate Total

RESIDENTIAL GALLONS PER CAPITA DAY (RGPCD)

RGPCD is a performance standard for public water suppliers serving municipalities and is a measure of the average amount of water a resident uses each day during the reporting period. High RGPCD values are associated with unrestricted outdoor water use, especially lawn watering. See ASR Instructions for further explanation and examples. There are two steps to determine your RGPCD number: Step 1: Determine the residential population served by your system (2 options to choose from). Step 2: Calculate RGPCD from population served and residential metered water volume.

RGPCD Step 1 - Choose one of two options to determine Population Served

Population Option 1: Accurate Count (census data): If your PWS serves an entire municipality, then use the most recent local or Federal census number for the total residential population. Click Here for 2010 U.S. census populations for MA cities and towns. Partially served communities can use the most recent local or Federal census if private well users and/or those served by other PWS systems are subtracted out (attach documentation to this ASR). Communities with high seasonal fluctuations can pro-rate the population for the duration of the influx. See ASR Instructions for further detail and examples.

Population Option 2: Estimate from Households Served If your PWS serves a portion of one or more communities and you cannot obtain a reliable census, click on the following link to open an excel spreadsheet for estimating your population. Click Here. This estimate is calculated from the number of households connected to your distribution system and the average household size. Save the spreadsheet onto your computer for use in subsequent years' reporting. If you are using a spreadsheet from your assessor's office or planning board to estimate number of households served, attach the spreadsheet or mail it to DEP and report the population served on Table DS-7 below.

If mailing Population Calculations or documentation send to:
Mass DEP
1 Winter St.
Boston MA 02108
Attn: Water Management Act Program

Table DS-7 Residential Population Served

Community(ies) served by PWS is (are) : Combination
Method of Determining Population Served: Combination
Census Type (Federal or Local): Local
Census year: 2016
Population Served: 18519

RGPCD Step 2 – Calculate RGPCD

Table DS-8 Residential Gallons per Capita Day To determine RGPCD, your metered residential volume (million gallons/year) is divided by 366 days. The result in then divided by the population served and multiplied by 1,000,000 to obtain gallons per person per day. If you include Residential Institutions volume in your RGPCD volume, also include the Residential Institutions population. See ASR instructions

Residential Water Use (million gallons)	/ 366	/ Population Served	X 1,000,000	=	Residential Gallons per Capita Day (gallons/person/day)
518.067	/ 366	/ 18519	X1,000,000	=	77

Table DS-9 Use this table to provide comments or additional information regarding this section of the ASR. You may explain discrepancies, provide supplemental information, or provide any other information to assist MassDEP in processing the data in your ASR.

#7

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2016

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Water Management Act Annual Report - Basin Withdrawal

Instructions for completing Tables BW-1 through BW-4 are included in the ASR Instructions available at MassDEP's website. If you have any questions concerning completion of the Water Management Act Annual Report, please contact Richard Friend with the WMA Program at (617) 654-6522 or email him at richard.friend@state.ma.us

Table BW-1 Permit & Registration Information

River Basin (Watershed)	Registration Number	Permit Number
25-TAUNTON	42527301	9P42527301

Water Withdrawal by Watershed

Calculation of Daily Average Withdrawal: Use Table BW-2 to document the reporting year withdrawal volume(s) by watershed. Table BW-3 compare's the reporting year actual withdrawal volume(s) to the volume(s) authorized under your WMA registration(s) and/or permit(s). The total volumes for each source and their respective watershed are reported in the Ground Water Sources and for Surface Water Sources report forms. Enter the total of all sources for each watershed in Table BW-2.

Enter volumes in million gallons per year(MGY). Example: If you pumped 400,512,000 gallons in the year, enter 400.512.

Table BW-2 Average Daily Withdrawal by Watershed

River Basin	*Total Raw Water Pumped in the reporting year (mgy)	/ 365 =	Watershed Average Daily Withdrawal (mgd)
25-TAUNTON	1128.395	/ 366 =	3.09
Calculate			

Table BW-3 WMA Authorized Volume vs. Actual Withdrawal Volume

River Basin	Registered Volume (mgd)	+	Permitted Volume (mgd)	=	WMA Authorized Withdrawal Volume (mgd)	-	Daily Avg. Water Use (mgd) (from Table BW-2 above)	=	Difference*
25-TAUNTON	2.81	+	1.61	=	4.42	-	3.09	=	1.33

*** A positive difference indicates that the volume withdrawn is less than the authorized volume. A negative value indicates that more water was pumped than is authorized and that your PWS may be out of compliance.**

Table BW-4 Permit Special Conditions

Review your WMA permit and list any Special Conditions of your WMA permit that require submission of an annual report to MassDEP. If the required report is being submitted with this ASR, please note in Table BW-4. If a required report was submitted earlier in the year, please provide the date submitted.

WMA Permit Special Condition Requiring

Annual Report to MassDEP	Report Attached to ASR	If not attached, date submitted to MassDEP
Add Special Condition		

If mailing annual report, send to:
MADEP

1 Winter St.
Boston MA 02108
Attn: Water Management Act Program

Table BW-5 Use this table to provide comments or additional information regarding this section of the ASR. You may explain discrepancies, provide supplemental information, or provide any other information to assist MassDEP in processing the data in your ASR.

#8

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2016

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Treatment Plants

Treatment Plant

1. Plant Information

Plant ID# : 4273000-01T:
Plant Name: TREATMENT PLANT
Street Address Line 1: 3249 COUNTY ST
Street Address Line 2:
City/Town: SOMERSET
State(2 letter abbreviation): MA
Zip: 02726
Status: ACTIVE
Availability: ACTIVE
Class: III-T
Capacity (MGD): 6
Contact: ROBERT E LIMA
Phone: 508-674-4215
Fax: 508-672-1272

2. Related Sources Table

4273000-01S	SOMERSET RES.

3. Treatment Table(s)

Click to Expand/Collapse

Treatment Plant

1. Plant Information

Plant ID# : 4273000-03T:
Plant Name: FJM 2 WELL TREATMENT PLANT
Street Address Line 1: 581 BROOK STREET
Street Address Line 2:
City/Town: SOMERSET
State(2 letter abbreviation): MA
Zip: 02726
Status: ACTIVE
Availability: ACTIVE
Class: I-T
Capacity (MGD): .58
Contact: ROBERT E LIMA
Phone: 508-674-4215
Fax: 508-672-1272

2. Related Sources Table

4273000-05G	FJM 2 WELL

3. Treatment Table(s)

Click to Expand/Collapse

Comments or additional information regarding this section

#9

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2016

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Pump Stations

Pump

1. Pump Information

RAW WATER INTAKE PUMPS — Pump Station Name

TREATMENT PLANT REAR — Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	2	Number of Emergency Pumps:	
Raw or Finished Water:	R	Maximum Aggregate Capacity (Gallons per Minute):	4800
Standby/Emergency Power:			
Primary Pump Details			
Suction Type:	C	Suction Head (ft.):	
Suction Size (inches):	10	Motor Horse Power:	20
Motor Type:	CENTRIFUG	Motor Control:	M
Discharge Type:	S	Discharge Size (inches):	10
Installation Date	01/01/1993	Model #:	
Pump Manufacturer:	PEERLESS		

2. Related Sources Table (if applicable)

4273000-01S	SOMERSET RES.

Pump

1. Pump Information

HOT AND COLD LANE BOOSTER PUMP STATION — Pump Station Name

HOT AND COLD — Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	2	Number of Emergency Pumps:	
Raw or Finished Water:	F	Maximum Aggregate Capacity (Gallons per Minute):	200
Standby/Emergency Power:	N		
Primary Pump Details			
Suction Type:		Suction Head (ft.):	
Suction Size (inches):	2	Motor Horse Power:	25
Motor Type:	CENTRIFUGA	Motor Control:	A
Discharge Type:		Discharge Size (inches):	2
Installation Date	05/01/1995	Model #:	
Pump Manufacturer:	PEARLESS		

2. Related Sources Table (if applicable)

4273000-01S	SOMERSET RES.
4273000-05G	FJM 2 WELL

Pump

1. Pump Information

SEGREGANSET RIVER PUMPING STATION — Pump Station Name

SOMERSET — Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	2	Number of Emergency Pumps:	0
Raw or Finished Water:	R	Maximum Aggregate Capacity (Gallons per Minute):	10416
Standby/Emergency Power:	N		
Primary Pump Details			
Suction Type:		Suction Head (ft.):	0

Suction Size (inches):	12	Motor Horse Power:	250
Motor Type:		Motor Control:	A
Discharge Type:		Discharge Size (inches):	12
Installation Date	01/01/1962	Model #:	
Pump Manufacturer:	ALLIS-CHALMERS		

2. Related Sources Table (if applicable)

Pump

1. Pump Information

SOMERSET FILTRATION PLANT
Pump Station Name

3249 COUNTY
Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	3	Number of Emergency Pumps:	
Raw or Finished Water:	F	Maximum Aggregate Capacity (Gallons per Minute):	3800
Standby/Emergency Power:	Y		
Primary Pump Details			
Suction Type:		Suction Head (ft.):	
Suction Size (inches):	10	Motor Horse Power:	200
Motor Type:		Motor Control:	
Discharge Type:	S	Discharge Size (inches):	12
Installation Date	01/01/1993	Model #:	
Pump Manufacturer:	DEMPSTER		

2. Related Sources Table (if applicable)

4273000-01S	SOMERSET RES.

Pump

1. Pump Information

FJM #2 WELL PUMPING STATION
Pump Station Name

581 BROOK STREET
Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	1	Number of Emergency Pumps:	
Raw or Finished Water:	R	Maximum Aggregate Capacity (Gallons per Minute):	400
Standby/Emergency Power:	Y		
Primary Pump Details			
Suction Type:		Suction Head (ft.):	
Suction Size (inches):	4	Motor Horse Power:	40
Motor Type:	VT	Motor Control:	
Discharge Type:		Discharge Size (inches):	6
Installation Date	09/01/2000	Model #:	
Pump Manufacturer:	FLOWAY		

2. Related Sources Table (if applicable)

4273000-05G	FJM 2 WELL

Comments or additional information regarding this section

#10

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2016

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Storage Facilities

Storage Facility

WEST TANK @ HOT AND COLD LANE
Storage Facility Name

HOT AND COLD LANE W/SOLARBEE MIX. SYSTEM
Location

Status:	ACTIVE	Availability:	ACTIVE
Storage Type:	GROUND LEVEL STORAGE TANK	Capacity (MG):	3.07
Material:	CONCRETE	Installation Date	07/01/2012

Storage Facility

EAST TANK @ HOT AND COLD LANE
Storage Facility Name

HOT AND COLD LANE W/SOLARBEE MIX. SYSTEM
Location

Status:	ACTIVE	Availability:	ACTIVE
Storage Type:	GROUND LEVEL STORAGE TANK	Capacity (MG):	3
Material:	CONCRETE	Installation Date	06/15/2011

Storage Facility

READ ST.
Storage Facility Name

DISTR. SYSTEM
Location

Status:	ACTIVE	Availability:	ACTIVE
Storage Type:	GROUND LEVEL STORAGE TANK	Capacity (MG):	.643
Material:	STEEL	Installation Date	10/13/1998

Storage Facility

RICHMOND HILL
Storage Facility Name

DISTR. SYSTEM ELM STREET IN DIGHTON
Location

Status:		Availability:	ACTIVE
Storage Type:	GROUND LEVEL STORAGE TANK	Capacity (MG):	.38
Material:	STEEL	Installation Date	

Comments or additional information regarding this section

RICHMOND HILL STORAGE TANK INACTIVE NOT IN SYSTEM

#11

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2016

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Ground Water Sources

Individual Ground Water Source Statistics

Source ID: 4273000-05G
Source Name: FJM 2 WELL
Location: BROOK ST 581

Status: A
Source Availability: ACTIVE

Latitude: 41.824569
Longitude: -71.134841
Source Watershed: TAUNTON
Well Type: GRAVEL-PACKED
Well Depth (ft.): 39
Well Casing Height (ft.): 0
Well Casing Depth (ft.): 0
Screen Length (ft.): 7.5

Pump Setting (ft): 0

Approved Daily Pumping Volume (MGD): .576
Source Metered: Yes *This is a Required field.
Date of Meter Installation: 11/9/2004
Type of water metered for source: FINISHED

Last Meter Calibration: 6/7/2016

Withdrawal Units: GAL
January: 9,230,000
February: 8,662,000
March: 9,177,000
April: 9,373,000
May: 9,440,000
June: 9,444,000
July: 9,218,000
August: 9,272,000
September: 9,041,000
October: 9,079,000
November: 8,882,000

December: 9,270,000
Total Amount Pumped: 110,088,000

Total # of Days Pumped: 365
Maximum Single Day Pumped Volume: 355,000
Date of Maximum Amount Pumped: 4/24/2016

Comments or additional information regarding this section

#12

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2016

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Surface Water Sources

Individual Surface Water Source Statistics

Source ID:	4273000-01S
Source Name:	SOMERSET RES.
Location:	SOMERSET
Location (Line2):	
Status:	A
Source Availability:	ACTIVE
Latitude:	41.777569
Longitude: -	71.137337
Source Watershed:	TAUNTON
Terminal Reservoir:	Y
Watershed Area (Miles^2):	.39
USGS Elevation (ft.):	
Surface Area (Acres):	175
Storage Capacity (MG):	1400
Watershed Plan?:	Y
SWTR Waiver Granted?:	Y
Safe Yield (MGD):	5
Source Metered:	Yes
Date of Meter Installation:	7/25/1999
Type of water metered for source:	RAW
Last Meter Calibration:	6/7/2016

Withdrawal Units:	GAL
January:	89,574,000
February:	84,090,000
March:	70,983,000
April:	72,491,000
May:	77,099,000
June:	94,599,000
July:	117,797,000
August:	107,224,000
September:	80,300,000
October:	73,599,000
November:	65,600,000
December:	84,441,000
Total Amount Pumped:	1,017,797,000
Total # of Days Pumped:	365
Maximum Single Day Pumped Volume:	4,528,000
Date of Maximum Amount Pumped:	7/28/2016

Comments or additional information regarding this section

#13

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2016

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Purchased Water Sources

Comments or additional information regarding this section

ASR 2017 File COPY

Massachusetts Department of Environmental Protection

eDEP Transaction Copy

Here is the file you requested for your records. * Also See 2016 ASR. for 2017 Work-Sheets

To retain a copy of this file you must save and/or print.

Username:	**SOMERSETWATERDEPT**
Transaction ID:	**995673**
Document:	**Public Water System Annual Statistical Report**
Size of File:	**2709.05K**
Status of Transaction:	**In Process**
Date and Time Created:	**3/14/2018:1:32:55 PM**

Note: This file only includes forms that were part of your transaction as of the date and time indicated above. If you need a more current copy of your transaction, return to eDEP and select to "Download a Copy" from the Current Submittals page.

2017 ASR

MassDEP's Online Filing System

Receipt

Forms | Attach Files | Signature | Receipt

Summary/Receipt

print receipt | Exit

Your submission is complete. Thank you for using DEP's online reporting system. You can select "My eDEP" to see a list of your transactions.

DEP Transaction ID: 995673
Date and Time Submitted: 4/17/2018 9:52:25 AM
Other Email :

Form Name: Public Water System Annual Statistical Report

PWS ID: 4273000
PWS NAME: SOMERSET WATER DEPARTMENT
SIGNATURE: Christopher Wickman

1- System Information (COM/NTNC)(4273000)
2- Cross Connection Control Program (CCCP)(4273000)
3- Water Production & Consumption Information(4273000)
4- Source Protection - Watershed(4273000)
5- Source Protection - Zone II(4273000)
6- Water Management Act Annual Report - Distribution(4273000)
7- Water Management Act Annual Report - Basin Withdrawal(4273000)
8- Treatment Plants(4273000)
9- Pump Stations(4273000)
10- Storage Facilities(4273000)
11- Ground Water Sources(4273000)
12- Surface Water Sources(4273000)
13- Purchased Water Sources(4273000)

Ancillary Document Uploaded/Mailed
Emergency Response annual training plan, CEMU doc. & 2017 census

My eDEP

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2017

COVER

2017 Public Water Supply Verification

Please verify the information below and then click the Continue button.

PWS ID:	**4273000**
PWS Name:	**SOMERSET WATER DEPARTMENT**
PWS Street Address Line 1:	**3249 COUNTY ST**
PWS Street Address Line 2:	
City/Town:	**SOMERSET**
State:	**MA**
Zip Code:	**02726-0000**
Class:	**COM**

Legally Responsible Party Contact Information

The Legally Responsible Party is that individual who has the ultimate authority to ensure that your system is in compliance with the federal and state drinking water regulations. This may be the owner of a private facility, a town or school official or other similarly authorized person.

Book/Page:	
First Name	CHRISTOPHER
Middle Initial	E
Last Name	WICKMAN
Company Name	TOWN OF SOMERSET
Phone Number	5086744215
Street Address 1	3249 COUNTY STREET
Street Address 2	
City/Town	SOMERSET
State	MA
Zip Code	02726
Comments	

#1

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Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

System Information (COM/NTNC)

1. PWS Street Address

SOMERSET WATER DEPARTMENT		
PWS Name		
3249 COUNTY ST		
PWS Street Address Line 1	PWS Street Address Line 2	
SOMERSET	Massachusetts	02726
City/Town	State	Zip Code
508-674-4215	508-677-9691	
Phone Number	Fax Number (if available)	
Web Site Address of PWS (if available)		

2. PWS Mailing Address ☑ Same as street address.

SOMERSET WATER DEPARTMENT		
Mailing Name		
3249 COUNTY ST		
Mailing address Line 1	Mailing address Line 2	
SOMERSET	Massachusetts	02726
City/Town	State	Zip Code

3. Is this a Seasonal System? (This question is not applicable to your PWS)

4. Owner/Responsible Person:

	[redacted] ☐ This is a new owner.
Owners Name- First, Middle Int, Last - one name only(if not municipal):	Phone Number

5. Primary Contact:

CHRISTOPHER E WICKMAN	[redacted] ☑ This is a new contact.
Name (First, Middle Int, Last) ▪ one name only▪	Phone Number
[redacted]	[redacted]
Email Address (For Emergency Purposes)	Re-enter Email Address

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6. Certified Drinking Water Operators employed by the PWS:

Name	Grade	License Number	Function	Begin-Date	End-Date
IAN F, AMBROZIAK	2T OIT	24312	GENERAL OPERATOR	2/10/2014	
MICHAEL J, AGRESTI	2D	23599	SECONDARY DISTRIBUTION OPERATO	2/10/2014	
SCOTT N, CHEETHAM	2T OIT	22583	GENERAL OPERATOR	1/12/2010	
CHRISTOPHER E, WICKMAN	4D/4T	12729/12709	PRIMARY TREATMENT OPERATOR	2/27/2017	
GREGORY , HORDERN	2D	4885	PRIMARY DISTRIBUTION OPERATOR	2/28/2003	
JONATHAN C, REBACK	3T	20737	SECONDARY TREATMENT OPERATOR	3/10/2008	
JONATHAN C, REBACK	3T	20737	GENERAL OPERATOR	3/10/2008	

Name	Grade	License Number	Function	Begin-Date	End-Date
JASON R, SOARES	2T OIT	26228	GENERAL OPERATOR	2/26/2018	
STEVEN , SABATINO	1T OIT	26187	GENERAL OPERATOR	2/26/2018	
To Add an operator, begin typing a license # in the field below. Pick the license number from the list and then click the "Add Operator" button. License Number:					

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7. Primary Certified Operator Contact Information:

Primary Distribution Certified Operator Contact Information

GREGORY | | HORDERN | [redacted] | [redacted]

Name | Phone Number | Fax Number

Mailing address information is provided to MassDEP by the Division of Professional Licensure

[redacted] | [redacted]

Mailing Address 1 | Mailing Address 2

[redacted] | [redacted] | [redacted] | [redacted]

Town/City | State | Zip Code | E-Mail Address | Re-Enter E-Mail Address

Primary Treatment Certified Operator Contact Information

CHRISTOPHER | E | WICKMAN | [redacted] | [redacted]

Name | Phone Number | Fax Number

Mailing address information is provided to MassDEP by the Division of Professional Licensure

[redacted] | [redacted]

Mailing Address 1 | Mailing Address 2

[redacted] | [redacted] | [redacted] | [redacted]

Town/City | State | Zip Code | E-Mail Address | Re-Enter E-Mail Address

If you use a contract certified operator, does your system have a signed Public Water System Certified Operator Compliance Notice approved by the DEP

(•) N/A ( ) Yes ( ) No

8. Names of Water Commissioners/Selectmen/Trustees/Association Board Members (if applicable). Please attach an organizational chart, if available. ☐ Check here to upload

Name			Phone	Title
SCOTT		O'BRIEN	[redacted]	CHAIRMAN
RODGER		BENEVIDES	[redacted]	VICE-CHAIRMAN
JOSEPH		BEDNARIK	[redacted]	CLERK

9. Owner Type:
MUNICIPAL

Federal Employment Identification Number (FEIN):
(FEIN) - Do NOT provide SSN

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10. Is this system a not-for-profit organization	
(•) Yes ( ) No	
If yes, indicate Tax Exempt code (e.g., 501C):	501C

11. Population Served(DailyAverage):		
Winter Population (October March):	18373	
Summer Population (April September):	18373	
By what method was the population figured	Census Type:	City/Town
	Other Description:	

12. Testing requirements for lead and copper and bacteria in your system is based on the population .		
	Number of Samples	Frequency of Samples
Lead and copper samples required:	30	3YEARS
Winter Bacteria samples required:	20	MONTH
Summer Bacteria samples required:	20	MONTH

13. **Distribution Meter information:**	
a. Number of Service Connections:	6745
b. Percentage of service connections that are metered:	100 %
c. Are all publicly owned buildings metered?	(•) Yes ( ) No ( ) N/A
d. If No, what percent are	%

14. System Information	
a. Number of Distribution Systems:	1
b. Finished Water Storage Capacity in Million Gallons (MG): [Conversion factor is (# of gallons)/(1,000,000)= MG]	7.093
c. Pumping Capacity (GPM):	4450

15. Percentage of Source Types (must add up to 100%)			
Ground Water	**Surface Water**	**Purchased Ground**	**Purchased Surface**
13 %	87 %	0 %	0 %

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16. Emergency Response Actions:

a. Has your system completed an Emergency Response Plan (ERP).(DO NOT submit your ERP to MassDEP. MassDEP will review the ERP during your next sanitary survey.)

(•) Yes ( ) No

( ) I have made changes to the ERP (attach copies of all changes.)

(•) I have made no changes to the ERP.

b. Does your system have an Emergency Response (ER) annual training plan as required per 310 CMR 22.04(13)(b)(10)?

( ) Yes ( ) No

Documentation of ER training must be kept onsite for state review, including at the next sanitary survey. This documentation should describe the training performed during the reporting period, including the types of training, the date(s) of training, and number of staff and local officials trained on each date and their job titles.

c. Is your system registered for the Health and Homeland Alert Network (HHAN)

( ) Yes (•) No

d. Has your system signed the agreement and joined the Massachusetts Water and Wastewater Agency Response Network

( ) Yes (•) No

e. How often does your system test the following

Alarms:	Quarterly	Other Frequency:	
Interlocks:	Quarterly	Other Frequency:	
Back-up power sources:	Other	Other Frequency:	WEEKLY

f. List and describe all Level 3 or higher ER incidents during the reporting period.

Date of ER incident	Level	Description

17. Do you have an antenna or other appurtenance (not needed for drinking water purposes) attached to any of your storage tank(s)

(•) Yes ( ) No ( ) No storage tanks

If Yes, list the antennae or other appurtenances, owner(s) names, and the date installed:

Storage Tank Name	Antennae or Appurtenance	Owner Name	Date (mm/dd/yyyy) Installed
EAST TANK @ HOT AND COLD LANE	ANTENNAE	SPRINT	9/7/2012
WEST TANK @ HOT AND COLD LANE	ANTENNAE	T-MOBILE	2/5/2016
READ ST.	ANTENNAE	AT&T	12/18/2000
READ ST.	ANTENNAE	TOWN OF SOMERSET	10/1/1999

18. Comments or additional information regarding this section:

#2

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PWS Class: COM

Cross Connection Control Program (CCCP)

1. Cross Connection Program Coordinator

CHRISTOPHER	WICKMAN	
Coordinator First Name	Coordinator Last Name	
[redacted]	[redacted]	
Coordinator Street Address Line 1	Coordinator Street Address Line 2	
[redacted]	[redacted]	[redacted]
City/Town	State	Zip Code
[redacted]	[redacted]	
Phone Number	Fax Number (if available)	
[redacted]		
Coordinator email		

Surveyor Personnel Information :

To add a surveyor, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Surveyor" button.

MassDEP Certification ID Number

Surveyor's FirstName	Surveyor's LastName	MassDEP Certification ID Number	Expiration Date	Phone Number	Reviewer Surveyor
KURT W	LAVERTUE	4281		[redacted]	
EMIL T	PUSTEA	32087	6/1/2020	[redacted]	

Tester Personnel Information :

To add a tester, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Tester" button..

MassDEP Certification ID Number

Tester's FirstName	Tester's LastName	MassDEP Certification ID Number	Expiration Date	Phone Number
KURT W	LAVERTUE	4281		[redacted]
EMIL T	PUSTEA	32087	6/1/2020	[redacted]

2. Did your system use the services of a third party/consultant for the implementation of your Cross-connection Control Program or a portion of it?

(•) Yes ( ) No

EMIL	PUSTEA	SIGMA WATER SAFETY I
Contact First Name	Contact Last Name	Doing Business As (Company/Individual Name)
[redacted]	[redacted]	
Consultant Street Address Line 1	Consultant Street Address Line 2	
[redacted]	[redacted]	[redacted]
City/Town	State	Zip Code

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[redacted]
Phone Number

[redacted]
Fax Number (if available)

[redacted]
Consultant email

Third Party Consultant Surveyor Personnel Information:
To add a surveyor, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Surveyor" button.

MassDEP Certification ID Number

Surveyor's FirstName	Surveyor's LastName	MassDEP Certification ID Number	Expiration Date	Phone Number	Third Party Reviewer Surveyor
EMIL T	PUSTEA	32087	6/1/2020	[redacted]	☐

Third Party Consultant Tester Personnel Information:
To add a tester, begin typing the certification ID # in the field below. Pick the license # off the list and then click the "Add Tester" button.

MassDEP Certification ID Number

Tester's FirstName	Tester's LastName	MassDEP Certification ID Number	Expiration Date	Phone Number
EMIL T	PUSTEA	32087	6/1/2020	[redacted]

What services does the consultant perform for the town	
☑ Facilities Survey	☑ Testing of Devices
☑ Device Installation Plan Approval	☐ Program Management
☐ Other(explain)	

3. Complete the following table summarizing types and numbers of facilities surveyed during this reporting period.

Type of Facility	Total # of Facilities Served by PWS	# of Facilities Surveyed Prior to this reporting period	# of Facilities with first time surveys during this reporting period	# of Facilities Remaining to be Surveyed	# of Facilities Re-surveyed in this reporting period
	A	B	C	= A - (B+C)	
Commercial	206	206	0	0	0
Industrial	2	2	0	0	0
Institutional	3	3	0	0	0

Municipal	42	42	0	0	0
Residential (Optional)	0	0	0	0	0
Total	253	253	0	0	0

*Use Comment field at the end of this question set (question #16) to provide, clarifications, descriptions or explanations regarding the above data. Please reference the question number and table field in your description.

4. Are there any cross-connection(s) within your systems service area protected by:

Reduced Pressure Backflow Preventer (RPBP):	(●) Yes ( ) No	
Double Check Valve Assembly (DCVA):	(●) Yes ( ) No	

If the answer is No to both questions go to question 8. If the answer is yes please complete the appropriate section(s) of the following table.

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Type of Facility	Total # of devices at the beginning of this reporting period	# of devices installed in this reporting period	# of devices removed & not replaced in this reporting period	Total # of devices	# of seasonal devices in Total
	A	B	C	= A +B-C	
RPBP					
Commercial	42	1	0	43	6
Industrial	79	0	2	77	3
Institutional	13	0	0	13	1
Municipal	40	0	0	40	6
Residential (Optional)	0	0	0	0	0
Total	174	1	2	173	16
DCVA					
Commercial	34	0	0	34	4
Industrial	16	0	2	14	0
Institutional	04	0	0	4	0
Municipal	5	0	0	5	1
Residential (Optional)	0	0	0	0	0
Total	59	0	2	57	5

*Use Comment field at the end of this question set (question #16) to provide, clarifications, descriptions or explanations regarding the above data.
Please reference the question number and table field in your description.
*PWSs must maintain a list of ALL registered cross connections that are being protected by a RPBP or DCVA. The list must contain at a minimum the following information: owner/business name, Cross Connection ID#, types of protection (RPBP or DCVA), brand, model, serial # and exact location within the facility.

5. Provide information on the testing performed in this reporting period by the type of device/assembly.

Type of Protection	# of Initial tests	# of Routine tests	# of Failures	# of Repairs &Re-tests	# Not Tested
RPBP	1	252	3	3	0
DCVA	0	57	0	0	0

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Describe any discrepancies between the expected number of tests, based on the total number of devices reported in question #5, and the actual number of tests reported in question #6. If you reported a value greater than 0 for "# Not Tested" in question #6 provide an explanation for why the devices were not tested.

6. Can your PWS provide MassDEP with a copy of the list of RPBP and DCVA within 2 hours?

◉ Yes ○ No

7. Does your PWS approve, permit and/or test PVB and/or SPPVB* devices?

PVB DEVICES	◉ Yes ○ No	SPPVB DEVICES	○ Yes ◉ No

If Yes to either please provide the following details:

Type of Protection	# of Initial tests	# of Routine tests	# of Failures	# of Repairs &Re-tests
PVB	0	8	0	0
SPPVB				

*Use Comment field at the end of this question set (question #16) to provide, clarifications, descriptions or explanations regarding the above data. Please reference the question number and table field in your description.

8. What is the maximum time allowed to protect a cross connection after the discovery of a violation?

Check one: ◉ 14 days ○ 30 days ○ 90 days ○ Greater than 90 days

9. Do you have a fully implemented active cross-connection educational program directed toward residential customers?

◉ Yes ○ No

If No, is there a date when you plan to have an educational program implemented?
NTNCs may skip this question.

Date(mm/dd/yyyy)

10. Do you have a fully implemented educational program for specific users (ex. Industrial, Commercial, Institutional, Municipal and Residential)?

◉ Yes ○ No ○ N/A

"N/A" should be selected only if your system does not have any Industrial, Commercial, Institutional, Municipal or Residential users. If Yes, please list the types of users targeted through your education program. (Check all that apply):

☑ Industrial ☑ Commercial ☑ Institutional ☑ Municipal ☑ Residential

If No, when do you plan to have the educational program implemented?

Date(mm/dd/yyyy)

11. Does your system have an atmospheric vacuum breaker (hose bib) program for your customers?

○ Yes ◉ No

If no do you plan to institute one in furure?
If yes go to question13

○ Yes ◉ No

If yes When?
If no go to question 13.

Date(mm/dd/yyyy)

12. Does your system have a local ordinance, by-law or policy statement on cross-connection control?

Yes No

If YES,and you already provided copy to MassDEP in 2008 (2007 ASR) no further action is required.

If YES,and you did not provide a copy to MassDEP please forward a copy to:

MassDEP Boston office, 1 Winter Street, 5th floor, Boston, MA 02108

Attn : Otavio DePaula-Santos

13. Does your water system have a total containment policy?

Yes No (selected: No)

Containment policy means ALL services connections have a device installed at the meter. Containment protects the water main by isolating each facility independently of its activity (residential, commertial, industrial, or municipal).

14. Has there been a cross-connection incident in your water system during the reporting period?

Yes No (selected: No)

If Yes, please provide infomation below:

Date of Incident	Location of the Incident	DESCRIPTION

Comments or additional information regarding this section

A TOTAL OF FOUR "INDUSTRIAL" DEVICES WERE REMOVED AND NOT PUT BACK INTO SERVICE AT BRAYTON POINT POWER STATION.

#3

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PWS Class: COM

Water Production & Consumption Information

How to report in Gallons vs. Million Gallons
When Converting gallons to Million gallons, decimal point moves 6 places to the left.

	If Reporting in Gallons (Gal)	If Reporting in Million Gallons (MG)
Example 1	45,562,100	45.5621
Example 2	340,212	0.340212
Example 3	631,020,000	631.02
Example 4	96,543	0.096543

Volume Units ○ Gallons (GAL) ◉ Million Gallons (MG) ○ No Meter

FINISHED Water Production and Consumption Summary for Reporting Year :

Finished Water means water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as treatment necessary to maintain water quality in the distribution system (e.g. booster disinfection, addition of corrosion control chemicals).

Month	(1) Amount of **finished** water from own sources (MG)	(2) Amount of **finished** water purchased from other systems (MG)	(3) Amount of **finished** water sold to other systems (MG)	(4) Net **finished** Water that entered your distribution system (1) + (2) - (3)= (4) (MG)
January	82.658	0.000	0.000	82.658
February	74.352	0.000	0.000	74.352
March	77.248	0.000	0.000	77.248
April	66.301	0.000	0.000	66.301
May	71.134	0.000	0.000	71.134
June	68.510	0.000	0.000	68.510
July	65.030	0.000	0.000	65.030
August	65.081	0.000	0.000	65.081
September	53.209	0.000	0.000	53.209
October	49.159	0.000	0.000	49.159
November	46.927	0.000	0.000	46.927
December	48.622	0.000	0.000	48.622
TOTAL	768.231	0.000	0.000	768.231

Maximum Daily Finished Water Consumption:	Volume (MG): 3.322 Date: 1/10/2017

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RAW Water Production and Consumption Summary for Reporting Year :

Raw Water means water in its natural state, prior to treatment and is usually the water entering the first treatment process of a water treatment plant.

☐ Same as finished water (it is not necessary to complete Table if same volume as above)

Month	(1) Amount of **raw** water pumped from own sources (MG)	(2) Amount of **raw** water purchased from other systems (MG)	(3) Amount of **raw** water sold to other systems (MG)	(4) Net **raw** Water Consumption (1) + (2) - (3) = (4) (MG)
January	117.922	0.000	0.000	117.922
February	90.677	0.000	0.000	90.677
March	92.421	0.000	0.000	92.421
April	79.752	0.000	0.000	79.752
May	85.605	0.000	0.000	85.605
June	83.078	0.000	0.000	83.078
July	79.239	0.000	0.000	79.239
August	76.686	0.000	0.000	76.686
September	66.641	0.000	0.000	66.641
October	65.272	0.000	0.000	65.272
November	62.776	0.000	0.000	62.776
December	63.061	0.000	0.000	63.061
TOTAL	963.130	0.000	0.000	963.130

Maximum Daily Raw Water Pumping:	Volume (MG): 3.937	Date: 1/10/2017

Summary of Water Sold

Sold Water

System Name	PWS ID#	Total Volume Sold (MG)	Water type
DIGHTON WATER DISTRICT	4076000	0.000	Finished

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PWS Class: COM

Metered Finished Water Consumption by Service Type

U.S. EPA requires every PWS to report what their water is used for in order to characterize each system. In this table, report the percentages of metered water for each category below, ONLY for those categories over 10%. For municipal water suppliers, most of the water will be reported as Residential Area. If any other categories are more than 10% of your metered use, report it in the appropriate category. If any category is less than 10%, do NOT report it. The precentage do NOT have to add to 100%, since water use in some categories will be less than 10% and therefore is not reported.

ONLY report uses for categories over 10% of total metered use. Report ALL metered water use in the Water Management Distribution System Form (if appropriate)

%	Primary Service Area	Type	%	Primary Service Area	Type
	Yes	Day Care Center		Yes	Other Residential
	Yes	Dispenser		Yes	Other Transient
	Yes	Homeowners Association		Yes	Recreation Area
	Yes	Hotel/Motel	63	Yes	Residential Area
	Yes	Highway Rest Area		Yes	Restaurant
31	Yes (selected)	Industrial/Agricultural		Yes	Retail Employees
	Yes	Interstate Carrier		Yes	School
	Yes	Institution		Yes	Sanitary Improvement District
	Yes	Medical Facility		Yes	Summer Camp
	Yes	Mobile Home Park		Yes	Secondary Residences
	Yes	Mobile Home Park, Principal Residence		Yes	Service Station
	Yes	Municipality		Yes	Subdivision
	Yes	Other Area		Yes	Water Bottler
	Yes	Other Non-Transient Area		Yes	Wholesaler
	Yes	Commercial			

Summary of Treatment Plant Losses (complete only if finished water volume is less than raw water)

☐ No treatment plant losses (not applicable)

Treatment PlantID:	Total Raw Water into treatment plant last year (raw pumped + raw purchased - raw sold):	-	Total Finished Water from treatment plant last year:	=	Total Water Lost to Treatment Process last year:
4273000-01T	859.795		664.896		194.900

Briefly describe the fate of the waste product (slurry or sludge) produced by your treatment process (discharge to sewer, groundwater discharge, settling lagoons, re-circulate back into treatment plant, etc.):

DISCHARGE TO SETTLING LAGOONS & SEWER

X. Comments or additional information regarding this section

Source Protection - Watershed

WaterShed

1. Mass DEP assigned WaterShed ID #:	14383

2. DEP Source IDs and Names of the withdrawal points in WaterShed.

SourceID	Source Name	Comments
4273000-01S	SOMERSET RES.	

3. MassDEP SWAP Program Identified Potential Sources of Contamination (PSC), please update with current water supply protection area inventory information.

PSC Description	Quantity	Ground Threat	Comments
RESIDENTIAL LAWN CARE/GARDENING	25	M	
RESIDENTIAL SEPTIC/CESSPOOL	25	M	
TRANSMISSION LINE	2	H	
TRANSPORTATION CORRIDOR	5	H	
FERTILIZER STORAGE AND USE	5	M	
PESTICIDE STORAGE OR USE	5	H	
AQUATIC WILDLIFE	1	H	SEASONAL
CLANDESTINE DUMPING	1	H	UNAUTHORIZED OFF-ROAD VEHICLES
LARGE QUANTITY HAZARDOUS WASTE GENERATORS	1	H	
21E OIL OR HAZARDOUS MATERIALS RELEASE	2	-	
CHEMICAL MANUFACTURE	2	H	
RESIDENTIAL FUEL OIL STORAGE	25	M	

4. Did your inspections of the WaterShed identify any new land uses or activities that pose a threat to drinking water quality?

○ Yes ● No

If YES, please describe:

5. Did your inspections identify violations of 310 CMR 22.20B or local land use controls (zoning, nonzoning or regulations) adopted for compliance with 310 CMR 22.20C or 310 CMR 22.21?

○ Yes ● No

If YES, please describe each violation and its resolution or current status.

6. If YES, did you report those violations to the municipality (i.e. building inspector, board of health, planning board)?

○ Yes ○ No

Comments or Additional Information regarding this section:

#5

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Source Protection - Zone II

Zone

1. Mass DEP assigned Zone II ID # :	503

2. DEP Source IDs and Names of the withdrawal points in Zone II.

SourceID	Source Name	Zone I Radius(ft)	Zone I Control	Pollution Sources
4273000-04G	GP WELL # 2	400	Y	
4273000-05G	FJM 2 WELL	400	Y	

3. MassDEP SWAP Program Identified Potential Sources of Contamination (PSC), please update with current water supply protection area inventory information.

PSC Description	Quantity	Ground Threat	Comments
RESIDENTIAL LAWN CARE/GARDENING	25	M	
RESIDENTIAL SEPTIC/CESSPOOL	25	M	
TRANSMISSION LINE	2	L	
TRANSPORTATION CORRIDOR	5	M	
CLANDESTINE DUMPING	1	H	UNAUTHORIZED OFF-ROAD VEHICLES
21E OIL OR HAZARDOUS MATERIALS RELEASE	2	-	
RESIDENTIAL FUEL OIL STORAGE	25	M	

4. Did your inspections of the Zone II identify any new land uses or activities that pose a threat to drinking water quality?

○ Yes ◉ No

If YES, please describe:

5. Did your inspections identify violations of 310 CMR 22.20B or local land use controls (zoning, nonzoning or regulations) adopted for compliance with 310 CMR 22.20C or 310 CMR 22.21?

○ Yes ◉ No

If YES, please describe each violation and its resolution or current status.

6. If YES, did you report those violations to the municipality (i.e. building inspector, board of health, planning board)?

○ Yes ○ No

Comments or Additional Information regarding this section:

#6

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2017

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Water Management Act Annual Report - Distribution

All public water suppliers distributing 100,000 gallons per day or more must complete Tables DS-1 through DS-5 and Tables DS-7 and DS-8. Tables DS-6 and DS-9 are optional. Instructions for completing Tables DS-1 through DS-8 are included in the ASR Instructions available at MassDEP's website. If you have any questions concerning completion of the Distribution System Report, please contact Richard Friend with the WMA Program at (617) 654-6522 or email him at richard.friend@state.ma.us

Table DS-1 Summary of Leak Detection Activities During the Reporting Year	
1. Total miles of water mains	95.31
2. Miles of mains surveyed this year	95.31
3. Number of leaks found	54
4. Number of leaks repaired	54
5. Estimated volume lost (mg) if a reliable estimate can be made	
6. Date of last leak detection survey of entire system:	5/5/2017 (mm/dd/yyyy)

Table DS-2 Water Conservation - Limits on Withdrawals

1. **Did your PWS implement mandatory nonessential outdoor water use restrictions in the reporting year?**

   ○ Yes ◉ No

2. **If yes,why did you institute mandatory restrictions (check all that apply)?**

a. ☐ Required by WMA permit

☐ Calendar trigger in permit

☐ Streamflow trigger in permit

☐ Other trigger in permit — If "Other Trigger" then describe:

b. ☐ Reason other than permit requirement

Describe:

3. **Please characterize the type of mandatory restrictions that were in place (Check all that apply)**

☐ Total outdoor ban

☐ Hand-held only

☐ Hourly Describe:

Daily: ○ Odd/Even ○ Twice/Week ○ Once/Week ○ Other Daily — If "Other Daily" then describe:

4. **If you instituted mandatory restrictions, on what dates were restrictions in place? (you may have had only one period of restriction)**

	Start Date	End Date
Period 1		
	(mm/dd/yyyy)	(mm/dd/yyyy)
Period 2		
	(mm/dd/yyyy)	(mm/dd/yyyy)
Period 3		
	(mm/dd/yyyy)	(mm/dd/yyyy)

5. **Indicate if you plan or expect to institute nonessential outdoor water use restrictions in the upcoming summer. If you hold a WMA permit with Seasonal Limits on Nonessential Outdoor Water Use conditions, indicate whether you plan on instituting calendar-based or streamflow trigger-based outdoor water use restrictions. Remember that if you plan on instituting calendar restrictions, they must be in place by May 1. Streamflow-based restrictions must be in place once the trigger specified in your WMA permit has been reached for three consecutive days. Refer to your permit for specific nonessential outdoor water use requirements. Indicate if you plan on instituting restrictions even though you do not hold a WMA permit with outdoor water use restriction or do not hold a permit at all.**

- ☐ Planning to institute calendar-based nonessential outdoor water use restrictions per WMA permit.
- ☐ Planning to institute streamflow-based nonessential outdoor water use restrictions per WMA permit.
- ☐ Planning to institute nonessential outdoor water use restrictions for reasons other than WMA permit requirements.
- ☑ Do not intend on instituting nonessential outdoor water use restrictions.

Please Note: Enter volumes in Tables DS-3, DS-4, DS-5 and DS-6 in million gallons per year (mgy).
Example 1: if a volume is 654,120,152 gallons, enter 645.120152 mgy.
Example 2: if a volume is 580,123 gallons, enter 0.580123 mgy.
Example 3: if a volume is 86,000 gallons, enter 0.086 mgy.

Massachusetts Department of Environmental Protection
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PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Table DS-3 Metered Finished Water Use Complete Table DS-3 to account for all of your metered water volumes (e.g. permanent and temporary; private and municipal/government; billed and non-billed). Do not include water sold to other PWSs, which is reported on the Water Production & Consumption Information form

Use Category	No. of Service Connections	Total Volume (mgy)	Category Description
Residential	6332	533.907	Water provided to residences in your distribution system, including for-profit apartments, condos, and seasonal homes. All water used for lawn watering at residential buildings belongs in this category.
Residential Institutions	5	11.13	Water provided to institutions with residential population such as colleges. It is optional to account institutions volumes separately (may be included in Residential above - see instructions).
Commercial/Business	332	27.80	Water served to businesses and other commercial entities.
Agricultural	7	0.755	Water used mainly to grow food, raise animals, or run a garden center.
Industrial	6	135.70	Water used mainly for industrial purposes.
Municipal/Institutional/Non-profits	63	4.01	Water used for municipal purposes, including schools, playing fields, municipal buildings, treatment plant; non-profits such as churches; non-residential institutions such as private schools.
Other*	0	0	Water used for purposes not included in above categories.
TOTALS	6745	713.302	Total number of service connections and metered volume.

* If you include a volume under "Other", list the use(s):

UNACCOUNTED FOR WATER (UAW)

Table DS-4 Confidently Estimated Municipal Use volume To qualify as confidently estimated municipal use calculations/documentation for each estimated use must be attached to this ASR or mailed to MassDEP. If no documentation is provided, DEP will count the volumes as unaccounted for water. See ASR Instructions for more detail. Leak detection volumes are not counted as a confidently estimated municipal use. Optional Excel spreadsheets for calculating confidently estimated use can be found at the MADEP website at http://www.mass.gov/eea/agencies/massdep/water/approvals/drinking-water-forms.html#16

Confidently Estimated Municipal Use (CEMU)	Estimated million gallons per year
Fire protection & training	0.840
Hydrant/water main flushing/main construction	+ 3.902
Flow testing	+ 0.018
Bleeders/ Blow offs	+ 12.777
Tank overflow & drainage	+ 0
Sewer & stormwater system flushing	+ 0
Street cleaning	+ 0.020
Source meter calibration adjustments	+ 0
Major water main breaks (not leak detection)	+ 0
Total Confidently Estimated Municipal Use	= 17.557

YOU MUST PROVIDE DOCUMENTATION FOR ALL OF YOUR CEMU VOLUMES.

Are you attaching electronic files to the eASR that document your CEMU volumes?

○ Yes ◉ No

Paper copies of CEMU volumes may be mailed to:
Mass DEP
1 Winter St.
Boston MA 02108
Attn: Water Management Act Program

Table DS-5 Unaccounted for Water To calculate UAW, subtract total metered use and confidently estimated municipal use volumes from the total volume of finished water entering your distribution system.

	Million Gallons/Year (MGY)	% of Total Water Available for Distribution
Total Finished Water Available for Distribution **(Total Net Finished Water from Production Form)**	768.231	100%
Total Metered Use **(System Total Metered Use from Table DS-3)**	- 713.302	- 92.8 %
Total Confidently Estimated Municipal Use **(Total from Table DS-4)**	- 17.557	- 2.3 %
Unaccounted for Water (UAW)	= 37.4	= 4.9 %

Table DS-6 Sources of Unaccounted for Water (Optional) Use this table to provide estimated volumes of your unaccounted for water.

Known or Suspected Source of Unaccounted for Water	Estimated Volume (MGY)
Leak Detection	
Water Theft	
Meter Malfunction/mis-registration	
Other (specify):	
Other (specify):	
Total:	0

RESIDENTIAL GALLONS PER CAPITA DAY (RGPCD)

RGPCD is a performance standard for public water suppliers serving municipalities and is a measure of the average amount of water a resident uses each day during the reporting period. High RGPCD values are associated with unrestricted outdoor water use, especially lawn watering. See ASR Instructions for further explanation and examples. There are two steps to determine your RGPCD number: Step 1: Determine the residential population served by your system (2 options to choose from). Step 2: Calculate RGPCD from population served and residential metered water volume.

RGPCD Step 1 - Choose one of two options to determine Population Served

Population Option 1: Accurate Count (census data): If your PWS serves an entire municipality, then use the most recent local or Federal census number for the total residential population. Click Here for 2010 U.S. census populations for MA cities and towns. Partially served communities can use the most recent local or Federal census if private well users and/or those served by other PWS systems are subtracted out (attach documentation to this ASR). Communities with high seasonal fluctuations can pro-rate the population for the duration of the influx. See ASR Instructions for further detail and examples.

Population Option 2: Estimate from Households Served If your PWS serves a portion of one or more communities and you cannot obtain a reliable census, click on the following link to open an excel spreadsheet for estimating your population. Click Here. This estimate is calculated from the number of households connected to your distribution system and the average household size. Save the spreadsheet onto your computer for use in subsequent years' reporting. If you are using a spreadsheet from your assessor's office or planning board to estimate number of households served, attach the spreadsheet or mail it to DEP and report the population served on Table DS-7 below.

If mailing Population Calculations or documentation send to:
Mass DEP
1 Winter St.
Boston MA 02108
Attn: Water Management Act Program

Table DS-7 Residential Population Served	
Community(ies) served by PWS is (are) :	Combination
Method of Determining Population Served:	Combination
Census Type (Federal or Local):	Local
Census year:	2017
Population Served:	18279

RGPCD Step 2 – Calculate RGPCD

Table DS-8 Residential Gallons per Capita Day To determine RGPCD, your metered residential volume (million gallons/year) is divided by 365 days. The result in then divided by the population served and multiplied by 1,000,000 to obtain gallons per person per day. If you include Residential Institutions volume in your RGPCD volume, also include the Residential Institutions population. See ASR instructions

Residential Water Use (million gallons)	/ 365	/ Population Served	X 1,000,000	=	Residential Gallons per Capita Day (gallons/person/day)
533.907	/ 365	/ 18279	X1,000,000	=	80

Table DS-9: Use this table to provide comments or additional information regarding this section of the ASR. You may explain discrepancies, provide supplemental information, or provide any other information to assist MassDEP in processing the data in your ASR.

DECREASE IN "UNACCOUNTED FOR WATER" MOST LIKELY INFLUENCED BY THE OFFICIAL CLOSURE OF BRAYTON POINT POWER STATION IN JULY 2017. THEY WHERE SUPPLIED BY MULTIPLE LARGE DIAMETER COMPOUND WATER METERS.

#7

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
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Reporting Year 2017

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Water Management Act Annual Report - Basin Withdrawal

Instructions for completing Tables BW-1 through BW-4 are included in the ASR Instructions available at MassDEP's website. If you have any questions concerning completion of the Water Management Act Annual Report, please contact Richard Friend with the WMA Program at (617) 654-6522 or email him at richard.friend@state.ma.us

Table BW-1 Permit & Registration Information

River Basin (Watershed)	Registration Number	Permit Number
25-TAUNTON	42527301	9P42527301

Water Withdrawal by Watershed

Calculation of Daily Average Withdrawal: Use Table BW-2 to document the reporting year withdrawal volume(s) by watershed. Table BW-3 compare's the reporting year actual withdrawal volume(s) to the volume(s) authorized under your WMA registration(s) and/or permit(s). The total volumes for each source and their respective watershed are reported in the Ground Water Sources and for Surface Water Sources report forms. Enter the total of all sources for each watershed in Table BW-2.

Enter volumes in million gallons per year(MGY). Example: If you pumped 400,512,000 gallons in the year, enter 400.512.

Table BW-2 Average Daily Withdrawal by Watershed

River Basin	Total Raw Water Pumped in the reporting year (mgy)	/365=	Watershed Average Daily Withdrawal (mgd)
25-TAUNTON	859.795	/365 =	2.36

Table BW-3 WMA Authorized Volume vs. Actual Withdrawal Volume

River Basin	Registered Volume (mgd)	+	Permitted Volume (mgd)	=	WMA Authorized Withdrawal Volume (mgd)	-	Daily Avg. Water Use (mgd) (from Table BW-2 above)	=	Difference*
25-TAUNTON	2.81	+	1.61	=	4.42	-	2.36	=	2.06

*** A positive difference indicates that the volume withdrawn is less than the authorized volume. A negative value indicates that more water was pumped than is authorized and that your PWS may be out of compliance.**

Table BW-4 Permit Special Conditions

Review your WMA permit and list any Special Conditions of your WMA permit that require submission of an annual report to MassDEP. If the required report is being submitted with this ASR, please note in Table BW-4. If a required report was submitted earlier in the year, please provide the date submitted.

WMA Permit Special Condition Requiring Annual Report to MassDEP	Report Attached to ASR	If not attached, date submitted to MassDEP
	Yes No	(mm\dd\yyyy)

If mailing annual report, send to:
MADEP
1 Winter St.
Boston MA 02108
Attn: Water Management Act Program

Table BW-5 Use this table to provide comments or additional information regarding this section of the ASR. You may explain discrepancies, provide supplemental information, or provide any other information to assist MassDEP in processing the data in your ASR.

#8

Treatment Plants

Treatment Plant

1. Plant Information

Plant ID#: 4273000-01T		Plant Name: TREATMENT PLANT	
Street Address Line 1: 3249 COUNTY ST		Street Address Line 2:	
City/Town: SOMERSET		State(2 letter abbreviation): MA	Zip: 02726
Status:	Availability: ACTIVE	Class: III-T	Capacity (MGD): 6
Contact: CHRISTOPHER E WICKMAN		Phone: [redacted]	Fax:

2. Related Sources Table

4273000-01S	SOMERSET RES.

3. Treatment Table(s)

Treatment Objective: OTHER	Treatment Process: FLUORIDATION	
Innovative: N	Start Date: 07/25/1994	End Date:

Chemical Name
SODIUM FLUORIDE

Comment:

Treatment Objective: CORROSION CONTROL	Treatment Process: PH ADJUSTMENT, POST	
Innovative: N	Start Date: 07/25/1994	End Date:

Chemical Name
SODIUM HYDROXIDE

Comment:

Treatment Objective: PARTICULATE REMOVAL	Treatment Process: COAGULATION	
Innovative: N	Start Date: 07/25/1994	End Date:

Chemical Name
POLYALUMINUM CHLORIDE

Comment:
NALCO 8157, POLYDINE N3300P

Treatment Objective:	Treatment Process:
INORGANICS REMOVAL	FLOCCULATION

Innovative: N | Start Date: 01/01/1992 | End Date:

No Data Found

Comment:
UPFLOW CLARIFIER

Treatment Objective:	Treatment Process:
PARTICULATE REMOVAL	FILTERED

Innovative: N | Start Date: 01/01/1992 | End Date:

No Data Found

Comment:
MEDIA: ANTHRACITE/SILICA/GARNET SAND

Treatment Objective:	Treatment Process:
DISINFECTION	HYPOCHLORINATION, POST

Innovative: N | Start Date: 06/06/2017 | End Date:

Chemical Name
SODIUM HYPOCHLORITE

Comment:
REPLACED GAS CHLORINE

Treatment Objective:	Treatment Process:
CORROSION CONTROL	INHIBITOR, BIMETALLIC PHOSPHATE

Innovative: N | Start Date: 07/25/1994 | End Date:

No Data Found

Comment:
CALGON C-8

Treatment Objective:		Treatment Process:	
INORGANICS REMOVAL		RAPID MIX	
Innovative: N	Start Date: 01/01/1992	End Date:	

No Data Found

Comment:
STATIC MIXER

Treatment Plant

1. Plant Information

4273000-03T		FJM #2 WELL TREATMENT PLANT	
Plant ID# :		Plant Name:	
581 BROOK STREET			
Street Address Line 1:		Street Address Line 2:	
DIGHTON		MA	02715
City/Town:		State(2 letter abbreviation)	Zip:
ACTIVE	ACTIVE	I - T	.58
Status:	Availability:	Class:	Capacity (MGD):
CHRISTOPHER E	WICKMAN	[redacted]	
Contact:		Phone:	Fax:

2. Related Sources Table

4273000-05G	FJM 2 WELL

3. Treatment Table(s)

Treatment Objective:	Treatment Process:	
CORROSION CONTROL	PH ADJUSTMENT	
Innovative: N	Start Date: 10/01/2004	End Date:

Chemical Name
SODIUM HYDROXIDE

Comment:

Treatment Objective:	Treatment Process:	
DISINFECTION	ULTRAVIOLET RADIATION	
Innovative: N	Start Date: 10/01/2004	End Date:

No Data Found

Comment:

Treatment Objective:	Treatment Process:
OTHER	FLUORIDATION

Innovative:	Start Date:	End Date:
N	10/01/2004	

Chemical Name
SODIUM FLUORIDE

Comment:

Comments or additional information regarding this section

#9

Pump Stations

Pump

1. Pump Information	
FJM #2 WELL PUMPING STATION	581 BROOK STREET DIGHTON, MA
Pump Station Name	Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	1	Number of Emergency Pumps:	
Raw or Finished Water:	Raw	Maximum Aggregate Capacity (Gallons per Minutes):	400
Standby/Emergency Power:	Y		

Primary Pump Details			
Suction Type:		Suction Head (ft.):	
Suction Size (inches):	4	Motor Horse Power:	40
Motor Type:	VT	Motor Control:	
Discharge Type:		Discharge Size (inches):	6
Installation Date	8/9/2017	Model #:	
Pump Manufacturer:	FLOWAY		

2. Related Sources Table (if applicable)

4273000-05G	FJM 2 WELL

Pump

1. Pump Information	
RAW WATER INTAKE PUMPS	3249 COUNTY ST SOMERSET TREATMENT PLANT
Pump Station Name	Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	2	Number of Emergency Pumps:	
Raw or Finished Water:	Raw	Maximum Aggregate Capacity (Gallons per Minutes):	4800
Standby/Emergency Power:	Y		

Primary Pump Details			
Suction Type:	C	Suction Head (ft.):	
Suction Size (inches):	10	Motor Horse Power:	20
Motor Type:	CENTRIFUG	Motor Control:	
Discharge Type:	C	Discharge Size (inches):	10
Installation Date	1/1/1993	Model #:	
Pump Manufacturer:	PEERLESS		

2. Related Sources Table (if applicable)

4273000-01S	SOMERSET RES.

Pump

1. Pump Information

HOT AND COLD LANE BOOSTER PUMP STATION	HOT AND COLD LANE SOMERSET, MA
Pump Station Name	Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	2	Number of Emergency Pumps:	
Raw or Finished Water:	Finished	Maximum Aggregate Capacity (Gallons per Minutes):	200
Standby/Emergency Power:	N		

Primary Pump Details			
Suction Type:		Suction Head (ft.):	
Suction Size (inches):	2	Motor Horse Power:	25
Motor Type:	CENTRIFUGA	Motor Control:	AUTOMATIC
Discharge Type:		Discharge Size (inches):	2
Installation Date	5/1/1995	Model #:	
Pump Manufacturer:	PEARLESS		

2. Related Sources Table (if applicable)

4273000-01S	SOMERSET RES.
4273000-05G	FJM 2 WELL

Pump

1. Pump Information

SEGREGANSET RIVER PUMPING STATION	SOMERSET
Pump Station Name	Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	2	Number of Emergency Pumps:	0
Raw or Finished Water:	Raw	Maximum Aggregate Capacity (Gallons per Minutes):	10416
Standby/Emergency Power:	N		

Primary Pump Details			
Suction Type:		Suction Head (ft.):	0
Suction Size (inches):	12	Motor Horse Power:	250
Motor Type:		Motor Control:	
Discharge Type:		Discharge Size (inches):	12
Installation Date	1/1/1962	Model #:	
Pump Manufacturer:	ALLIS-CHALMERS		

2. Related Sources Table (if applicable)

No Data Found

Pump

1. Pump Information	
SOMERSET FILTRATION PLANT	3249 COUNTY RD. SOMERSET, MA
Pump Station Name	Location

Status:	ACTIVE	Availability:	ACTIVE
Number of Pumps:	3	Number of Emergency Pumps:	
Raw or Finished Water:	Finished	Maximum Aggregate Capacity (Gallons per Minutes):	3800
Standby/Emergency Power:	Y		

Primary Pump Details			
Suction Type:	S	Suction Head (ft.):	
Suction Size (inches):	10	Motor Horse Power:	200
Motor Type:		Motor Control:	
Discharge Type:	S	Discharge Size (inches):	12
Installation Date	1/1/1993	Model #:	
Pump Manufacturer:	DEMPSTER		

2. Related Sources Table (if applicable)

4273000-01S	SOMERSET RES.

Comments or additional information regarding this section

#10

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
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Reporting Year 2017

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Storage Facilities

Show all storage facilities

Storage Facility

Edit Delete

RICHMOND HILL TANK	ELM STREET DIGHTON, MA
Storage Facility Name	**Location**

Status:		Availability:	ACTIVE
Storage Type:	GROUND LEVEL STORAGE TANK	Capacity (MG):	.38
Material:	STEEL	Installation Date	

Storage Facility

Edit Delete

HOT AND COLD LANE - EAST TANK	HOT AND COLD LANE SOMERSET, MA
Storage Facility Name	**Location**

Status:		Availability:	ACTIVE
Storage Type:	GROUND LEVEL STORAGE TANK	Capacity (MG):	3
Material:	CONCRETE	Installation Date	6/15/2011

Storage Facility

Edit Delete

HOT AND COLD LANE - WEST TANK	HOT AND COLD LANE SOMERSET, MA
Storage Facility Name	**Location**

Status:		Availability:	ACTIVE
Storage Type:	GROUND LEVEL STORAGE TANK	Capacity (MG):	3.07
Material:	CONCRETE	Installation Date	7/1/2012

Storage Facility

Edit Delete

READ ST. TANK	READ ST. SOMERSET, MA
Storage Facility Name	**Location**

Status:		Availability:	ACTIVE
Storage Type:	GROUND LEVEL STORAGE TANK	Capacity (MG):	.643
Material:	STEEL	Installation Date	10/13/1998

Comments or additional information

- RICHMOND HILL STORAGE TANK ELM ST. DIGHTON, MA. IS OUT OF SERVICE. BROKEN INLET VALVE. - HOT AND COLD LANE STORAGE TANKS SOMERSET MA. BOTH HAVE "SOLARBEE" MIXING SYSTEMS INSTALLED - READ STREET TANK HAS A "TIDEFLEX" MIXING SYSTEM INSTALLED

#11

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2017

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Ground Water Sources

Individual Ground Water Source Statistics

Source ID:	4273000-05G
Source Name:	FJM #2 WELL
Location:	581 BROOK ST
	DIGHTON, MA.
Status:	A
Source Availability:	ACTIVE

		Withdrawal Units:	MG
Latitude:	41.824569	January:	9.220000
Longitude: -	71.134841	February:	8.202000
Source Watershed:	TAUNTON	March:	8.887000
Well Type:	GRAVEL-PACKED	April:	9.133000
Well Depth (ft.):	39	May:	9.675000
Well Casing Height (ft.):	0	June:	2.399000
Well Casing Depth (ft.):	0	July:	9.799000
Screen Length (ft.):	7.5	August:	9.497000
		September:	9.119000
Pump Setting (ft):	0	October:	9.422000
		November:	8.872000
Approved Daily Pumping Volume (MGD):	.576	December:	9.110000
Source Metered:	Yes	Total Amount Pumped:	103.335000
Date of Meter Installation:	11/9/2004	Total # of Days Pumped:	343
Type of water metered for source:	FINISHED	Maximum Single Day Pumped Volume:	0.347000
Last Meter Calibration:	6/7/2016	Date of Maximum Amount Pumped:	6/9/2017

Comments or additional information regarding this section
- FJM WELL #2 OUT OF SERVICE FOR MAINTENANCE 6/6/17 - 6/28/17

#12

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2017

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Surface Water Sources

Individual Surface Water Source Statistics

Source ID:	4273000-01S
Source Name:	SOMERSET RESERVOIR
Location:	3249 COUNTY ST.
Location (Line2):	SOMERSET, MA.
Status:	A
Source Availability:	ACTIVE

		Withdrawal Units:	MG
Latitude:	41.777569	January:	108.702000
Longitude:	71.137337	February:	82.475000
Source Watershed:	TAUNTON	March:	83.534000
		April:	70.619000
Terminal Reservoir:	Y	May:	75.930000
Watershed Area (Miles2):	.39	June:	80.679000
USGS Elevation (ft.):		July:	69.440000
Surface Area (Acres):	175	August:	67.189000
Storage Capacity (MG):	1400	September:	57.522000
Watershed Plan?:	Y	October:	55.850000
SWTR Waiver Granted?:	Y	November:	53.904000
Safe Yield (MGD):	5	December:	53.951000
Source Metered:	Yes	Total Amount Pumped:	859.795000
Date of Meter Installation:	7/25/1999	Total # of Days Pumped:	365
Type of water metered for source:	RAW	Maximum Single Day Pumped Volume:	3.659000
Last Meter Calibration:	6/7/2016	Date of Maximum Amount Pumped:	1/10/2017

Comments or additional information regarding this section:

#13

Purchased Water Sources

No Data Found

Comments or additional information regarding this section
- NO WHOLESALE WATER PURCHASED IN 2017.

Gmail

Chris Wickman <cwickmansomersetwater@gmail.com>

attachments for 2017 ASR report

Chris Wickman <cwickmansomersetwater@gmail.com> Mon, Jul 9, 2018 at 1:17 PM
To: jen.durso@state.ma.us

Dear Ms. Jen D'Urso,
Please find the attached corrected 2017 ASR watershed withdrawal volumes in reference to the DEP letter dated June 5, 2018.

After review of Table BW-2 for the TOTAL RAW WATER PUMPED (River Basin 25-Taunton) I neglected to add the total from the FJM#2 well to the Somerset Reservoir volume. If you have any questions, please feel free to contact me anytime.

Christopher E. Wickman
Plant Manager & Chief Operator
Somerset Water Department
3249 County Rd.
Somerset, Massachusetts 02726
(508) 679-2731

3 attachments

corrected ASR watershed data 7-6-18.pdf
564K

DEP ASR letter 6-7-18.pdf
474K

filename-1 (5).pdf
355K

Massachusetts Department of Environmental Protection
Bureau of Water Resources (BWR) – Drinking Water Program
Public Water Supply Annual Statistical Report
Reporting Year 2017

PWSID#: 4273000
Name: SOMERSET WATER DEPARTMENT
City: SOMERSET
PWS Class: COM

Water Management Act Annual Report - Basin Withdrawal

Instructions for completing Tables BW-1 through BW-4 are included in the ASR Instructions available at MassDEP's website. If you have any questions concerning completion of the Water Management Act Annual Report, please contact Richard Friend with the WMA Program at (617) 654-6522 or email him at richard.friend@state.ma.us

Table BW-1 Permit & Registration Information

River Basin (Watershed)	Registration Number	Permit Number
25-TAUNTON	42527301	9P42527301

Water Withdrawal by Watershed

Calculation of Daily Average Withdrawal: Use Table BW-2 to document the reporting year withdrawal volume(s) by watershed. Table BW-3 compare's the reporting year actual withdrawal volume(s) to the volume(s) authorized under your WMA registration(s) and/or permit(s). The total volumes for each source and their respective watershed are reported in the Ground Water Sources and for Surface Water Sources report forms. Enter the total of all sources for each watershed in Table BW-2.

Enter volumes in million gallons per year(MGY). Example: If you pumped 400,512,000 gallons in the year, enter 400.512.

Table BW-2 Average Daily Withdrawal by Watershed

River Basin	Total Raw Water Pumped in the reporting year (mgy)	/365=	Watershed Average Daily Withdrawal (mgd)
25-TAUNTON	859.795	/365 =	2.36
	963.130		2.639 mgd

SOURCE I.D. #		
#4273000-05G	103.335	MG
#4273000-01S	859.795	MG
TOTAL	963.130	MG

Table BW-3 WMA Authorized Volume vs. Actual Withdrawal Volume

River Basin	Registered Volume (mgd)	+	Permitted Volume (mgd)	=	WMA Authorized Withdrawal Volume (mgd)	-	Daily Avg. Water Use (mgd) (from Table BW-2 above)	=	Difference*
25-TAUNTON	2.81	+	1.61	=	4.42	-	2.36 2.639	=	2.06 1.781

*** A positive difference indicates that the volume withdrawn is less than the authorized volume. A negative value indicates that more water was pumped than is authorized and that your PWS may be out of compliance.**

Table BW-4 Permit Special Conditions		
Review your WMA permit and list any Special Conditions of your WMA permit that require submission of an annual report to MassDEP. If the required report is being submitted with this ASR, please note in Table BW-4. If a required report was submitted earlier in the year, please provide the date submitted.		
WMA Permit Special Condition Requiring Annual Report to MassDEP	**Report Attached to ASR**	**If not attached, date submitted to MassDEP**
	○ Yes ○ No	(mm\dd\yyyy)

If mailing annual report, send to:
MADEP
1 Winter St.
Boston MA 02108
Attn: Water Management Act Program

CEW 7/6/18

MassDEP

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

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JUN 07 2018
Somerset Water Dept.
Somerset, MA

June 5, 2018

SOMERSET WATER DEPARTMENT
3249 COUNTY ST
SOMERSET, MA 02726
PWSID: 4273000

RE: 2017 MassDEP Annual Statistical Report Review

Dear Public Water Supplier:

You are receiving this letter because the Water Management Act (WMA) program at MassDEP is proposing to adjust the Unaccounted-for-Water (UAW) value reported in your 2017 Annual Statistical Report (eASR), or has found an inconsistency with the reported Watershed Volume as compared to the sum of the Individual Source Volumes.

Since 2003, WMA permits have included a Performance Standard for UAW, which is a measure of how well public water suppliers (PWSs) can account for the water entering and leaving their distribution systems. MassDEP requires PWSs to meet a specific UAW standard as outlined in their permits. MassDEP reviews this data for consistency with the guidance provided to PWSs, agreement with published census data, and documentation and validity of water volumes. Watershed Volumes from Table BW-2 are compared to the sum of the Individual Water Source Statistics.

Below is a summary of your reported values, MassDEP's proposed adjustments for your system, and any comments by MassDEP staff on the reasons for the adjustment. In addition, if necessary, there is a request to review the Watershed Volumes reported in Table BW-2, as compared to the totals reported under the Individual Source Volumes.

Please review the data submitted in your eASR. Please note that the most common reasons that UAW values are adjusted (usually upward) is a lack of supporting documentation of CEMU volumes and claiming ordinary leakage as major main breaks.

PWS: SOMERSET WATER DEPARTMENT PWSID: 4273000

MassDEP Comments on Watershed Volume: The sum of the individual sources (Somerset Reservoir and FJM #2 well) is 963.13 mgy. Watershed volume is reported as 859.795 mgy. Please review.

The Mass-DEP adjusted UAW values will be posted on MassDEP's website in August 2018. **If you wish to provide additional data supporting your original reported values, you must do so by July 9, 2018.** You can email Jen D'Urso (jen.durso@state.ma.us) electronic files in Excel, Word, and Adobe.pdf formats. If submitting Excel files, please submit one file with as many tabs as is necessary, rather than multiple files.

You cannot make changes to the eASR forms on-line once you have submitted them to eDEP. If you wish to change your 2017 eASR data, print out the appropriate pages from your eASR (pdf format), manually change the data, scan the marked-up page(s) and email those pages to Jen D'Urso. DEP will electronically attach the scanned pages to your eASR as an addendum. Please note that if your Adjusted UAW is greater than 10%, you may need to submit a UAW Compliance Plan. Please review your permit for specific requirements.

If you have any questions, Jen can be reached at (617) 654-6591.

Sincerely,

Duane LeVangie

Duane LeVangie
Water Management Act Program Chief

DL/jd

Y:\DWP Archive\Boston\ASR 2017 Adjustments

APPENDIX E
EPA Regulatory Fact Sheets

United States Environmental Protection Agency | Office of Water (4606) | EPA 816-F-01-004 January 2001

Arsenic and Clarifications to Compliance and New Source Monitoring Rule: A Quick Reference Guide

Overview of the Rule

Title	Arsenic and Clarifications to Compliance and New Source Monitoring Rule 66 FR 6976 (January 22, 2001)
Purpose	To improve public health by reducing exposure to arsenic in drinking water.
General Description	Changes the arsenic MCL from 50 µg/L to 10 µg/L; Sets arsenic MCLG at 0; Requires monitoring for new systems and new drinking water sources; Clarifies the procedures for determining compliance with the MCLs for IOCs, SOCs, and VOCs.
Utilities Covered	All community water systems (CWSs) and nontransient, noncommunity water systems (NTNCWSs) must comply with the arsenic requirements. EPA estimates that 3,024 CWSs and 1,080 NTNCWSs will have to install treatment to comply with the revised MCL.

Public Health Benefits

Implementation of the Arsenic Rule will result in . . .	• Avoidance of 16 to 26 non-fatal bladder and lung cancers per year. • Avoidance of 21 to 30 fatal bladder and lung cancers per year. • Reduction in the frequency of non-carcinogenic diseases.

Critical Deadlines & Requirements

Consumer Confidence Report Requirements *

Report Due	Report Requirements
July 1, 2001	For the report covering calendar year 2000, systems that detect arsenic between 25 µg/L and 50 µg/L must include an educational statement in the consumer confidence reports (CCRs).
July 1, 2002 and beyond	For reports covering calendar years 2001 and beyond, systems that detect arsenic between 5 µg/L and 10 µg/L must include an educational statement in the CCRs.
July 1, 2002 - July 1, 2006	For reports covering calendar years 2001 to 2005, systems that detect arsenic between 10 µg/L and 50 µg/L must include a health effects statement in their CCRs.
July 1, 2007 and beyond	For reports covering calendar year 2006 and beyond, systems that are in violation of the arsenic MLC (10 µg/L) must include a health effects statement in their CCRs.

For Drinking Water Systems

Jan. 22, 2004	All *NEW* systems/sources must collect initial monitoring samples for all IOCs, SOCs, and VOCs within a period and frequency determined by the State.
Jan. 1, 2005	When allowed by the State, systems may grandfather data collected after this date.
Jan. 23, 2006	The new arsenic MCL of 10 µg/L becomes effective. All systems must begin monitoring or when allowed by the State, submit data that meets grandfathering requirements.
Dec. 31, 2006	Surface water systems must complete initial monitoring or have a State approved waiver.
Dec. 31, 2007	Ground water systems must complete initial monitoring or have a State approved waiver.

For States

Spring 2001	EPA meets and works with States to explain new rules and requirements and to initiate adoption and implementation activities.
Jan. 22, 2003	State primacy revision applications due.
Jan. 22, 2005	State primacy revision applications due from States that received 2-year extensions.

* For required educational and health effects statements, please see 40 CFR 141.154.

Compliance Determination (IOCs, VOCs, and SOCs)

1. **Calculate compliance based on a running annual average at each sampling point.**
2. **Systems will not be in violation until 1 year of quarterly samples have been collected (unless fewer samples would cause the running annual average to be exceeded.)**
3. **If a system does not collect all required samples, compliance will be based on the running annual average of the samples collected.**

Monitoring Requirements for Total Arsenic [(1)]

Initial Monitoring

One sample after the effective date of the MCL (January 23, 2006). Surface water systems must take annual samples. Ground water systems must take one sample between 2005 and 2007.

Reduced Monitoring

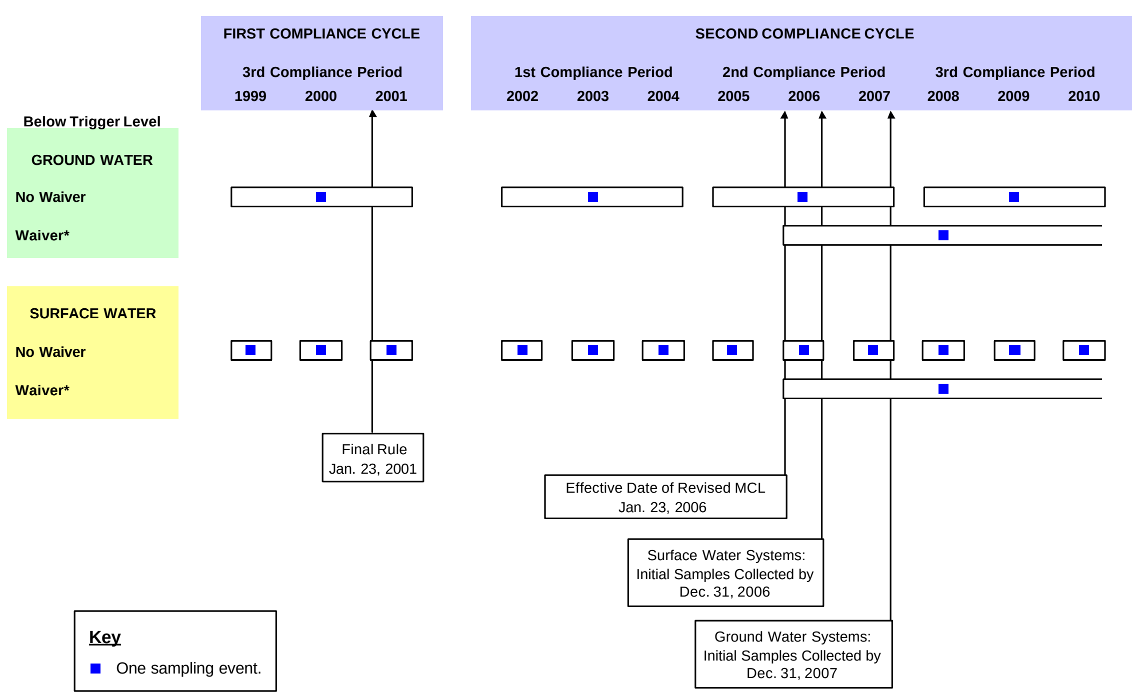
If the initial monitoring result for arsenic is less than the MCL . . .	**Ground water systems must collect one sample every 3 years. Surface water systems must collect annual samples.**

Increased Monitoring

A system with a sampling point result above the MCL must collect quarterly samples at that sampling point, until the system is reliably and consistently below the MCL.

[(1)] All samples must be collected at each entry point to the distribution system, unless otherwise specified by the State.

Applicability of the Standardized Monitoring Framework to Arsenic



*Waivers are not permitted under the current arsenic requirements. States may issue 9 year monitoring waivers under the revised final arsenic rule. To be eligible for a waiver, surface water systems must have monitored annually for at least 3 years. Ground water systems must conduct a minimum of 3 rounds of monitoring with detection limits below 10 µg/L.

For additional information on the Arsenic Rule

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA Web site at www.epa.gov/safewater; or contact your State drinking water representative. EPA will provide arsenic training over the next year.

United States
Environmental Protection
Agency

Consumer Confidence Report Rule: A Quick Reference Guide

Overview of the Rule

Title	Consumer Confidence Report (CCR) Rule, 63 FR 44511, August 19, 1998, Vol. 63, No. 160
Purpose	Improve public health protection by providing educational material to allow consumers to make educated decisions regarding any potential health risks pertaining to the quality, treatment, and management of their drinking water supply.
General Description	The CCR Rule requires all community water systems to prepare and distribute a brief annual water quality report summarizing information regarding source water, detected contaminants, compliance, and educational information.
Utilities Covered	Community water systems (CWSs), all size categories.

Public Health Related Benefits

Implementation of the CCR Rule will result in . . .	► Increased consumer knowledge of drinking water sources, quality, susceptibility to contamination, treatment, and drinking water supply management. ► Increased awareness of consumers to potential health risks so they may make informed decisions to reduce those risks, including taking steps toward protecting their water supply. ► Increased dialogue between drinking water utilities and consumers to increase understanding of the value of drinking water and water supply services and to facilitate consumer participation in decisions that affect public health.

Annual Requirements

CWSs must prepare and distribute a CCR to all billing units or service connections.	► *April 1* - Deadline for CWS that sells water to another CWS to deliver the information necessary for the buyer CWS to prepare their CCR (requirement outlined in 40 CFR 141.152). ► *July 1* - Deadline for annual distribution of CCR to customers and state or local primary agency for report covering January 1 - December 31 of previous calendar year. ► *October 1* - (or 90 days after distribution of CCR to customers, whichever is first) Deadline for annual submission of proof of distribution to state or local primacy agency. ► A CWS serving 100,000 or more persons must also post its current year's report on a publicly accessible site on the Internet. Many systems choose to post their reports at the following EPA Web site http://yosemite.epa.gov/ogwdw/ccr.nsf/america. ► All CWSs must make copies of the report available on request.

Multilingual Requirements

- ► CWSs that have a large proportion of non-English speaking residents must include information in the appropriate language(s) expressing the importance of the CCR, or a phone number or address where residents may contact the CWS to obtain a translated copy of the CCR or assistance in the appropriate language.
- ► The state or EPA will make the determination of which CWSs need to include this information.

Small Water System Flexibility

- ► With the permission of the governor of a state (or designee), or where the tribe has primacy, in lieu of mailing, systems serving fewer than 10,000 persons may publish their CCR in a local newspaper.*
- ► With the permission of the governor of a state (or designee), or where the tribe has primacy, in lieu of a mailing and/or publication, systems serving 500 or fewer persons may provide a notice stating the CCR is available upon request.*

*Questions regarding whether the necessary permission has been granted should be addressed to the appropriate state or primacy agency.

Eight Content Requirements of a CCR

- ***Item 1*: Water System Information** – Name/phone number of a contact person; information on public participation opportunities.
- ***Item 2*: Source(s) of Water**.
- ***Item 3*: Definitions** – Maximum Contaminant Level (MCL); MCL Goal (MCLG); Treatment Technique (TT); Action Level (AL); Maximum Residual Disinfectant Level (MRDL); MRDL Goal (MRDLG).
- ***Item 4*: Detected Contaminants** – A table summarizing reported concentrations and relevant MCLs and MCLGs or MRDLs and MRDLGs; known source of detected contaminants; health effects language.
- ***Item 5*: Information on Monitoring for *Cryptosporidium*, Radon, and Other Contaminants** (if detected).
- ***Item 6*: Compliance with Other Drinking Water Regulations** (any violations and Ground Water Rule [GWR] special notices).
- ***Item 7*: Variances and Exemptions** (if applicable).
- ***Item 8*: Required Educational Information** – Explanation of contaminants in drinking water and bottled water; information to vulnerable populations about *Cryptosporidium*; statements on nitrate, arsenic, and lead.

Optional Information

CWSs are not limited to providing only the required information in their CCR. CWSs may want to include:

- An explanation (or include a diagram of) the CWSs treatment processes.
- Source water protection efforts and/or water conservation tips.
- Costs of making the water safe to drink.
- A statement from the mayor or general manager.
- **Information to educate customers about**: Taste and odor issues, affiliations with programs such as the Partnership for Safe Water, opportunities for public participation, etc.

Communication Tips

- Provide a consistent message. Be as simple, truthful, and straightforward as possible. Avoid acronyms, initials, and jargon.
- Provide links to useful information resources.
- Limit wordiness – write short sentences and keep your paragraphs short.
- Assume that consumers will only read the top half of the notice or what can be read in 10 seconds.
- Display important elements in bold and/or large type in the top half of the notice.
- Do not make your text size too small.
- Give a draft of your CCR to relatives or friends who are not drinking water experts and ask them if it makes sense. Ask customers for their comments when you publish the CCR.
- Use graphics, photographs, maps, and drawings to illustrate your message. Do not distract from your main message with graphics and/or pictures that do not complement your message.
- Consider printing the CCR on recycled paper and taking other steps to make the CCR "environmentally friendly." If you hope to get your customers involved in protecting or conserving water, set a good example for them to follow.
- Use the CCR as an opportunity to tell your customers about all of the things that you are doing well.

Reporting and Recordkeeping

- CWSs must:
  - Mail or directly deliver a copy of the CCR to each of their customers by July 1 annually.
  - Make a good faith effort to get CCRs to non-bill-paying consumers, using means recommended by the state.
  - Send a copy to the director of the state drinking water program and any other state agency that the state drinking water program director identifies when you mail it to customers.
  - Submit to the state a certification, within 3 months of mailing, that the CWS distributed the CCR, and that its information is correct and consistent with the compliance monitoring data previously submitted to the state.
  - Post their CCRs on the Internet (if the CWSs serve 100,000 or more people).
- CWSs may also want to send copies to state and local health departments, as well as local TV and radio stations and newspapers.

For additional information on the CCR Rule

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA Web site at www.epa.gov/safewater/ccr1.html; or contact your state or local primacy agency's drinking water representative. Log onto the CCRiWriter Web site to use EPA's template at www.CCRiWriter.com.

EPA
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Comprehensive Disinfectants and Disinfection Byproducts Rules (Stage 1 and Stage 2): Quick Reference Guide

Overview of the Rules

Titles*	► Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) 63 FR 69390, December 16, 1998, Vol. 63, No. 241 ► Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) 71 FR 388, January 4, 2006, Vol. 71, No. 2
Purpose	Improve public health protection by reducing exposure to disinfection byproducts. Some disinfectants and disinfection byproducts (DBPs) have been shown to cause cancer and reproductive effects in lab animals and suggested bladder cancer and reproductive effects in humans.
General Description	The DBPRs require public water systems (PWSs) to: ► Comply with established maximum contaminant levels (MCLs) and operational evaluation levels (OELs) for DBPs, and maximum residual disinfection levels (MRDLs) for disinfectant residuals. ► Conduct an initial evaluation of their distribution system. In addition, PWSs using conventional filtration are required to remove specific percentages of organic material that may react to form DBPs through the implementation of a treatment technique.
Utilities Covered	The DBPRs apply to all sizes of community water systems (CWSs) and nontransient noncommunity water systems (NTNCWSs) that add a disinfectant other than ultraviolet (UV) light or deliver disinfected water, and transient noncommunity water systems (TNCWSs) that add chlorine dioxide.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Overview of Requirements

This table shows how the requirements for the Stage 2 DBPR build on the existing requirements established in the Stage 1 DBPR. For more information on changes in monitoring requirements, see Table 1.

		Stage 1 DBPR	Stage 2 DBPR	For More Info:
Coverage	All CWSs and NTNCWSs that add disinfectant other than UV light and TNCWSs that treat with chlorine dioxide.	✓	✓	
	Consecutive systems that deliver water treated with a disinfectant other than UV light.		✓	
TTHM & HAA5 MCL Compliance	MCL compliance is calculated using the running annual average (RAA) of all samples from all monitoring locations across the system.	✓		See Table 3 and Table 4.
	MCL compliance is calculated using the locational RAA (LRAA) for each monitoring location in the distribution system.		✓	
Regulated Contaminants & Disinfectants	*Contaminants*			See Table 2.
	Total Trihalomethanes (TTHM)	✓	✓	
	5 Haloacetic Acids (HAA5)	✓	✓	
	Bromate	✓	Regulated under Stage 1 DBPR[1]	
	Chlorite	✓	Regulated under Stage 1 DBPR	
	Disinfectants			
	Chlorine/chloramines	✓	Regulated under Stage 1 DBPR	
	Chlorine dioxide	✓	Regulated under Stage 1 DBPR	
Operational Evaluation	If an operational evaluation level (OEL) is exceeded, systems must evaluate practices and identify DBP mitigation actions.		✓	See Table 5.

1. A new analytical method for bromate was approved with the Stage 2 DBPR.

Table 1. Changes in Monitoring Requirements

			Stage 1 DBPR	Stage 2 DBPR
TTHM/ HAA5 Routine Monitoring	Number of Samples		Based on source water type, population, and number of treatment plants or wells.	Based on source water type and population.
	Sample Locations		At location of maximum residence time.[1]	Based on Initial Distribution System Evaluation (IDSE) requirements.[2]
	Compliance Calculation		RAA must not exceed the MCL for TTHM or HAA5.	LRAA must not exceed the MCL for TTHM or HAA5.
Reduced Monitoring	Eligibility	TTHM/HAA5	All systems need TTHM RAA ≤ 0.040 mg/L and HAA5 ≤ 0.030 mg/L. Subpart H systems also need source water TOC RAA at location prior to treatment ≤ 4.0 mg/L .[3, 4] The Stage 2 DBPR left eligibility unchanged but specifies that Subpart H systems must take source water TOC samples every 30 days. Subpart H systems on reduced monitoring must take source water TOC samples every 90 days to qualify for reduced monitoring.	
		Bromate[5]	Source water bromide RAA < 0.05 mg/L. With the Stage 2 DBPR specified entry point to distribution system bromate RAA ≤ 0.0025 mg/L.	

[1]Subpart H systems serving ≥ 10,000 must have at least 25 percent of samples at the location of maximum residence time; the remaining samples must be representative of average residence time.

[2]All systems are required to satisfy their IDSE requirement by July 10, 2010.

[3]Subpart H systems are water systems that use surface water or ground water under the direct influence of surface water (GWUDI).

[4]Ground water systems serving < 10,000 must meet these RAA for 2 years; can also qualify for reduced monitoring if the TTHM RAA is ≤ 0.020 mg/L and a HAA5 RAA ≤ 0.015 mg/L for 1 year.

[5]A new analytical method for bromate was established with the Stage 2 DBPR.

Table 2. Regulated Contaminants and Disinfectants

	Stage 1 DBPR		Stage 2 DBPR	
Regulated Contaminants	MCL (mg/L)	MCLG (mg/L)	MCL (mg/L)	MCLG (mg/L)
TTHM	0.080		Unchanged[2]	
Chloroform		-		0.07
Bromodichloromethane		Zero		Unchanged[2]
Dibromochloromethane		0.06		Unchanged[2]
Bromoform		Zero		Unchanged[2]
HAA5	0.060		Unchanged[2]	
Monochloroacetic acid		-		0.07
Dichloroacetic acid		Zero		Unchanged[2]
Trichloroacetic acid		0.3		0.2
Bromoacetic acid		-		-
Dibromoacetic acid		-		-
Bromate (plants that use ozone)[1]	0.010	Zero	Unchanged[2]	Unchanged[2]
Chlorite (plants that use chlorine dioxide)	1.0	0.8	Unchanged[2]	Unchanged[2]
Regulated Disinfectants	MRDL[3] (mg/L)	MRDLG[3] (mg/L)	MRDL (mg/L)	MRDLG (mg/L)
Chlorine	4.0 as Cl_2	4	Unchanged[2]	Unchanged[2]
Chloramines	4.0 as Cl_2	4	Unchanged[2]	Unchanged[2]
Chlorine dioxide	0.8	0.8	Unchanged[2]	Unchanged[2]

[1]A new analytical method for bromate was established with the Stage 2 DBPR.

[2]Stage 2 DBPR did not revise the MCL or MRDL for this contaminant/disinfectant.

[3]Stage 1 DBPR included MRDLs and MRDLGs for disinfectants, which are similar to MCLs and MCLGs.

Table 3. Compliance Determination

	Stage 1 DBPR	Stage 2 DBPR
TTHM/HAA5	RAA	LRAA
Bromate[1]	RAA	Unchanged[2]
Chlorite	Daily/follow-up monitoring	Unchanged[2]
Chorine dioxide	Daily/follow-up monitoring	Unchanged[2]
Chlorine/chloramines	RAA	Unchanged[2]
DBP precursors (TOC sample set)*	Monthly for TOC and alkalinity	Every 30 days for TOC and alkalinity

[1]A new analytical method for bromate was established with the Stage 2 DBPR.

[2]Stage 2 DBPR did not change the compliance requirements for this contaminant/disinfectant.

*TOC sample set is comprised of source water alkalinity, source water TOC, and treated TOC.

Table 4. Compliance with MCLs and MRDLs (Routine Monitoring)

Contaminant/ Disinfectant	Coverage		Stage 1 DBPR		Stage 2 DBPR	
	Source Water	Population	Monitoring Frequency	Total Distribution System Monitoring Locations	Monitoring Frequency[1]	Total Distribution System Monitoring Locations
TTHM/HAA5	Subpart H	< 500	Per year[2]	1 per treatment plant	Per year[2]	2
		500 - 3,300	Per quarter	1 per treatment plant	Per quarter	2
		3,301 - 9,999				
		10,000 - 49,000		4 per treatment plant		4
		50,000 - 249,999				8
		250,000 - 999,999				12
		1,000,000 - 4,999,999				16
		≥ 5,000,000				20
	Ground water	< 500	Per year[2]	1 per treatment plant	Per year[2]	2
		500 - 9,999				
		10,000 - 99,999	Per quarter		Per quarter	4
		100,000 - 499,999				6
		≥ 500,000				8
Bromate[3]	Systems that use ozone as a disinfectant		Monthly	1 at entry point to distribution system	Unchanged[4]	
Chlorite	Systems that use chlorine dioxide as a disinfectant		**Daily** (at entrance to distribution system); **monthly** (in distribution system)	1 at entry point to distribution system; 3 in distribution system	Unchanged[4]	
Chlorine dixoide	Systems that use chlorine dioxide as a disinfectant		Daily	1 at entry point to distribution system	Unchanged[4]	
Chorine/ Chloramines	All systems		Same location and frequency as Total Coliform Rule (TCR) sampling		Unchanged[4]	
DBP precursors (TOC sample set)*	Systems that use conventional filtration		Monthly	1 per source water source	Unchanged[4]	

[1]All systems must monitor during the month of highest DBP concentrations. Systems on quarterly monitoring, except Subpart H systems serving 500 - 3,300, must take dual sample sets every 90 days at each monitoring location. Systems on annual monitoring and Subpart H systems serving 500 - 3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. If monitoring annually, only one location with a dual sample set per monitoring period is needed if the highest TTHM and HAA5 concentrations occur at the same location and in the same month.

[2]Ground water systems serving < 10,000 and Subpart H systems serving < 500 must increase monitoring to quarterly if an MCL is exceeded.

[3]A new analytical method for bromate was established with the Stage 2 DBPR.

[4]Stage 2 DBPR did not revise the monitoring frequency or location requirements for this contaminant/disinfectant.

*TOC sample set is comprised of source water alkalinity, source water TOC, and treated TOC.

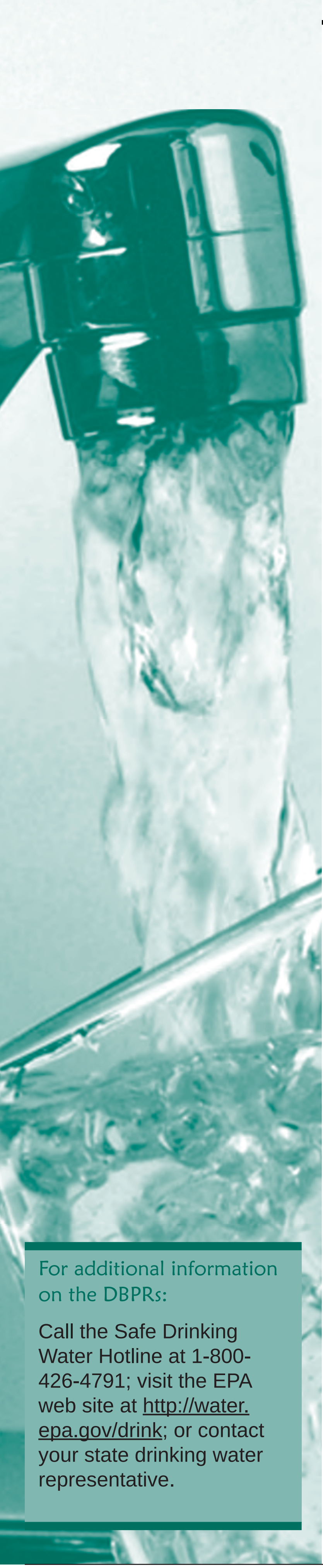


Table 5. Operational Evaluation Levels (OELs)

Applies to:	All systems subject to Stage 2 DBPR monitoring requirements that conduct compliance monitoring and collect samples quarterly.
Purpose of establishing OELs:	To reduce peaks in DBP levels and exposure to high DBP levels.
OEL calculations:	▶ Calculated for both TTHMs and HAA5s at each monitoring location using Stage 2 DBPR compliance monitoring results. ▶ OEL is determined by the sum of the two previous quarter's TTHM or HAA5 result plus twice the current quarter's TTHM or HAA5 result at that location, divided by four. ▶ OEL = (Q1 + Q2 + 2Q3) / 4
OELs are exceeded:	During any quarter in which the OEL is greater than the TTHM or HAA5 MCL.
If an OEL is exceeded, a system must:	▶ Conduct an operational evaluation. ▶ Submit a written report of the evaluation to the state no later than 90 days after being notified of the analytical results that caused the exceedance(s). ▶ Keep a copy of the operational evaluation report and make it publically available upon request.
The operational evaluation must include:	▶ An examination of the treatment and distribution systems' operational practices that may contribute to TTHM and HAA5 formation. ▶ Steps to minimize future exceedances.
OEL requirements take effect:	When the system begins compliance monitoring for the Stage 2 DBPR.

Table 6. Standard Monitoring Compliance Dates

If You are a System Serving:	Schedule[1]	Begin LRAA TTHM & HAA5 Monitoring By:
At least 100,000 people or part of a combined distribution system (CDS) serving at least 100,000 people.	1	April 1, 2012
50,000 to 99,999 people or part of a CDS serving 50,000 to 99,999 people.	2	October 1, 2012
10,000 to 49,999 people or part of a CDS serving 10,000 to 49,999 people.	3	October 1, 2013
Less than 10,000 people or part of a CDS serving less than 10,000 people.	4	October 1, 2013[2]

[1]Your schedule is determined by the largest system in your CDS.

[2]Systems not conducting *Cryptosporidium* monitoring under Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) must begin LRAA TTHM/HAA5 monitoring by this date. Systems conducting *Cryptosporidium* monitoring under LT2ESWTR must begin LRAA TTHM/HAA5 monitoring by October 1, 2014.

Table 7. TOC Removal

Subpart H systems that use conventional filtration treatment are required to remove specific percentages of organic materials, measured as total organic carbon (TOC), that may react with disinfectants to form DBPs. Removal must be achieved through a treatment technique (enhanced coagulation or enhanced softening) unless a system meets alternative criteria. Systems practicing softening must meet TOC removal requirements for source water alkalinity greater than 120 mg/L $CaC0_3$.

Source Water TOC (mg/L)	Source Water Alkalinity, mg/L as $CaCO_3$		
	0 - 60	> 60 to 120	> 120
> 2.0 to 4.0	35.0%	25.0%	15.0%
> 4.0 to 8.0	45.0%	35.0%	25.0%
> 8.0	50.0%	40.0%	30.0%

For additional information on the DBPRs:

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at http://water.epa.gov/drink; or contact your state drinking water representative.

United States Environmental Protection Agency | Office of Water (4606) | EPA 816-F-01-019 June 2001 www.epa.gov/safewater

Filter Backwash Recycling Rule: A Quick Reference Guide

Overview of the Rule

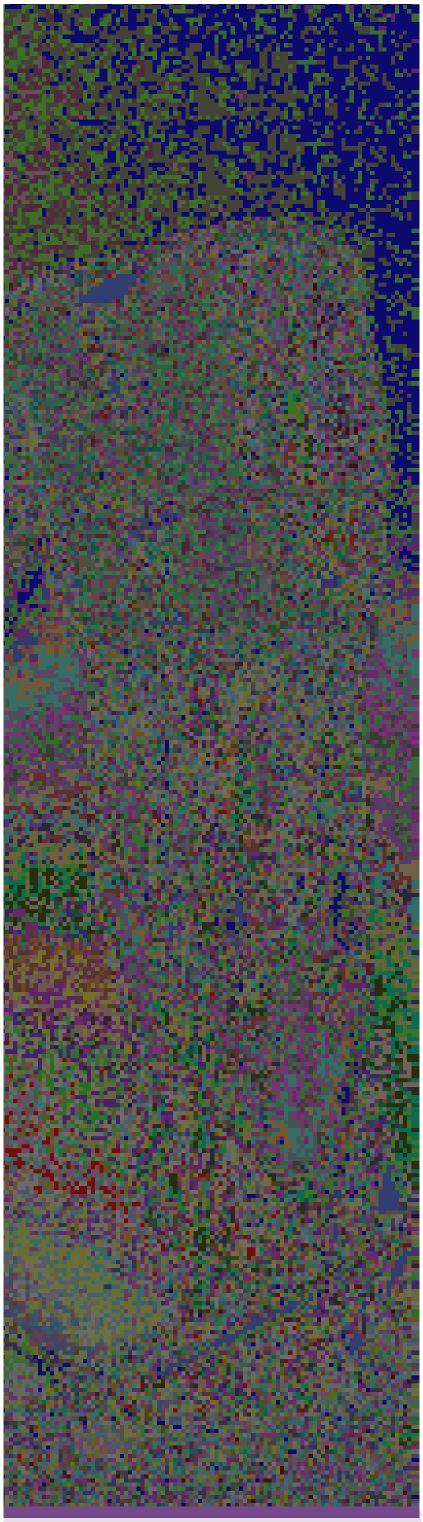
Title	Filter Backwash Recycling Rule (FBRR) 66 FR 31086, June 8, 2001, Vol. 66, No. 111
Purpose	Improve public health protection by assessing and changing, where needed, recycle practices for improved contaminant control, particularly microbial contaminants.
General Description	The FBRR requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.
Utilities Covered	Applies to public water systems that use surface water or ground water under the direct influence of surface water, practice conventional or direct filtration, and recycle spent filter backwash, thickener supernatant, or liquids from dewatering processes.

Public Health Benefits

Implementation of FBRR will result in . . .	• Reduction in risk of illness from microbial pathogens in drinking water, particularly *Cryptosporidium*.
Estimated impacts of the FBRR include . . .	• FBRR will apply to an estimated 4,650 systems serving 35 million Americans. • Fewer than 400 systems are expected to require capital improvements. • Annualized capital costs incurred by public water systems associated with recycle modifications are estimated to be \$5.8 million. • Mean annual cost per household is estimated to be less than \$1.70 for 99 percent of the affected households and between \$1.70 and \$100 for the remaining one percent of affected households.

Conventional and Direct Filtration

- Conventional filtration, as defined in 40 CFR 141.2, is a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial particulate removal. Conventional filtration is the most common type of filtration.
- Direct filtration, as defined in 40 CFR 141.2, is a series of processes including coagulation and filtration, but excluding sedimentation, and resulting in substantial particulate removal. Typically, direct filtration can be used only with high-quality raw water that has low levels of turbidity and suspended solids.



Recycle Flows

- <u>Spent Filter Backwash Water</u> - A stream containing particles that are dislodged from filter media when water is forced back through a filter (backwashed) to clean the filter.
- <u>Thickener Supernatant</u> - A stream containing the decant from a sedimentation basin, clarifier or other unit that is used to treat water, solids, or semi-solids from the primary treatment processes.
- <u>Liquids From Dewatering Processes</u> - A stream containing liquids generated from a unit used to concentrate solids for disposal.

Critical Deadlines and Requirements

For Drinking Water Systems	
December 8, 2003	Submit recycle notification to the state.
June 8, 2004	Return recycle flows through the processes of a system's existing conventional or direct filtration system or an alternate recycle location approved by the state (a 2-year extension is available for systems making capital improvements to modify recycle location). Collect recycle flow information and retain on file.
June 8, 2006	Complete all capital improvements associated with relocating recycle return location (if necessary).
For States	
June 8, 2003	States submit FBRR primacy revision application to EPA (triggers interim primacy).
June 8, 2005	Primacy extension deadline - all states with an extension must submit primacy revision applications to EPA.

What does a recycle notification include?

- Plant schematic showing origin of recycle flows, how recycle flows are conveyed, and return location of recycle flows.
- Typical recycle flows (gpm), highest observed plant flow experienced in the previous year (gpm), and design flow for the treatment plant (gpm).
- State-approved plant operating capacity (if applicable).

What recycle flow information does a system need to collect and retain on file?

- Copy of recycle notification and information submitted to the state.
- List of all recycle flows and frequency with which they are returned.
- Average and maximum backwash flow rates through filters, and average and maximum duration of filter backwash process (in minutes).
- Typical filter run length and written summary of how filter run length is determined.
- Type of treatment provided for recycle flows.
- Data on the physical dimension of the equalization and/or treatment units, typical and maximum hydraulic loading rates, types of treatment chemicals used, average dose, frequency of use, and frequency at which solids are removed, if applicable.

For additional information on the FBRR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater; or contact your state drinking water representative.

Additional material is available at www.epa.gov/safewater/filterbackwash.html.

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Ground Water Rule: A Quick Reference Guide

Overview of the Rule

Title	Ground Water Rule (GWR) 71 FR 65574, November 8, 2006, Vol. 71, No. 216 Correction 71 FR 67427, November 21, 2006, Vol. 71, No. 224
Purpose	Reduce the risk of illness caused by microbial contamination in public ground water systems (GWSs).
General Description	The GWR establishes a risk-targeted approach to identify GWSs susceptible to fecal contamination and requires corrective action to correct significant deficiencies and source water fecal contamination in all public GWSs.
Utilities Covered	The GWR applies to all public water systems (PWSs) that use ground water, including consecutive systems, except that it does not apply to PWSs that combine all of their ground water with surface water or with ground water under the direct influence of surface water prior to treatment.

Public Health Benefits

Implementation of the GWR will result in . . .	▶ Targeted protection for over 70 million people served by ground water sources that are either not disinfected or receive less than 4-log treatment. ▶ Avoidance of 42,000 viral illnesses and 1 related death annually.
Estimated impacts of the GWR include . . .	▶ The annualized present value of the GWR is $19.7 million, with a 90-percent confidence interval of $6.5 to $45.4 million. ▶ Mean annual cost per household is estimated to be less than $1.00 for approximately 96 percent of affected households.

Critical Deadlines and Requirements

For Drinking Water Systems

November 30, 2009	New ground water sources put in place after this date must meet triggered source water monitoring requirements or conduct compliance monitoring.
December 1, 2009	By this date, GWSs conducting compliance monitoring because they provide at least 4-log virus inactivation, removal, or a state-approved combination of these technologies before or at the first customer, must have notified the state and must begin compliance monitoring. The written notification to the state must include engineering, operational, and other information the state requests.
December 1, 2009	GWSs must conduct triggered source water monitoring if the GWS does not provide at least 4-log virus inactivation, removal, or a state-approved combination of these technologies before or at the first customer and the GWS is notified that a sample collected for the Total Coliform Rule (TCR) is total coliform-positive.
December 1, 2009	GWSs for which the state has identified a significant deficiency and GWSs at which at least one of the five additional ground water source samples (or at state discretion, after the initial source sample) has tested positive for fecal contamination must comply with the treatment technique requirements.

For States

August 8, 2008	States are encouraged to submit final primacy applications or extension requests to EPA.
November 8, 2008	Final primacy revision applications for GWR must be submitted to the EPA regional administrator, unless state is granted an extension.
August 8, 2010	States with approved extension agreements are encouraged to submit final primacy applications to EPA.
November 8, 2010	Final primacy applications must be submitted to the EPA regional administrator for states with a full 2 year extension.
December 31, 2012	States must complete initial sanitary survey cycle for all community GWSs except those that meet performance criteria.
December 31, 2014	States must complete initial sanitary survey cycle for all noncommunity GWSs and all community GWSs that meet performance criteria.

Analytical Methods for Source Water Monitoring

Fecal Indicator	Methodology	Method Citation*
E. coli	Colilert Colisure Membrane Filter Method with MI Agar m-ColiBlue24 Test E*Colite Test EC-MUG NA-MUG	9223 B. 9223 B. EPA Method 1604. 9221 F. 9222 G.
Enterococci	Multiple-Tube Technique Membrane Filter Technique Membrane Filter Technique Enterolert	9230 B. 9230 C. EPA Method 1600.
Coliphage	Two-Step Enrichment Presence-Absence Procedure Single Agar Layer Procedure	EPA Method 1601. EPA Method 1602.

*Footnotes regarding methods can be found in 40 CFR 141.402

Major Provisions

Compliance Monitoring

Treatment Technique Compliance Monitoring	► In order not to be subject to triggered source water monitoring, a GWS can notify the state that it provides at least 4-log treatment of viruses using virus inactivation, removal, or a state-approved combination of 4-log virus inactivation and removal before or at the first customer. The GWS must then begin compliance monitoring designed to show the effectiveness of their treatment processes. ► GWSs that use chemical disinfection and serve more than 3,300 people must continuously monitor their disinfectant concentration. GWSs must maintain the minimum disinfectant residual concentration determined by the state. ► GWSs that use chemical disinfection and serve 3,300 people or fewer must take daily grab samples or meet the continuous monitoring requirements described above for GWSs serving more than 3,300 people. ► GWSs using membrane filtration for 4-log treatment of viruses must monitor the membrane filtration process according to state-specified monitoring requirements. ► GWSs may use alternative treatment technologies (e.g., ultraviolet radiation [UV]) approved by the state. GWSs must monitor the alternative treatment according to state-specified monitoring requirements, and must operate the alternative treatment according to compliance requirements established by the state.

Source Water Monitoring

Triggered Source Water Monitoring	► GWSs that do not conduct compliance monitoring and are notified of a total coliform-positive routine sample collected in compliance with the TCR (40 CFR 141.21) must conduct triggered source water monitoring. ► GWSs must collect at least one ground water source sample from each source in use at the time the total coliform-positive sample was collected. The triggered source water sample must be analyzed for the presence of a fecal indicator as specified in the rule. ► If the triggered source water sample is fecal indicator-positive, the GWS must either take corrective action, as directed by the state, or if corrective action is not required by the state and the sample is not invalided by the state, the GWS must conduct additional source water sampling. ► States may waive the triggered source water monitoring requirement if the state determines and documents, in writing, that the total coliform-positive routine sample is the result of a documented distribution system deficiency. ► States may develop criteria for distribution system conditions that cause total coliform positive samples. A GWS can document to the state that it met the state criteria within 30 days of the total coliform-positive sample and be exempt from collecting triggered source water sample(s). ► States may invalidate a fecal indicator-positive ground water source sample under specific conditions. If a fecal indicator-positive source sample is invalidated, the GWS must collect another source water sample within 24 hours of being notified by the state of its invalidation decision.
Additional Source Water Sampling	► If the state does not require corrective action in response to a fecal indicator-positive triggered source water sample, the GWS must collect five additional source water samples (from the same source), using the same indicator as used in triggered source water monitoring, within 24 hours of being notified of the fecal indicator-positive sample.
Assessment Source Water Monitoring	► States have the opportunity to target higher risk GWSs for additional testing. States independently can determine on a case by case basis whether monitoring is necessary and when corrective action needs to be taken.

Treatment Technique Requirements

GWSs with Significant Deficiencies or Source Water Fecal Contamination	► GWSs must take corrective action if a significant deficiency is identified, or if the initial source sample (if required by the state) or one of the five additional ground water source samples tests positive for fecal contamination. The GWS must implement at least one of the following corrective actions: ► Correct all significant deficiencies. ► Provide an alternate source of water. ► Eliminate the source of contamination. ► Provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a state-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source.

New Sources

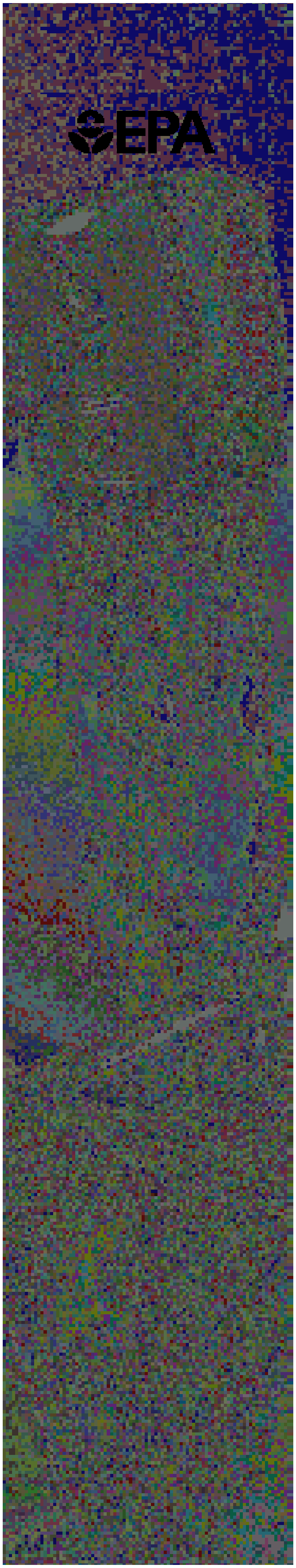
New Ground Water Sources	► New sources which come on line after November 30, 2009 are required either to conduct triggered source water monitoring as required by the GWR, or provide at least 4-log inactivation, removal or a state-approved combination of these technologies and conduct compliance monitoring within 30 days of the source being put in service.

Sanitary Surveys

All Ground Water Systems	► States are required to conduct sanitary surveys of all GWSs in order to identify significant deficiencies, including deficiencies which may make a system susceptible to microbial contamination. ► Following the initial sanitary survey, states must conduct sanitary surveys every 3 years for most CWSs and every 5 years for NCWSs and CWSs that provide at least 4-log treatment of viruses or have outstanding performance records, as determined by the state.

For additional information on the GWR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater/disinfection/gwr; or contact your state drinking water representative.



United States Environmental Protection Agency
Office of Water (4606)
EPA 816-F-01-011
May 2001
www.epa.gov/safewater

Interim Enhanced Surface Water Treatment Rule: A Quick Reference Guide

Overview of the Rule

Title	**Interim Enhanced Surface Water Treatment Rule (IESWTR)** **63 FR 69478 - 69521, December 16, 1998, Vol. 63, No. 241** **Revisions to the Interim Enhanced Surface Water Treatment Rule (IESWTR), the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR), and Revisions to State Primacy Requirements to Implement the Safe Drinking Water Act (SDWA) Amendments** **66 FR 3770, January 16, 2001, Vol 66, No. 29**
Purpose	**Improve public health control of microbial contaminants, particularly *Cryptosporidium*. Prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 1 Disinfectants and Disinfection Byproducts Rule.**
General Description	**Builds upon treatment technique approach and requirements of the 1989 Surface Water Treatment Rule. Relies on existing technologies currently in use at water treatment plants.**
Utilities Covered	**Sanitary survey requirements apply to all public water systems using surface water or ground water under the direct influence of surface water, regardless of size. All remaining requirements apply to public water systems that use surface water or ground water under the direct influence of surface water and serve 10,000 or more people.**

Major Provisions

Regulated Contaminants

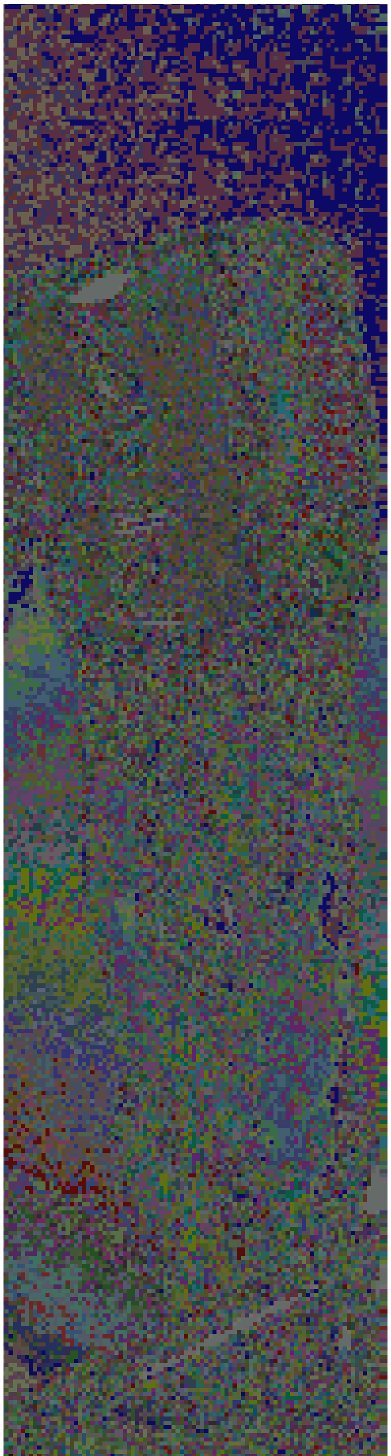
Cryptosporidium	▸ **Maximum contaminant level goal (MCLG) of zero.** ▸ **99 percent (2-log) physical removal for systems that filter.** ▸ **Include in watershed control program for unfiltered systems.**
Turbidity Performance Standards	**Conventional and direct filtration combined filter effluent:** ▸ **£ 0.3 nephelometric turbidity units (NTU) in at least 95 percent of measurements taken each month.** ▸ **Maximum level of 1 NTU.**

Turbidity Monitoring Requirements (Conventional and Direct Filtration)

Combined Filter Effluent	▸ **Performed every 4 hours to ensure compliance with turbidity performance standards.**
Individual Filter Effluent	▸ **Performed continuously (every 15 minutes) to assist treatment plant operators in understanding and assessing filter performance.**

Additional Requirements

- **Disinfection profiling and benchmarking.**
- **Construction of new uncovered finished water storage facilities prohibited.**
- **Sanitary surveys, conducted by the state, for all surface water and ground water under the direct influence of surface water systems regardless of size (every 3 years for community water systems and every 5 years for noncommunity water systems).**



Profiling and Benchmarking

Public water systems must evaluate impacts on microbial risk before changing disinfection practices to ensure adequate protection is maintained. The three major steps are:

- **Determine if a public water system needs to profile based on TTHM and HAA5 levels (applicability monitoring)**
- **Develop a disinfection profile that reflects daily *Giardia lamblia* inactivation for at least a year (systems using ozone or chloramines must also calculate inactivation of viruses)**
- **Calculate a disinfection benchmark (lowest monthly inactivation) based on the profile and consult with the state prior to making a significant change to disinfection practices**

Critical Deadlines and Requirements

For Drinking Water Systems

February 16, 1999	Construction of uncovered finished water reservoirs is prohibited.
March 1999	Public water systems lacking ICR or other occurrence data begin 4 quarters of applicability monitoring for TTHM and HAA5 to determine if disinfection profiling is necessary.
April 16, 1999	Systems that have 4 consecutive quarters of HAA5 occurrence data that meet the TTHM monitoring requirements must submit data to the state to determine if disinfection profiling is necessary.
December 31, 1999	Public water systems with ICR data must submit it to states to determine if disinfection profiling is necessary.
April 1, 2000	Public water systems must begin developing a disinfection profile if their annual average (based on 4 quarters of data) for TTHM is greater than or equal to 0.064 mg/L or HAA5 is greater than or equal to 0.048 mg/L.
March 31, 2001	Disinfection profile must be complete.
January 1, 2002	Surface water systems or ground water under the direct influence of surface water systems serving 10,000 or more people must comply with all IESWTR provisions (e.g., turbidity standards, individual filter monitoring).

For States

December 16, 2000	States submit IESWTR primacy revision applications to EPA (triggers interim primacy).
January 2002	States begin first round of sanitary surveys.
December 16, 2002	Primacy extension deadline - all states with an extension must submit primacy revision applications to EPA.
December 2004	States must complete first round of sanitary surveys for community water systems.
December 2006	States must complete first round of sanitary surveys for noncommunity water systems.

For additional information on the IESWTR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater; or contact your State drinking water representative.

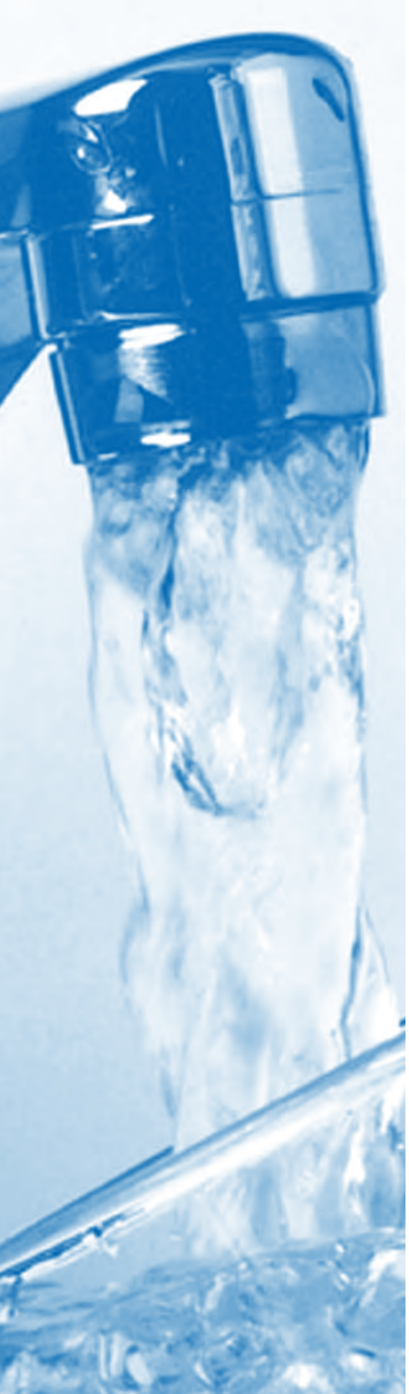
Additional material is available at www.epa.gov/safewater/mdbp/implement.html.

Public Health Benefits

Implementation of the IESWTR will result in . . .	• Increased protection against gastrointestinal illnesses from *Cryptosporidium* and other pathogens through improvements in filtration. • Reduced likelihood of endemic illness from *Cryptosporidium* by 110,000 to 463,000 cases annually. • Reduced likelihood of outbreaks of cryptosporidiosis.
Estimated impacts of the IESWTR include . . .	• National total annualized cost: $307 million • 92 percent of households will incur an increase of less than $1 per month. • Less than 1 percent of households will incur an increase of more than $5 per month (about $8 per month).

United States Environmental Protection Agency

Lead and Copper Rule: A Quick Reference Guide



Overview of the Rule

Title[1]	Lead and Copper Rule (LCR)[2], 56 FR 26460 - 26564, June 7, 1991
Purpose	Protect public health by minimizing lead (Pb) and copper (Cu) levels in drinking water, primarily by reducing water corrosivity. Pb and Cu enter drinking water mainly from corrosion of Pb and Cu containing plumbing materials.
General Description	Establishes action level (AL) of 0.015 mg/L for Pb and 1.3 mg/L for Cu based on 90^{th} percentile level of tap water samples. An AL exceedance is not a violation but can trigger other requirements that include water quality parameter (WQP) monitoring, corrosion control treatment (CCT), source water monitoring/treatment, public education, and lead service line replacement (LSLR).
Utilities Covered	All community water systems (CWSs) and non-transient non-community water systems (NTNCWSs) are subject to the LCR requirements.

Public Health Benefits

Implementation of the LCR has resulted in	► Reduction in risk of exposure to Pb that can cause damage to brain, red blood cells, and kidneys, especially for young children and pregnant women. ► Reduction in risk of exposure to Cu that can cause stomach and intestinal distress, liver or kidney damage, and complications of Wilson's disease in genetically predisposed people.

Major Monitoring Provisions

Lead and Copper Tap

Applicability	► All CWSs and NTNCWSs.
Standard	► CWSs and NTNCWSs must collect first-draw samples at taps in homes/buildings that are at high risk of Pb/Cu contamination as identified in 40 CFR 141.86(a). ► Number of samples is based on system size (see Table 1). ► Systems must conduct monitoring every 6 months unless they qualify for reduced monitoring.
Reduced	► See Table 1 for sample number and Table 2 for criteria.

Water Quality Parameter (WQP)

Applicability	► Systems serving > 50,000 people. ► Systems serving ≤ 50,000 during monitoring periods in which either AL is exceeded.
Standard	► WQP samples at taps are collected every 6 months. ► WQPs at entry points to distribution system (EPTDS) are collected every 6 months prior to CCT installation, then every 2 weeks.
Reduced	► See Table 1 for sample number and page 2 for criteria. Does not apply to EPTDS WQP monitoring.

Table 1: Lead and Copper Tap and WQP Tap Monitoring

Size Category	System Size	Number of Pb/Cu Tap Sample Sites[3]		Number of WQP Tap Sample Sites[4]	
		Standard	Reduced	Standard	Reduced
Large	> 100K	100	50	25	10
	50,001 - 100K	60	30	10	7
Medium	10,001 - 50K	60	30	10	7
	3,301 - 10K	40	20	3	3
Small	501 - 3,300	20	10	2	2
	101 - 500	10	5	1	1
	≤ 100	5	5	1	1

[3] *With written State approval, PWSs can collect < 5 samples if all taps used for human consumption are sampled.*
[4] *Two WQP tap samples are collected at each sampling site.*

Table 2: Criteria for Reduced Pb/Cu Tap Monitoring

Annual	1. PWS serves ≤ 50,000 people and is ≤ both ALs for 2 consecutive 6-month monitoring periods; or 2. Any PWS that meets optimal WQPs (OWQPs) and is ≤ Pb AL for 2 consecutive 6-month monitoring periods.
Triennial	1. PWS serves ≤ 50,000 people and is ≤ both ALs for 3 consecutive years of monitoring; or 2. Any PWS that meets OWQP specifications and is ≤ Pb AL for 3 consecutive years of monitoring; or 3. Any PWS with 90^{th} percentile Pb and Cu levels ≤ 0.005 mg/L and ≤ 0.65 mg/L, respectively, for 2 consecutive 6-month monitoring periods (i.e., accelerated reduced Pb/Cu tap monitoring).
Every 9 years	PWS serves ≤ 3,300 people and meets monitoring waiver criteria found at 40 CFR 141.86(g).

Lead Consumer Notice

Within 30 days of learning the results, all systems must provide individual Pb tap results to people who receive water from sites that were sampled, *regardless of whether the results exceed the Pb AL*, as required by 40 CFR 141.85(d).

Consumer Confidence Report (CCR)

All CWSs, irrespective of their lead levels, must provide an educational statement about lead in drinking water in their CCRs as required by 40 CFR 141.154. Must be in 2008 CCR (due July 1, 2009) if EPA is Primacy Agency, State adopts the rule by reference automatically, or adopts during 2008. Otherwise, this statement is required in the 2009 CCR (due July 1, 2010).

[1] *This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.*

[2] *The June 1991 LCR was revised with the following Technical Amendments: 56 FR 32112, July 15, 1991; 57 FR 28785, June 29, 1992; 59 FR 33860, June 30, 1994.*

It was subsequently revised by: the LCR Minor Revisions, 65 FR 1950, January 12, 2000; and the LCR Short-Term Revisions, 72 FR 57782, October 10, 2007.

Treatment Technique and Sampling Requirements if the AL is Exceeded[5]

[5] Based on 90th percentile level. Multiply number of valid samples by 0.9 (e.g., 10 samples x 0.9 = 9; thus, use 9th highest Pb and Cu test result to compare to AL). For 5 samples, average 4th and 5th highest results. For < 5 samples, use highest result.

Water Quality Parameter (WQP)

Applicability	Refer to page 1.
Parameters	► pH, alkalinity, calcium *(initial only, unless calcium carbonate stabilization is used)*, conductivity *(initial monitoring only)*, orthophosphate *(if inhibitor is phosphate-based)*; silica *(if inhibitor is silicate-based)*, and temperature *(initial monitoring only)*.
Frequency	► Systems installing CCT, must conduct follow-up monitoring for 2 consecutive 6-month periods. ► WQP tap monitoring is conducted every 6 months, EPTDS monitoring increases to every 2 weeks. ► After follow-up monitoring, State sets OWQP specifications that define optimal CCT.
Reduced Tap Monitoring	► Collect reduced number of sampling sites (see Table 1) if meet OWQPs for 2 consecutive 6-month periods. ► Collect reduced number of sampling sites at reduced frequency if meet OWQPs for: - 6 consecutive 6-month monitoring periods can monitor annually; - 3 consecutive years of annual monitoring can monitor triennially.

Public Education (PE)

Applicability	► Systems that exceed the Pb AL (*not required if only the Cu AL is exceeded*).
Purpose	► Educates consumers about lead health effects, sources, and steps to minimize exposure.
Delivery Method	► CWSs: deliver materials to bill-paying customers and post lead information on water bills, work in concert with local health agencies to reach at-risk populations (children, pregnant woman), deliver to other organizations serving "at-risk" populations, provide press releases, include new outreach activities from list in 40 CFR 141.85(a)(2)(vi), and post to Web site (CWSs serving > 100,000 only). ► NTNCWSs: posting and distribution to all consumers (can be electronic with State permission). Can apply to CWSs such as hospitals and prisons where population cannot make improvements.
Timing	► Within 60 days *after end of monitoring period* in which Pb AL was exceeded if not already delivering PE.[6] ► Repeat annually except: water bill inserts - quarterly; press releases - 2x/year, and Web posting - continuous. ► Can discontinue whenever ≤ Pb AL but must recommence if subsequently exceed Pb AL.

[6]State may allow extension in some situations. Also, State may require approval of message content prior to delivery.

Source Water Monitoring and Source Water Treatment (SOWT)

Applicability	► Systems that exceed Pb or Cu AL.
Purpose	► Determine contribution from source water to total tap water Pb and Cu levels and need for SOWT.
Timing	► One set of samples at each EPTDS is due within 6 months of first AL exceedance. ► System has 24 months to install any required SOWT. ► State sets maximum permissible levels (MPLs) for Pb and Cu in source water based on initial and follow-up source water monitoring.
Standard	► Ground water PWSs monitor once during 3-year compliance periods; surface water PWSs monitor annually.
Reduced	► Monitor every 9 years if MPLs are not exceeded during 3 consecutive compliance periods for ground water PWSs or 3 consecutive years for surface water PWSs.

Corrosion Control Treatment (CCT)

Applicability	► All large systems except those meeting requirements of 40 CFR 141.81(b)(2) or (b)(3). ► Medium and small systems that exceed either AL; may stop CCT steps if ≤ both ALs for 2 consecutive 6-month periods but must recommence CCT if subsequently exceed either AL.
Study	► All large systems except as noted above. ► If State requires study for small or medium systems, it must be completed within 18 months.
Treatment	► Once State determines type of CCT to be installed, PWS has 24 months to install. ► Systems installing CCT must conduct 2 consecutive 6 months of follow-up tap and WQP monitoring.
OWQPs	► After follow-up Pb/Cu tap and WQP monitoring, State sets OWQPs. *Refer to WQP section above.*

Lead Service Line Replacement (LSLR)

Applicability	► Systems that continue to exceed the Pb AL after installing CCT and/or SOWT. ► Can discontinue LSLR whenever ≤ Pb AL in tap samples for 2 consecutive 6-month monitoring periods; must recommence if subsequently exceed.
Monitoring	► Optional: Sample from LSL to determine if line must be replaced. If all samples are ≤ 0.015 mg/L, line is considered "replaced through testing"; must reconsider these lines if Pb AL is subsequently exceeded. ► Required: Sample from any LSLs not completely replaced to determine impact on Pb levels.
Replacement	► Must replace at least 7% of LSLs annually; State can require accelerated schedule. ► If only portion of LSL is replaced, PWS must: - Notify customers at least 45 days prior to replacement about potential for increased Pb levels. - Collect samples within 72 hours of replacement and provide results within 3 days of receipt.

For additional information on the LCR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA Web site at http://water.epa.gov/drink; or contact your State drinking water representative.

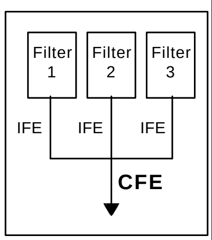
EPA United States Environmental Protection Agency

Long Term 1 Enhanced Surface Water Treatment Rule: A Quick Reference Guide

Overview of the Rule

Title	**Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR)** **67 FR 1812, January 14, 2002, Vol. 67, No. 9**
Purpose	**Improve public health protection through the control of microbial contaminants, particularly *Cryptosporidium*. Prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 1 Disinfectants and Disinfection Byproducts Rule.**
General Description	**Builds upon the requirements of the 1989 Surface Water Treatment Rule (SWTR). Smaller system counterpart of the Interim Enhanced Surface Water Treatment Rule (IESWTR).**
Utilities Covered	**Public water systems that use surface water or ground water under the direct influence of surface water (GWUDI) and serve fewer than 10,000 people.**

Major Provisions

Control of *Cryptosporidium*	▸ **The maximum contaminant level goal (MCLG) is set at zero.** ▸ **Filtered systems must physically remove 99% (2-log) of *Cryptosporidium*.** ▸ **Unfiltered systems must update their watershed control programs to minimize the potential for contamination by *Cryptosporidium* oocysts.** ▸ ***Cryptosporidium* is included as an indicator of GWUDI.**
Combined Filter Effluent (CFE) Turbidity Performance Standards  	***Specific CFE turbidity requirements depend on the type of filtration used by the system.*** <u>Conventional and direct filtration:</u> ▸ **£ 0.3 nephelometric turbidity units (NTU) in at least 95% of measurements taken each month.** ▸ **Maximum level of turbidity: 1 NTU.** <u>Slow sand and diatomaceous earth (DE) filtration:</u> ▸ **Continue to meet CFE turbidity limits specified in the SWTR:** • **1 NTU in at least 95% of measurements taken each month.** • **Maximum level of turbidity: 5 NTU.** <u>Alternative technologies (other than conventional, direct, slow sand, or DE):</u> ▸ **Turbidity levels are established by the State based on filter demonstration data submitted by the system.** • **State-set limits must not exceed 1 NTU (in at least 95% of measurements) or 5 NTU (maximum).**

Turbidity Monitoring Requirements

Combined Filter Effluent	▸ **Performed at least every 4 hours to ensure compliance with CFE turbidity performance standards.[1]**
Individual Filter Effluent (IFE) (for systems using conventional and direct filtration only)	***Since the CFE may meet regulatory requirements even though one filter is producing high turbidity water, the IFE is measured to assist conventional and direct filtration treatment plant operators in understanding and assessing individual filter performance.*** ▸ **Performed continuously (recorded at least every 15 minutes).** ▸ **Systems with two or fewer filters may conduct continuous monitoring of CFE turbidity in place of individual filter effluent turbidity monitoring.** ▸ **Certain follow-up actions are required if the IFE turbidity (or CFE for systems with two filters) exceeds 1.0 NTU in 2 consecutive readings or more (i.e., additional reporting, filter self-assessments, and/or comprehensive performance evaluations (CPEs)).**

For additional information on the LT1ESWTR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater/mdbp/lt1eswtr.html; or contact your State drinking water representative.

[1] This frequency may be reduced by the State to once per day for systems using slow sand/alternative filtration or for systems serving 500 persons or fewer regardless of the type of filtration used.

Disinfection Profiling and Benchmarking Requirements

Community and non-transient non-community public water systems must evaluate impacts on microbial risk before changing disinfection practices to ensure adequate microbial protection is maintained. This is accomplished through a process called disinfection profiling and benchmarking.

What are the disinfection profiling and benchmarking requirements?

- **Systems must develop a disinfection profile, which is a graphical compilation of weekly inactivation *of Giardia lamblia*, taken on the same calendar day each week over 12 consecutive months. (Systems using chloramines, ozone, or chlorine dioxide for primary disinfection must also calculate inactivation of viruses). Results must be available for review by the State during sanitary surveys.**
- **A State may deem a profile unnecessary if the system has sample data collected after January 1, 1998–during the month of warmest water temperature and at maximum residence time in the distribution system–indicating TTHM levels are below 0.064 mg/L <u>and</u> HAA5 levels are below 0.048 mg/L.**
- **Prior to making a significant change to disinfection practices, systems required to develop a profile must calculate a disinfection benchmark and consult with the State. The benchmark is the calculation of the lowest monthly average of inactivation based on the disinfection profile.**

Additional Requirements

- **Construction of new uncovered finished water reservoirs is prohibited.**

Critical Deadlines and Requirements

For Drinking Water Systems

March 15, 2002	Construction of uncovered finished reservoirs is prohibited.
July 1, 2003	No later than this date, systems serving between 500-9,999 persons must report to the State: • Results of optional monitoring which show levels of TTHM < 0.064 mg/L <u>and</u> HAA5 < 0.048 mg/L, OR • System has started profiling.
January 1, 2004	No later than this date, systems serving fewer than 500 persons must report to the State: • Results of optional monitoring which show levels of TTHM < 0.064 mg/L <u>and</u> HAA5 < 0.048 mg/L, OR • System has started profiling.
June 30, 2004	Systems serving between 500 and 9,999 persons must complete their disinfection profile unless the State has determined it is unnecessary.
December 31, 2004	Systems serving fewer than 500 persons must complete their disinfection profile unless the State has determined it is unnecessary.
January 14, 2005	Surface water systems or GWUDI systems serving fewer than 10,000 people must comply with the applicable LT1ESWTR provisions (e.g., turbidity standards, individual filter monitoring, *Cryptosporidium* removal requirements, updated watershed control requirements for unfiltered systems).

For States

January 2002	As per the IESWTR, States begin first round of sanitary surveys (at least every 3 years for community water systems and every 5 years for non-community water systems).
October 14, 2003	States are encouraged to submit final primacy applications to EPA.
January 14, 2004	Final primacy applications must be submitted to EPA unless granted an extension.
December 2004	States must complete first round of sanitary surveys for community water systems (as per the IESWTR).
January 14, 2006	Final primacy revision applications from States with approved 2-year extension agreements must be submitted to EPA.
December 2006	States must complete first round of sanitary surveys for non-community water systems (as per the IESWTR).

Public Health Benefits

Implementation of the LT1ESWTR will result in . . .	• Increased protection against gastrointestinal illnesses from *Cryptosporidium* and other pathogens through improvements in filtration. • Reduced likelihood of endemic illness from *Cryptosporidium* by an estimated 12,000 to 41,000 cases annually. • Reduced likelihood of outbreaks of cryptosporidiosis.
Estimated impacts of the LT1ESWTR include . . .	• National total annualized cost: $39.5 million. • 90% of affected households will incur an increase of less than $1.25 per month. • One percent of affected households are likely to incur an increase of more than $10 per month.

EPA United States Environmental Protection Agency

Long Term 2 Enhanced Surface Water Treatment Rule: A Quick Reference Guide For Schedule 1 Systems

Overview of the Rule

Title	Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) 71 FR 654, January 5, 2006, Vol. 71, No. 3
Purposes	Improve public health protection through the control of microbial contaminants by focusing on systems with elevated *Cryptosporidium* risk. Prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR).
General Description	The LT2ESWTR requires systems to monitor their source water, calculate an average *Cryptosporidium* concentration, and use those results to determine if their source is vulnerable to contamination and may require additional treatment.
Utilities Covered	• Public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI). • Schedule 1 systems include PWSs serving 100,000 or more people OR wholesale PWSs that are part of a combined distribution system in which the largest system serves 100,000 or more people.

Major Provisions

Control of *Cryptosporidium*

Source Water Monitoring	Filtered and unfiltered systems must conduct 24 months of source water monitoring for *Cryptosporidium*. Filtered systems must also record source water *E. coli* and turbidity levels. Filtered systems will be classified into one of four "Bins" based on the results of their source water monitoring. Unfiltered systems will calculate a mean *Cryptosporidium* level to determine treatment requirements. Systems may also use previously collected data (i.e., Grandfathered data). Filtered systems providing at least 5.5 log of treatment for *Cryptosporidium* and unfiltered systems providing at least 3-log of treatment for *Cryptosporidium* and those systems that intend to install this level of treatment are not required to conduct source water monitoring.
Installation of Additional Treatment	Filtered systems must provide additional treatment for *Cryptosporidium* based on their bin classification (average source water *Cryptosporidium* concentration), using treatment options from the "microbial toolbox." Unfiltered systems must provide additional treatment for *Cryptosporidium* using chlorine dioxide, ozone, or UV.
Uncovered Finished Water Storage Facility	Systems with an uncovered finished water storage facility must either: • Cover the uncovered finished water storage facility; or, • Treat the discharge to achieve inactivation and/or removal of at least 4-log for viruses, 3-log for *Giardia lamblia*, and 2-log for *Cryptosporidium*.

Disinfection Profiling and Benchmarking

After completing the initial round of source water monitoring any system that plans on making a significant change to their disinfection practices must:

- Create disinfection profiles for *Giardia lamblia* and viruses;
- Calculate a disinfection benchmark; and,
- Consult with the state prior to making a significant change in disinfection practice.

Bin Classification For Filtered Systems

Cryptosporidium Concentration (oocysts/L)	Bin Classification	Additional *Cryptosporidium* Treatment Required			Alternative Filtration
		Conventional Filtration	Direct Filtration	Slow Sand or Diatomaceous Earth Filtration	
< 0.075	Bin 1	No additional treatment required	No additional treatment required	No additional treatment required	No additional treatment required
0.075 to < 1.0	Bin 2	1 log	1.5 log	1 log	(1)
1.0 to < 3.0	Bin 3	2 log	2.5 log	2 log	(2)
≥ 3.0	Bin 4	2.5 log	3 log	2.5 log	(3)

(1) As determined by the state (or other primacy agency) such that the total removal/inactivation > 4.0-log.
(2) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.0-log.
(3) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.5-log.

Inactivation Requirements for Unfiltered Systems

Cryptosporidium Concentration (oocysts/L)	Required *Cryptosporidium* Inactivation
≤ 0.01	2-log
> 0.01	3-log

Critical Deadlines and Requirements

For Drinking Water Systems (Schedule 1)

July 1, 2006	**Systems must submit their:** • **Sampling schedule that specifies the dates of sample collection and location of sampling for initial source water monitoring to EPA electronically; or** • **Notify EPA or the state of the systems intent to submit results for grandfathering data; or** • **Notify EPA or the state of the systems intent to provide at least 5.5 log of treatment for *Cryptosporidium*. Systems should consult with EPA or their state prior to submitting this notice.**
October 2006	**No later than this month systems must begin 24 months of source water monitoring.**
December 10, 2006	**System submit results for first month of source water monitoring.**
December 1, 2006	**No later than this date, systems must submit monitoring results for data that they want to have grandfathered.**
April 1, 2008	**No later than this date, systems must notify the EPA or the state of all uncovered treated water storage facilities.**
September 2008	**No later than this month, systems must complete their inital round of source water monitoring.**
March 2009	**No later than this month, filtered systems must report their initial bin classification to the EPA or the state for approval.**
March 2009	**No later than this month, unfiltered systems must report the mean of all *Cryptosporidium* sample results to the EPA or the state.**
April 1, 2009	**No later than this date, uncovered finished water storage facilities must be covered, or the water must be treated before entry into the distribution system, or the system must be in compliance with a state approved schedule.**
March 31, 2012	**Systems must install and operate additional treatment in accordance with their bin classification.†**
January 1, 2015	**Systems must submit their sampling schedule that specifies the dates of sample collection and location of sampling for second round of source water monitoring to the state.**
April 1, 2015	• **Systems are required to begin conducting a second round of source water monitoring.** • **Based on the results, systems must re-determine their bin classification and provide additional *Cryptosporidium* treatment, if necessary.**

For States

January - June 2006	**States are encouraged to communicate with affected systems regarding LT2ESWTR requirements.**
April 1, 2007	**States are encouraged to communicate LT2ESWTR requirements related to treatment, uncovered finished water reservoirs, and disinfection profiling to affected systems.**
October 5, 2007	**States are encouraged to submit final primacy applications or extension requests to EPA.**
January 5, 2008	**Final primacy applications must be submitted to EPA, unless granted an extension.**
June 30, 2008	**States should begin awarding *Cryptosporidium* treatment credit for primary treatments in place.**
January 5, 2010	**Final primacy revision applications from states with approved 2-year extensions agreements must be submitted to EPA.**
December 31, 2012	**States should award *Cryptosporidium* treatment credit for toolbox option implementation.**

† States may allow up to an additional 24 months for compliance for systems making capital improvements.

For additional information on the LT2ESWTR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater/disinfection/lt2; or contact your State drinking water representative.

EPA United States Environmental Protection Agency

The Public Notification Rule: A Quick Reference Guide

Overview of the Rule

Title	Public Notification (PN) Rule, 65 FR 25982, May 4, 2000.
Purpose	To notify the public of drinking water violations or situations that may pose a risk to public health.
General Description	The PN Rule requires all public water systems (PWSs) to notify their consumers any time a PWS violates a national primary drinking water regulation or has a situation posing a risk to public health. Notices must be provided to persons served (not just billing customers).
Utilities Covered	All PWSs.
Timing and Distribution	Notices must be sent within 24 hours, 30 days, or one year depending on the tier to which the violation is assigned. The clock for notification starts when the PWS learns of the violation.

Tier 1 (Immediate Notice, Within 24 Hours)

Tier 1 PN is required to be issued as soon as practical but no later than 24 hours after the PWS learns of the violation or situation including:

- Distribution system sample violation when fecal coliform or *E. coli* are present; failure to test for fecal coliform or *E. coli* after initial total coliform distribution system sample tests positive.
- Nitrate, nitrite, or total nitrate and nitrite maximum contaminant level (MCL) violation; failure to take confirmation sample.
- Special notice for noncommunity water systems (NCWSs) with nitrate exceedances between 10 mg/L and 20 mg/L, where system is allowed to exceed 10 mg/L by primacy agency.
- Chlorine dioxide maximum residual disinfectant level (MRDL) violation when one or more of the samples taken in the distribution system exceeds the MRDL on the day after a chlorine dioxide measurement taken at the entrance to the distribution system exceeds the MRDL, or when required samples are not taken in the distribution system.
- Exceedance of maximum allowable turbidity level, if elevated to a Tier 1 notice by primacy agency.
- Waterborne disease outbreak or other waterborne emergency.
- Detection of *E. coli*, enterococci, or coliphage in a ground water source sample.
- Other violations or situations determined by the primacy agency.

Tier 2 (Notice as Soon as Practical, Within 30 Days)

Tier 2 PN is required to be issued as soon as practical or within 30 days. Repeat notice every 3 months until violation or situation is resolved.

- All MCL, MRDL, and treatment technique violations, except where Tier 1 notice is required.
- Monitoring violations, if elevated to Tier 2 notice by primacy agency.
- Failure to comply with variance and exemption conditions.
- For ground water systems providing 4-log treatment and conducting Ground Water Rule (GWR) compliance monitoring, failure to maintain required treatment for more than 4 hours.
- Failure to take any required corrective action or be in compliance with a corrective action plan for a fecal indicator-positive ground water source sample.
- Failure to take any required corrective action or be in compliance with a corrective action plan for a significant deficiency under the GWR.
- Special public notice for repeated failure to conduct monitoring for *Cryptosporidium.*

Turbidity consultation is required when a PWS has a treatment technique violation resulting from a single exceedance of the maximum allowable turbidity limit or an MCL violation resulting from an exceedance of the 2-day turbidity limit. The PWS must consult their primacy agency within 24 hours. Primacy agencies will then determine whether a Tier 1 PN is necessary. If consultation does not occur within 24 hours, violations are automatically elevated to require Tier 1 PN.

Tier 3 (Annual Notice)

Tier 3 PN is required to be issued within 12 months and repeated annually for unresolved violations.

- All monitoring or testing procedure violations, unless primacy agency elevates to Tier 2, including failure to conduct benchmarking and profiling (surface water systems) and failure to develop a monitoring plan (disinfecting systems).
- Operating under a variance and exemption.
- Special public notice for availability of unregulated contaminant monitoring results.
- Special public notice for fluoride secondary maximum contaminant level (SMCL) exceedance.

For additional information on the PN Rule

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA Web site at www.epa.gov/safewater/pn.html; or contact your state or local primacy agency's drinking water representative. Log onto the PNiWriter Web site to use EPA's templates at www.PNiWriter.com.

Ten Required Elements of a Public Notice

Unless otherwise specified in the regulations,* each notice must contain:

1. Description of the violation or situation, including the contaminant(s) of concern, and (as applicable) the contaminant level(s).
2. When the violation or situation occurred (i.e., date the sample was collected or was supposed to be collected).
3. Any potential adverse health effects from drinking the water and standard language regarding the violation or situation. (For MCL, MRDL, treatment technique violations, or violations of the conditions of a variance or exemption, use health effects language from Appendix B of the PN Rule. For monitoring and testing procedure violations, use the standard monitoring language below.)
4. The population at risk, including subpopulations that may be particularly vulnerable if exposed to the contaminant in their drinking water.
5. Whether alternate water supplies should be used.
6. Actions consumers should take, including when they should seek medical help, if known.
7. What the PWS is doing to correct the violation or situation.
8. When the PWS expects to return to compliance or resolve the situation.
9. The name, business address, and phone number or those of a designee of the PWS as a source of additional information concerning the notice.
10. A statement (see standard distribution language below) encouraging notice recipients to distribute the notice to others, where applicable.

** These elements do not apply to notices for fluoride SMCL exceedances, availability of unregulated contaminant monitoring data, and operation under a variance or exemption. Content requirements for these notices are specified in the PN Rule.*

Standard Language:
Standard Monitoring Language: We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not our drinking water meets health standards. During [period] we [did not monitor or test/did not complete all monitoring or testing] for [contaminant(s)], and therefore cannot be sure of the quality of the drinking water during that time.

Standard Distribution Language: Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

Multilingual Requirements

- Where the PWS serves a large proportion of non-English speakers, the PWS must provide information in the appropriate language(s) on the importance of the notice or on how to get assistance or a translated copy.

Presentation and Distribution

- The Tier 1 PN must be issued via radio, TV, hand delivery, posting, or other method specified by the primacy agency to reach all persons served. PWSs must also initiate consultation with the primacy agency within 24 hours. Primacy agency may establish additional requirements during consultation.
- The Tier 2 and Tier 3 PNs must be issued by Community Water Systems (CWSs) via mail or direct delivery and by NCWSs via posting, direct delivery, or mail. Primacy agencies may permit alternate methods. All PWSs must use additional delivery methods reasonably calculated to reach other consumers not notified by the first method.*
- Notices for individual violations can be combined into an annual notice (including the Consumer Confidence Report [CCR], if PN requirements can still be met).
- Each PN:
  - Must be displayed in a conspicuous way.
  - Must not include overly technical language or very small print.
  - Must not be formatted in a way that defeats the purpose of the notice.
  - Must not include language that nullifies the purpose of the notice.
- If the notice is posted, it must remain in place for as long as the violation or situation persists, but in no case for less than seven days, even if the violation or situation is resolved.

*PWSs should check with their primacy agency to determine the most appropriate delivery methods.

Notices to New Customers

- All new billing units and customers must be notified of ongoing violations or situations requiring PN.

Reporting and Recordkeeping

- PWSs have 10 days to send a certification of compliance and a copy of the completed notice to the primacy agency.
- PWS and primacy agency must keep notices on file for 3 years.

The Required Elements of a Public Notice

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

Tests Showed Presence of Coliform Bacteria

2. When the violation occurred →

← 1. Description of the violation

The Jonesville Water System routinely monitors for coliform bacteria. During the month of July, 7 percent of our samples tested positive. The standard is that no more than 5 percent of samples may test positive.

6. Actions consumers should take →

What should I do?

← 5. Should alternate water supplies be used

← 4. The population at risk

- **You do not need to boil your water or take other corrective actions.** However, if you have specific health concerns, consult your doctor.
- You do not need to use an alternate (e.g., bottled) water supply.
- People with severely compromised immune systems, infants, pregnant women, and some elderly may be at increased risk. These people should seek advice about drinking water from their health care providers. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at 1-800-426-4791.

What does this mean?

3. Potential adverse health effects →

This is not an emergency. If it had been, you would have been notified immediately. Coliform bacteria are generally not harmful themselves. *Coliforms are bacteria which are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.*

Usually, coliforms are a sign that there could be a problem with the system's treatment or distribution system (pipes). Whenever we detect coliform bacteria in any sample, we do follow-up testing to see if other bacteria of greater concern, such as fecal coliform or *E. coli*, are present. We did not find any of these bacteria in our subsequent testing.

7. What is being done to correct the violation or situation →

What was done?

← 8. When the system expects to return to compliance

We took additional samples for coliform bacteria which all came back negative. As an added precaution, we chlorinated and flushed the pipes in the distribution system to make sure bacteria were eliminated. This situation is now resolved.

← 9. Phone number for more information

For more information, or to learn more about protecting your drinking water please contact John Jones at (502) 555-1212.

10. Required distribution language →

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by the Jonesville Water System.

State Water System ID#1234567. Date Distributed: 8/8/09

United States Environmental Protection Agency | Office of Water (4606) | EPA 816-F-01-003 June 2001

Radionuclides Rule: A Quick Reference Guide

Overview of the Rule

Title	Radionuclides Rule 66 FR 76708 December 7, 2000 Vol. 65, No. 236
Purpose	Reducing the exposure to radionuclides in drinking water will reduce the risk of cancer. This rule will also improve public health protection by reducing exposure to all radionuclides.
General Description	The rule retains the existing MCLs for combined radium-226 and radium-228, gross alpha particle radioactivity, and beta particle and photon activity. The rule regulates uranium for the first time.
Utilities Covered	Community water systems, all size categories.

Public Health Benefits

Implementation of the Radionuclides Rule will result in . . .	Reduced uranium exposure for 620,000 persons, protection from toxic kidney effects of uranium, and a reduced risk of cancer.
Estimated impacts of the Radionuclides Rule include . . .	Annual compliance costs of $81 million. Only 795 systems will have to install treatment.

Regulated Contaminants

Regulated Radionuclide	MCL	MCLG
Beta/photon emitters*	4 mrem/yr	0
Gross alpha particle	15 pCi/L	0
Combined radium-226/228	5 pCi/L	0
Uranium	30 µg/L	0

*A total of 168 individual beta particle and photon emitters may be used to calculate compliance with the MCL.

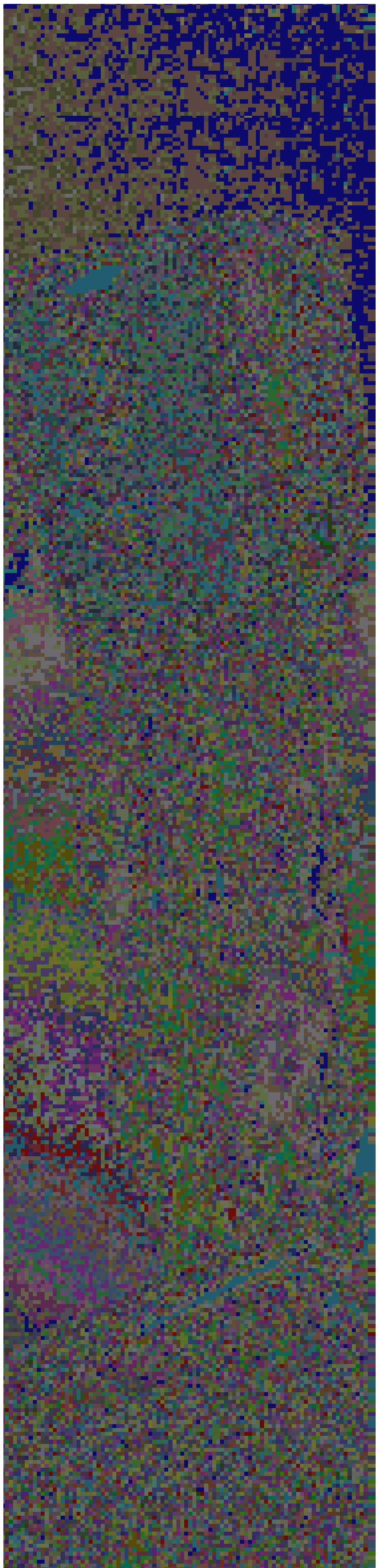
Critical Deadlines & Requirements

For Drinking Water Systems

June 2000 - December 8, 2003	When allowed by the State, data collected between these dates may be eligible for use as grandfathered data (excluding beta particle and photon emitters).
December 8, 2003	Systems begin initial monitoring under State-specified monitoring plan unless the State permits use of grandfathered data.
December 31, 2007	All systems must complete initial monitoring.

For States

December 2000 - December 2003	States work with systems to establish monitoring schedules.
December 8, 2000	States should begin to update vulnerability assessments for beta photon and particle emitters and notify systems of monitoring requirements.
Spring 2001	EPA meets and works with States to explain new rules and requirements and to initiate adoption and implementation activities.
December 8, 2002	State submits primacy revision application to EPA. (EPA approves within 90 days.)



Monitoring Requirements

Gross Alpha, Combined Radium-226/228, and Uranium (1)	Beta Particle and Photon Radioactivity (1)
Initial Monitoring	
Four consecutive quarters of monitoring.	No monitoring required for most CWSs. Vulnerable CWSs (2) must sample for: • Gross beta: quarterly samples. • Tritium and Strontium-90: annual samples.
Reduced Monitoring	
If the average of the initial monitoring results for each contaminant is below the detection limit: One sample every 9 years. If the average of the initial monitoring results for each contaminant is greater than or equal to the detection limit, but less than or equal to one-half the MCL: One sample every 6 years. If the average of the initial monitoring results for each contaminant is greater than one-half the MCL, but less than or equal to the MCL: One sample every 3 years.	If the running annual average of the gross beta particle activity minus the naturally occurring potassium-40 activity is less than or equal to 50 pCi/L: One sample every 3 years.
Increased Monitoring	
A system with an entry point result above the MCL must return to quarterly sampling until 4 consecutive quarterly samples are below the MCL.	If gross beta particle activity minus the naturally occurring potassium-40 activity exceeds 50 pCi/L, the system must: • Speciate as required by the State. • Sample at the initial monitoring frequency.

(1) All samples must be collected at each entry point to the distribution system.
(2) The rule also contains requirements for CWSs using waters contaminated by effluents from nuclear facilities.

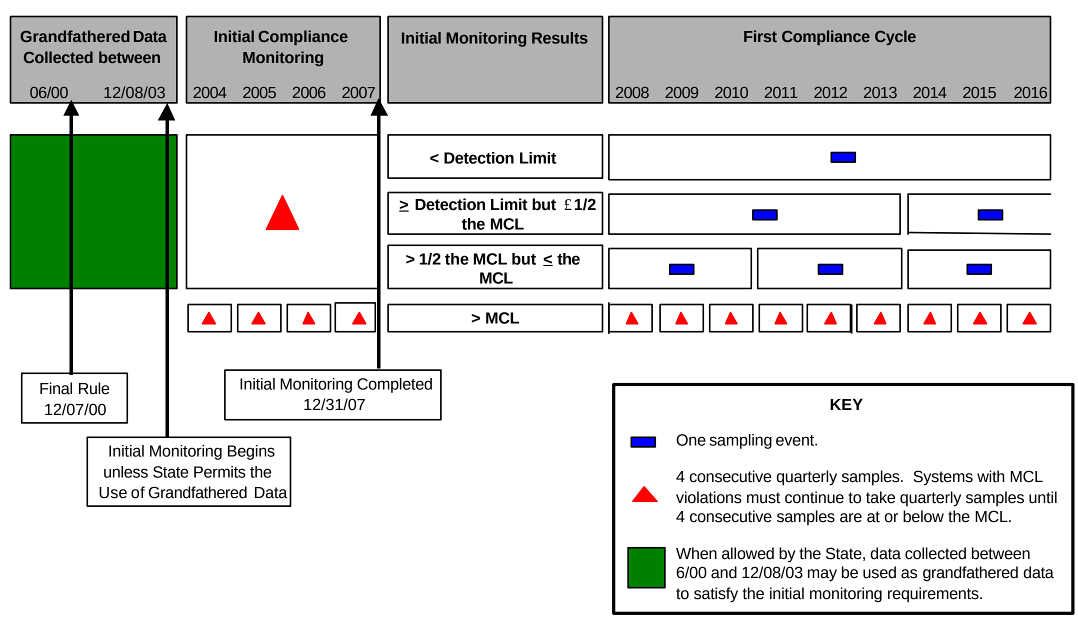
Grandfathering of Data

When allowed by the State, data collected between June, 2000 and December 8, 2003 may be used to satisfy the initial monitoring requirements if samples have been collected from:

- Each entry point to the distribution system (EPTDS).
- The distribution system, provided the system has a single EPTDS.
- The distribution system, provided the State makes a written justification explaining why the sample is representative of all EPTDS.

Applicability of the Standardized Monitoring Framework to Radionuclides

(Excluding the Beta Particle and Photon Emitters)



For additional information on the Radionuclides Rule

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA Web site at www.epa.gov/safewater; or contact your State drinking water representative. EPA will provide radionuclide training over the next year.

EPA United States Environmental Protection Agency

Revised Total Coliform Rule: A Quick Reference Guide

Overview of the Rule

Title*	Revised Total Coliform Rule (RTCR) 78 FR 10269, February 13, 2013, Vol. 78, No. 30
Purpose	Increase public health protection through the reduction of potential pathways of entry for fecal contamination into distribution systems.
General Description	The RTCR establishes a maximum contaminant level (MCL) for *E. coli* and uses *E. coli* and total coliforms to initiate a “find and fix” approach to address fecal contamination that could enter into the distribution system. It requires public water systems (PWSs) to perform assessments to identify sanitary defects and subsequently take action to correct them.
Utilities Covered	The RTCR applies to all PWSs.

***** This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Public Health Benefits

Implementation of the RTCR will result in:

- ► A decrease in the pathways by which fecal contamination can enter the drinking water distribution system.
- ► Reduction in fecal contamination *should* reduce the potential risk from all waterborne pathogens including bacteria, viruses, parasitic protozoa, and their associated illnesses.

Critical Deadlines and Requirements

For Public Water Systems

Before **April 1, 2016**	► PWSs must develop a written sample siting plan that identifies the system’s sample collection schedule and all sample sites, including sites for routine and repeat monitoring. ► PWSs monitoring quarterly or annually must also identify additional routine monitoring sites in their sample siting plans. ► Sample siting plans are subject to state review and revision.
Beginning **April 1, 2016**	PWSs must comply with the RTCR requirements unless the state selects an earlier implementation date.

For State Drinking Water Agencies

By **February 13, 2015**	State submits final primacy program revision package to the EPA Region, including: ► Adopted State Regulations. ► Regulation Crosswalk. ► 40 CFR 142.10 Primacy Update Checklist. ► 40 CFR 142.14 and 142.15 Reporting and Recordkeeping. ► 40 CFR 142.16 Special Primacy Requirements. ► Attorney General’s Enforceability Certification. NOTE: EPA regulations allow states until February 13, 2015, for this submittal. An extension of up to 2 years may be requested by the state.
Before **February 13, 2015**	State must submit a primacy program revision extension request if it does not plan to submit the final primacy program revision package by February 13, 2015. The state extension request is submitted to the EPA Region including all of the information required in 40 CFR 142.12(b): ► A schedule (not to exceed 2 years) for the submission of the final primacy program revision package. ► Justification that meets the federal requirements for an extension request. ► Confirmation that the state is implementing the RTCR within its scope of its current authorities and capabilities. ► An approved workload agreement with the EPA Region.
No later than **February 13, 2017**	For states with an approved extension, submit complete and final program revision package by the agreed upon extension date.

What are the Major Provisions?

Routine Sampling Requirements

- ► Total coliform samples must be collected by PWSs at sites which are representative of water quality throughout the distribution system according to a written sample siting plan subject to state review and revision.
- ► For PWSs collecting more than one sample per month, collect total coliform samples at regular intervals throughout the month, except that ground water systems serving 4,900 or fewer people may collect all required samples on a single day if the samples are taken from different sites.

Routine Sampling Requirements (cont.)

- Each total coliform-positive (TC+) routine sample must be tested for the presence of *E. coli*.
- If any TC+ sample is also *E. coli*-positive (EC+), then the EC+ sample result must be reported to the state by the end of the day that the PWS is notified.
- If any routine sample is TC+, repeat samples are required.
  - PWSs on quarterly or annual monitoring must take a minimum of three additional routine samples (known as additional routine monitoring) the month following a TC+ routine or repeat sample.
- Reduced monitoring may be available for PWSs using only ground water and serving 1,000 or fewer persons that meet certain additional PWS criteria.

Repeat Sampling Requirements

Within 24 hours of learning of a TC+ routine sample result, at least 3 repeat samples must be collected and analyzed for total coliform:	► One repeat sample must be collected from the same tap as the original sample. ► One repeat sample must be collected from within five service connections upstream. ► One repeat sample must be collected from within five service connections downstream. ► The PWS may propose alternative repeat monitoring locations that are expected to better represent pathways of contamination into the distribution system.
If one or more repeat sample is TC+:	► The TC+ sample must be analyzed for the presence of *E. coli.* ► If any repeat TC+ sample is also EC+, then the EC+ sample result must be reported to the state by the end of the day that the PWS is notified. ► The PWS must collect another set of repeat samples, unless an assessment has been triggered and the PWS has notified the state.

Assessments and Corrective Action

The RTCR requires PWSs that have an indication of coliform contamination (e.g., as a result of TC+ samples, *E. coli* MCL violations, performance failure) to assess the problem and take corrective action. There are two levels of assessments (i.e., Level 1 and Level 2) based on the severity or frequency of the problem.

Purpose of Level 1 and Level 2 Assessments	To find sanitary defects at the PWS including: ► Sanitary defects that could provide a pathway of entry for microbial contamination, or ► Sanitary defects that indicate failure (existing or potential) of protective barriers against microbial contamination. *Guidance on how to conduct Level 1 and Level 2 Assessments and how to correct sanitary defects found during the Assessments can be found at:* http://water.epa.gov/lawsregs/rulesregs/sdwa/tcr/regulation_revisions.cfm.
Deadline for Completing Corrective Actions	When sanitary defects are identified during a Level 1 or Level 2 Assessment, they should be corrected as soon as possible to protect public health. The PWS must complete corrective actions by one of the following timeframes: ► No later than the time the assessment form is submitted to the state, which must be within 30 days of triggering the assessment, or ► Within state-approved timeframe which was proposed in the assessment form.

Level 1 Assessments

Conducting Level 1 Assessments	► Performed by the PWS owner or operator each time a Level 1 Assessment is triggered. ► Upon trigger of a Level 1 Assessment, the Level 1 Assessment form must be submitted within 30 days to the state.
Level 1 Assessment Triggers	Level 1 Assessment is triggered if any one of the following occurs: ► A PWS collecting fewer than 40 samples per month has 2 or more TC+ routine/repeat samples in the same month. ► A PWS collecting at least 40 samples per month has greater than 5.0 percent of the routine/repeat samples in the same month that are TC+. ► A PWS fails to take every required repeat sample after any single TC+ sample.

Level 2 Assessments

Conducting Level 2 Assessments	► Performed by the state or state-approved entity each time a Level 2 Assessment is triggered. ► The PWS is responsible for ensuring that the Level 2 Assessment is conducted regardless of the entity conducting the Level 2 Assessment. ► Upon trigger of a Level 2 Assessment, the Level 2 Assessment form must be submitted within 30 days to the state.
Level 2 Assessment Triggers	Level 2 Assessment is triggered if any one of the following occurs: ► A PWS incurs an *E. coli* MCL violation. ► A PWS has a second Level 1 Assessment within a rolling 12-month period. ► A PWS on state-approved annual monitoring has a Level 1 Assessment trigger in 2 consecutive years.

Seasonal System Provisions

The RTCR defines seasonal systems and specifies additional requirements for these types of PWSs:

- A seasonal system is defined as a non-community water system that is not operated as a PWS on a year-round basis and starts up and shuts down at the beginning and end of each operating season.

Start-up Procedures for Seasonal Systems	At the beginning of each operating period, before serving water to the public, seasonal water systems must: ► Conduct state-approved start-up procedures. ► Certify completion of state-approved start-up procedures. ► An exemption from conducting state-approved start-up procedures may be available for seasonal systems that maintain pressure throughout the distribution system during non-operating periods.
	Examples of state-approved start-up procedures, which need to be completed prior to serving water to the public, may include one or more of the following: ► Disinfection. ► Distribution system flushing. ► Sampling for total coliform and *E. coli*. ► Site visit by state. ► Verification that any current or historical sanitary defects have been corrected.
Routine Monitoring for Seasonal Systems	► The baseline monitoring frequency for seasonal systems is monthly. ► A reduced monitoring frequency may be available for seasonal systems that use ground water only and serve fewer than 1,000 persons.

Other Provisions for the State Drinking Water Agency

Special Monitoring Evaluation	The state must perform a special monitoring evaluation at all ground water systems serving 1,000 or fewer persons during each sanitary survey to review the status of the PWS and to determine whether the sample sites and monitoring schedule need to be modified.

Major Violations

E. coli MCL Violation

A PWS will receive an *E. coli* MCL violation when there is any combination of an EC+ sample result with a routine/repeat TC+ or EC+ sample result:

E. coli **MCL Violation Occurs with the Following Sample Result Combination**	
Routine	**Repeat**
EC+	**TC+**
EC+	**Any missing sample**
EC+	**EC+**
TC+	**EC+**
TC+	**TC+ (but no *E. coli* analysis)**

Treatment Technique Violation

A PWS will receive a Treatment Technique violation when any of the following occur:

- Failure to conduct a Level 1 or Level 2 Assessment within 30 days of a trigger.
- Failure to correct all sanitary defects from a Level 1 or Level 2 Assessment within 30 days of a trigger or in accordance with the state-approved timeframe.
- Failure of a seasonal system to complete state-approved start-up procedures prior to serving water to the public.

Key Points for Public Water Systems to Remember

Find and correct sanitary defects as soon as you become aware of them.

- This can help reduce *E. coli* MCL violations, which trigger a Level 2 Assessment.
- This can help reduce TC+ sample results, which may trigger a Level 1 Assessment.

Make sure to collect all routine and repeat samples as required.

- Timely and correct monitoring can help reduce triggering a Level 1 or Level 2 Assessment because:
  - Failure to conduct repeat monitoring triggers a Level 1 Assessment.
  - A Level 1 Assessment triggered twice within a certain timeframe triggers a Level 2 Assessment.

For additional information on the RTCR:

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA website at http://water.epa.gov/lawsregs/rulesregs/sdwa/tcr/regulation_revisions.cfm; or contact your state drinking water representative.

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Total Coliform Rule: A Quick Reference Guide

Overview of the Rule

Title	Total Coliform Rule (TCR) 54 FR 27544-27568, June 29, 1989, Vol. 54, No. 124[1]
Purpose	Improve public health protection by reducing fecal pathogens to minimal levels through control of total coliform bacteria, including fecal coliforms and *Escherichia coli* (*E. coli*).
General	Establishes a maximum contaminant level (MCL) based on the presence or absence of total coliforms, modifies monitoring requirements including testing for fecal coliforms or *E. coli*, requires use of a sample siting plan, and also requires sanitary surveys for systems collecting fewer than five samples per month.
Utilities Covered	The TCR applies to all public water systems.

Public Health Benefits

Implementation of the TCR has resulted in . . .	► Reduction in risk of illness from disease causing organisms associated with sewage or animal wastes. Disease symptoms may include diarrhea, cramps, nausea, and possibly jaundice, and associated headaches and fatigue.

What are the Major Provisions?

ROUTINE Sampling Requirements

- Total coliform samples must be collected at sites which are representative of water quality throughout the distribution system according to a written sample siting plan subject to state review and revision.
- Samples must be collected at regular time intervals throughout the month except groundwater systems serving 4,900 persons or fewer may collect them on the same day.
- Monthly sampling requirements are based on population served (see table on next page for the minimum sampling frequency).
- A reduced monitoring frequency may be available for systems serving 1,000 persons or fewer and using only ground water if a sanitary survey within the past 5 years shows the system is free of sanitary defects (the frequency may be no less than 1 sample/quarter for community and 1 sample/year for non-community systems).
- Each total coliform-positive routine sample must be tested for the presence of fecal coliforms or *E. coli.*
- If any routine sample is total coliform-positive, repeat samples are required.

REPEAT Sampling Requirements

- Within 24 hours of learning of a total coliform-positive ROUTINE sample result, at least 3 REPEAT samples must be collected and analyzed for total coliforms:
  - One REPEAT sample must be collected from the same tap as the original sample.
  - One REPEAT sample must be collected within five service connections upstream.
  - One REPEAT sample must be collected within five service connections downstream.
  - Systems that collect 1 ROUTINE sample per month or fewer must collect a 4th REPEAT sample.
- If any REPEAT sample is total coliform-positive:
  - The system must analyze that total coliform-positive culture for fecal coliforms or *E.coli.*
  - The system must collect another set of REPEAT samples, as before, unless the MCL has been violated and the system has notified the state.

Additional ROUTINE Sample Requirements

- A positive ROUTINE or REPEAT total coliform result requires a minimum of five ROUTINE samples be collected the following month the system provides water to the public unless waived by the state.

[1] The June 1989 Rule was revised as follows: Corrections and Technical Amendments, 6/19/90 and Partial Stay of Certain Provision (Variance Criteria) 56 FR1556-1557, Vol 56, No 10.

Note: The TCR is currently undergoing the 6 year review process and may be subject to change.

Public Water System ROUTINE Monitoring Frequencies

Population	Minimum Samples/ Month	Population	Minimum Samples/ Month	Population	Minimum Samples/ Month
25-1,000*	1	21,501-25,000	25	450,001-600,000	210
1,001-2,500	2	25,001-33,000	30	600,001-780,000	240
2,501-3,300	3	33,001-41,000	40	780,001-970,000	270
3,301-4,100	4	41,001-50,000	50	970,001-1,230,000	300
4,101-4,900	5	50,001-59,000	60	1,230,001-1,520,000	330
4,901-5,800	6	59,001-70,000	70	1,520,001-1,850,000	360
5,801-6,700	7	70,001-83,000	80	1,850,001-2,270,000	390
6,701-7,600	8	83,001-96,000	90	2,270,001-3,020,000	420
7,601-8,500	9	96,001-130,000	100	3,020,001-3,960,000	450
8,501-12,900	10	130,001-220,000	120	$\geq$ 3,960,001	480
12,901-17,200	15	220,001-320,000	150		
17,201-21,500	20	320,001-450,000	180		

*Includes PWSs which have at least 15 service connections, but serve <25 people.

What are the Other Provisions?

Systems collecting fewer than 5 ROUTINE samples per month . . .	Must have a sanitary survey every 5 years (or every 10 years if it is a non-community water system using protected and disinfected ground water).**
Systems using surface water or ground water under the direct influence of surface water (GWUDI) and meeting filtration avoidance criteria . . .	Must collect and have analyzed one coliform sample each day the turbidity of the source water exceeds 1 NTU. This sample must be collected from a tap near the first service connection.

** As per the IESWTR, states must conduct sanitary surveys for community surface water and GWUDI systems in this category every 3 years (unless reduced by the state based on outstanding performance).

How is Compliance Determined?

- ▶ Compliance is based on the presence or absence of total coliforms.
- ▶ Compliance is determined each calendar month the system serves water to the public (or each calendar month that sampling occurs for systems on reduced monitoring).
- ▶ The results of ROUTINE and REPEAT samples are used to calculate compliance.

A Monthly MCL Violation is Triggered if:

A system collecting fewer than 40 samples per month . . .	Has greater than 1 ROUTINE/REPEAT sample per month which is total coliform-positive.
A system collecting at least 40 samples per month . . .	Has greater than 5.0 percent of the ROUTINE/REPEAT samples in a month total coliform-positive.

An Acute MCL Violation is Triggered if:

Any public water system . . .	Has any fecal coliform- or *E. coli*-positive REPEAT sample or has a fecal coliform- or *E. coli*-positive ROUTINE sample followed by a total coliform-positive REPEAT sample.

What are the Public Notification and Reporting Requirements?

For a Monthly MCL Violation	▶ The violation must be reported to the state no later than the end of the next business day after the system learns of the violation. ▶ The public must be notified within 30 days after the system learns of the violation.
For an Acute MCL Violation	▶ The violation must be reported to the state no later than the end of the next business day after the system learns of the violation. ▶ The public must be notified within 24 hours after the system learns of the violation.
Systems with ROUTINE or REPEAT samples that are fecal coliform- or *E. coli*-positive . . .	Must notify the state by the end of the day they are notified of the result or by the end of the next business day if the state office is already closed.

For additional information on the TCR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater/disinfection/tcr/index.html; or contact your state drinking water representative.

United States Environmental Protection Agency | Office of Water 4606 | EPA 815-F-01-004 January 2001

Unregulated Contaminant Monitoring Regulation: Monitoring for List 1 Contaminants by Selected Small Public Water Systems

Introduction
Section 1445(a)(2) of the Safe Drinking Water Act (SDWA), as amended in 1996, requires the U.S. Environmental Protection Agency (EPA) to establish criteria for a program to monitor unregulated contaminants in drinking water and to publish a list of the contaminants to be monitored. A randomly selected sample of 800 community water systems (CWSs) and non-transient, non-community water systems (NTNCWSs) that serve 10,000 or fewer persons (small systems) will monitor their water for these contaminants. EPA will pay the costs of shipping the samples and analyzing them in a laboratory. The purpose of this monitoring is to collect data to support the U.S. EPA Administrator's decisions regarding whether or not to regulate contaminants such as those on the Drinking Water Contaminant Candidate List to protect public health.

To implement this requirement, EPA promulgated the revisions to the Unregulated Contaminant Monitoring Regulations (UCMR) for Public Water Systems (PWSs). Published on September 17, 1999, and supplemented on March 2, 2000 and January 11, 2001, the regulation substantially revised the previous Unregulated Contaminant Monitoring program and specified:

- Which PWSs must monitor
- How a randomly selected sample set of small PWSs will be chosen to monitor
- Which contaminants systems must monitor
- When, where, and how often samples must be taken
- Which laboratory methods are to be used for analyzing the samples
- What quality control procedures, in addition to those in the laboratory methods, must be followed
- What the requirements are for reporting the results of the monitoring
- What roles the States and Indian Tribes will play in implementing the monitoring program.

EPA has organized the contaminants on the UCMR (1999) List into three lists based on the availability of analytical methods to detect their presence in drinking water and the type of monitoring to be conducted: List 1, Assessment Monitoring, consists of 12 chemical contaminants for which standard analytical methods are available; List 2, Screening Survey, consists of 16 contaminants for which there are new analytical methods that will be used; and List 3, Pre-Screen Testing, consists of 9 contaminants for which analytical methods are being researched. This fact sheet is concerned with List 1, Assessment Monitoring. Table 1 identifies the List 1 contaminants and their uses or environmental sources.

What Systems Must Monitor for List 1 Contaminants? (See §141.40(a)(1))
A randomly selected sample of 800 small water systems will conduct Assessment Monitoring, to establish a statistically valid data set. These systems are part of their State's Monitoring Plan. If your system is among those selected, you should have been notified by your State drinking water agency or EPA. EPA will also select 30 of the 800 systems to be "Index Systems." These systems must monitor every year during the 5-year UCMR listing cycle. They also must report on their operating conditions, such as water source and pumping rates. Small system monitoring will be paid for by EPA, including provisions for sampling equipment, and sample shipping, testing, and analysis.

Table 1: UCMR (1999) List 1 Contaminants and Their Uses or Sources		
Contaminant	**CASRN**	**Use or Environmental Source**
2,4-dinitrotoluene	121-14-2	Used in the production of isocyanate, dyes, and explosives
2,6-dinitrotoluene	606-20-2	Used as a mixture with 2,4-dinitrotoluene (similar uses)
Acetochlor	34256-82-1	Herbicide used with cabbage, citrus, coffee, and corn crops
DCPA mono acid; DCPA di acid	887-54-7; 2136-79-0	Degradation products of DCPA; an herbicide used on grasses and weeds with fruit and vegetable crops; the two DCPA degradates are measured and reported as a single analyte
4,4'-DDE	72-55-9	Degradation product of DDT; a general insecticide
EPTC	759-94-4	Herbicide used on annual grasses and weeds, with potatoes and corn
Molinate	2212-67-1	Selective herbicide used with rice; controls watergrass
MTBE	1634-04-4	Octane enhancer in unleaded gasoline
Nitrobenzene	98-95-3	Used in the production of aniline, which is used to make dyes, herbicides, and drugs
Perchlorate	14797-73-0	Oxygen additive in solid fuel propellant for rockets, missiles, and fireworks
Terbacil	5902-51-2	Herbicide used with sugarcane, alfalfa, and some fruit, etc.

When and How Often Must Monitoring Occur? (See §141.40(a)(5))
The effective implementation date of the Assessment Monitoring requirement is January 1, 2001. Small system Assessment Monitoring must occur during 1 year of the 3-year period from January 1, 2001 to December 31, 2003, as specified in the State's Monitoring Plan. Monitoring will be conducted at about one-third of the selected small systems each year.

The State or EPA will specify the year and months in which each selected small system must conduct Assessment Monitoring. At least one sample must be taken between May 1 and July 31, when the water system is vulnerable to contamination, or during another period of greatest vulnerability, as specified by the State or EPA. Small systems that use surface water or ground water under the influence of surface water as sources must sample four times per year (once every 3 months). Samples will be taken from ground water systems twice during the one year of Assessment Monitoring: once during the period of greatest vulnerability, and 5 to 7 months before or after the vulnerable period sampling.

From Where Must Samples be Taken? (See §141.40(a)(5))
Assessment Monitoring samples must be taken at the entry points to the distribution system, such as the representative Phase II/V sampling points specified by the State, unless otherwise specified by the State or EPA. If your State requires source water monitoring, inquire with your State or EPA drinking water program contact for further guidance. Small systems must collect the samples with EPA-supplied equipment and send them to EPA-specified laboratories. (In some cases, the State may elect to collect the samples, especially if the State already collects samples from a system for regulated contaminant monitoring. The State will inform systems of their responsibilities if the State elects to collect the samples.) EPA will pay for shipping the unregulated contaminant monitoring samples, testing by the EPA-specified laboratory, and reporting of the analytical results for these small systems.

How Are the Samples to be Analyzed? (See §141.40(a)(5) and Appendix A)
Samples are to be analyzed by an EPA-specified laboratory, which will be required on contract to adhere to the UCMR's quality control (QC) specifications. (For details, see the *Unregulated Contaminant Monitoring Regulation Analytical Methods and Quality Control Manual* [EPA 815-R-00-006] and its supplements.) EPA currently has contracts in place to analyze samples taken at small systems.

What Data Must be Reported to EPA? (See §141.35(d))
Analytical results that are reported must include the UCMR Data Elements listed in Table 2. Many of these are QC measures and will be provided by the laboratory.

How Will the Monitoring Data be Reported to EPA? (See §141.35(e))
Small systems will not have to report monitoring results directly to EPA. Instead, EPA will arrange to receive the results from the designated contract laboratory; copies will be sent to the system and to the State. The system will have 30 days to review and comment on the data. EPA will wait for an additional 60 days before placing the data in the National

Drinking Water Contaminant Occurrence Database to allow for review by the system and the State. Each small system, however, is still responsible for ensuring compliance with State reporting requirements.

Table 2: UCMR Data Elements for Reporting Sample Results	
Public Water System (PWS) Identification Number	Analytical Method Number
PWS Facility Identification Number – Identification Number and Sampling Point Type Identification	Sample Analysis Type
Sample Collection Date	Sample Batch Identification Number
Sample Identification Number	Minimum Reporting Level
Contaminant/Parameter	Minimum Reporting Level Unit of Measure
Analytical Results – Sign	Analytical Precision
Analytical Results – Value	Analytical Accuracy
Analytical Results – Unit of Measure	Spiking Concentration
Note: Small systems must provide information in **bold,** or ensure that it is correct.	

Are There Requirements for Notifying the Public?
Yes. Under the Consumer Confidence Report (CCR) Rule, as specified in 40 CFR §141.153(d), CWSs must report the monitoring results whenever unregulated contaminants are detected. CCRs are to be sent to all billing customers each year by July 1. (The CCR Rule does not apply to non-community water systems.) In addition, the Public Notification Rule (40 CFR §141.207), published on May 4, 2000 (65 FR 25981), requires PWSs to notify the public annually that the results of monitoring for unregulated contaminants are available. Therefore, CWSs and NTNCWSs must provide public notice if they are required to monitor for unregulated contaminants. Details on these reporting requirements can be found in the documents *Preparing Your Drinking Water Consumer Confidence Report* (EPA 816-R-99-002) and *Public Notification Handbook* (EPA 816-R-00-010). Both are available on the Web at www.epa.gov/safewater.

Where Can I Get More Information?
More information on the UCMR is available from the following sources:

- *Federal Register* notices of September 17, 1999 (64 FR 50556), March 2, 2000 (65 FR 11372), and January 11, 2001 (66 FR 2273).
- The EPA Office of Ground Water and Drinking Water Web Site (www.epa.gov/safewater/ucmr.html).
- *Unregulated Contaminant Monitoring Regulation Analytical Methods and Quality Control Manual* (EPA 815-R-00-006).
- *Supplement A to the Unregulated Contaminant Monitoring Regulation Analytical Methods and Quality Control Manual* (EPA 815-R-00-002).
- *Unregulated Contaminant Monitoring Regulation Guidance for Operators of Public Water Systems Serving 10,000 or Fewer People* (EPA 815-R-01-002).
- The Safe Drinking Water Hotline (800 426-4791).

EPA is developing additional guidance materials, so check the Office of Ground Water and Drinking Water Web Site often for the latest information about them.

Table 3, at right, lists UCMR contacts in the EPA regional offices and the Agency's Technical Support Center in Cincinnati, OH.

Table 3: EPA UCMR Contacts

EPA	Contact	Telephone
Region 1	Chris Ryan	617 918-1567
Region 2	Robert Poon	212 637-3821
Region 3	Michelle Hoover	215 814-5258
Region 4	Janine Morris	404 562-9480
Region 5	Janet Kuefler	312 886-0123
Region 6	Andrew J. Waite	214 665-7332
Region 7	Stan Calow	913 551-7410
Region 8	Rod Glebe	303 312-6627
Region 9	Jill Korte	415 744-1853
Region 10	Gene Taylor	206 553-1389
Technical Support Center	Dan Hautman	513 569-7948

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January 1, 2012

EPA uses the Unregulated Contaminant Monitoring Regulation (UCMR) program to collect data for contaminants suspected to be present in drinking water, but that do not have health-based standards set under the Safe Drinking Water Act (SDWA). Every five years EPA reviews the list of contaminants, largely based on the Contaminant Candidate List. The SDWA Amendments of 1996 provide for:

- Monitoring no more than 30 contaminants per 5-year cycle
- Monitoring only a representative sample of public water systems serving less than 10,000 people
- Storing analytical results in a National Contaminant Occurrence Database (NCOD)

This dataset represents the last NCOD release of analytical results for UCMR 2. For more information about UCMR2, please visit our website:
http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr2/index.html

UCMR 2 Data Considerations

- This dataset is complete.
- Data are presented as four method-specific text files (UCMR2_521.txt, UCMR2_525_2_and_535.txt, UCMR2_527.txt, UCMR2_529.txt), and one text file containing all UCMR 2 data (UCMR2_All.txt).
- Samples collected at the maximum residence time in the distribution system (MR) are required to be analyzed only for nitrosamines using Method 521.
- Extra data were submitted but not required are included.
- Disinfectant type is only required for Method 521 data.
- Population categories are based on total population (retail plus wholesale) as of June 30, 2005.
- These text files are tab delimited and have no text qualifier. Field names are included in the first row of each file.
- EPA suggests you import each field into your choice of software as text. Some of the IDs can be misinterpreted as long integer field types when they actually contain alpha characters.

UCMR 2 Data Field Names and Definitions

Field Name	Definition	
PWSID	Public Water System Identification Code, 9 character identification code	
PWSName	Public Water System Name, name of the public water system (PWS)	
Size	Size category of the PWS for UCMR, based on total population as of June 30, 2005	
	VS	<500
	S	501-3300
	M	3301-10000
	L	10001-50000
	VL	50001-100000
	XL	>100000
FacilityID	Public Water System Facility Identification Code, 5 digit identification code	
FacilityName	Name of the facility at the PWS	
FacilityWaterType	Source of water at the facility	
	SW	surface water
	GW	ground water
	GU	ground water under the direct influence of surface water
	MX	mixed
SamplePointID	Identification code up to 15 characters for each sample point at the PWS	
SamplePointName	Name of the sample point at the facility at the PWS	
SamplePointType	Sampling Point Type Code	
	EP	entry point to the distribution system
	MR	maximum residence time in the distribution system (screening survey facilities only)

Field Name	Definition	
AssociatedFacilityID	Maximum residence time facility ID associated with the entry point facility (screening survey facilities only)	
AssociatedSamplePointID	Maximum residence time sample point ID associated with the entry point ID sample point (screening survey facilities only)	
DisinfectantType	This information exists for screening survey facilities only.	
	CL	chlorine
	CA	chloramine
	OT	other
	ND	no disinfectant used
CollectionDate	Date of sample collection (month, day, year)	
SampleID	Identification code up to 30 characters for each sample, as defined by the laboratory	
Contaminant	Common name for analyte monitored under UCMR2	
MRL	Minimum reporting level defined by UCMR2	
MethodID	Identification code of the analytical method	
AnalyticalResultsSign	Less than (<) the minimum reporting requirement (MRL) or equal to (=) a numeric value at or above the MRL	
AnalyticalResultValue	Numeric value of the analytical result (ppb). Null values represent less than MRL.	
SampleEventCode	Identification code for each sample event. Includes sample event one (SE1), sample event two (SE2), sample event three (SE3), and sample event four (SE4). GW systems report only SE1 and SE2.	
MonitoringRequirement	AM	Assessment Monitoring (List 1)
	SS	Screening Survey (List 2)
Region	EPA Region	States
	1	CT, ME, MA, NH, RI, VT
	2	NJ, NY, PR (Puerto Rico), VI (Virgin Islands)
	3	DE, DC, MD, PA, VA, WV
	4	FL, FL, GA, KY, MS, NC, SC, TN

Field Name	Definition	
	5	IL, IN, MI, MN, OH, WI
	6	AR, LA, NM, OK, TX
	7	IA, KS, MO, NE
	8	CO, MT, ND, SD, UT, WY
	9	AZ, CA, HI, NV, AS (American Samoa), GU (Guam), MP (Northern Marianas Islands), NN (Navajo Nation)
	10	AK, ID, OR, WA
State	Two character postal code referring to a state or a two digit numeric code referring to tribal systems within that Region.	

UCMR 2 Contaminants and Methods

Contaminant	Contaminant Full Name	CAS[1] Number	Method ID	Method Name	Monitoring Requirement
Dimethoate	Dimethoate	60-51-5	EPA 527	Pesticides and Flame Retardants	AM
Terbufos sulfone	Terbufos sulfone	56070-16-7	EPA 527	Pesticides and Flame Retardants	AM
BDE-47	2,2',4,4'-tetrabromodiphenyl ether	5436-43-1	EPA 527	Pesticides and Flame Retardants	AM
BDE-99	2,2',4,4',5-pentabromodiphenyl ether	60348-60-9	EPA 527	Pesticides and Flame Retardants	AM
BDE-153	2,2',4,4',5,5'-hexabromodiphenyl ether	68631-49-2	EPA 527	Pesticides and Flame Retardants	AM
BDE-100	2,2',4,4',6-pentabromodiphenyl ether	189084-64-8	EPA 527	Pesticides and Flame Retardants	AM
HBB	2,2',4,4',5,5'-hexabromobiphenyl	59080-40-9	EPA 527	Pesticides and Flame Retardants	AM
TNT	2,4,6-trinitrotoluene	118-96-7	EPA 529	Explosives and Related Compounds	AM
1,3-dinitrobenzene	1,3-dinitrobenzene	99-65-0	EPA 529	Explosives and Related Compounds	AM
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine	121-82-4	EPA 529	Explosives and Related Compounds	AM
Acetochlor	Acetochlor	34256-82-1	EPA 525.2	Acetanilide Pesticide Parent	SS
Alachlor	Alachlor	15972-60-8	EPA 525.2	Acetanilide Pesticide Parent	SS
Metolachlor	Metolachlor	51218-45-2	EPA 525.2	Acetanilide Pesticide Parent	SS
Acetochlor ESA	Acetochlor ethane sulfonic acid	187022-11-3	EPA 535	Acetanilide Pesticide Degradation Products	SS
Acetochlor OA	Acetochlor oxanilic acid	184992-44-4	EPA 535	Acetanilide Pesticide Degradation Products	SS
Alachlor ESA	Alachlor ethane sulfonic acid	142363-53-9	EPA 535	Acetanilide Pesticide Degradation Products	SS
Alachlor OA	Alachlor oxanilic acid	171262-17-2	EPA 535	Acetanilide Pesticide Degradation Products	SS
Metolachlor ESA	Metolachlor ethane sulfonic acid	171118-09-5	EPA 535	Acetanilide Pesticide Degradation Products	SS
Metolachlor OA	Metolachlor oxanilic acid	152019-73-3	EPA 535	Acetanilide Pesticide Degradation Products	SS
NDEA	N-nitroso-diethylamine	55-18-5	EPA 521	Nitrosamines	SS
NDMA	N-nitroso-dimethylamine	62-75-9	EPA 521	Nitrosamines	SS
NDBA	N-nitroso-di-n-butylamine	924-16-3	EPA 521	Nitrosamines	SS
NDPA	N-nitroso-di-n-propylamine	621-64-7	EPA 521	Nitrosamines	SS
NMEA	N-nitroso-methylethylamine	10595-95-6	EPA 521	Nitrosamines	SS
NPYR	N-nitroso-pyrrolidine	930-55-2	EPA 521	Nitrosamines	SS

[1]Chemical Abstracts Service

January 1, 2012 UCMR 2 Data Summary

Contaminant	MRL[1]	Number of analyses	Number of PWS with analyses	Number of detections >MRL	Number of PWS with detects	Minimum detection[1]	Maximum detection[1]	Average detection[1]	Median detection[1]
Dimethoate	0.7	32150	4140	0	0				
Terbufos sulfone	0.4	32149	4140	1	1	0.42	0.42	0.42	0.42
BDE-47	0.3	32149	4140	0	0				
BDE-99	0.9	32149	4140	0	0				
BDE-153	0.8	32139	4140	0	0				
BDE-100	0.5	32149	4140	0	0				
HBB	0.7	32143	4140	0	0				
TNT	0.8	32151	4139	0	0				
1,3-dinitrobenzene	0.8	32152	4139	0	0				
RDX	1.0	32150	4139	4	3	1.0	1.1	1.1	1.1
Acetochlor	2.0	11193	1198	0	0				
Alachlor	2.0	11193	1198	0	0				
Metolachlor	1.0	11192	1198	3	3	1.2	2.7	1.8	1.4
Acetochlor ESA	1.0	11157	1198	2	2	1.1	1.2	1.2	1.2
Acetochlor OA	2.0	11157	1198	0	0				
Alachlor ESA	1.0	11156	1198	5	3	1.0	1.3	1.2	1.2
Alachlor OA	2.0	11157	1198	0	0				
Metolachlor ESA	1.0	11157	1198	52	19	1.0	4.0	1.7	1.4
Metolachlor OA	2.0	11157	1198	3	1	2.5	3.5	3.0	3.1
NDEA	0.005	18096	1198	46	26	0.005	0.100	0.015	0.007
NDMA	0.002	18098	1198	1861	324	0.002	0.630	0.009	0.004
NDBA	0.004	18101	1198	9	5	0.004	0.021	0.008	0.007
NDPA	0.007	18107	1198	0	0				
NMEA	0.003	18101	1198	3	3	0.004	0.005	0.004	0.004
NPYR	0.002	18107	1198	41	21	0.002	0.024	0.005	0.004

[1] Measured in µg/L (ppb)

United States Environmental Protection Agency

The Third Unregulated Contaminant Monitoring Rule (UCMR 3)

Searching for Emerging Contaminants in Drinking Water

What is the Unregulated Contaminant Monitoring Rule?

The 1996 amendments to the Safe Drinking Water Act (SDWA) require that once every five years, the U.S. Environmental Protection Agency (EPA) issue a new list of no more than 30 unregulated contaminants to be monitored by public water systems (PWSs). The Unregulated Contaminant Monitoring Rule (UCMR) provides EPA and other interested parties with scientifically valid data on the occurrence of contaminants in drinking water. These data serve as a primary source of occurrence and exposure information that the agency uses to develop regulatory decisions.

The final rule "Revisions to the Unregulated Contaminant Monitoring Rule (UCMR 3) for Public Water Systems" was published in the *Federal Register* on May 2, 2012 (77 FR 26072). UCMR 3 monitoring will take place from 2013-2015, and includes monitoring for 28 chemicals and two viruses.

What contaminants are systems looking for as part of UCMR 3?

Under UCMR 3, public water systems or EPA will conduct sampling and analysis for Assessment Monitoring (List 1), Screening Survey (List 2), and Pre-Screen Testing (List 3) contaminants, as follows:

UCMR 3 Contaminant List			
Assessment Monitoring (List 1 Contaminants)			
1,2,3-trichloropropane	bromomethane (methyl bromide)	chloromethane (methyl chloride)	bromochloromethane (Halon 1011)
chlorodifluoromethane (HCFC-22)	1,3-butadiene	1,1-dichloroethane	1,4-dioxane
vanadium	molybdenum	cobalt	strontium
chromium[1]	chromium-6[2]	chlorate	perfluorooctanesulfonic acid (PFOS)
perfluorooctanoic acid (PFOA)	perfluorobutanesulfonic acid (PFBS)	perfluorohexanesulfonic acid (PFHxS)	perfluoroheptanoic acid (PFHpA)
perfluorononanoic acid (PFNA)			
Screening Survey (List 2 Contaminants)			
17-β-estradiol	estriol	estrone	4-androstene-3,17-dione
17-α-ethynylestradiol	equilin	testosterone	
Pre-Screen Testing[3] (List 3 Contaminants)			
enteroviruses		noroviruses	

1. Monitoring for total chromium, in conjunction with UCMR 3 Assessment Monitoring, is required under the authority provided in Section 1445 (a)(1)(A) of SDWA.
2. Chromium-6 will be measured as soluble chromate (ion).
3. Monitoring for microbial indicators, in conjunction with Pre-Screen Testing, will be conducted, including: total coliforms, *E.coli*, bacteriophage, *Enterococci* and aerobic spores. EPA will pay for all sampling and analysis costs for the small systems selected for this monitoring.

Which water systems will participate in UCMR 3?

The UCMR program divides contaminants into three types of monitoring. UCMR 3 includes monitoring under each of the three lists:

- **Assessment Monitoring (List 1):** All PWSs serving more than 10,000 people (i.e., large systems) and 800 representative PWSs serving 10,000 or fewer people (i.e., small systems) will monitor for 21 chemicals during a 12-month period from 2013-2015.

- **Screening Survey (List 2):** All PWSs serving more than 100,000 people, a representative sample of 320 large PWSs serving 10,001 to 100,000 people, and a representative sample of 480 small PWSs serving 10,000 or fewer people will monitor for seven chemicals during a 12-month period from 2013-2015.

- **Pre-Screen Testing (List 3):** A representative selection of 800 undisinfected ground water PWSs serving 1,000 or fewer people will participate in monitoring for two viruses (i.e., enterovirus and norovirus) and related pathogen indicators (i.e., total coliforms, *E. coli*, bacteriophage, *Enterococci*, and aerobic spores) during a 12-month period from 2013-2015. The virus monitoring will take place in sensitive hydrogeological areas (e.g., karst or fractured bedrock).

Approximately, 6,000 PWSs are participating in UCMR 3. All laboratories conducting analyses for UCMR 3 List 1 and List 2 contaminants must receive EPA approval to perform those analyses (see "UCMR 3 Laboratory Approval Requirements and Information Document" for details of the EPA laboratory approval program). Pre-Screen Testing (List 3) analyses for viruses and indicators are organized and paid for by EPA through direct contracts with laboratories.

Where will samples be collected?

UCMR 3 samples are to be collected at entry points to the distribution system for all contaminants. Assessment Monitoring systems must also sample for chromium, chromium-6, cobalt, molybdenum, strontium, vanadium, and chlorate in the distribution system.

What does UCMR 3 participation involve? What does it cost?

Participating systems collect drinking water samples and have them tested for UCMR contaminants. Large PWSs (systems serving more than 10,000 people) pay for their own testing costs ($50-$470 per sample, per testing method, on average). EPA pays for the testing costs of small PWSs (systems serving 10,000 or fewer people) and manages the small system monitoring.

How did EPA select the UCMR 3 contaminants?

EPA used a stepwise prioritization process to identify potential UCMR 3 contaminants. An agency and state working group first reviewed the third Contaminant Candidate List (CCL 3), as well as the contaminants considered in the development of CCL 3. The final CCL 3 is comprised of contaminants that were selected through a data-driven process that considered adverse health effects (potency and severity) and occurrence (prevalence and magnitude). EPA used CCL 3, along with additional sources of information about other emerging contaminants of potential concern, to establish an initial list of potential UCMR 3 contaminants. This list was further pared down by eliminating contaminants with methods that would not be ready for UCMR 3 monitoring and contaminants included in UCMR 1 or UCMR 2 monitoring. EPA published this proposed list of 30 contaminants in the Federal Register on March 3, 2011. After receiving and considering public comments on the proposed list, EPA added chromium-6 and total chromium to UCMR 3, and removed *sec*-butylbenzene and *n*-propylbenzene, both non-carcinogenic VOCs.

What does this information mean to me?

Contaminant monitoring is part of a larger process that EPA, states, tribes, water systems, and other partners use to protect drinking water. Health information is necessary to know whether these contaminants pose a health risk, but it is often incomplete for unregulated contaminants. Some contaminants maybe harmful at low levels; others may be harmful only at much higher levels. UCMR examines what is in the drinking water, but additional health information is needed to know whether these contaminants pose a health risk.

What are the environmental and public health benefits?

UCMR 3 benefits the environment and public health as follows: EPA and other interested parties will have scientifically valid data on the occurrence of targeted contaminants in drinking water; EPA can assess the number of people potentially being exposed; and EPA can provide an estimate of the levels of that exposure. This data set is one of the primary sources of occurrence and exposure information the agency uses to develop regulatory decisions for contaminants of concern.

Where can consumers find UCMR results?

If a PWS monitoring for UCMR 3 finds contaminants in its drinking water, it provides the information to its customers in an annual water quality report (called a Consumer Confidence Report). This includes both regulated and unregulated contaminants. Most systems mail these reports directly to customers, and many reports are available from EPA's website. EPA also makes the results available online via its National Drinking Water Contaminant Occurrence Database, http://water.epa.gov/scitech/datait/databases/drink/ncod/databases-index.cfm. These results will be posted on an ongoing basis after they have been reviewed for quality.

How can I learn more?

For general information on UCMR 3, go to: http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr3/ or contact the Safe Drinking Water Hotline at (800) 426-4791, or at: http://water.epa.gov/drink/contact.cfm.

United States Environmental Protection Agency

The Third Unregulated Contaminant Monitoring Rule (UCMR 3)

Fact Sheet for Assessment Monitoring (List 1 Contaminants)

Overview of the Rule

- **Title**: Revisions to the Unregulated Contaminant Monitoring Rule for Public Water Systems; 77 FR 26072, May 2, 2012.
- **Purpose**: To collect occurrence data for contaminants suspected to be present in drinking water but that do not have health-based standards set under the Safe Drinking Water Act (SDWA). Assessment Monitoring targets contaminants that are analyzed with methods that utilize existing and widely used technology. The UCMR program is the primary source of drinking water contaminant occurrence data used by EPA in regulatory determinations.
- **Description**: UCMR 3 includes Assessment Monitoring for 21 List 1 chemical contaminants using six EPA-approved analytical methods and four equivalent consensus methods. List 1 contaminants are always associated with an Assessment Monitoring sampling design. Public water systems (PWSs) subject to Assessment Monitoring will sample within a 12-month period during 2013 - 2015.
- **Utilities Affected**: Community water systems (CWSs) and non-transient non-community water systems (NTNCWSs) with more than 10,000 retail customers and a representative sample of 800 systems serving 10,000 or fewer retail customers are required to conduct Assessment Monitoring.
- **Occurrence Data**: The analytical results from UCMR 3 are stored in the National Contaminant Occurrence Database (NCOD). For a summary of the NCOD results, tips for querying NCOD, and health effects information (including reference concentrations) please refer to the UCMR 3 Data Summary document.

Assessment Monitoring (List 1 Contaminants)

Contaminant / CASRN[1]	MRL[2] (µg/L)	Use or Environmental Source[3]
Volatile Organic Compounds: EPA Method 524.3		
1,2,3-trichloropropane 96-18-4	0.03	Halogenated alkane; used as an ingredient in paint, varnish remover, solvents and degreasing agents
1,3-butadiene 106-99-0	0.1	Alkene; used in rubber manufacturing and occurs as a gas
chloromethane (methyl chloride) 74-87-3	0.2	Halogenated alkane; used as foaming agent, in production of other substances, and by-product that can form when chlorine used to disinfect drinking water
1,1-dichloroethane 75-34-3	0.03	Halogenated alkane; used as a solvent
bromomethane 74-83-9	0.2	Halogenated alkane; occurs as a gas, and used as a fumigant on soil before planting, on crops after harvest, on vehicles and buildings, and for other specialized purposes
chlorodifluoromethane (HCFC-22) 75-45-6	0.08	Chlorofluorocarbon; occurs as a gas, and used as a refrigerant, as a low-temperature solvent, and in fluorocarbon resins, especially tetrafluoroethylene polymers
bromochloromethane (Halon 1011) 74-97-5	0.06	Used as a fire-extinguishing fluid, an explosive suppressant, and as a solvent in the manufacturing of pesticides

Synthetic Organic Compound: EPA Method 522		
1,4-dioxane **123-91-1**	0.07	Cyclic aliphatic ether; used as a solvent or solvent stabilizer in manufacture and processing of paper, cotton, textile products, automotive coolant, cosmetics and shampoos
Metals: EPA Method 200.8; SM 3125; ASTM D5763-10[4]		
vanadium **7440-62-2**	0.2	Naturally-occurring elemental metal; used as vanadium pentoxide which is a chemical intermediate and a catalyst
molybdenum **7439-98-7**	1	Naturally-occurring element found in ores and present in plants, animals and bacteria; commonly used form molybdenum trioxide used as a chemical reagent
cobalt **7440-48-4**	1	Naturally-occurring element found in the earth's crust and at low concentrations in seawater, and in some surface and ground water; cobaltous chloride was formerly used in medicine and as a germicide
strontium **7440-24-6**	0.3	Naturally-occurring element; historically, commercial use of strontium has been in the faceplate glass of cathode-ray tube televisions to block x-ray emissions
chromium[5] **CASRN n/a**	0.2	See chromium-6 for use or source information; though the amount measured when analyzing for "total chromium" is the sum of chromium in all of its valence states, the MCL for EPA's current total chromium regulation was determined based upon the health effects of chromium-6
Chromium-6: EPA Method 218.7		
chromium-6[6] **18540-29-9**	0.03	Naturally-occurring element; used in making steel and other alloys; chromium-3 or -6 forms are used for chrome plating, dyes and pigments, leather tanning, and wood preservation
Oxyhalide Anion: EPA Method 300.1; SM 4110D; ASTM D658-08		
chlorate **14866-68-3**	20	Agricultural defoliant or desiccant; disinfection byproduct; and used in production of chlorine dioxide
Perfluorinated Compounds: EPA Method 537		
perfluorooctanesulfonic acid (PFOS) **1763-23-1**	0.04	Surfactant or emulsifier; used in fire-fighting foam, circuit board etching acids, alkaline cleaners, floor polish, and as a pesticide active ingredient for insect bait traps; U.S. manufacture of PFOS phased out in 2002; however, PFOS still generated incidentally
perfluorooctanoic acid (PFOA) **335-67-1**	0.02	Perfluorinated aliphatic carboxylic acid; used for its emulsifier and surfactant properties in or as fluoropolymers (such as Teflon), fire-fighting foams, cleaners, cosmetics, greases and lubricants, paints, polishes, adhesives and photographic films
perfluorononanoic acid (PFNA) **375-95-1**	0.02	Manmade chemical; used in products to make them stain, grease, heat and water resistant
perfluorohexanesulfonic acid (PFHxS) **355-46-4**	0.03	Manmade chemical; used in products to make them stain, grease, heat and water resistant
perfluoroheptanoic acid (PFHpA) **375-85-9**	0.01	Manmade chemical; used in products to make them stain, grease, heat and water resistant
perfluorobutanesulfonic acid (PFBS) **375-73-5**	0.09	Manmade chemical; used in products to make them stain, grease, heat and water resistant

1. CASRN - Chemical Abstracts Service Registry Number
2. MRL - Minimum Reporting Level
3. "Use or Environmental Source" further documented in UCMR 3 Contaminants – Information Compendium. EPA 815-B-11-001. January 2012
4. SM – Standard Methods; ASTM – ASTM International
5. Monitoring for total chromium, in conjunction with UCMR 3 Assessment Monitoring, is required under the authority provided in Section 1445(a)(1)(A) of SDWA
6. Chromium-6 will be measured as soluble chromate ion (CASRN 13907-45-4)

Assessment Monitoring

- **Time frame**: One consecutive 12-month period during January 2013 - December 2015 (monitoring can span more than one calendar year, as long as conducted during a consecutive 12-month period).
- **Frequency**: *Ground Water*: Monitoring will occur twice in one consecutive 12-month period. Sample events must occur 5 - 7 months apart. *Surface Water or GUDI*: Monitoring will occur in 4 consecutive quarters, with sampling events occurring 3 months apart.
- **Location:** Entry point to the distribution system (EPTDS) for all contaminants, as well as distribution system maximum residence time sampling locations for chromium, chromium-6, cobalt, molybdenum, strontium, vanadium and chlorate.
- **Laboratories**: Samples must be analyzed by EPA-approved laboratories.

Critical Deadlines and Requirements

Due Date	Requirement	Report through SDWARS[1]	Contact Sampling Coordinator[2]
	Following Rule Publication		
October 1, 2012	Systems must submit **contact information** to SDWARS. (Any subsequent changes must be submitted within 30 days of the change occurring).	X	
	Laboratories seeking approval must submit a registration form to participate in the **laboratory approval process**.		X
August 1, 2012	**Ground water** systems that wish to monitor from **representative EPTDSs** must submit either state-approved, UCMR 2-approved or propose a new representative sampling plan.		X
October 1, 2012	Deadline for systems to **change their monitoring schedule** (after October 1, systems must provide an explanation for the requested schedule change and obtain EPA approval of the change).	X	X (after October 1)
	PWSs review/edit if necessary, **inventory information** for sampling locations.	X	X (after October 1)
	Following Sample Collection		
Within 120 days of sample collection	**Laboratories post data** to SDWARS.	X	
Within 60 days of lab posting data	**PWSs review and approve the data**. If the PWS has not taken action after 60 days, the data are considered approved and ready for state and EPA review.	X	

1. Safe Drinking Water Accession and Review System
2. Contact via email at: UCMR_Sampling_Coordinator@epa.gov.

Data Elements

Public Water System Identification (PWSID) Code	Sampling Point Identification Code	Sample Collection Date	Analytical Method Code	Analytical Result–Value
Public Water System Facility Identification Code	Sampling Point Type Code	Sample Identification Code	Sample Analysis Type	Laboratory Identification Code
Water Source Type	Disinfectant Type	Contaminant	Analytical Results–Sign	Sample Event Code

Additional Information

The **Public Notification Rule** (40 CFR §141.207), published on May 4, 2000 (65 FR 25982) with amendments and corrections included in the Code of Federal Regulations for the Public Notification Rule published on July 1, 2006, requires PWSs to notify the public annually that the results of monitoring for unregulated contaminants are available. CWSs may include their public notice within their CCRs. Details on these reporting requirements can be found in the document: Revised Public Notification Handbook (EPA 816-R-09-013).

Under the **Consumer Confidence Report (CCR) Rule**, as specified in 40 CFR §141.153(d), CWSs must report the monitoring results whenever unregulated contaminants are detected. CCRs are delivered to all billing customers each year by July 1. (The CCR Rule does not apply to non-community water systems). Details on these reporting requirements can be found on the CCR Home Page.

For More Information

- Safe Drinking Water Hotline: (800) 426 – 4791
- CDX/SDWARS Help Desk: (888) 890 – 1995
- UCMR Homepage

United States Environmental Protection Agency

The Fourth Unregulated Contaminant Monitoring Rule (UCMR 4)

Metals, Pesticides, Alcohols, SVOCs – Fact Sheet for Assessment Monitoring

Overview

EPA published the "Revisions to the Unregulated Contaminant Monitoring Rule (UCMR 4) for Public Water Systems and Announcement of Public Meeting" on December 20, 2016 (81 FR 92666). UCMR 4 includes Assessment Monitoring for a total of 30 chemical contaminants including two metals, eight pesticides plus one pesticide manufacturing byproduct, three alcohols, and three semivolatile organic chemicals (SVOCs), as shown in the table below. UCMR 4 also requires Assessment Monitoring for:

- Three brominated haloacetic acid (HAA) disinfection byproducts groups and the indicators total organic carbon (TOC) and bromide.
- Nine cyanotoxins and one cyanotoxin group.

Monitoring under UCMR 4 will occur from 2018-2020. For more information on these contaminants, please refer to the respective UCMR 4 Fact Sheets.

Assessment Monitoring (Metals, Pesticides, Alcohols, SVOCs)

Metals: EPA Method 200.8, ASTM D5673-10, SM 3125[3]

Contaminant	CASRN[1]	MRL[2] (µg/L)	Additional Information
germanium	7440-56-4	0.3	Naturally-occurring element; commercially available in combination with other elements and minerals; a byproduct of zinc ore processing; used in infrared optics, fiber-optic systems, electronics and solar applications
manganese	7439-96-5	0.4	Naturally-occurring element; commercially available in combination with other elements and minerals; used in steel production, fertilizer, batteries and fireworks; drinking water and wastewater treatment chemical; essential nutrient

Pesticides and a Pesticide Manufacturing Byproduct: EPA Method 525.3

Contaminant	CASRN[1]	MRL[2] (µg/L)	Additional Information
alpha-hexachlorocyclohexane	319-84-6	0.01	Component of benzene hexachloride (BHC); formerly used as an insecticide
chlorpyrifos	2921-88-2	0.03	Organophosphate; used as an insecticide, acaricide and miticide
dimethipin	55290-64-7	0.2	Used as an herbicide and plant growth regulator
ethoprop	13194-48-4	0.03	Used as an insecticide
oxyfluorfen	42874-03-3	0.05	Used as an herbicide
profenofos	41198-08-7	0.3	Used as an insecticide and acaricide
tebuconazole	107534-96-3	0.2	Used as a fungicide
total permethrin (cis- & trans-)	52645-53-1	0.04	Used as an insecticide
tribufos	78-48-8	0.07	Used as an insecticide and cotton defoliant

Alcohols: EPA Method 541

Contaminant	CASRN[1]	MRL[2] (µg/L)	Additional Information
1-butanol	71-36-3	2.0	Used as a solvent, food additive and in production of other chemicals
2-methoxyethanol	109-86-4	0.4	Used in a number of consumer products, such as synthetic cosmetics, perfumes, fragrances, hair preparations and skin lotions
2-propen-1-ol	107-18-6	0.5	Used in the production flavorings, perfumes and other chemicals

Semivolatile Chemicals: EPA Method 530

Contaminant	CASRN[1]	MRL[2] (µg/L)	Additional Information
butylated hydroxyanisole	25013-16-5	0.03	Used as a food additive (antioxidant)
o-toluidine	95-53-4	0.007	Used in the production of dyes, rubber, pharmaceuticals and pesticides
quinoline	91-22-5	0.02	Used as a pharmaceutical (anti-malarial) and flavoring agent; produced as a chemical intermediate; component of coal

1. CASRN - Chemical Abstracts Service Registry Number
2. MRL - Minimum Reporting Level
3. ASTM – ASTM International; SM – Standard Methods

- **Applicable Water Systems:** Community water systems (CWSs) and non-transient non-community water systems (NTNCWSs) serving more than 10,000 retail customers (i.e., large systems) and a representative sample of 800 CWSs and NTNCWSs serving 10,000 or fewer retail customers (i.e., small systems).
- **Timeframe and Frequency:** For surface water and ground water under the direct influence of surface water systems, sampling will take place for four consecutive quarters over the course of 12 months; a total of four sampling events that occur three months apart. For ground water systems, sampling will take place twice over the course of 12 months; a total of two sampling events that occur five to seven months apart.
- **Monitoring Locations:** Sample collection will take place at the entry point to the distribution system (EPTDS). With prior approval, large ground water systems that have multiple EPTDSs can sample at representative sampling locations rather than at each EPTDS. Systems that purchase water with multiple connections from the same wholesaler may select one representative connection from that wholesaler. This EPTDS sampling location must be representative of the highest annual volume connections.
- **Laboratories:** Samples must be analyzed by EPA UCMR approved laboratories.
- **Occurrence Data:** The analytical results from UCMR 4 are stored in the National Contaminant Occurrence Database (NCOD). For a summary of the NCOD results, tips for querying NCOD, and health effects information (including reference concentrations, where available), please refer to the UCMR 4 Data Summary document.

Critical Deadlines and Requirements

Following Rule Publication

Due Date	Requirement	Report through SDWARS[1]	Contact Sampling Coordinator[2]
December 31, 2017	**Large systems** must update contact information, zip code(s), sampling location(s), inventory information and monitoring schedule. With the exception of monitoring schedule changes, any subsequent changes must be submitted within 30 days of the change occurring. EPA will coordinate with the small systems to collect the contact information, zip code(s) and inventory information. After December 31, 2017, systems must provide an explanation for any requested schedule change and obtain EPA approval of the change.	X	X (after December 31, 2017)
February 21, 2017	**Laboratories** seeking approval must submit a registration form to participate in the laboratory approval process.		X
April 19, 2017	**Laboratories** must complete and submit the necessary laboratory approval application materials.		X
October 31, 2017	**Large ground water systems** that wish to monitor from representative EPTDSs must submit their plan previously approved by EPA or a state (i.e., under a prior UCMR cycle) or a proposal for a new representative sampling plan. Note: the original deadline of April 19, 2017 was extended to provide greater opportunities for PWSs to reduce their monitoring.		X

Following Sample Collection

Due Date	Requirement	Report through SDWARS[1]	Contact Sampling Coordinator[2]
Within 120 days of sample collection	**Laboratories** post data to SDWARS.	X	
Within 60 days of lab posting data	**PWSs** review and approve the data. If the PWS has not taken action after 60 days, the data are considered approved and ready for state and EPA review.	X	

1. Safe Drinking Water Accession and Review System.
2. Contact via email at UCMR_Sampling_Coordinator@epa.gov.

Data Elements

EPA will collect the following data elements in SDWARS 4, an updated version of the data reporting system used in previous UCMR actions.

Public Water System Identification (PWSID) Code	Sampling Point Identification Code	Sample Collection Date	Analysis Batch Identification Code	Laboratory Identification Code
Public Water System Name	Sampling Point Name	Sample Identification Code	Analysis Date	Sample Event Code
Public Water System Facility Identification Code	Sampling Point Type Code	Contaminant	Sample Analysis Type	
Public Water System Facility Name	Disinfectant Type	Analytical Method Code	Analytical Results–Sign	
Public Water System Facility Type	Treatment Information	Extraction Batch Identification Code	Analytical Result-Measured Value	
Water Source Type	Disinfectant Residual Type	Extraction Date	Additional Value	

Additional Information

The **Public Notification Rule** (40 CFR 141.207) requires PWSs to notify the persons served of the availability of the results no later than 12-months after monitoring results are known. CWSs may include their public notice within their Consumer Confidence Reports (CCRs).

Under the **Consumer Confidence Report (CCR) Rule** (40 CFR 141.153(d)) requires CWSs to report the monitoring results whenever unregulated contaminants are detected. CCRs are to be sent to all billing customers each year by July 1. (The CCR Rule does not apply to non-community water systems). To obtain a copy of your CCR, you should contact your water supplier or you may find information for how to obtain a copy of the CCR in your water bill. Additional information about the CCR including detains on reporting requirements can be found on the CCR Homepage.

For More Information

- Safe Drinking Water Hotline: 1-800-426-4791
- CDX/SDWARS Help Desk: 1-888-890-1995
- UCMR Homepage

United States Environmental Protection Agency

The Fourth Unregulated Contaminant Monitoring Rule (UCMR 4)

Cyanotoxins – Fact Sheet for Assessment Monitoring

Overview

EPA published the "Revisions to the Unregulated Contaminant Monitoring Rule (UCMR 4) for Public Water Systems and Announcement of Public Meeting" on December 20, 2016 (81 FR 92666). UCMR 4 includes Assessment Monitoring for a total of 30 chemical contaminants including nine cyanotoxins and one cyanotoxin group. UCMR 4 also requires Assessment Monitoring for:

- Three brominated haloacetic acid (HAA) disinfection byproducts groups and two associated indicators (TOC and bromide).
- Seventeen additional contaminants including two metals, eight pesticides plus one pesticide manufacturing byproduct, three alcohols and three semivolatile organic chemicals.

Monitoring under UCMR 4 will occur from 2018-2020. For more information on these contaminants, please refer to the respective UCMR 4 Fact Sheets.

Assessment Monitoring (Cyanotoxins)

Freshwater cyanobacterial blooms may be composed of a single-species or variety of toxic and non-toxic strains. Cyanotoxins are produced and contained within the actively growing cyanobacterial cells, and can be released into the surrounding water.

Contaminant	CASRN[1]	MRL[2] (μg/L)	Method
"total microcystins"	N/A	0.3	EPA 546
microcystin-LA	96180-79-9	0.008	EPA 544
microcystin-LF	154037-70-4	0.006	EPA 544
microcystin-LR	101043-37-2	0.02	EPA 544
microcystin-LY	123304-10-9	0.009	EPA 544
microcystin-RR	111755-37-4	0.006	EPA 544
microcystin-YR	101064-48-6	0.02	EPA 544
nodularin	118399-22-7	0.005	EPA 544
anatoxin-a	64285-06-9	0.03	EPA 545
cylindrospermopsin	143545-90-8	0.09	EPA 545

1. CASRN - Chemical Abstracts Service Registry Number
2. MRL - Minimum Reporting Level

- **Applicable Water Systems**: Community water systems (CWSs) and non-transient non-community water systems (NTNCWSs) serving more than 10,000 retail customers (i.e., large systems) and a representative sample of 800 CWSs and NTNCWSs serving 10,000 or fewer retail customers (i.e., small systems). Systems using surface water or ground water under the direct influence of surface water are required to sample; **ground water systems are excluded from cyanotoxin monitoring**.
- **Timeframe and Frequency:** Systems will take samples twice a month for four consecutive months (total of eight sampling events), during the monitoring timeframe of March through November (excludes December, January and February).
- **Monitoring Locations:** Three samples for cyanotoxin analysis will be collected at the entry point to the distribution system (EPTDS). One sample will be collected for total microcystins analysis by EPA Method 546 (Adda specific enzyme linked

immunosorbent assay (ELISA)), the second for identification of specific microcystins by analysis using EPA Method 544, and the third for cylindrospermopsin and anatoxin-a by EPA Method 545.

  - If the Adda ELISA result is less than 0.3 micrograms per liter (µg/L) (i.e., the reporting limit for total microcystins), then the sample collected for Method 544 will not be analyzed for that sample event, and only the Adda ELISA result will be reported to EPA through the Safe Drinking Water Accession and Review System (SDWARS).
  - If the Adda ELISA result is greater than or equal to 0.3 µg/L, the result will be reported to EPA and the EPA Method 544 sample will be analyzed to identify and quantify the six specific microcystin congeners and nodularin.
  - Cylindrospermopsin and anatoxin-a will be analyzed by EPA Method 545.
- **Laboratories:** Samples must be analyzed by EPA UCMR approved laboratories.
- **Occurrence Data:** The analytical results from UCMR 4 are stored in the National Contaminant Occurrence Database (NCOD). For a summary of the NCOD results, tips for querying NCOD, and health effects information (including reference concentrations, where available), please refer to the UCMR 4 Data Summary document.

Critical Deadlines and Requirements

Following Rule Publication

Due Date	Requirement	Report through SDWARS[1]	Contact Sampling Coordinator[2]
December 31, 2017	**Large systems** must update contact information, zip code(s), sampling location(s), inventory information and monitoring schedule. With the exception of monitoring schedule changes, any subsequent changes must be submitted within 30 days of the change occurring. EPA will coordinate with the small systems to collect the contact information, zip code(s) and inventory information. After December 31, 2017, systems must provide an explanation for any requested schedule change and obtain EPA approval of the change.	X	X (after December 31, 2017)
February 21, 2017	**Laboratories** seeking approval must submit a registration form to participate in the laboratory approval process.		X
April 19, 2017	**Laboratories** must complete and submit the necessary laboratory approval application materials.		X

Following Sample Collection

Due Date	Requirement	Report through SDWARS[1]	Contact Sampling Coordinator[2]
Within 120 days of sample collection	**Laboratories** post data to SDWARS.	X	
Within 60 days of lab posting data	**PWSs** review and approve the data. If the PWS has not taken action after 60 days, the data are considered approved and ready for state and EPA review.	X	

1. Safe Drinking Water Accession and Review System.
2. Contact via email at UCMR_Sampling_Coordinator@epa.gov.

Data Elements

EPA will collect the data elements described in the table below via SDWARS 4, an updated version of the data reporting system used in previous UCMR actions. The final four data elements bolded in the table below are exclusively cyanotoxin data elements, and will include "yes" or "no" questions with a corresponding drop down menu of options. These elements were added to understand source water quality at the time the EPTDS samples are collected.

Public Water System Identification (PWSID) Code	Sampling Point Identification Code	Sample Collection Date	Analysis Batch Identification Code	Laboratory Identification Code
Public Water System Name	Sampling Point Name	Sample Identification Code	Analysis Date	Sample Event Code
Public Water System Facility Identification Code	Sampling Point Type Code	Contaminant	Sample Analysis Type	**Bloom Occurrence**
Public Water System Facility Name	Disinfectant Type	Analytical Method Code	Analytical Results–Sign	**Cyanotoxin Occurrence**
Public Water System Facility Type	Treatment Information	Extraction Batch Identification Code	Analytical Result-Measured Value	**Indicator of Possible Bloom – Treatment**
Water Source Type	Disinfectant Residual Type	Extraction Date	Additional Value	**Indicator of Possible Bloom – Source Water Quality Parameters**

Additional Information

The **Public Notification Rule** (40 CFR 141.207) requires PWSs to notify the persons served of the availability of the results no later than 12-months after monitoring results are known. CWSs may include their public notice within their Consumer Confidence Reports (CCRs).

Under the **Consumer Confidence Report (CCR) Rule** (40 CFR 141.153(d)) requires CWSs to report the monitoring results whenever unregulated contaminants are detected. CCRs are to be sent to all billing customers each year by July 1. (The CCR Rule does not apply to non-community water systems). To obtain a copy of your CCR, you should contact your water supplier or you may find information for how to obtain a copy of the CCR in your water bill. Additional information about the CCR including detains on reporting requirements can be found on the CCR Homepage.

For More Information

- Safe Drinking Water Hotline: 1-800-426-4791
- CDX/SDWARS Help Desk: 1-888-890-1995
- UCMR Homepage
- Cyanotoxins in Drinking Water Homepage

United States Environmental Protection Agency

The Fourth Unregulated Contaminant Monitoring Rule (UCMR 4)

General Information

What is the Unregulated Contaminant Monitoring Rule?

The 1996 amendments to the Safe Drinking Water Act (SDWA) require that once every five years, the U.S. Environmental Protection Agency (EPA) issue a new list of no more than 30 unregulated contaminants to be monitored by public water systems (PWSs). The Unregulated Contaminant Monitoring Rule (UCMR) provides EPA and other interested parties with scientifically valid data on the occurrence of contaminants in drinking water. This national survey is one of the primary sources of information on occurrence and levels of exposure that the Agency uses to develop regulatory decisions for contaminants in the public drinking water supply.

The "Revisions to the Unregulated Contaminant Monitoring Rule (UCMR 4) for Public Water Systems and Announcement of Public Meeting" was published in the *Federal Register* on December 20, 2016 (81 FR 92666). UCMR 4 monitoring will occur from 2018-2020 and includes monitoring for a total of 30 chemical contaminants: 10 cyanotoxins (nine cyanotoxins and one cyanotoxin group) and 20 additional contaminants (two metals, eight pesticides plus one pesticide manufacturing byproduct, three brominated haloacetic acid [HAA] disinfection byproducts groups, three alcohols, and three semivolatile organic chemicals [SVOCs]).

What contaminants are systems monitoring for under UCMR 4?

Under UCMR 4, PWSs will conduct sampling for Assessment Monitoring ("List 1") contaminants as shown in the table below. For additional information on these contaminants, please review the contaminant-specific UCMR 4 Fact Sheets.

10 Cyanotoxins (Nine Cyanotoxins and One Cyanotoxin Group)

total microcystins	microcystin-LA	microcystin-RR	microcystin-LF	microcystin-YR
microcystin-LR	microcystin-LY	nodularin	cylindrospermopsin	anatoxin-a

20 Additional Contaminants

germanium	manganese	alpha-hexachlorocyclohexane	profenofos	chlorpyrifos
tebuconazole	dimethipin	total permethrin (cis- & trans-)	ethoprop	tribufos
oxyfluorfen	HAA5[1]	HAA6Br[1]	HAA9[1]	1-butanol
2-propen-1-ol	2-methoxyethanol	butylated hydroxyanisole	o-toluidine	quinoline

1. HAA5 (dibromoacetic acid, dichloroacetic acid, monobromoacetic acid, monochloroacetic acid, trichloroacetic acid); HAA6Br (bromochloroacetic acid, bromodichloroacetic acid, dibromoacetic acid, chlorodibromoacetic acid, monobromoacetic acid, tribromoacetic acid); HAA9 (bromochloroacetic acid, bromodichloroacetic acid, chlorodibromoacetic acid, dibromoacetic acid, dichloroacetic acid, monobromoacetic acid, monochloroacetic acid, tribromoacetic acid, and trichloroacetic acid).

Which water systems will participate in UCMR 4?

Approximately 6,000 PWSs will participate in UCMR 4. All community water systems (CWSs) and non-transient non-community water systems (NTNCWSs) serving more than 10,000 people (i.e., large systems) are required to monitor:

- All large surface water (SW) and ground water under the direct influence of surface water (GWUDI) systems will monitor for cyanotoxins and the 20 additional contaminants.
- All large ground water systems will monitor for the 20 additional contaminants.

Of the CWSs and NTNCWSs serving 10,000 or fewer people (i.e., small systems):

- A nationally representative set of 800 randomly selected SW and GWUDI small systems will monitor for cyanotoxins.
- A different set of 800 randomly selected small systems will monitor for the 20 additional contaminants.

Note that any PWS that is not subject to HAA5 monitoring under the D/DBPRs (40 CFR 141.Subparts L and V) is not required to monitor for the UCMR 4 HAAs or associated indicators (total organic carbon (TOC) and bromide). Also, transient non-community water systems (TNCWSs) are not required to monitor under UCMR 4.

Where will samples be collected?

UCMR 4 samples will be collected at entry points to the distribution system (EPTDS) for all contaminant groups except for the HAAs, which will be taken in the distribution system. Sampling for the HAA indicators (TOC and bromide) will take place at a single source water influent for each treatment plant.

What does UCMR 4 participation involve?

All large systems and only small systems notified by their state or EPA, will collect samples and have them analyzed for UCMR 4 contaminants. As with previous UCMRs, large PWSs pay for their own testing. EPA pays for the analytical costs for the selected small systems.

All laboratories conducting analyses for UCMR 4 contaminants must receive EPA UCMR approval to perform those analyses.

How did EPA select the UCMR 4 contaminants?

The Contaminant Candidate List (CCL) was the primary source of priority contaminants considered for UCMR 4. The CCL is a list of contaminants that are not currently addressed by national primary drinking water regulations, are known or anticipated to occur at public water systems and may warrant regulation. The EPA selected the UCMR 4 contaminants using a stepwise prioritization process. The first step identified contaminants that were not monitored under UCMR 2 or UCMR 3; may have significant occurrence nationally; and have a completed, validated drinking water method. The next step focused on contaminants associated with one or more of the following considerations: an available health assessment to facilitate regulatory determinations; high public concern; critical health endpoints (e.g., likely or suggestive carcinogen); active use (e.g., pesticides); and/or an occurrence data gap. During the final step, EPA considered workgroup and stakeholder input; looked at cost-effectiveness of analytical methods (i.e., can a single method address multiple contaminants of interest); considered implementation factors (e.g., laboratory capacity); and further evaluated health, occurrence and persistence/mobility data to identify the list of 30 UCMR 4 contaminants.

What are the public health benefits of the UCMR program?

The UCMR program provides the EPA and other interested parties with nationally representative data on the occurrence of particular contaminants in drinking water, the number of people potentially being exposed and an estimate of the levels of that exposure. In accordance with SDWA, EPA will consider the occurrence data from UCMR 4 and other sources, along with the peer reviewed health effects assessments, to support a regulatory determination on whether to initiate the process to develop a national primary drinking water regulation.

Where can consumers find UCMR results?

CWSs are required to address their UCMR monitoring results in their annual Consumer Confidence Report (CCR) whenever unregulated contaminants are detected. CCRs are delivered to all billing customers each year by July 1. (The CCR Rule does not apply to non-community water systems). To obtain a copy of your CCR, you should contact your water supplier or you may find information for how to obtain a copy of the CCR in your water bill. Additional information about the CCR including details on reporting requirements can be found on the CCR Homepage.

All PWSs are required to report their data to EPA as outlined in the UCMR. The analytical results from UCMR 4 (and previous UCMRs) are stored in the National Contaminant Occurrence Database (NCOD) for drinking water. For a summary of the NCOD results, tips for querying NCOD and health effects information (including reference concentrations), please refer to the UCMR 4 Data Summary document.

How can I learn more?

General information is available on the UCMR web page or by calling the Safe Drinking Water Hotline at 1-800-426-4791.

United States Environmental Protection Agency

The Fourth Unregulated Contaminant Monitoring Rule (UCMR 4)

HAA Groups – Fact Sheet for Assessment Monitoring

Overview

EPA published the "Revisions to the Unregulated Contaminant Monitoring Rule (UCMR 4) for Public Water Systems and Announcement of Public Meeting" on December 20, 2016 (81 FR 92666). UCMR 4 includes Assessment Monitoring for a total of 30 chemical contaminants including three brominated haloacetic acid (HAA) disinfection byproducts groups (shown in the table at right) and two associated indicators (total organic carbon (TOC) and bromide). UCMR 4 also requires Assessment Monitoring for:

- Nine cyanotoxins and one cyanotoxin group.
- 17 additional contaminants: two metals; eight pesticides plus one pesticide manufacturing byproduct; three alcohols; and three semivolatile organic chemicals.

Monitoring under UCMR 4 will occur from 2018-2020. For more information on these contaminants, please refer to the respective UCMR 4 Fact Sheets.

<table>
<tr><th colspan="4">HAA Groups</th></tr>
<tr><td>Dichloroacetic acid (DCAA)</td><td rowspan="5">HAA5</td><td rowspan="3"></td><td rowspan="9">HAA9</td></tr>
<tr><td>Monochloroacetic acid (MCAA)</td></tr>
<tr><td>Trichloroacetic acid (TCAA)</td></tr>
<tr><td>Monobromoacetic acid (MBAA)</td><td rowspan="6">HAA6Br</td></tr>
<tr><td>Dibromoacetic acid (DBAA)</td></tr>
<tr><td>Bromochloroacetic acid (BCAA)</td><td rowspan="4"></td></tr>
<tr><td>Bromodichloroacetic acid (BDCAA)</td></tr>
<tr><td>Chlorodibromoacetic acid (CDBAA)</td></tr>
<tr><td>Tribromoacetic acid (TBAA)</td></tr>
</table>

Assessment Monitoring (HAA Groups)

- **Applicable Water Systems**: Community water systems (CWSs) and non-transient non-community water systems (NTNCWSs) serving more than 10,000 retail customers (i.e., large systems), and a representative sample of 800 CWSs and NTNCWSs serving 10,000 or fewer retail customers (i.e., small systems). UCMR 4 HAA monitoring **only applies** to public water systems (PWSs) that are subject to Disinfectants and Disinfection Byproduct Rules (D/DBPRs) HAA5 monitoring requirements.
- **Timeframe and Frequency:** For surface water (SW) and ground water under the direct influence of surface water (GWUDI) systems, sampling will take place for four consecutive quarters over the course of 12 months; a total of four sampling events that occur three months apart. For ground water (GW) systems, sampling will take place twice over the course of 12 months; a total of two sampling events that occur five to seven months apart.
- **Monitoring Locations:**
  - **HAA Groups:** Taken at the D/DBPRs sampling locations described in 40 CFR 141.622. UCMR 4 HAA samples and D/DBPRs HAA5 compliance monitoring samples may be collected by the PWS at the same time (see below regarding laboratory and method requirements). See the Quick Reference Guides for Stage 1 and Stage 2 D/DBPRs for more information about the HAA5 compliance monitoring requirements.

- **TOC and Bromide:** Taken at source water influent locations representing untreated water entering the water treatment plant (i.e., a location prior to any treatment). Must be collected at the same time as HAA samples.
    - SW and GWUDI systems subject to the D/DBPR TOC monitoring must use their D/DBPRs TOC source water sampling site(s) from 40 CFR 141.132.
    - SW and GWUDI systems that are not subject to D/DBPRs TOC monitoring must use their Long Term 2 Enhanced Surface Water Treatment Rule (LT2) source water sampling site(s) (40 CFR 141.703).
    - GW systems that are subject to the D/DBPRs collect TOC and bromide samples at the influents entering their treatment train.
    - Consecutive systems (PWSs that purchase 100 percent of their water) are not required to collect source water samples for TOC or bromide analyses.

- **Laboratories:** UCMR 4 HAA samples must be analyzed by a UCMR 4 EPA UCMR approved laboratory using EPA Method 552.3 or 557 (both of which are compliance methods also approved for analysis of D/DBPRs samples). TOC and bromide must be analyzed by methods already approved for compliance monitoring. For additional information on the D/DBPRs compliance methods, see CFR 141.131(d). Minimum Reporting Levels (MRLs) for the individual HAAs are provided (40 CFR 141.40(a)(5)(v)) for quality control purposes. The HAA5 group is currently regulated in drinking water at a maximum contaminant level (MCL) of 60 µg/L; all are disinfection by-products.
    - Note: laboratories (including PWS laboratories) that wish to exclusively analyze TOC and/or bromide samples do not need to undergo all of the steps for UCMR 4 laboratory approval. Rather, they must email UCMR_Sampling_Coordinator@epa.gov by December 1, 2017 to register for the Lab Approval Program. Next, the PWS laboratory must complete the registration and submit documentation that they are authorized by their primacy state to analyze TOC and/or bromide compliance monitoring samples under the D/DBPRs by December 15, 2017.
- **Occurrence Data:** The analytical results from UCMR 4 are stored in the National Contaminant Occurrence Database (NCOD). For a summary of the NCOD results, tips for querying NCOD, and health effects information (including reference concentrations, where available), please refer to the UCMR 4 Data Summary document.

Critical Deadlines and Requirements

Following Rule Publication

Due Date	Requirement	Report through SDWARS[1]	Contact Sampling Coordinator[2]
December 31, 2017	**Large systems** must update contact information, zip code(s), sampling location(s), inventory information and monitoring schedule. With the exception of monitoring schedule changes, any subsequent changes must be submitted within 30 days of the change occurring. EPA will coordinate with the small systems to collect the contact information, zip code(s) and inventory information. After December 31, 2017, systems must provide an explanation for any requested schedule change and obtain EPA approval of the change.	X	X (after December 31, 2017)
February 21, 2017	**Laboratories** seeking approval must submit a registration form to participate in the laboratory approval process.		X
April 19, 2017	**Laboratories** must complete and submit the necessary laboratory approval application materials.		X

Following Sample Collection

Due Date	Requirement	Report through SDWARS[1]	Contact Sampling Coordinator[2]
Within 120 days of sample collection	**Laboratories** post data to SDWARS.	X	
Within 60 days of lab posting data	**PWSs** review and approve the data. If the PWS has not taken action after 60 days, the data are considered approved and ready for state and EPA review.	X	

1. Safe Drinking Water Accession and Review System.
2. Contact via email at UCMR_Sampling_Coordinator@epa.gov.

Data Elements

EPA will collect the following data elements via SDWARS 4, an updated version of the data reporting system used in previous UCMR actions.

Public Water System Identification (PWSID) Code	Sampling Point Identification Code	Sample Collection Date	Analysis Batch Identification Code	Laboratory Identification Code
Public Water System Name	Sampling Point Name	Sample Identification Code	Analysis Date	Sample Event Code
Public Water System Facility Identification Code	Sampling Point Type Code	Contaminant	Sample Analysis Type	
Public Water System Facility Name	Disinfectant Type	Analytical Method Code	Analytical Results–Sign	
Public Water System Facility Type	Treatment Information	Extraction Batch Identification Code	Analytical Result-Measured Value	
Water Source Type	Disinfectant Residual Type	Extraction Date	Additional Value	

Additional Information

The **Public Notification Rule** (40 CFR 141.207) requires PWSs to notify the persons served of the availability of the results no later than 12-months after monitoring results are known. CWSs may include their public notice within their Consumer Confidence Reports (CCRs).

Under the **Consumer Confidence Report (CCR) Rule** (40 CFR 141.153(d)) requires CWSs to report the monitoring results whenever unregulated contaminants are detected. CCRs are to be sent to all billing customers each year by July 1. (The CCR Rule does not apply to non-community water systems). To obtain a copy of your CCR, you should contact your water supplier or you may find information for how to obtain a copy of the CCR in your water bill. Additional information about the CCR including detains on reporting requirements can be found on the CCR Homepage.

For More Information

- Safe Drinking Water Hotline: 1-800-426-4791
- CDX/SDWARS Help Desk: 1-888-890-1995
- UCMR Homepage

APPENDIX F
Pipe Inventory

Distribution Pipe Inventory
Somerset MA Water & Sewer Department

Updated: 6/1/2011

A = None (no complaints / no breaks)
B = Some (some complaints / some breaks)
C = Frequent (frequent complaints / frequent breaks)
D = Junk

Street Name	Map #	Pipe Segment Length (feet)	Pipe Diameter (inches)	Location From	Location To	Year Installed	Pipe Material	Lined	C-Value	Static Pressure (psi)	Number of Gates	Number Of Hydrants	Dead End	Water Quality Complaints	Break History	Comments
Adams St.	863	300	6	Hillside Ave	Kaufman Road	1985	PVC			52				A	A	
Adams St.	385, 392 & 393	520	6	Wahl Street	Hillside Ave	1949	Transite			50				A	A	
Admiral Hill	File #122/252	400	8			1952	PVC									
Aetna Street	842	340	6			1966	C.I.P.			63			X	A	A	
Albany Street	1049	200	6			1977	PVC			74			X	A	A	
Alberta Ave	640, 686 & 1040	900	2	Seaver Ave East	End	1950	PVC			65			X	A	A	Galvanized PVC
Alberta Ave	126 & 127	1350	6	Seaver Ave West	Antrim Road	1930	C.I.P.			73				A	A	
Alden Place	173, 174 & 289	550	6	Wilbur Ave	Riverside Ave	1931	C.I.P.			99				A	B	
Alden Place	173, 174 & 289	550	8	Wilbur Ave	Riverside Ave	1949	C.I.P.			99				A	A	8" connects to 6" at hydrant
Alfred Street	962	350	6			1961	C.I.P.			81			X	A	A	
Allardice Avenue	1113	1350	8	Almy Road Loops	Utah Ave	1966	C.I.P.			63				A	A	
Allen Lane	Tie Cards	200	2			1956	PE Tubing			79.65				A	A	
Almy Road	1139 & 1140	3,550	12	Chace Street	Delaware Avenue	2003	Ductile Iron			59				A	A	
Almy Road		2,300	12	Delaware Avenue	Whetstone Hill Road	2003	Ductile Iron			59				A	A	
Alyce Avenue 1" service		0				0							X			1" service to 1 house
Anawan Street	766	250	6			1953	C.I.P.			110.6				A	B	
Anchor Drive	1007 – 1009 & 868	1,200	6			1966	PVC			97.95				B	A	C.I.P. and PVC
Andrew Street		0				0										No Water Main
Aneila Avenue	932	50	8			1999	Ductile Iron			58.8				A	A	
Angus Street	140 to 146	900	6			1927	C.I.P.			108				A	B	
Ann Street	794 & 1023	280	6			1955	Transite			67.3				A	A	1955 & 1975
Annette Street	Big Map	330	1.5			1927	Galvanized			99.2				C	A	
Anthony street	1209	280	6			1990	PVC			103.3				A	B	
Antrim Street	Big Map	500	2			1957	Galvanized			76.25				A	A	
Apache Road	New map	180	6	Mt. Hope Road South	End	1998	PVC			90.6			X	A	A	
Apostle Road	957	550	6			1965	Transite			53.05				B	C	
Arcadia Road	713	500	2			1951	Galvanized			57.7			X	B	B	
Arch Street	Big Map	250	1			1951	Galvanized			98.25			X	A	B	
Argyle Road	1049	550	6			1976	PVC			58.55				A	A	
Arnold Street	946	330	6			1963	C.I.P.			79.3				A	A	
Arruda Avenue	1128	450	6			1960	Transite			84.6				A	A	
Ash Street	388 & 965	500	6			1949	C.I.P.			86				A	A	C.I.P. & AC
Atlanthus Avenue	1041	230	6			1975	PVC							A	A	
Atlas Avenue	974 & 1006	400	6			1962	C.I.P.			102.7				A	A	
Avon Street	418 & 435	440	6			1927	C.I.P.			79				A	A	
Bangor Street	687	200	6			1980	PVC			74.9			X	A	A	1980's
Banville Ave.	845	250	6	Forest	Patterson Ave	1980	PVC			74.9				B	A	
Banville Ave.	307, 309 & 310	550	6	Wood St. North	Purrington Street	1935	C.I.P.			79.5				B	B	
Banville Ave.	845	180	6	Wood St. North	Patterson Ave	1939	C.I.P.			80.45				B	B	
Barrows Street	140 & 141	260	6			1927	C.I.P.			105.65			X	A	A	
Barry Avenue – see note on #1186	No map	400	6			1969	C.I.P.			75.1				A	A	
Bayview Avenue	970	820	6			1962	C.I.P.			78				A	B	
Beach Street 1" > 11/2"	New map	520	6			2002	PVC			105.7				A	A	
Bellevue Avenue	1001	350	6			1975	C.I.P.			83				A	A	
Bertram Street (Dead ends)	Tie Card	270	1			1927	Galvanized			85.95			X	B	B	
Berube Avenue	748	320	2	Hydrant	Gardner Ave	1952	C.I.P.			104				A	A	
Berube Avenue	748	420	6	Buffington St.	Hydrant	1952	C.I.P.			99.3				A	A	
Besty B. Avenue	975 & 995	850	6			1962	Transite			83				A	B	
Beverly Street	1023	500	6			1975	Transite			67				A	A	
Billy's Lane	File #91	470	6	High St. West		1997	Ductile Iron			92.6				A	A	
Birch St.	670	550	1	Buffington St.	Ash St.	1948	Galvanized			87.65				B	C	
Birch St.	725	550	2	Ash St.	Judy Lane	1951	Galvanized			85.3				B	C	
Blossom Avenue	Undersize main list	350	2			1956	Galvanized			64.45				A	B	
Bodwell Street	689	480	2			1950	Galvanized			56.05				A	A	
Borland Avenue	419 & 447	1050	6			1927	C.I.P.			76				A	A	
Bourn Avenue	724, 735, 768, 769 & 1124	1840	6			1954	Transite			84				B	B	1954 & 1960
Bovin Ave.	852	270	6	Perron	Hydrant	1980	PVC							A	A	Hydant Location?
Bovin Ave.	272	350	1.5	Read St.	Foley Ave	1930	Galvanized							A	A	
Bower Street	842	520	6			1956	Transite			65				A	A	
Bowker Terrace	No Map	350	6			1952	C.I.P.			81.9				A	A	
Bradley Avenue	File folder of maps	700	6			1997	PVC			66.05				A	A	
Brayton Avenue	1031	1,000	2	MacArthur Ave.	Riverside Ave (East Side)	1975	Galvanized							B	B	
Brayton Avenue	835 & 1126	6580	8	Swansea Town Line	Riverside Ave	1960	Transite			67.5				A	A	
Brayton Point Road 16" interconnections @ all side streets from Read Street to Wilbur Avenue are CLOSED						0										
Brayton Point Road	Hanging Map #16	8780	16	Water Tank	New England Power Co.	1963	C.I.P.			76				A	A	
Brayton Point Road	Hanging Map #16	8450	8	Water Tank	O'Neil Road	1955	C.I.P.			66				A	A	
Brewster Drive	1138	300	6			1966	C.I.P.			75.75				A	A	
Brian Avenue		1,220	6	Almy Road	Regan Road	1975	C.I.P.			53.2						
Briar Road	886	200	6			1957	Transite			69				B	C	
Briggs Avenue	151 & 293	400	1.5	Brayton Point Rd	Fortier Street	1952	Galvanized			75.4				A	C	
Briggs Avenue	659	600	2	Fortier Street	Lawton Street	1949	Galvanized			78.65				A	C	
Brisbon Road	No Map	850	6			1978	C.I.P.			60				A	A	
Broad Cove Street	File #198	1000	8			1999	Ductile Iron			92				A	A	
Brook Street	992	860	6			1964	C.I.P.			93			X	A	A	
Brookside Road	947	770	6			1959	Transite			73				B	C	
Brown Avenue		0				0										No Water Main
Brushwood Drive	980	430	6			1975	Transite			67.25				B	B	
Buckner Court	Big Map	200	2			1950	Galvanized			74				A	A	
Buffington St.	215 & 231	1370	8	County St.	Prospect St.	1927	C.I.P.			86				B	A	
Buffington St	249, 250 & 251	1,800	6	Prospect St.	Town Line	1927	C.I.P.			73				B	A	
Buffington St.	244	1430	6	Riverside Ave.	County Street	1927	C.I.P.			73				B	A	
Burgess Road	1148 – 1150	900	6	Almy Road	Chace St.	1966	C.I.P.			61				B	A	
Burk Street	1035	230	6			1975	PVC			111.45			X	A	A	
Butler Street	923	1,110	6			1927	Transite			80.95				B	B	
Butternut Road	1024 & 1025	800	6			1969	C.I.P.			79.75				A	B	

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D = Junk

Street Name	Map #	Pipe Segment Length (feet)	Pipe Diameter (inches)	Location From	Location To	Year Installed	Pipe Material	Lined	C-Value	Static Pressure (psi)	Number of Gates	Number Of Hydrants	Dead End	Water Quality Complaints	Break History	Comments
Butterworth Drive	1004	490	6			1975	C.I.P.			77.7				A	A	
Buxton Avenue	File #213	950	6			1943	Transite			72.15				D	D	
Calvin Avenue	977	1200	6			1975	C.I.P.			53.1				A	A	
Captains Way	883	570	6			1971	C.I.P.			96.85				A	A	
Cardinal Road	1109	220	6			1966	C.I.P.			67.3				B	A	
Carey Street	140 & 142	500	6	Angus St.	Farren St.	1928	C.I.P.			110				A	A	
Carey Street	142, 143 & 146	0		Farren St.	Perkins St.	0										No Water Main
Carol Street	1222	550	6			1955	Transite			91.25				A	A	
Carol Street Extension	File #198	500	8			1997	Ductile Iron			98.5				A	A	
Caroline Ave	961, 975, 995 & 1088	1500	6	Hezichia Ave	Cornhill Road	1966	C.I.P.			69.9				A	B	
Caroline Ave	885, 975 & 1088	0	6	Summerfield Ave	Hezichia Ave	1962	Transite			81				A	B	
Carrie Hood Lane	829	800	8			1992	Ductile Iron			93.7				A	A	
Cedar St.	687	400	2	Buffington St.	Hemlock St.	1949	C.I.P.			83.1				B	C	
Cedar St.	661	400	6	Hemlock St.	Ash St.	1948	C.I.P.			82.4				B	B	
Cedarville Road	1138	730	6			1966	C.I.P.			75				A	A	
Centre Street – East of County Street	311, 338, 339 & 341	1,350	6			1927	C.I.P.			87				A	A	
Chace Street	357 – 361, 820, 959, 1003 & 1005	4,850	6			1960	Ductile Iron			67				A	A	
Chandler Drive	1004	260	6			1975	C.I.P.			78.75				A	A	
Channel View Street	1156	520	6			1966	C.I.P.			94.5				A	A	
Charlene Drive	Big Map	188	6			1977	PVC			72.4				A	A	
Charles Street Paper Street	1032	270	6			1975	PVC							A	A	
Charlotte Street	630	120	1			1950	Galvanized							B	A	1" and 1.5"
Charlrod Street	798 & 1005	120	6	Prescott Drive	Hydrant	1999	PVC			79.25				A	A	
Charlrod Street	1077	275	6	Hydrant	County Street	1999	Ductile Iron			80.35				A	A	
Chateau Drive	1024 & 1025	1160	8			1970	C.I.P.			76				A	B	
Chatham Drive	1138	310	6			1966	C.I.P.							A	A	
Chatterton Avenue	394 & 823	2,140	6			1949	Transite			83.3				A	B	1949 & 1958
Cherry Street	409 & 428	550	6	High Street	Main Street	1927	C.I.P.			93.15				A	A	
Cherry Street	733	230	2	High Street	West End	1952	Galvanized			94.8						
Cheryl Lane	865 & 1081	850	6			1981	C.I.P.			78.35				A	A	
Chestnut Street		0				0										No Water Main
Church Street	432	500	6	High Street	Main Street	1927	C.I.P.			85.7				A	A	
Circle Drive	1156	610	6			1966	C.I.P.			93				A	B	East & West of Tide St
Clark Street	434	440	6	High Street	Main Street	1927	C.I.P.			83.6				B	A	
Clark Street	Tie Card	270	1	Main Street	East End	1927	Galvanized			94.3				B	A	
Clay St.	1211	200	6	South St.	Linda Lane Conn.	1948	C.I.P.			89.85				A	A	
Clearview Avenue	1144	2510	10	Eastview Ave.	Regan Road	1961	Transite			63.8				A	A	
Clifford M. Holland Road		0				0										No Water Main
Cobblestone Drive	1217	480	8			1990	PVC			78.4				A	A	
Colonial Drive – 6" tied into 20"	981D	500	6	Marigold Ave.	20" main at Swansea town line	1970	PVC			68.85				A	A	
Colonial Drive	981D	950	8	Propect St.	Marigold Ave.	1971	PVC			68.2				A	A	
Compos Street	439, 449, 450 & 451	1380	6			1980	C.I.P.			79.7				A	A	Not tied into County Street
Connecticut Avenue	960	1740	8			1961	Transite			68				B	B	
Content Street	1219	550	6			1964	C.I.P.			71.1				A	A	
Cornhill Road	1219	650	6			1965	C.I.P.			66				A	A	
Country Drive	1175	2,100	8			1970	C.I.P.			47.75				A	A	
County Street	231 & 446	14,670	10	Buffington St.	East County Street	1927	C.I.P.			84.5				A	A	
County Street	501 - 507	8,400	12	North St.	Brook St. Well in Dighton	1927	C.I.P.							A	A	
County Street	226 & 231	3900	8	Read St.	Buffington St.	1927	C.I.P.							A	A	
County Street	Big Map	21700	20	Water Treatment Plant	Hot & Cold Lane Tank	1974	C.I.P.							A	A	
County Street	Hanging map Dighton	1,750	12	North St.	Dighton, MA	1927	C.I.P.			95.35				A	A	
County Street	231	4,900	8	Read St.	Buffington St.	1927	C.I.P.							A	A	
Cox Street	848	200	2			1982	PVC			100.8			X	A	B	
Crestview Avenue	Big Map 782 & 921	20	8			1962	C.I.P.									Stub
Crestview Avenue	Big Map 782 & 921	800	2			1962	Galvanized			81.7						
Crestwood Road	1026	570	6			1966	C.I.P.			88.8				A	A	
Cross Street	846	150	6			1982	C.I.P.			77.65				A	A	
Crown Court	1018	130	6			1975	Transite			78.75				A	A	
Cusick Lane	1013	450	6	Donald Street	Stagecoach Lane	1975	C.I.P.			91.6				B	B	
Cusick Lane	Big Map & 349	300	1.5	Riverside Ave	End	1975	Galvanized			101.2			X	B	B	
Cypress Road	813, 1020 & 1021	440	6			1958	Transite			64.5				A	B	
Daisy Court		250	8			2000	PVC									
Data PRG Building		1,200	10	Brayton Point Road	End	1955	C.I.P.						X			
Davis Street	420 & 447-2	330	6			1927	C.I.P.			75.9				A	A	
Debbie Lane	890	250	6			1968	PVC			74.65				A	A	
Deer Street		520	6	Chace Street	Halfway down Deer	1960	Transite			87.5						
Deer Street		500	2	Lafayette Street	6" on Deer	0	Galvanized			91.65						
Delaware Avenue	1140	1,120	10			1966	C.I.P.			54.4				B	B	
Del-Rita Avenue		0		Regan Rd.	Robin Lane	0										No Water Main
Del-Tom Lane	Tie Cards	270	1			1965	Galvanized			88				A	C	
Demarco Street	1022	430	2			1975	Galvanized			68.35				A	A	
Denham Ave. – Extension of main about 200'	New Map File	200	6			1994	PVC			49.5				A	A	
Denham Avenue	978	1200	6			1975	C.I.P.			53.15				A	A	
Desmond Avenue	233 & 235	620	6			1927	C.I.P.			100				A	B	
Dias Terrace 2"> 1 ½" > 1"	781	320	1.5			1954	Galvanized			66.75				B	B	
Doherty Ave. – 1">2">3"	622 & 836	250	2			1948	Transite			92				B	A	
Dolphin Circle	File folder of maps	200	8			1996	Ductile Iron							A	A	
Domingos Street	1022	470	6			1975	Transite			65.8				A	A	
Donald Avenue	1013	1350	6			1975	C.I.P.			93				A	A	
Doolittle Court	File folder of maps	600	8			1960	Transite			70				A	A	
Dove Lane	1109	230	6			1966	C.I.P.			67				B	A	
Dublin Street	406, 407 & 408	1050	8			1961	C.I.P.			98.9				A	B	
Duke Street	File folder of maps	520	6			1985	PVC						X	A	A	
Dumont Street	Bid Map	300	1.5			1954	Galvanized			79.35				B	A	
Durfee Court	972 & Big Map	330	2			1963	Copper			101.1				A	A	
Dwelly Rd. ext. connected to Fawn Road Ext.	New file	720	8			2000	Ductile Iron			82.85				A	A	

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Street Name	Map #	Pipe Segment Length (feet)	Pipe Diameter (inches)	Location From	Location To	Year Installed	Pipe Material	Lined	C-Value	Static Pressure (psi)	Number of Gates	Number Of Hydrants	Dead End	Water Quality Complaints	Break History	Comments
Dwelly Rd.	1025	460	8	Chateau Rd.	Butternut Rd.	1975	C.I.P.			73				A	B	
Eagle Lane	1109	690	6			1966	C.I.P.			66				A	A	
East County Street		540	10	North Street	County Street	1927	C.I.P.									
Eastview Avenue	958	2760	8	Clearview Ave.	Regan Road	1961	Transite			64				A	A	
Eastview Avenue	958	950	10	County Street	Clearview Ave.	1961	Transite			85				A	A	
Eddy Lane	See ties no map	200	2			1956	PE Tubing			83.3				A	A	
Edmond Street off line on Hot & Cold Lane	Plate D853	300	6			1985	PVC			53.3				A	A	
Ellenwood Avenue (6” tee from Lawton St?)	715	600	2			1951	Galvanized			83.65				C	C	
Elm Street	1129	4500	6			1960	Transite			57				B	A	
Emergency water line from Fall River, MA under the Taunton	900, 902, 903 & 908	410	16	Meter Chamber	East	1957	C.I.P.									C.I.P. & Steel
River to the meter building on Riverside Avenue (Magoni’s		1340	12	Davol St	Under river, West	1957	Steel									Meter Bldg Location - see Map A
Enterprise Drive	Big Map	520	8	River Road North		1985	PVC			104.5				A	A	
Enterprise Drive	389 & 390	570	2	River Road South		1949	Galvanized			104.65				A	A	
Euclid Avenue	1048	450	6			1974	C.I.P.			93.55				A	A	
Euclid Avenue	643 & 1048	470	2			1974	Galvanized							A	A	
Evans Street	No map	700	6			1960	Transite			79.3				B	B	
Everett Street	File Map Index	630	6	Extension off Wood St.	Hydrant	1980	Ductile Iron			91.4				A	A	
Everett Street	680	320	1	Riverside Ave 237' West		1950	Galvanized			96.95				B	B	
Evergreen Avenue	974 & 1006	400	6			1962	C.I.P.			109.75				A	A	
Fair Drive	No map	700	6			1972	C.I.P.			72.65				B	B	
Fairview Ave. 6” > 1 ½”	266 & 267	700	6			1975	Galvanized			71.65				B	C	6” & 1 ½”
Fairway Drive	File Draw 9	2400	6			1970	C.I.P.			53				A	A	
Falcon Locke Way	1213	1550	8			1990	PVC			72				A	A	
Farren Street	142	430	6	O'Neil Road	Carey St. "Connected"	1940	C.I.P.			107.4						
Fatima Road	957	1250	6			1960	Transite			53				B	C	
Fawn Rd. Ext. connected to Dwelly Rd. Ext.	File Map #229	1800	8			2000	Ductile Iron							A	A	
Fawn Road	1024 & 1025	300	8			1968	C.I.P.			82				A	B	
Feno Court – loop	1078 & 1160	1220	6			1966	C.I.P.			68				A	A	
Ferncroft Rd.	743	950	6	Franklin Road	House #172	1952	Transite			88.25				A	A	
Ferncroft Rd.	395	212	2	House #172	Reducer	1949	Galvanized			126.2				A	B	
Ferncroft Rd.	395	970	6	Sherman Road	1st Hydrant	1949	Transite			93.8				A	A	
Fiore Drive (Sycamore Terrace)	File #206, 990 & 1172	250	6			1957	Ductile Iron			109.75				A	A	
Fir Avenue	974 & 1006	400	6			1962	C.I.P.			109.75				A	A	
First Street	682	700	2			1950	Galvanized			63				A	A	
Fisher Way	1076	300	6			1965	C.I.P.			83.95				B	A	1965 & 1966
Fitzgerald Road	1015	1000	6			1968	C.I.P.			59				B	A	
Flores Avenue	665 & 693	560	2			1948	Galvanized			98.35				B	B	1948 & 1950
Florida Avenue	1038	300	1.5	Gibbs St. North	End	1950	Galvanized			76.7			X	B	A	
Foley Ave.	265	720	1	Brayton Ave	Fairview	1950	Galvanized			67				A	A	1” > 1 ½”
Foley Ave.	280	1700	8	Riverside Ave	Fairview	1950	C.I.P.			86				A	A	
Folsom Avenue		1,220	8	Almy Road	Regan Road	1975	C.I.P.			53.6						
Folsom Avenue		1,100	6	Regan Road	Olympic Road	1975	C.I.P.			54						
Fordham Drive 6” tied into 20”	1012, 1012D & 1167	950	6			1967	C.I.P.			80.55				A	A	
Forest Avenue	845	1420	6	Banville Ave	Patterson Ave	1980	PVC			80.5				A	A	
Forest Avenue	845	370	2	County Street	Banville Ave	1980	PVC			82.2				A	A	
Forge Road	1212	600	8			1990	PVC			74.9				A	A	
Forestdale Drive	1138	650	6			1966	C.I.P.			74				A	A	
Forsythe Avenue	1168 – 1169	1550	8			1967	Ductile Iron			80				B	A	
Fortier Avenue	615 & 616	460	2			1960	Galvanized			74.6				A	C	
Fourth Street	681 & 1102	1350	6			1950	C.I.P.			64				A	A	1950 & 1963
Francis Street	Big Map	700	16	Wilbur Ave	Easment	1963	C.I.P.			92.85				A	A	
Frank Street	1003	220	6			1975	C.I.P.			74.2				A	A	
Franklin Road	636 – 638	1440	6			1953	Transite			53				A	B	
Friends Cove	1074	350	6			1985	PVC			95				B	A	
Fulton Road	No Map	300	6			1969	PVC			80.6				A	A	
G.A.R. Highway Rt. 6	Map Index #100	2350	16	Brayton Point East		2001	Ductile Iron							A	A	
G.A.R. Highway Rt. 6	1127/F0001	1210	6	Lee's River Ave West	End	1960	Transite			106.45				A	A	
G.A.R. Highway Rt. 6	1127/F0001	3600	10	Lee's River Ave East	Brayton Point Road	1960	Transite			74.85				A	A	
G.A.R. Highway Rt. 6 no main from Brayton Point Road to Riverside Avenue		0				0										No Water Main
Gail Avenue	828	130	6			1986	PVC			72.2						
Garden Avenue	828	170	6			1986	PVC			73				A	A	
Gardner Ave.	253 & 255	300	6	County Street	Dead End	2005	PVC			88.75			X	B	C	
Garfield Street	325 & 331	450	6			1927	C.I.P.			89.25				A	A	
Gay Street	342, 343 & 366	290	6			1927	C.I.P.			100.95			X	A	A	
George Street	850 & 991	590	6			1975	C.I.P.			72.2				A	A	C.I.P. & PVC
Gertrude Street	1022	640	6			1975	Transite			70				A	A	
Gibbs Street	305 & 376	470	1.5	County Street	Florida Ave.	1950	Galvanized			77.8				B	A	10x6 Tee
Gibbs Street	1038	420	6	East of Thomas Drive	#69 Gibbs Street	1975	PVC			92.55				A	A	
Gibbs Street	1132 & 1134	1300	8	Forrestdale Drive	225' East of Thomas Drive	1966	C.I.P.			75				A	A	
Gifford Avenue	9556 & 1013	1400	6			1961	C.I.P.			92				A	A	1961 & 1975
Glendale St. off 6” line on Hot & Cold Lane		350	6			1985	PVC			50.7				A	A	
Grandview Ave.	229	850	6	County Street East	Riverside Avenue	1935	C.I.P.			85.25				A	B	
Grandview Ave.	1181	840	8	County Street West	School	1968	C.I.P.			76.05				A	B	
Grandview Ave.	286	107	1.5	Riverside East	End	1939	Galvanized			100.3				B	B	
Grant Avenue	375	350	6	Buffington St.	Roosevelt Ave	1940	C.I.P.			91.05				A	A	
Grant Avenue	326 & 332	500	6	Washington St.	Pratt Ave	1940	C.I.P.			87.85				A	A	
Gray Street		0				0										No Water Main
Greenwood Road	881, 886 & 890	200	6			1957	Transite			71.5				B	C	
Grove Avenue	355, 356, 617, 618 & 626	1320	6			1927	Transite			91.65				A	A	
Halsey Ave.	File folder of maps, 684A	100	8	Doolittle Ct.	Hodges Ave.	1960	C.I.P.			65				A	A	
Halsey Ave.	File folder of maps	350	6	Hodges Ave.	Leahey Ave.	1997	PVC			63				A	A	
Halsey Ave.	File folder of maps, 684A	230	6	Truman	Reducer (in front of #39 Halsey)	1997	PVC			93.5				A	A	
Halsey Ave.	File folder of maps, 684A	178	8	Doolittle Ct.	Reducer	1998	PVC			89.95				A	A	
Hamilton Street	987	350	6			1975	PVC			106.85			X	A	A	
Hanley Street (16” interconnections)	830	360	2			1963	Galvanized			88.25			X	A	B	

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Harborview Blvd.	830	60	6	Brayton Point Road East		1963	Transite			82				A	A	
Harborview Blvd.	Hanging file	1900	16	Brayton Point Road	Easement	1963	C.I.P.			84.7				A	A	
Harborview Blvd.	Hanging file	1850	16	Through Easement	Francis Street	1963	C.I.P.			84.7				A	A	
Hargraves Avenue	336 – 338	700	6			1940	C.I.P.			84.4				B	A	
Harmon Street	309, 786 & 950	870	6			1955	C.I.P.			79				B	B	1955 & 1961
Harold Ave.	275 & 396	690	1.5			1949	Galvanized			80				B	C	
Harrington Lane	1026, 1161 & 1162	1630	6			1966	C.I.P.			90				A	A	
Harrison Avenue	692 & 716	660	2	Riverside West	Hydrant	1951	Galvanized			89.05				A	B	
Harrison Avenue	752	330	6	County St.	Hydrant	1952	C.I.P.			80.45				A	A	
Hart Street Dighton, MA	502, 503 & 504	1010	12	County St.	Richmond Hill Tank	1927	C.I.P.							A	A	
Harvey Lane	987	450	6			1990	PVC			104.05				A	A	
Hathaway Road	666 & 709	350	2			1948	Galvanized			70.6				A	A	
Haute Drive	990 & 1172	1250	6			1967	C.I.P.			74.5				A	A	1967 & 1975
Hawthorne Street	No Map	450	6			1966	PVC			93.45				A	A	
Hazlehurst Road	656	1120	6			1948	Transite			56				A	B	
Hebb Street	837	200	2			1979	PVC							A	B	
Hemlock Street 6” & 2”	387 & 667	335	6			1949	C.I.P.			75.5				A	A	
Hemlock Street 6” & 2”	387 & 667	122	2			1949	Galvanized			75.5				A	A	
Henri Street	816	700	6			1957	Transite			80				C	C	
Herbert Street	Big Map	630	1.5			1948	Galvanized			88.45				B	A	
Hezichia Street	975 & 995	760	6			1962	Transite			77				A	B	
High Street	408 thru 416, 418 & 424	2100	10			1927	C.I.P.			81				A	A	
Highland Road	727 & 815	1320	6			1951	C.I.P.			97				A	A	1951 & 1957, CIP/Transite
Highview Ave	1143 & 1146	1070	8	Almy Road	Regan Road	1961	C.I.P.			53.95				A	A	1961 1966
Highview Ave	978	2760	8	Eastview Ave.	Regan Road	1961	Transite			68				B	B	
Hillside Avenue	641, 649, 679, 722 & 799	2000	6			1959	Transite			66				A	A	
Hilton Street	996	200	8			1973	C.I.P.			99.85				A	A	
Hinchey Lane	824	1490	6			1958	Transite			53				B	C	
Hodges Avenue	File folder of maps	650	8			1997	PVC			67.9				A	A	
Holiday Circle	996 & 1100	200	2			1973	Galvanized			102.65			X	A	A	
Holly Lane	Big Map & 1013	260	6			1975	C.I.P.			90.25			X	A	A	
Home Street	753 & 1036	650	6			1953	Ductile Iron			101				A	A	
Homer Street	983	450	8			1975	C.I.P.			91.1				A	A	
Homestead Street	1080	760	6			1963	C.I.P.			64				A	A	
Homestead Street	1080	760	2			1963	Galvanized							A	A	
Hood Street	969	430	6	Maple Street	End	1962	C.I.P.			72.35			X	B	A	
Hot & Cold Lane	744	950	6	Tank	Read St.	1953	Transite			50				A	A	
Hot & Cold Lane	940, 942 & 943	150	16	Tank	Tank	1965	C.I.P.							A	A	
Irving Street	702	870	6			1950	C.I.P.			59				A	A	
Island Height Avenue	1186, 1016 & 1017	1300	6			1967	C.I.P.			67				A	A	1967 & 1975
Ivanhoe Avenue	634 & 635	1100	2			1955	Galvanized			60				A	A	
Ivy Avenue		0				0										No Water Main
Jackson Avenue	738 & 758	1500	6			1952	Transite			78.55				A	B	
Jean Avenue	1001	350	6			1975	C.I.P.			76.75				B	B	
John Street	677	400	2			1950	Galvanized			82.85				A	B	
Johnson Street	228 & 238	940	6			1927	C.I.P.			85.15				A	B	
Judy Lane	725	100	2			1951	Galvanized			82.35				A	A	
Kansas Avenue	1113	680	8	Almy Road Loops	Mohawk Road	1966	C.I.P.			60.65				A	A	
Kathleen Avenue	1036	385	6	Home Street East	End	1979	PVC			103.35			X	A	A	Check Lengths
Kathleen Avenue	Big Map	320	2	Home Street West	Randolf Ave	1954	C.I.P.			106.85				A	A	
Kaufman Road	863	2850	6			1955	Transite			60				A	B	
Kay Street	816	820	6			1957	Transite			79.7			X	B	B	
Keene Street	660 & 1105	550	2	O'Neil Road	End	1948	Galvanized			107.8			X	A	B	Carey St. Not Connected, 1948 & 1968
Kelly Drive – 8” with loop back to Montaup St.	1210	672	8			1990	PVC			91.7				A	A	
Ken-Mar Drive	999	1350	6			1975	C.I.P.			90.8				A	A	
Kenneth Avenue	Big Map	2300	12	Home St. East	Through Easment	1986	Ductile Iron							A	A	
Kenneth Avenue	771	1600	2	Home Street West	Randolf Street	1954	Galvanized			106				A	B	East and West of Home St.
King Phillip Avenue	800 – 801	320	6	County Street	Watuppa Ave	1955	C.I.P.			73.9				A	A	
King Street	Bid Map	470	6			1963	C.I.P.			65.6				A	A	
Knapp Street		200	6			1965	C.I.P.			50.95				A	A	
Lacerda Lane	No Main	0				0										No Water Main
Lafayette Street	380, 749, 750, 811, 1019 & 1020	5500	6			1948	Transite			74				C	C	1948 - 1975
Lake Street	456D	1060	6			1992	PVC			86.8				A	A	
Lawton Street	739, 970 & 1122	1380	6			1952	C.I.P.			80.5				A	B	1952 & 1960
Leaf Avenue	1148 – 1150	170	6	Burgess Road	Eagle Lane	1966	C.I.P.			64.2				B	A	
Leahey Avenue	File folder of maps	720	6			1997	PVC			64.85				A	A	
Lee’s River Avenue	Big Map & 851	670	8	G.A.R. Highway	Read Street	1930	C.I.P.			96.1				A	A	
Lee’s River Avenue	987 & 996	3950	8	Wilbur Avenue	G.A.R. Highway	1930	C.I.P.			100				A	A	
Lepes Road	No Map	3240	6			1955	Transite			68				A	B	
Lewis Street	Tie cards	650	6			2007	PVC			55				B	B	
Lilac Avenue	952	450	6			1964	C.I.P.			58.95				A	A	
Lincoln Avenue	327 & 327a	1150	6	Buffington Street	Washington Street	1930	C.I.P.			87				A	A	
Linda Lane 8” x 6” reducer @ end of Clay St.	1211	300	8			1991	Ductile Iron			92.3				A	A	
Linden Drive	806 & 948	880	6			1956	C.I.P.			68.9				A	A	
Locust Street 200’ of 2” PVC to house #38		200	2			1979	PVC							A	A	No Main Services to Both Houses
Longhill Ave.	201 & 219	1840	6	Brayton Ave	Riverside Ave	1946	C.I.P.							A	B	
Longhill Ave.	627	250	2	Riverside Ave	Beach Street	1946	Galvanized			102.1				B	B	
Lonsdale Street off 6” line on Hot & Cold Lane	Book F	300	6			1985	PVC			49.45				A	A	
Lorie Street	1170	370	6			1967	C.I.P.			65.05				A	A	
Lorraine Avenue	287	500	2			1949	Galvanized			58.9				A	A	
Lourdes Road	957	550	6			1964	Transite			51.7				B	C	
Lucy Lane	990	800	6			1975	C.I.P.			72.1				A	A	
Lufkin Avenue	763	240	6	Washington Street	Hydrant	1953	C.I.P.									
Luther Avenue	282 – 284 & 619 & 620	1000	6	County St.	Riverside Ave.	1945	C.I.P.			89.95				A	A	
Luther Avenue	282 – 284 & 619 & 620	1350	8	Prospect St.	County St.	1946	C.I.P.			85				A	A	
Lynch Avenue	No Map	800	8			1970	C.I.P.			57				A	A	

Distribution Pipe Inventory
Somerset MA Water & Sewer Department

Updated: 6/1/2011

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D = Junk

Street Name	Map #	Pipe Segment Length (feet)	Pipe Diameter (inches)	Location From	Location To	Year Installed	Pipe Material	Lined	C-Value	Static Pressure (psi)	Number of Gates	Number Of Hydrants	Dead End	Water Quality Complaints	Break History	Comments
Madison Avenue	1217	164	6	Washington Street	Hydrant	1997	PVC			101.65				A	A	
Main Street	426 – 437	3900	8			2001	Ductile Iron			94				A	A	
Maple Street	969	300	6	Hood Street	High Street	1962	C.I.P.			79				A	A	1983 8/19/62
Maple Street	866	550	6	Seward Street	Hood Street	1983	PVC			76.2				A	A	
Marble Street	347, 348, 364, 623 & 624	1550	6			1943	Transite			91				B	A	
Maria Avenue	645	250	2			1948	C.I.P.			67.2				A	A	
Marigold Avenue	981, 952, 867, 701 & 867	950	6			1950	C.I.P.			63				A	A	
Marsh Street	405	400	8			1963	C.I.P.			96.25				A	B	
Maryland Avenue	1079	1080	8			1965	C.I.P.			56.8				A	A	
Mason Ave.	702	1150	6	Brayton Point Road	Irving	1950	C.I.P.			56.7				A	A	
Mason Ave.	898	340	6	Pleasant View East		1950	C.I.P.			82.65			X	A	A	
Massachusetts Avenue	960	1760	10			1961	Transite			70				B	B	
Massachusetts Avenue	960	450	10			1961	Transite			70				B	B	
Massasoit Street	737	250	2			1952	Galvanized			112.3				A	B	
McArthur Avenue	1046	2100	8			1977	Transite			74				A	A	
McKinley Avenue	321 & 324	250	6			1927	C.I.P.			93.1				A	A	
Meadow Lane	757	470	2			1953	Galvanized			85.85				A	A	
Mellen Street	109, 142 & 822	450	6			1958	Transite			53.9				A	A	
Mercier Avenue	1001	950	6			1975	C.I.P.			80				A	B	
Meribah Street	243 & 245	750	6			1927	C.I.P.			94.25				A	A	C.I.P & Transite
Merton St.	291	440	6	Brayton Point Road	Lewis Street	1949	C.I.P.			52				A	A	
Middle Street		0				0										No Water Main
Midland Road	886	1000	6			1957	Transite			70				B	C	
Miller's Lane	864	280	6	Extension last 280'		1979	PVC							A	A	
Miller's Lane	966	1350	6	Fork in Road	280' from End	1962	C.I.P.							A	A	
Miller's Lane	966	950	10	Whetstone Hill Road	Fork in Road	1962	C.I.P.							A	A	631' of 10" to 6"
Milton Street	Big Map	200	2			1960	Galvanized			99.9				B	B	
Moffitt Avenue	977	740	6			1975	C.I.P.			51.7				A	A	
Mohawk Road	1114	650	8	Almy Road Loops	Kansas Ave	1966	C.I.P.							A	A	
Mohawk Road	1114 & 1115	650	8	Almy Road	Allardice Ave	1966	C.I.P.							A	A	
Mohawk Road	1176	400	6	Narragansett Ave	Mohican Road	1967	C.I.P.							A	A	
Mohawk Road	803 & 817	690	6	Pontiac Road	Wamsutta Road	1956	Transite							A	A	1956 – 1957
Mohawk Road	800 & 1135	1040	6	Watuppa Ave	Pontiac Ave	1956	Transite							A	A	1956 – 1966
Mohican Road	1176	600	6			1978	C.I.P.			55				A	A	
Montaup Street	1210	530	8			1990	PVC			101				A	A	
Morton Avenue	1001	430	6			1975	C.I.P.			79.75				A	B	
Mota Court	1267	440	8			1999	Ductile Iron			55.15				A	A	
Mt. Hope Road	949 & 971	1860	8	County Street	Mohican Road	1960	Transite			70				A	A	
Mt. Vernon Ave.	281 & 814	430	1.5	Read Street	Foley Ave	1957	Galvanized			75.2				B	C	
Myra Drive	File #197	1080	8			1998	Ductile Iron							A	A	
Narragansett Avenue		570	6			1978	C.I.P.			55.85				A	A	
New Hampshire Avenue	1079	1000	8	Almy Road	Regan Road	1965	C.I.P.			59.4				A	A	
New Hampshire Avenue	1091	930	8	Rounsville Ave	Regan Road	1963	C.I.P.			55				A	A	
New Jersey Avenue	1141	1100	8			1966	C.I.P.			55.25				A	A	
New York Avenue	No Map	940	8			1964	C.I.P.			55.9				A	B	
Newhill Ave	217 & 220	1630	6	Brayton Ave	Riverside Ave	1930	C.I.P.			85.05				A	A	
Newhill Ave	Big Map	270	1.5	Riverside Ave East	End	1930	Galvanized			96.6				A	A	
Nora Avenue from Bayview Avenue West 124feet of 6" > 2"	970	120	6	Bayview St	West	1962	C.I.P.			78.45				A	B	
Nora Avenue from Lawton Street East 118 feet of 6" > 2"	970	120	6	Lawton St.	East	1962	C.I.P.			78.4				C	C	
Nora Avenue	970	300	2	End of 6" pipe from Lawton	End of 6" pipe from Bayview	1953	Galvanized			117.8				C	C	
Nora Avenue	754 & 970	600	2	Wilbur Ave	Through Easement	1953	Galvanized			98				C	C	
Norman Avenue	740 & 759	350	2			1952	Galvanized			92				B	B	1952 – 1953
North Street	441 – 446	850	12	County St.	Pleasant St.	1928	C.I.P.			88				A	A	
North Street	No Map	300	6	Pleasant St. East	End	1955	C.I.P.			85				A	A	
O'Neil Road	1096	100	6	Angus St. East	End	1963	C.I.P.			105.75				A	A	
O'Neil Road	130 to 137	1050	8	Brayton Point Road	Farren Street	1930	C.I.P.			103				A	A	
O'Neil Road	137 to 139	500	6	Farren Street	Angus Street	1930	C.I.P.			103				A	A	
Oak Lane	No Map	720	8			1970	C.I.P.			49.6				A	A	
Ocean Boulevard	390	600	6			1949	C.I.P.			102				A	A	
Old Colony Ave.	Tie Cards	400	1	County Street East	End	1949	Galvanized						X	B	A	
Old Colony Ave.	450 & 832	400	6	Main St. East and West		1979	PVC							B	A	Not in Service
Old Colony Ave.	422 & 437	1400	8	Pleasant St. East		1956	C.I.P.			92				B	A	
Old Colony Ave.	968	850	8	Pleasant St. West		1949	Transite							B	A	
Old North Street	No Map	520	6			1965	C.I.P.			71.8				A	A	
Olympic Road	No Map	820	8	Duke Street	End at Cul-de-sac	1997	Ductile Iron			62				A	A	
Olympic Road	No Map	570	6	Folsom Ave	Duke Street	1985	PVC			59.55				A	A	
Orchard Street	378	680	6			1948	Transite			91				B	A	
Oregon Avenue	No Map	280	6			1978	C.I.P.			61.05				A	A	
Owen Avenue two 1" taps	254	250	2			1965	Galvanized			103.15				A	B	
Palmer Street	703	3000	6			1950	C.I.P.			80				A	A	
Park Avenue	1082	400	6			1965	C.I.P.			89.25			X	B	B	
Parsons Lane	970 & 1122	600	6			1960	C.I.P.			80.6				A	B	1960 & 1962, C.I.P. & Transite
Patton Avenue	Big Map	370	1.5			1948	Galvanized			72				A	A	
Patterson Avenue	705, 844 & 845	960	2			1950	Galvanized			80				A	A	
Paul Drive	980 & 1093	400	6			1967	Transite			63.05				A	B	1967 & 1975
Paula Street	1023	640	6			1975	Transite			65				A	A	
Pennsylvania Avenue	1079	1050	10			1965	C.I.P.			57.95				A	A	
Perkins Street	132	680	6	O'Neil Road	End	1952	Transite			106.6			X	A	A	Carey St. not connected
Perron Avenue	717, 941 & 1108	1770	6			1959	Transite			87				A	A	1959 & 1965, Transite & C.I.P.
Perry Avenue	967	630	8			1962	C.I.P.			98.85				B	B	C.I.P. & Transite
Peter Drive	980 & 1093	300	6			1975	Transite			65.15				A	B	
Peterson Street	Tie Cards	230	2			1999	PE Tubing			91.3						
Philip Avenue	Index	260	6			1973	PVC			66.45				A	A	
Picard Lane	Tie cards	200	1			1956	Galvanized			76				A	A	
Pierce Lane		0				0										No Water Main
Pilot Drive	1007, 1008 & 868	1050	6			1975	PVC			98				B	A	

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Street Name	Map #	Pipe Segment Length (feet)	Pipe Diameter (inches)	Location From	Location To	Year Installed	Pipe Material	Lined	C-Value	Static Pressure (psi)	Number of Gates	Number Of Hydrants	Dead End	Water Quality Complaints	Break History	Comments
Pilot Drive Extension	1009 & 1030	400	6			1975	PVC			98				B	A	
Pine Street	663	280	2			1948	Galvanized			63.8				B	C	
Place Avenue	874 & 1169	300	8	Highview	End	1969	C.I.P.			68				A	A	
Pleasant St.	422	320	10	Avon St	Old Colony	1928	C.I.P.			77				A	A	
Pleasant St.	No Map	470	6	Extension	Dighton Line	1952	Transite			100.2				A	A	Extension from North St to Dighton Line
Pleasant St.	776	2000	6	North St.	Extension	1954	C.I.P.			91				A	A	
Pleasant St.	422-441	3200	12	Old Colony	North Street	1928	C.I.P.			78				A	A	
Pleasant View Ave. – 1 ½” from RT. 6 (off)	898 & 1208	820	6			1990	C.I.P.			88				B	B	C.I.P. & PVC
Pocasset Street	797	370	2			1955	Galvanized			110				A	B	
Pocasset Street extension	954	188	2			1961	Galvanized			110				A	B	
Pontiac Road	1136	330	8	Mohawk Road South	End	1966	C.I.P.			65				A	A	
Pontiac Road No water from Mohawk Road to Mt. Hope Road		0				0										No Water Main
Poplar Drive	Tie Cards	300	1	High Street East		1927	Galvanized			97.65				A	A	
Pratt Avenue	301 & 322 – 326	1570	6			1927	C.I.P.			91				A	A	
Prescott Drive	1003 & 1004	1300	6			1975	C.I.P.			79				A	A	
Prospect Street		5730	8			1927	C.I.P.			71				A	B	
Purrington Street	Big Map	500	2			1950	Transite							B	B	
Purrington Street	381, 694 & 695	730	6			1950	Transite			80				B	B	
Queen Street	1018 – 1019	750	6			1975	Transite			78				A	A	
Quental St off 6” line on Hot & Cold Lane	Book F	310	6			1985	PVC			52.2				A	A	
Randall Avenue	No Map	1190	6			1949	PVC			50.85				A	A	
Randolf Avenue	771	230	2			1954	Galvanized			113.3				A	B	
Ranger Road	1002	800	6			1975	C.I.P.			78.2				A	A	
Ray Street	1186	370	6			1967	C.I.P.			76.35				A	A	
Read Street	207, 225 & 226	2600	10	County Street	Prospect Street	1927	C.I.P.			79				A	A	
Read Street	115 to 225	2150	8	Lee's River Ave	Swansea Line	1927	C.I.P.			104				A	A	
Read Street	203, 207 & 246	2800	12	Prospect Street	Read Street Water Tank	1927	C.I.P.			61				A	A	
Read Street	115 to 125	3630	10	Water Tank West	Lee's River Ave	1927	C.I.P.			79				A	A	
Redwood Road	813, 1020 & 1021	350	6			1958	Transite			64.9				A	A	
Regan Road	No Map	2050	8	Chace Street	Vermont Ave	1966	C.I.P.			66				A	B	
Regan Road	No Map	1440	8	Highview Ave	Calvin Ave	1975	C.I.P.			49.5				A	B	
Regan Road		0		Vermont Ave	Highview Ave	0										No Water Main
Regina Avenue	1170 – 1172	1250	6			1967	C.I.P.			73				A	A	
Remington Drive	982	300	8			1975	C.I.P.			84				A	A	
Rhode Island Avenue – Connects to Penn. Avenue	No Map	910	10			1963	C.I.P.			55.1				A	B	
Rice Avenue	150 & 714	1400	6			1951	C.I.P.			75				A	B	
Richmond Road	1002	270	6			1951	C.I.P.			74.4				A	A	
Riley Avenue		1,220	6	Almy Road	Regan Road	1975	C.I.P.			53.6						
Ripley Street	146, 147 & 148	1610	6	East & West of Angus St		1940	C.I.P.			113				A	B	
River Road	Big Map	650	6			1962	Transite			100.65				A	A	
Riverside Ave.	No Map	2250	12	Read St. @ County St.	(Montaup Line)	1927	C.I.P.			102				B	B	Follows Driveway into Power Plant
Riverside Ave.	Big map	17400	8	South St.	End Hydrant @ Brightman St. Bridge	1927	C.I.P.			100.5				B	B	
Riverside Ave.	No Map	2200	16	Park Cemetary	Read Street	1927	C.I.P.							B	B	Cemetary at Slades Ferry Ave
Riverside Ave.	1063	2500	8	Alden Place	Wilbur Ave & Brayton Ave	1978	PVC			104.3				B	B	
Riverside Avenue	Map #907	3770	16	Rt. 6	Read Street	1963	C.I.P.			110.4				B	B	16" lines does not connect to side streets
Riverside Avenue from Brayton Ave. to meter building, through building across Rt. 6 through Slade’s Farm Park back out to Riverside near Slade’s Farm Park Cemetery	904, 905 & 906	1500	16			1953	C.I.P.							B	B	
Roberge Street	826	800	6			1968	PVC			83				A	A	
Robin Lane	1109	670	6			1966	C.I.P.			67.15				A	A	
Rockdale St. off 6” line on Hot & Cold Lane	858	310	6			1985	PVC			49.45				A	A	
Rodney Avenue	961	540	6			1961	Transite			86.75				A	B	
Roland Street	828	180	6			1986	PVC			67						
Ronald Avenue	Big Map	100	2			1952	Galvanized			82				B	B	
Rounsville Avenue only at “tee” @ Mass. Avenue to feed New Hampshire Ave. & Rhode Island Avenue	1091	220	6			1963	C.I.P.			57				A	A	
Russell Avenue		0				0										No Water Main
Rustic Road	1026	900	6			1966	C.I.P.			94.1				A	A	
Saddle Brook Terrace	1218	550	8			1990	PVC			68.55				A	A	
Sagamore St.	384	500	2	County St. East		1948	Galvanized			100.6				A	A	
Samson Avenue	977	670	6			1975	C.I.P.			53.7				A	A	
Sandra Road	1010	320	1.5			1975	Galvanized			81.25				B	A	
Sandy Point Road	765	900	6	Pleasant St. East		1953	Transite			86.25				B	A	
Sandy Point Road Extension	770	200	1.5			1954	Galvanized			95.1				B	A	
Sanford Avenue	377	180	1.5			1930	Galvanized			97.4				A	A	
Sarah Avenue	961	670	6			1961	Transite			89				A	B	
Sargent Street	983	630	8			1975	C.I.P.			89.2				A	A	
Scenic Drive	813, 1020 & 1021	200	6			1958	Transite			59.9				A	A	
School Street	431	520	6	High Street	Main Street	1927	C.I.P.			83.6				A	A	
Sea Crest Avenue	1156	270	6			1966	C.I.P.			95.7				B	B	
Sea View Avenue	1156	260	6			1966	C.I.P.							A	A	
Seaver Street	No Map	500	6			1927	C.I.P.			68				A	A	
Sebastian Street	731	350	2	Marble Street	End	1952	Galvanized			83.5				B	B	
Second Street	264 & 1080	400	6	Brayton Ave	East	1963	C.I.P.			86.95				A	A	
Second Street	264 & 1080	130	1.5	Homestead St	West	1963	Galvanized			83.85				A	A	
Senechal Drive	741 & 1055	550	2			1952	Galvanized			109.85				A	A	
Seward Aveue	No Map	230	6	Maple Street North		1983	Transite			81.3				A	A	
Seward Aveue	1128	220	6	Palmer Street South		1960	Transite			79.7				A	A	
Seymour Avenue	710	890	2			1951	Galvanized			94.5			X	A	A	
Seymour Avenue	779	900	2			1954	Galvanized			94.5			X	A	A	
Shawomet Avenue	File #213	1400	6			1943	Transite			76				D	D	
Shay Avenue	1015	330	6			1967	C.I.P.			55.35				B	A	
Sheraton Avenue	1100	930	6			1973	C.I.P.			104.7				A	A	
Sheraton Avenue	1100	930	8			1973	C.I.P.			104.7				A	A	
Sherman Road	164	1450	6			1928	Transite			61				A	A	

Distribution Pipe Inventory
Somerset MA Water & Sewer Department

Updated: 6/1/2011

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B = Some (some complaints / some breaks)
C = Frequent (frequent complaints / frequent breaks)
D = Junk

Street Name	Map #	Pipe Segment Length (feet)	Pipe Diameter (inches)	Location From	Location To	Year Installed	Pipe Material	Lined	C-Value	Static Pressure (psi)	Number of Gates	Number Of Hydrants	Dead End	Water Quality Complaints	Break History	Comments
Shirley Avenue	974	155	6	Bayview Ave	Hydrant	1962	C.I.P.			79.8				A	B	
Shirley Avenue	974	400	2	Hydrant	End	1962	Galvanized			83				A	B	
Shove Street 1 ½" & 8" (all services should be off 8")	698 & 862	720	8			1950	Galvanized			66.85				A	B	
Simms Avenue 8 x 6 tee plugged	436	380	1			1927	Galvanized			93.35				A	A	
Slade Street	New Map file	820	6			1996	PVC			90.2				A	A	
Slade's Ferry Ave	1043	375	8	Brayton Ave	16" in park	1977	PVC			107.95				B	C	
Slade's Ferry Ave	Big Map, 904, 905 & 906	2900	6	Brayton Ave	16" in park	1949	C.I.P.			95.9				B	B	
Smith Avenue	268 & 269	650	1.5			1968	Galvanized			90.95				B	C	
Snyder Street	No Map	750	8			2000	Ductile Iron			63.35						
South Street	401 – 403	1270	10	County St.	Riverside Ave	1948	C.I.P.			91				A	A	
South Street	405	1600	10	Main Street	Marsh Street	1948	C.I.P.			91				A	A	
South Street	404 & 405	450	12	Marsh Street	Riverside Ave	1948	C.I.P.			99				A	A	
Southway Drive	File folder of maps	280	8			1993	PVC			59.65				A	A	
Sparrow Lane	1109	250	6			1966	C.I.P.			66.3				A	A	
Spruce Street	383 & 862	850	2	Buffington St. South, Shove St.	Hydrant	1948	Galvanized			64.55				B	C	
St. Michael's Avenue	645 & 646	1100	6			1947	Transite							A	B	
Stagecoach Lane	1013	900	6			1975	C.I.P.			90.65				A	A	
Stanley Street	1097	370	6			1964	C.I.P.			106.4				A	A	
Statler Avenue	1100	1000	6			1973	PVC			104				A	A	
Stetson Lane	Tie Cards	200	2			1956	PE Tubing			88.75				A	A	
Stevens St.	1210	340	8	County St.	Montaup St.	1990	PVC			103.15				A	A	
Stevens St.		0		Riverside Ave	County St.	0										No Water Main
Stillwell Court (dead ends)	File folder of maps	100	6			1997	PVC			64.6			X	A	A	
Stoddard Street	1124	460	6	O'Neil Road	End	1960	Transite			107.7			X	A	B	Carey St. not connected
Sullivan Avenue	995 & 1104	1100	8			1964	C.I.P.			82				A	A	
Summer Street	1101	500	8			1964	C.I.P.			51.05				A	A	
Summerfield Avenue	961 & 1088	760	6			1960	Transite			93				A	B	
Sunset Drive	Big Map	640	8			1989	PVC			104.15				A	A	
Susie Street	990	800	6			1975	C.I.P.			70.35				A	A	
Swampscott Road		0				0										No Water Main
Swan Street	1215	450	6			1993	PVC			112.3			X	A	A	
Swazey Street	1186	250	6			1967	C.I.P.			76.95						
Sycamore Terrace	813, 1020 & 1021	500	6			1957	Transite			69.5				A	A	
Taft Avenue	310 , 361 – 363 & 846	1280	6			1931	Transite			78.6				B	B	
Thelma Avenue	389	1020	6	Brayton Ave	Hydrant	1949	Transite			90.05				A	B	
Thelma Avenue	222, 223, 250 & 271	960	6	Hydrant	Riverside Ave	1949	C.I.P.			105.45				A	B	
Third Street	205, 206, 1080 & 1102	590	6			1963	C.I.P.			60.25				A	A	
Thomas Drive	1003 & 1004	680	8	Gibbs Street	Prescott Drive	1975	C.I.P.			77.1				A	A	
Thurber Avenue	166 & 167	1000	6			1931	Transite			82.1				B	B	
Tide Street	1156	250	6			1966	C.I.P.			93.55				A	B	
Tiffany Drive	1019	450	6			1975	Transite			78.7				A	A	
Tina Drive	Big Map	480	6			1984	C.I.P.			74.75				A	A	
Tower Hill Road	986	420	6			1975	C.I.P.			57.4				A	A	
Town Dump		700	6	Brayton Point Road	End	1955	C.I.P.			66.35			X			
Travers Street	628 & 629	390	2			1950	Galvanized			83.95			X	B	B	
Trolley Car Drive	1218	530	8			1990	PVC			79.1				A	A	
Truman Avenue	1107	380	6			1963	C.I.P.			74.35			X	A	A	
Tryan Avenue	1015	340	6			1967	C.I.P.			61.15				A	A	
Tulip Avenue	674 & 867	260	2			1950	Copper			63.6				A	A	
Tyler Avenue	324 & 330	430	6			1950	C.I.P.			90.85				A	A	
Utah Avenue	1113 & 1147	600	8	Almy Road Loops	Allardice Road	1966	C.I.P.			59.85				A	A	
Valley Road	992	980	6			1964	C.I.P.			103				A	B	
Varao Avenue	1016, 1017 & 1186	900	6			1967	C.I.P.			64.85				A	A	1967 & 1975
Velozo Avenue - 1st 334 feet is transite	1075	330	6	Lee's River Ave	East	1952	Transite			107.6				A	A	
Velozo Avenue	1075	220	6	End of transite pipe	End	1999	PVC			111.7				A	A	
Vermont Avenue	960	340	8	Mass Ave	Valve box West of Swanscott Road	1961	Transite			64.2				B	B	
Vermont Avenue	No Map	2270	8	Valve Box	Regan Road	1962	C.I.P.			57.35				B	B	
Vernon Avenue	844	180	6			1980	PVC			79.3				B	A	
Victor Street	795, 1122 & 1183	0	6	from 312' reducer	County St.	1955	Transite			83				B	A	1955 & 1960
Victor Street	759	730	2	Norman West 312'		1953	Galvanized			89.35				B	B	
Vine Street	833 & 1086	930	6			1964	C.I.P.							A	A	
Vine Street	833	930	20			1973	C.I.P.							A	A	
Violet Avenue	952	240	6			1953	C.I.P.			57				A	A	
Wahl St.	391 & 723	200	6	Adams St.	Lewis Ave	1949	C.I.P.			54				A	A	
Wahl St.	955	150	6	Lewis Ave	Tower Hill Road	1961	Transite			57.45				A	A	
Waldorf Road	997 & 1100	250	6			1973	PVC			109.25				A	A	
Walker Street	174	1000	6			1931	C.I.P.			105.2			X	A	B	
Walnut Street	729	300	2			1952	Galvanized						X	B	C	Out of Service
Walnut Street	1180	300	6			1968	C.I.P.			62			X	B	C	
Wamsutta Road	No Map	490	6			1978	C.I.P.			58.4				A	A	
Waring Road	1015	600	6			1967	C.I.P.			63.75				A	A	
Warren Avenue	344, 345 & 365	470	6			1950	C.I.P.			101.95			X	A	A	
Warren Avenue extension	379	300	1.5			1950	Galvanized							B	A	
Washington Avenue	304, 328 & 369	2300	6			1927	C.I.P.			88.5				A	A	
Washington Avenue	328	1650	6	Riverside Ave	County St.	1927	C.I.P.			88.5				A	A	
Water Street	File Folder	500	8			1996	Ductile Iron			88.55				A	A	
Watuppa Avenue	801	630	2	King Philip Ave North	Mt. Hope Rd.	1955	Galvanized			75				B	B	
Watuppa Avenue	1132 & 1135	510	6	King Philip Ave	Gibbs St.	1966	C.I.P.			74.5				B	A	
Watuppa Avenue	960	310	8	Mass Ave	Conn. Ave	1961	C.I.P.			78.2				A	A	C.I.P. & Transite
Wellesley Drive - 6" tied into 20"	1011	1110	6			1975	C.I.P.			64.55				A	A	
West County St. (Corn Road)	No Map	350	6			1960	C.I.P.			89.9				A	A	
Westhill Ave.	201 & 218	1730	8	Brayton Ave	Riverside Ave	1927	C.I.P.			84.2				A	A	
Westhill Ave.	Big Map	300	6	Riverside Ave	Beach St.	1944	C.I.P.			101.45				A	A	
Whetstone Hill Road	951, 966, 966D & 833	4880	10			1975	C.I.P.			62				A	A	
Whetstone Hill Road	Large hanging map	5058	20			1975	C.I.P.			75.75				A	A	
Wilbur Avenue	Tie Cards	500	6	Extension	Hotel on North Side	1982	PVC							A	A	

Distribution Pipe Inventory

Somerset MA Water & Sewer Department

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Street Name	Map #	Pipe Segment Length (feet)	Pipe Diameter (inches)	Location From	Location To	Year Installed	Pipe Material	Lined	C-Value	Static Pressure (psi)	Number of Gates	Number Of Hydrants	Dead End	Water Quality Complaints	Break History	Comments
Wilbur Avenue	See map 1037	2500	16	Alden Place	Riverside & Brayton	1963	C.I.P.			99				A	A	
Wilbur Avenue	168 to 175	3250	8	Brayton Point East	Alden Place	1931	C.I.P.			87.5				A	B	
Wilbur Avenue	1131	400	8	Brayton Point West	Hydrant	1960	Transite			77.9				A	A	
Wilbur Avenue	172	300	8	Francis Street	Alden Place	1963	C.I.P.							A	A	Both Mains on Wilbur
Wilbur Avenue	173	300	16	Francis Street	Alden Place	1963	C.I.P.			96.25				A	A	
Wilbur Avenue	1129	300	8	Home Street East	End	1961	Transite			105.15				A	B	
Wilbur Avenue	1129	0	2	Home Street West, South Side		1961	Galvanized							B	C	
Wilbur Avenue	1129	640	6	Lee's River Ave West, North Side		1961	Transite			110.8				A	B	
Wilbur Avenue	1037	0	2	Summerfield East, North Side		1975	PVC							A	A	
William J. Higgens Road (16” interconnections)	830	260	2			1960	Galvanized			83.35			X	A	A	
Williams Court	1116	260	1.5			1966	Galvanized			72.3			X	A	A	
Williamson Drive	1214	1750	6			1996	PVC			72.65						
Willow Avenue	276 & 277	670	1.5			1930	Galvanized			84.85				B	C	
Wilson Road	775	600	6			1954	C.I.P.			55.1				A	A	
Windmill Lane	1212	530	8			1992	PVC			76				A	A	
Windward Drive	File Map #50	1300	8	Whetstone Hill Road	End @ Cul-de-sac	1995	Ductile Iron			62.95				A	A	
Winslow Avenue	1090	730	6	Adams St.	Brayton Point	1966	C.I.P.			52.9				A	A	
Winslow Avenue	1090	1170	2	Brayton Point	Irving Ave	1966	Transite							A	A	
Winslow Avenue	1090	1170	8	Brayton Point	Irving Ave	1966	C.I.P.			59.2				A	A	
Winslow Avenue	1208	530	8	Pleasant View East		1990	PVC			86.2			X	A	A	
Wood Street	306 – 308, 844 & 1017	2550	6	County Street West	End	1944	C.I.P.			82.5				A	B	C.I.P. & Transite
Wood Street	334 & 335	1400	6	Riverside Ave	County St.	1944	C.I.P.			82.5				A	A	
Woodbine Avenue – Tie card #2198	728	300	2			1951	Copper			60.45				A	A	
Woodland Drive	1135 – 1137	1040	6	Watuppa Ave	Pontiac Road	1966	C.I.P.			71				A	A	
Woodridge Road	1125	450	6			1960	Transite			69.6				B	B	
Wooley Avenue	1186	380	6			1970	C.I.P.			78.1				A	A	
Wordell Road	700	480	2	Prospect St.	Hydrant	1950	Galvanized							A	A	
Wordell Road	709	480	6	Prospect St.	Hydrant	1951	C.I.P.			69.8				A	A	
Yankee Peddler Drive	1213	2550	8			1990	PVC			76				A	A	

APPENDIX G
Water Treatment **Plant** Evaluation **- Section 4**

SECTION 4

RECOMMENDED RENOVATIONS

This Section presents an overview of recommendations on repair, replacement or remediation for each building system to bring the existing spaces into compliance with current codes. In this Section, we examined renovation of the existing treatment facility and equipment in place; and maintaining the use of the existing building.

4.1 RENOVATION OF THE EXISTING TREATMENT FACILITY

Renovations to the existing facility include retaining the existing treatment facility, modernizing and protecting pumping and electrical systems, and bringing the current building envelop into compliance with the current electrical and building codes as necessary. The facility capacity would remain the same.

Based on the renovations proposed under this alternative, upgrading the entire building envelop to meet current code would not be required. A limited fire suppression system will be installed during the conversion to sodium hypochlorite, however a fire suppression system would not be necessary for the presented recommendations since we are not proposing extensive modification or relocation of the hazardous chemicals (Potassium Permanganate, etc.) currently being stored at the facility. However, any existing equipment that requires upgrading would need to be replaced with code compliant new equipment (HVAC, Plumbing, Electrical, etc.).

4.1.1 Process Upgrades

In general, the process equipment in the facility was found to be generally in fair condition and performing adequately. Due to the poor condition of the treatment tank base plates, replacement of the Microfloc units is recommended. Replacement of this system should include media replacement, cleaning and repainting of all process piping. The conversion from chlorine gas to sodium hypochlorite is not included in the planned upgrades as it is currently being designed. A summary of the proposed recommendations for the facility process equipment is presented below:

- Replacement of Microfloc system units
- Replacement of Microfloc media
- Cleaning and painting of Microfloc process piping
- Finished Water Pump Replacement
- Backwash Pump Rehabilitation
- Air Blower Rehabilitation/Replacement
- Filter to Waste Pump Rehabilitation
- Washwater Recovery Pump Replacement
- All process piping surfaces would need to be recoated with paint to remove and reduce surface corrosion.
- Decommission existing unused chemical feed systems.
- Replace Chemical Feed Pumps
- Clean Lagoons
- Adjust operations to maintain a minimum treatment flow rate of 1.0 MGD per filtration unit

4.1.2 Architectural Upgrades

A summary of the proposed renovations for this building are presented below:

- Entryway - Repairs to concrete surfaces and slate at patio
- Loading Dock - Prep and repaint loading dock, install permanent staircase for access
- Caulking – Remove and reinstall caulking in exterior walls
- Exterior Concrete - Prep and repaint exterior concrete surfaces
- Exterior Doors - Prep and repaint exterior doors
- Rollup door - Prep and repaint door and seal at top
- Storefront - Remove and replace the exterior storefront systems
- Floors - Remove VAT and install VCT
    - Remove and replace carpet
    - Fix popped tile in the women’s room
    - Prep and repaint existing painted floors

- Walls - Prep and repaint existing concrete block walls
- Lab - Prep and repaint metal lab casework
- Bathrooms - Replace toilet partitions
- Stairs - Provide a permanent aluminum stair at the loading dock
- Lab/Bathrooms - Rework area of lab and bathrooms and provide updated space
- Insulation - Insulate roof edge with rigid insulation and metal covering
    - Metal stud wall with GWB and sprayfoam on inside of exterior walls
    - Paint on new GWB
    - FRP finish at process areas
- Filter Building Roof - Remove and install new gutters and snow fence
- Filter Building Exterior Doors - Prep and repaint exterior doors
- Filter Building Rollup Door - Prep and repaint door
- Filter Building Insulation - Excavate at perimeter to install insulation and cover
    - Insulate exposed concrete wall
- Garage Steel Structure - Prep and paint visible surfaces of steel structure.
- Garage Wall Panels - Remove existing metal wall panels and replace.
- Garage Roof - Remove and install new gutters and snow fence

4.1.3 Mechanical Systems (HVAC/Plumbing) Upgrades

Recommended HVAC & Plumbing modifications if existing building is to be maintained are as follows:

- Remove insulation throughout the facility which has been determined to contain asbestos and re-insulate with fiberglass pipe insulation and PVC jacketing where appropriate.
- Replace the existing electric controls system.
- Replace all hydronic unit heaters, cabinet heaters, and fan coil units throughout the facility.
- Replace existing rooftop heat pump units. Provide new units with heating capability to provide ventilation air during the heating season. Replace existing air conditioning controls.

- Relocate toilet room exhaust penetration to allow for code required separation from ventilation air intake and modify existing ductwork as necessary.
- Replace existing plumbing fixtures in toilet rooms.
- Replace existing water cooler.
- Provide new intake louver and exhaust fan for ventilation of Storage / Workshop.
- Replace Chemical Storage exhaust fan.
- Provide new combination emergency shower / eyewash units in Chemical Storage and Chemical Room.
- Provide new water heater to provide tempered water to emergency shower / eyewash units.
- Provide new intake louver and exhaust fan for ventilation of Chemical Room.
- Replace exhaust fan and electric unit heater in Control Room.
- Replace boiler with new high efficiency, direct vent, gas-fired boiler.
- Replace boiler room piping and boiler accessories as necessary to accommodate new boiler.
- Replace the Pump Room exhaust fan and associated backdraft damper assembly.
- Replace existing gas fired unit heaters and associated appurtenances in the Filter Building.
- Replace existing wall mounted exhaust fans in the Filter Building.
- Provide new intake louver and exhaust fan for ventilation of Garage.
- Replace existing gas fired unit heater and associated appurtenances in Garage.

4.1.4 Electrical

The electrical distribution equipment is manufactured by Square D Company and appears to be in very good condition. The main electrical service is rated 1200 ampere with a main trip setting of 1200 ampere. This has the capacity of 1200 ampere at 100% continuous operation in order to maintain the proper electrical loading of the facility. The facility staff regularly maintains and tests this equipment and based upon the age and location of this equipment it is in very good condition.

- The current National Electrical Code requirements for arc flash and safety presents a problem regarding the installation and location of existing motor control centers located in the original building. These motor control centers MCC-2 and MCC-3 are in wide open areas and not in dedicated, enclosed spaces which creates a safety issue for personnel and facility staff. In order to properly install and create the necessary dedicated, enclosed spaces considerable expansion and upgrade to already aging buildings and structures would be required. The main electrical/control room is built out to the maximum limit based upon the equipment installation and room size. There is no room for expansion for additional equipment to be installed.

- The existing variable frequency drives (VFD's) and equipment for the finish water pumps and process equipment operations is located within the pump room area of the existing main treatment building. Similar to the motor control center equipment the location of these VFD's in open areas and not within dedicated, enclosed spaces create a safety issue for facility staff. In addition, the installation and operation of these VFD's has been a problem. The reliability and continuous operation of this critical equipment, shutdowns, and failures to the most critical process pumping equipment have impacted the ability to provide water to the Town.
- The original building presently does not have a fire alarm or security system.
- The overall energy efficiency of the original building and operating equipment does not provide for the most efficient overall performance for treating and producing water. The general operation of the facility provides fairly good electrical performance however based upon the standards and criteria set forth for efficiencies this performance falls below those guidelines.
- The electrical distribution equipment within the filter building appears to in good condition. There is limited equipment located in this portion of the facility because of the open building area and the mounting limitations of this space. The open tank design of the filters results in high humidity and condensation which has caused some corrosion. The main power to the larger process equipment loads is located in the main treatment building. There is little to no available space in the connecting corridor to the filter building; therefore, any new electrical conduits and feeders would have to be installed outside and underground and then re-enter into the filter building.
- The electrical work to the garage can be easily updated should additional electrical capacity and requirements become necessary in the future.

- The existing emergency stand-by generator is approximately 23 years old and has been well maintained by the facility staff. The unit has limited operational hours and has served to provide the facility with reliable emergency stand-by power over the years.
- The ability to meet the Town's water demands during emergency (stand-by) periods can be met with the existing generator. Continued regular maintenance and operation of the existing generator would extend the useful life of this equipment.
- The existing outside structures and electrical/instrumentation services and equipment have served to operate and provide the necessary functions to the operation of the treatment facility. There is limited equipment and infrastructure located within these structures. The present installations and operation of these locations and equipment would continue to serve the present and future needs of the facility and the Town.
- For the long term performance and reliability of the electrical equipment it is recommended that the electrical VFD equipment, motor control centers, transformers, etc. be relocated within dedicated, enclosed electrical rooms.

4.1.5 Instrumentation

Based on the state of the instrumentation and control system equipment noted in the section above, recommendations for capital improvements for WTF instrumentation and control system equipment are presented in this section.

- Upgrade the plant PLCs to the CompactLogix platform
  - The SLC 5/05 platform is being phased out by Allen-Bradley. Although it is still supported, pricing reflects the fact that eventually the line would be discontinued. CompactLogix platform components are comparably priced to replacement SLC 5/05 components and offer much more functionality.
- Upgrade the SCADA System hardware and software
  - Both SCADA workstations would be in need of upgrading by the time the plant is overhauled
  - The SCADA HMI software would be in need of upgrading by the time the plant is overhauled

    - Add historian and reporting software for improved reporting and record-keeping capabilities
- Upgrade obsolete and older instrumentation
    - The HACH 1720C turbidity meter is obsolete and should be replaced by the 1720E
    - HACH offers an sc200 two-channel universal transmitter that has newer technology than the HACH sc100 and can reduced the number needed in half
    - Differential-pressure based flow instrumentation requires period calibration and tends not to be as accurate as magnetic flow meters
    - Instruments in service since the 1994 upgrade should be replaced
- Eliminate chart recorders and single loop controllers
    - The functions of the chart recorders can be put into the PLCs and SCADA system
    - The functions of the single loop controllers can be put into the PLCs
- Evaluate the feasibility of radio or cellular communications for the remote sites
    - Leased-line telephone telemetry is an older technology that incurs monthly charges and the phone companies are slowly phasing this technology out
- Eliminate unused chemical feed control panels and put chemical feed control functions in the new PLC control panels

4.1.5.1 General Guidelines for New Instrumentation and Control System Equipment

Recommendations for capital improvements for WTF instrumentation and control system equipment state above include upgrades of all the current control system equipment and much of the instrumentation. In this section, some general guidelines for new instrumentation and control system equipment are presented.

New PLC-based SCADA system control panels would be used to gather monitoring, status and alarm signals from the various process equipment and instruments, and to output control signals to process equipment, enabling the means to control process equipment in either manual or automatic modes. The PLCs should contain configurable logic for automatic control of equipment and for alarm generation. For critical automatic control applications, the PLC’s control logic should be supplemented by hard-wired control logic.

The SCADA system control panels would contain a modular PLC system, such as the recommended Allen-Bradley CompactLogix platform. The modularity allows the incorporation of the right mix of input/output (I/O) modules for the analog and digital signals to/from the equipment and instruments, and the ability for ease of future expansion or modifications. At each control panel, a 10-in diagonal color graphic-screen based OIT would be used to access the monitoring, status, alarm and control information gathered by the PLC and display in a graphical manner for use by the operators, and to enable the operators to manually or automatically control the equipment, as well as view a history of the alarms. A UPS would provide back-up power to the PLC and OIT in the event of a utility power failure. The UPS would be sized to provide back-up power to sustain operation of the equipment for a minimum of 30 minutes.

The SCADA system control panels would contain an Ethernet switch to support the networking of the PLC, OIT and other devices to the SCADA system operator interface. The Ethernet switch would also connect to a front-panel programmer port on the control panel, and to Ethernet network interfaces in vendor-supplied control panels. The Ethernet switch would be supplied back-up power from the UPS.

The SCADA system control panels should be built to meet UL508A standards for control panel construction. A control panel should bear an appropriate NEMA rating for the area in which it is installed. It is anticipated that a control panel installed in an Electrical Room or similar environment would be rated NEMA 12; a control panel located in a process area would be rated either NEMA 4 or NEMA 4X (for corrosion protection).

Instrumentation to monitor various parts of the process should be supplied. Instruments should also bear the appropriate NEMA rating for the area in which they are installed. Transmitters for analog process variables (e.g., level, flow) should have local indication of the process variable.

Process equipment would have a hierarchical control structure: local manual control at the equipment (primarily for maintenance) along with emergency stop (E-Stop) pushbuttons for motors that are readily accessible; manual control at the motor control center (MCC) or variable frequency drive (VFD) for motors (if applicable), or at vendor control panels if local control has been placed in the REMOTE mode; manual or automatic control at the PLC/OIT at the SCADA system control panel only if the local control and MCC/VFD control levels are placed in REMOTE mode. Equipment placed in OFF at the local control level cannot be operated from either the MCC/VFD/Local Control Panel level or the SCADA system control panel level. Equipment placed in OFF at the MCC/VFD/Local Control Panel level cannot be operated from the SCADA system control panel level.

The SCADA system would integrate the process equipment, instrumentation, and control panels to provide equipment monitoring and control, data collection/logging, report generation and alarm handling procedures. The SCADA system would consist of centralized servers (two for redundancy) and human-machine interfaces (HMIs) on desktop personal computers. Network communications equipment would connect the SCADA servers to the PLCs located throughout the plant. The PLCs would contain the logic for automatic control of the plant equipment; the SCADA system enables supervisory control (e.g., changing setpoints). The HMIs would provide graphic-screens for monitoring and controlling plant processes; the HMIs would make available all of the information located at the SCADA system control panel OITs. The SCADA servers would contain an historian for storing operations data, and ancillary software used for report generation and remote alarm annunciation. At least one of the SCADA servers would also function as a workstation for the operators so that other work requiring the use of commonly used office software (e.g., Microsoft Word, Microsoft Excel) can be performed.

It is anticipated that plant operators would desire some level of remote access to the SCADA system to enable monitoring and control of plant process when the operator is not physically at the plant. During final design, it would be determined how best to provide this remote functionality, whether by a laptop PC, a tablet PC, or through a Web-based server running on the SCADA computers. The system would be designed for secure remote access to prevent unauthorized users from gaining access to the data and functionality of the SCADA system.

4.2 COST SUMMARY

Table 4-1 provides a summary of the costs associated with the recommendations for each system analyzed in the treatment facility. The cost estimates include a 25 percent construction contingency and an additional 25 percent for engineering. A cost breakdown for each component can be found in Appendix B.

TABLE 4-1

SUMMARY OF RECOMMENDATIONS ESTIMATED PROBABLE COSTS

DESCRIPTION	COST
General Architectural	$ 1,000,000
General Mechanical	$ 500,000
General Process	$ 3,000,000
General Electrical	$ 1,400,000
General Instrumentation	$ 600,000
TOTAL COST	$6,500,000

Prior to proceeding with any recommended improvements, it is recommended an analysis is completed comparing the costs of renovations and upgrades to the existing facilities and the costs of a new treatment facility. It should be considered that the recommended renovations will not restore the facility to “new” condition and the overall structures will continue to degrade over time. Additionally, the garage would remain as is. It is also recommended that additional analysis is completed when the future of Brayton Point is known. This will impact sizing of the treatment systems as well as the overall footprint of the building. These factors will substantially impact the cost comparison between completing renovations and constructing a new efficient facility. Future maintenance costs were not analyzed as part of this evaluation. As part of the comparison between renovation and new construction, annual operations and maintenance costs should also be considered (e.g. heating, cleaning, electricity, etc.).

Overall, the facility has been very well maintained and the care taken has extended the life of the infrastructure within the facility. A majority of the renovations necessary are due to the revised codes and regulations, and the general aging of the facility.

APPENDIX H
Available Fire Flow

APPENDIX H

Available Fire Flow (gpm)

Hot and Cold Lane Tank HGL =	238	238	238	238
Read Street Tank HGL =	238	238	238	238
WTP =	OFF	ON	OFF	ON
Booster Station =	OFF	ON	OFF	ON
North End Valves =	CLOSED	CLOSED	OPEN	OPEN

Pipe ID	Label	Zone	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Needed	Location
2433	J-1158	Low	0	0	0	0	500	Kenneth
2327	J-1135	Low	10	10	10	10	500	End of Arch St. (1")
3785	J-1426	Richmond Hill	11	12	11	12	500	End of Poplar Rd. (1")
1046	J-608	Richmond Hill	18	18	18	19	500	End of Clark St. (1.5")
622	J-373	High	16	20	20	20	500	End of Bertram St. (1")
1862	J-996	Low	31	32	31	32	500	End of Dias Terrace (2")
1082	J-628	Low	33	34	33	34	500	End of Herbert St. (1.5")
1056	J-613	Low	35	36	35	36	500	End of Williams Ct. (1.5")
2179	J-1100	Low	40	40	40	40	500	End of Grandview Ave (1.5")
1840	J-986	Richmond Hill	40	42	41	43	500	End of Sandra Rd. (1.5")
1946	J-1026	Low	44	44	44	44	500	End of Annette Ave (1.5")
1791	J-966	Low	44	45	44	45	500	End of Sanford Ave (1.5")
1060	J-615	Low	44	46	44	46	500	End of Dumont Ave (2")
2586	J-1176	Low	49	49	49	49	500	End of Crestview Ave (2")
2131	J-1087	Low	53	56	53	56	500	End of Lorraine Ave (2")
3111	J-1266	Richmond Hill	56	59	57	60	500	End of Sandy Point Ave (1.5")
47	J-15	Low	58	60	58	60	500	End of Seymour Ave (2")
2920	J-1211	Low	62	63	62	63	500	End of Ellenwood Ave (2")
2023	J-1051	Low	63	64	63	64	500	End of Judy Ln. (1")
591	J-355	Low	64	65	64	65	500	End of Newhill Ave (2")
2304	J-1130	Low	68	69	68	69	500	End of Meadow Ln. (2")
1810	J-973	Low	69	71	69	71	500	End of Pine St. (2")
2288	J-1126	High	58	74	74	74	500	End of Travers St. (2")
1400	J-794	Low	72	75	73	75	500	End of Woodbine Ave (2")
1063	J-617	Low	79	79	79	79	500	End of Keene St. (2")
1986	J-1039	Low	79	82	79	82	500	End of Cusick Ln. (2")
2173	J-1097	Richmond Hill	86	89	87	90	500	End of Cherry St. (2")
145	J-79	Low	89	91	89	90	500	End of Arch St. (1")
2102	J-1075	Low	89	91	90	90	500	End of Owen Ave (2")
439	J-264	Low	90	91	90	91	500	End of Hanley Road
2015	J-1048	Low	93	94	93	94	500	End of Durfee Ct. (2")
3030	J-1239	Low	98	100	98	100	500	Bend @ Judy Ln. (2")
1381	J-789	Low	100	100	100	100	500	End of Milton Ave (2")
520	J-312	Low	107	110	107	110	500	End of Norman Avenue (2")
767	J-455	Low	111	113	111	113	500	End of Ronald Ave (2")
942	J-551	Low	109	115	110	115	500	End of Stetson Ln. (2")
912	J-533	Low	116	116	115	116	500	End of Holiday Cir. (2")
3836	J-1440	<None>	118	120	118	119	500	End of Del Tom Ln. (2")
3874	J-1454	<None>	112	121	113	122	500	End of Snyder Street (8")
482	J-288	Low	121	123	121	123	500	End of Buckner Ct. (1.5")
1174	J-679	Low	131	132	131	132	500	End of Kathleen Ave (2")
383	J-228	Low	129	133	129	133	500	End of Hathaway Rd. (2")
2952	J-1216	Low	134	134	134	135	500	End of Kenneth Ave (2")
2379	J-1148	Low	150	152	150	152	500	End of Doherty Ave (2")
900	J-526	Low	150	158	151	158	500	End of Picard Ln. (1")
955	J-557	Low	154	158	155	158	500	Patton @ Buckner (2")
846	J-496	Low	159	159	159	159	500	Massasoit @ Pocasset (2")
835	J-490	Low	159	167	159	167	500	End of Allen Ln. (2")
755	J-448	Low	166	167	166	167	500	End of Cox St. (2")
521	J-313	Low	173	178	173	179	500	Norman Ave (2")
3334	J-1328	Low	289	295	292	296	500	Nora Ave (2")
3466	J-1371	Low	327	362	345	382	500	End of Mayes (8")
3467	J-1372	Low	394	425	416	448	500	End of Mayes (8")

APPENDIX H

Available Fire Flow (gpm)

		Hot and Cold Lane Tank HGL =	238	238	238	238		
		Read Street Tank HGL =	238	238	238	238		
		WTP =	OFF	ON	OFF	ON		
		Booster Station =	OFF	ON	OFF	ON		
		North End Valves =	CLOSED	CLOSED	OPEN	OPEN		
3104	J-1263	Low	399	427	420	449	500	End of Fairway Dr. (6")
3471	J-1373	Low	406	436	428	460	500	Snyder @ Mayes (8")
1275	J-734	Low	410	441	434	467	500	Fairway Dr. @ Snyder (8")
3455	J-1367	Low	426	478	456	510	500	End of Millers Ln.
3415	J-1351	Low	479	537	480	537	500	End of Shand Court Circle (6")
3872	J-1453	<None>	167	190	511	573	500	End of Sutherland St. (6")
3368	J-1340	High	362	580	580	580	500	Ferncroft Rd. (6")
1556	J-865	Low	433	502	502	583	500	Fairway Dr. @ Oak Ln. (8")
1615	J-889	Low	462	524	530	600	500	Fairway Dr. @ Country Dr. (8")
722	J-429	High	417	622	622	622	500	Maria @ King (2")
1613	J-888	Low	492	551	564	632	500	Lynch Ave @ Oak Lane (8")
3457	J-1368	Low	498	556	569	633	500	Lynch Ave @ Manchester Ave (8")
301	J-178	Low	499	557	571	636	500	Lynch Ave @ Country Dr. (8")
3178	J-1287	Richmond Hill	143	168	569	658	500	Elm St. (6")
287	J-169	High	297	659	659	659	500	Ferncroft @ Franklin (6")
3181	J-1288	Low	420	485	572	662	500	Elm St. (6")
2265	J-1121	Richmond Hill	253	272	657	691	500	End of Old North Street (6")
3869	J-1452	<None>	181	203	630	702	500	Sutherland St. @ Elm St. (6")
1804	J-970	High	187	711	493	711	500	End of Quental St. (6")
1702	J-925	High	204	714	556	714	500	End of Glendale St. (6")
2284	J-1125	High	101	719	415	719	500	Hot and Cold Ln.
1321	J-759	Low	487	579	617	734	500	Fairway Dr. @ Elm St. (6")
1827	J-980	High	167	758	444	758	500	End of Edmund Street (6")
175	J-98	Richmond Hill	159	185	670	774	750	Old North St. @ Elm St. (6")
1570	J-872	High	252	779	671	779	500	End of Lonsdale St. (6")
3490	J-1380	Richmond Hill	249	268	731	785	500	Elm St. (6")
2373	J-1146	Richmond Hill	323	347	758	791	500	End of Lake St. (6")
3547	J-1398	Richmond Hill	258	278	787	835	500	Elm St. (6")
291	J-172	Richmond Hill	264	284	794	839	500	Elm St. (6")
290	J-171	Richmond Hill	264	284	816	861	500	Elm St. @ North St. (6")
1512	J-844	Richmond Hill	323	347	880	923	500	Lake St. @ North (6")
1583	J-876	High	385	928	881	928	500	End of Rockdale St. (6")
1017	J-592	High	152	938	581	938	500	Hot and Cold Ln. @ Glendale St. (6")
1018	J-593	High	141	1002	507	1002	500	Hot and Cold Ln. @ Quental St. (6")
1025	J-597	High	182	1007	719	1007	500	Hot and Cold Ln. @ Lonsdale St. (6")
1545	J-859	Richmond Hill	428	460	1036	1085	500	End of Water St.
1544	J-858	Richmond Hill	428	460	1071	1122	500	Water Street @ North
1024	J-596	High	285	1263	1000	1263	500	Hot and Cold Ln. @ Rockdale St. (6")
1093	J-634	High	119	1271	450	1271	500	Hot and Cold Ln. @ Edmund St. (6")
3224	J-1297	High	127	1302	444	1302	500	Hot and Cold Ln.
3622	J-1409	<None>	145	1323	450	1323	500	Hot and Cold Ln.

APPENDIX I
Pipe Ranking System

APPENDIX I
PRIORITY/RANKING SYSTEM

Projects are prioritized based on the following criteria:

- Year Installed
- Diameter
- Material
- Remaining Service Life
- Break History
- Pressure
- Available Fire Flow

Each criterion was assigned an importance factor and a score was assigned to each project as follows:

Year Installed (10%)

Water mains were given the following scores based on their year of install.

0 points	=	Installed between 2000 – 2019
25 point	=	Installed between 1980 – 1999
50 points	=	Installed between 1960 - 1979
75 points	=	Installed between 1940-1959
100 points	=	Installed between 1927 – 1939

Diameter (10%)

The diameter of a water main correlates to the importance of the water main, as the larger the diameter, the larger volume of flow that can be conveyed and the population being served. A larger diameter water main represents a larger consequence of failure, and therefore large diameter mains were assigned higher scores than small diameter mains. The water mains were assigned the following values based on diameter:

10 points	=	4-inch diameter or less
30 points	=	6-inch diameter
40 points	=	8-inch diameter
50 points	=	10-inch diameter
70 points	=	12-inch diameter
80 points	=	16-inch diameter
100 points	=	20-inch dimeter

Material (20%)

Water mains have been constructed of various material, and some have proven to be more reliable and durable than other materials. Today the standard water main is constructed of Class 52 cement-lined ductile iron. Water main materials were scored as summarized below:

20 points = Ductile Iron
30 points = PVC/ PE
60 points = Galvanized/ Steel/ Copper
80 points = Cast Iron
100 points = Asbestos Cement / Transite

Remaining Service Life (20%)

The remaining service life was calculated for each water main based on the installation year and pipe material. A 2012 report published by AWWA presented estimated service life for the various water main materials. Wright-Pierce assigned a conservative expected service life based on this report that was used to calculate remaining life. These values are presented in Table XX-1.

TABLE I-1

ESTIMATED SERVICE LIFE FOR DIFFERENT WATER MAIN MATERIALS

Pipe Material	Expected Service Life	AWWA Estimated Service Life*
CI	100	115
DI	100	110
AC	70	85
PVC	100	100
Steel	80	100
RCP/PCCP	80	100

Expected service life of water mains for medium and small utilities in the Northeast ("Buried No Longer: Confronting America's Water Infrastructure Challenge"*, AWWA, 2012)

The score for each water main was determined by subtracting the remaining life of the water main from 100. Therefore, a main with an expected remaining life of 4 years would get a score of 96, and a main with an expected remaining life of 40 years would get a score of 60.

Break History (10%)

Water main break history from 2014-2018 was collected from the Somerset Water Department and was geolocated on the system's distribution system map to identify water mains and areas with a high break rate history. The water mains were given the following scores based on their break rate history:

0 points	=	No breaks
50 points	=	One break
60 points	=	Two breaks
70 points	=	Three breaks
80 points	=	Four breaks
100 points	=	Five or more breaks

<u>Pressure (10%)</u>

The water system model was used to identify static water pressures within the distribution system. The water mains were given the following scores based on their static pressure:

70 points	=	<35 psi
50 points	=	>35 psi and <80 psi
60 points	=	>80 psi
100 points	=	>90 psi

<u>Available Fire Flows (20%)</u>

A minimum fire flow of 500 gpm should be available at every hydrant within the distribution system. From the list of locations that do not meet the 500 gpm requirement, most of these locations are located at the end of dead-end streets and are supplied by small diameter water mains (less than 2-inch). Although these locations do not provide 500 gpm due to the restriction of their small diameter, they do not pose an immediate concern as they are all located within 500 – 1,000 feet of a hydrant capable of providing 500+ gpm. In the event that the fire flow was needed, a fire truck would be able to connect to the nearby hydrant and be supplied with adequate flow.

In addition to the base 500 gpm requirements, there are several locations within Somerset that the Insurance Services Office (ISO) has required specific fire flows above 500 gpm be available due to the location's use classification. Most locations are able to provide the ISO required fire flow when the WTP is on, except for the three following locations:

- Intersection of Lees River Avenue and Harvey Lane
- Intersection of Fatima Drive and Shay Drive
- Intersection of Elm Street and Old North Street

These locations have been included in the identified projects for water main replacement, and each given a score of 100 for fire flows due to their need for modifications to meet the ISO fire flows. All other projects that were not found to need modification to meet fire flows were given a score of 0.

In total 43 projects were identified to be prioritized for replacement. The projects listed in order of priority are included in the following table:

TABLE 5-3

WATER MAIN REPLACEMENT PROJECTS BY PRIOIRTY

Project	Description	Reason	Cost
1	Lees River Avenue approximately 5,090 LF of 8” CI Ocean Boulevard approximately 700 LF of 6” CI Milton Avenue approximately 250 LF of 2” Galvanized Enterprise Drive approximately 400 LF of 2” Galvanized	Old critical water main with restricted fire flows	$1,355,000
2	Buffington Street approximately 4,600 LF of 6” CI Hichney Lane 1,500 LF of 6” AC Fatima Drive 1010 LF of 6” AC Lourdes Road 700 LF of 6” AC Apostle Road 560 LF of 6” AC	Old AC watermain with restricted fire flows	$1,297,000
3	Elm Street replace approximately 5,500 LF of 6” AC with 8” DI	Old AC water main with restricted fire flows	$832,500
4	Read Street approximately 5,800 LF of 10” CI Highland Road 1,400 LF of AC Hot and Cold Lane 1350 LF of 6” CI Travers Street 460 LF of 2” Galvanized Seaver Street 400 LF of 6” CI Bertram Road 160 LF of 1” Galvanized	Old critical water main with restricted fire flows	$1,849,000
5	Riverside Avenue replace approximately 16,000 LF of 8” CI with 12” DI	Old critical water main	$3,700,000
6	County Street? from North Street to FJM Well #2 replace approximately 25,000 LF of 12” CI with 8” DI	Old critical water main/	$4,350,000

		WQ Complaints	
7	Lepes Road approximately 3,050 LF of 6” AC Kaufman Road 2,800 LF of 6” AC Hillside Avenue 1,900 LF of 6” AC Sherman Road 1,430 LF of 6” CI Mellen Avenue 600 LF of 6” AC Bower Street 470 LF of 6” AC Bodwell Street 430 LF of 2” galvanized Blossom Avenue 340 LF of 2” Galvanized	Old AC water mains with high break rate	$1,440,000
8	Chatterton Avenue approximately 1,990 LF of 6” AC Thelma Avenue 1,840 LF of 6” AC Perron Avenue 1,605 LF of 6” AC Riverside Avenue 1,435 LF of 8” CI Owen Avenue 390 LF of 2” Galvanized	Old AC water mains with high break rate	$1,113,000
9	O’Neil Road approximately 1,775 LF of 8” CI Ripley Street 815 LF of 6” CI Angus Street 800 LF of 6” CI Perkins Street 640 LF of 6” AC Massasoit Street 500 LF of 2” Galvanized Keene Street 490 LF of 6” CI Carey Street 455 LF of 6” CI Burrows Street 400 LF of 6” CI Stoddard Street 400 LF of 6” AC Pocasset Street 390 LF of 2” Galvanized Farren Street 360 LF of 6” CI Anawam Street 355 LF of 6” AC	Old water main with history of breaks	$1,092,000

10	Read Street approximately 4,740 LF of 12” CI Meadow Lane 470 LF of 2” Galvanized Doherty Avenue 260 LF of 2” Transite	Old Critical water main (90 + years old)	$1,110,000
11	Pleasant Street approximately 3,600 LF of 12” CI Old Colony Avenue 1,760 LF of 8” CI Sandy Point Avenue 910 LF of 6” AC	Old water main/ WQ complaints	$1,245,000
12	High Street approximately 3,130 LF of 10” CI Cherry Street 950 LF of 6” CI Clark Street 670 LF of 6” CI School Street 500 LF of 6” CI Poplar Road 470 LF of 1” Galvanized Avon Street 410 LF of 6” CI Church Street 390 LF of 6” CI Pleasant Street 160 LF of 10” CI	Old water main/ WQ complaints	$1,100,000
13	Linden Drive approximately 880 LF of 6” AC Hemlock Street 810 LF of 6” CI Birch Street 620 LF of 2” Galvanized West County Street 640 LF of 6” CI Ash Street 490 LF of 6” CI Ash Street 370 LF of 6” CI Pine Street 300 LF of 2” Galvanized Judy Lane 260 LF of 2” Galvanized Lorraine Avenue 400 LF of 2” Galvanized Violet Avenue 245 LF of 6” CI		$700,000
14	Westhill Avenue approximately 3700 LF of 6” CI Riverside Avenue 1,930 LF of 8” CI Newhill Avenue 1,360 LF of 8” CI Longhill Avenue 325 LF of 2” galvanized	Old water main	$1,205,000

15	Wilbur Avenue approximately 3,590 LF of 8" CI Walker Street 1,050 LF of 6" CI Arch Street 490 LF of 1" Galvanized Alden Place 400 LF of 8" CI	Old CI water main	$1,205,000
16	Vermont Avenue approximately 2,140 LF of 8" AC Massachusetts Avenue 2,130 LF of 10" AC Watuppa Avenue 260 LF of 2" Galvanized	Old AC pipe with break history	$800,000
17	Pleasant Street approximately 2520 LF of 6" CI North Street 1,500 LF of 12" CI Carol Street 330 LF of 6" AC	Aging water main	$860,000
18	Mohawk Road approximately 2850 LF of 6" AC Mount Hope Road 2,060 LF of 6" AC Bourn Avenue 1,750 LF of 6" AC Watuppa Avenue 660 LF of 2" Galvanized Eddy Lane 350 LF of 6" AC Eddy Lane 310 LF of 2" Galvanized Stetson Lane 210 LF of 2" Galvanized	Old AC water main	$1,240,000
19	Brayton Avenue approximately 3,360 LF of 8" AC Slades Ferry Avenue 1,130 LF of 6" CI	Old AC water main	$750,000
20	Lafayette Street approximately 4,450 LF of 6" AC Queen Street 815 LF of 6" AC Evans Street 735 LF of 6" CI Henri Street 600 LF of 6" AC Tiffany Drive 570 LF of 6" AC Cypress Road 415 LF of 6" AC Redwood Road 390 LF of 6" AC Kay Street 375 LF of 6" AC Crown Court 245 LF of 6" AC	Old AC and CI Watermain	$1,358,400

	Dumont Avenue 230 LF of 1.5” Galvanized on, and Scenic Drive 200 LF of 6” AC on		
21	Centre Street approximately 1,650 LF of 6” CI Lincoln Avenue 1,110 LF of 6” CI Grant Avenue 1,080 LF of 6” CI Hargreaves Avenue 740 LF of 6” CI Gay Street 440 LF of 6” CI Garfield Avenue 400 LF of 6” CI Tyler Avenue 370 LF of 6” CI Everett Street 300 LF of 1” galvanized Sanford Avenue 300 LF of 1.5” Galvanized McKinley Avenue 240 LF of 6” CI	Old water main with history of water main breaks	$970,000
22	Prospect Street approximately 2850 LF of 8” CI Luther Avenue 1,350 LF of 8” CI Wordell Road 640 LF of 6” CI Berkeley Regional HS 450 LF of 2” Galvanized and 390 LF of 6” CI		$930,000
23	Shawomet Avenue approximately 1,440 LF of 6” AC Marigold Avenue 1,045 LF of 6” CI Buxton Avenue 1,040 LF of 6” AC Spruce Street 920 LF of 2” Galvanized Prospect Street 875 LF of 8” CI Shove Street 710 LF of 8” GALVINIZED Dias Terrace 315 LF of 1.5” Galvanized Bowker Terrace 255 LF of 6” CI	Old water main with history of breaks	$1,015,000
24	Wilbur Avenue approximately 1,120 LF of 8” AC Kathleen Avenue 600 LF of 2” CI Kenneth Avenue 550 LF of 2” Galvanized Randolph Street 240 LF of 2” galvanized	Old AC water main with history of breaks	$721,500

25	Route 6 replace approximately 4,840 LF of 10” AC	Old AC water main	$350,000
26	Palmer Street replace approximately 2,890 LF of 6” CI Borland Avenue 1,420 LF of 6” CI Seward Avenue 530 LF of 6” AC Ranger Street 520 LF of 6” Galvanized Davis Street 370 LF of 6” CI Richmond Street 250 LF of 6” CI	Aging water main	$910,000
27	Prospect Street Replace approximately 1,980 LF of 8” CI Brayton Avenue 1,660 LF of 8” AC Fourth Street 1,260 LF of 6” CI First Street 680 LF of 2” Galvanized Arruda Avenue 450 LF of 6” AC Second Street 140 LF of 1.5” Galvanized		$980,000
28	Grandview Avenue replace approximately 1,350 LF of 6” CI Luther Avenue 1,020 LF of 6” CI Harrison Avenue 980 LF of 6” CI Johnson Street 900 LF of 6” CI Berube Avenue 730 LF of 6” CI Meribah Street 730 LF of 6” CI Gardner Avenue 500 LF of 6” CI Durfee Court 360 LF of 2” Galvanized Annette Avenue 340 LF of 1.5” Galvanized Roland Avenue 180 LF of 2” Galvanized		$980,000
29	Highview Avenue Replace approximately 3,880 LF of 8” AC Eastview Avenue 3,410 LF of 8” AC Clearview Avenue 2,380 LF of 10” AC Connecticut Avenue 1,720 LF of 8” AC Place Avenue 500 LF of 8” PVC		$2,180,000

	Watuppa Avenue 290 LF of 8” CI Rounseville Avenue 230 LF of 6” DI		
30	Purrington Street replace approximately 1,430 LF of 6” AC Taft Street 1,040 LF of 6” CI Banville Street 840 LF of 6” CI Harmon Avenue 830 LF of 6” CI Patterson Street 810 LF of 2” Galvanized		$720,200
31	Midland Road replace approximately 1,060 LF of 6” AC Deer Street 1,010 LF of 6” AC Beverly Street 820 LF of 6” AC Brookside Road 740 LF of 6” AC Gertrude Street 610 LF of 6” AC Paula Street 590 LF of 6” AC Peter Street 510 LF of 6” AC Woodbridge Road 500 LF of 6” AC Briar Road 500 LF of 6” AC Demarco Street 430 LF of 2” galvanized Paul Drive 420 LF of 6” AC Domingos Street 400 LF of 6” AC Brushwood Drive 260 LF of 6” AC Ann Street 250 LF of 6” AC Greenwood Road 250 LF of 6” AC		$1,226,200
32	South Street replace approximately 3,160 LF of 10” CI Clay Street 250 LF of 6” CI		$665,000
33	Mason Avenue replace approximately 1,620 LF of 6” CI Franklin Road 1,500 LF of 6” CI Chateau Drive 1,340 LF of 6” AC Hazelhurst Road 1,040 LF of 6” CI Saint Michaels Avenue 1,025 LF of 6” CI		$1,420,000

	Ferncroft Road 1,020 LF of 6” CI Butternut Road 900 LF of 6” AC Irving Avenue 640 LF of 6” CI Maria Avenue 180 LF of 2” galvanized		
34	Replace approximately 4230 LF of 6” CI on Wood Street, 680 LF of 6” CI on Orchard Street, and 420 LF of 1.5” Galvanized on Herbert Street		$791,300
35	Caroline Avenue replace approximately 1,450 LF of 6” AC MacArthur Avenue 1,380 LF of 8” AC Sullivan Avenue 1,300 LF of 8” CI Betsy B. Avenue 735 LF of 6” AC Hezekiah Street 690 LF of 6” AC Sarah Avenue 670 LF of 6” AC Cornhill Road 595 LF of 6” CI Content Street 565 LF of 6” CI Doolittle Court 520 LF of 8” AC Summerfield Avenue 510 LF of 6” AC Patton Avenue 500 LF of 1.5” Galvanized Rodney Avenue 480 LF of 6” AC Buckner Court 385 LF of 2” Galvanized		$1,550,000
36	Marble Street replace approximately 1,470 LF of 6” CI Grove Avenue 1,340 LF of 6” CI Victor Street 830 LF of 6” AC Seymour Street 680 LF of 2” Galvanized Sebastian Street 610 LF of 2” Galvanized Flores Avenue 570 LF of 2” Galvanized Norman Avenue 540 LF of 2” Galvanized Warren Street 380 LF of 6” CI		$862,400
37	Lawton Street replace approximately 1,420 LF of 6” AC		$900,000

	Jackson Avenue 1,070 LF of 6” CI Rice Avenue 1,050 LF of 6” CI Nora Avenue 850 LF of 2” Galvanized Crestview Avenue 750 LF of 2” Galvanized Parson Lane 620 LF of 6” CI Ellenwood Avenue 480 LF of 2” Galvanized Williams Court 240 LF of 1.5” Galvanized		
38	Harbor View Boulevard replace approximately 1,690 LF of 6” AC Hanley Road 260 LF of 2” Galvanized William J. Higgins Road 250 LF of 2” Galvanized		$315,200
39	Foley Avenue replace approximately 2,300 LF of 6” CI Brayton Avenue 1,410 LF of 8” AC Wilbur Avenue 800 LF of 1.5” Galvanized Smith Avenue 790 LF of 1.5” galvanized Fairview Avenue 780 LF of 6” galvanized Harold Avenue 370 LF of 1.5” Galvanized Boivin Avenue 310 LF of 1.5” Galvanized		$950,000
40	Brayton Point Road replace approximately 10,400 LF of 8” CI		$1,790,000
41	North Street replace approximately 3,690 LF of 6” CI		$554,000
42	Merton Street replace approximately 860 LF of 6” CI Randall Avenue 840 LF of 6” PVC Adams Street 490 LF of 6” CI Hillside Avenue 360 LF of 6” DI Wahl Street 240 LF of 6” CI		$426,000
43	Folsom Avenue Replace approximately 1970 LF of 6” CI Calvin Avenue 1250 LF of 6” CI Denham Avenue 1240 LF of 6” CI Brian Avenue 1220 LF of 8” CI Riley Avenue 1210 LF of 8” CI		$1,380,000

	Regan Road 960 LF of 8” CI Samson Avenue 700 LF of 8” CI		

Somerset IWRMP: Water Main Replacement
Wright-Pierce
June 2019

Pipe Information											Scoring								Project Scoring			
Label	Street_Name	Project Priority	Length (ft)	Diameter (in)	Material	Installation Year	Remaining Service Life	Number of Breaks	Hazen-Williams C	Pressure (psi)	**Pipe Diameter**	**Material**	**Install Year**	**Remaining Life**	**Static Pressure**	**Break History**	**Fire Flow Impact**	**TOTAL**	**Project Length**	**Pipe Segment Percentage of Project**	**Pipe Segment Score**	**Project Total**
P-432	LEES RIVER AVENUE	1	795.54	8	Cast Iron	1930	11	1	65	92.1	70	80	100	89	100	50	100	82.8	6398	12.44%	10.30	72.14
P-280	LEES RIVER AVENUE	1	301.59	8	Cast Iron	1930	11	2	65	81.3	70	80	100	89	60	60	100	80.8	6398	4.71%	3.81	72.14
P-1093	LEES RIVER AVENUE	1	621.29	8	Cast Iron	1930	11	1	65	87.8	70	80	100	89	60	50	100	78.8	6398	9.71%	7.65	72.14
P-1134	LEES RIVER AVENUE	1	674.98	8	Cast Iron	1930	11	1	65	82.7	70	80	100	89	60	50	100	78.8	6398	10.55%	8.31	72.14
P-68	LEE'S RIVER AVENUE	1	1157.83	8	Cast Iron	1930	11		65	92.1	70	80	100	89	100	0	100	72.8	6398	18.10%	13.18	72.14
P-11	LEES RIVER AVENUE	1	44.33	8	Cast Iron	1930	11		65	81.3	70	80	100	89	60	0	100	68.8	6398	0.69%	0.48	72.14
P-200	LEES RIVER AVENUE	1	163.16	8	Cast Iron	1930	11		65	81.4	70	80	100	89	60	0	100	68.8	6398	2.55%	1.75	72.14
P-433	LEES RIVER AVENUE	1	358.64	8	Cast Iron	1930	11		65	83.5	70	80	100	89	60	0	100	68.8	6398	5.61%	3.86	72.14
P-451	LEES RIVER AVENUE	1	392.07	8	Cast Iron	1930	11		65	81.3	70	80	100	89	60	0	100	68.8	6398	6.13%	4.22	72.14
P-77	LEES RIVER AVENUE	1	559.13	8	Cast Iron	1930	11		65	84.6	70	80	100	89	60	0	100	68.8	6398	8.74%	6.01	72.14
P-847	ENTERPRISE DRIVE	1	389.88	2	Galvanized	1949	10	1	80	89.4	10	60	75	90	60	50	100	68.5	6398	6.09%	4.17	72.14
P-347	OCEAN BOULEVARD	1	223.25	6	Cast Iron	1949	30		75	89.4	30	80	75	70	60	0	100	58.5	6398	3.49%	2.04	72.14
P-964	OCEAN BOULEVARD	1	465.03	6	Cast Iron	1949	30		75	86.6	30	80	75	70	60	0	100	58.5	6398	7.27%	4.25	72.14
P-472	MILTON AVENUE	1	250.8	2	Galvanized	1960	21		80	84.6	10	60	50	79	60	0	100	53.8	6398	3.92%	2.11	72.14
P-911	BUFFINGTON STREET	2	433.41	6	Cast Iron	1927	8		75	53.5	30	80	100	92	50	0	100	64.4	8323	5.21%	3.35	68.01
P-1051(2)	BUFFINGTON STREET	2	608.31	8	Cast Iron	1927	8	4	80	65	40	80	100	92	50	80	100	81.4	8323	7.31%	5.95	68.01
P-431	BUFFINGTON STREET	2	240.64	6	Cast Iron	1927	8	3	75	54.5	30	80	100	92	50	70	100	78.4	8323	2.89%	2.27	68.01
P-395	BUFFINGTON STREET	2	234.95	6	Cast Iron	1927	8	1	75	55.4	30	80	100	92	50	50	100	74.4	8323	2.82%	2.10	68.01
P-736	BUFFINGTON STREET	2	326.63	6	Cast Iron	1927	8	1	75	48.6	30	80	100	92	50	50	100	74.4	8323	3.92%	2.92	68.01
P-415	HINCHEY LANE	2	680.56	6	Transite	1958	9	1	120	46.1	30	100	75	91	50	50	100	73.7	8323	8.18%	6.03	68.01
P-674	HINCHEY LANE	2	296.7	6	Transite	1958	9	1	120	45.4	30	100	75	91	50	50	100	73.7	8323	3.56%	2.63	68.01
P-1109	FATIMA DRIVE	2	891.4	6	Transite	1960	11	1	120	46.2	30	100	50	89	50	50	100	70.8	8323	10.71%	7.58	68.01
P-160	BUFFINGTON STREET	2	139.73	8	Cast Iron	1927	8		80	85.3	40	80	100	92	60	0	100	66.4	8323	1.68%	1.11	68.01
P-96	BUFFINGTON STREET	2	105.45	8	Cast Iron	1927	8		80	82.6	40	80	100	92	60	0	100	66.4	8323	1.27%	0.84	68.01
P-1051(1)	BUFFINGTON STREET	2	198.84	8	Cast Iron	1927	8		80	61.3	40	80	100	92	50	0	100	65.4	8323	2.39%	1.56	68.01
P-418	BUFFINGTON STREET	2	239.18	8	Cast Iron	1927	8		80	76.5	40	80	100	92	50	0	100	65.4	8323	2.87%	1.88	68.01
P-224	BUFFINGTON STREET	2	239.01	6	Cast Iron	1927	8		75	85.3	30	80	100	92	60	0	100	65.4	8323	2.87%	1.88	68.01
P-317	BUFFINGTON STREET	2	216.64	6	Cast Iron	1927	8		75	85.3	30	80	100	92	60	0	100	65.4	8323	2.60%	1.70	68.01
P-352	BUFFINGTON STREET	2	223.9	6	Cast Iron	1927	8		75	85.1	30	80	100	92	60	0	100	65.4	8323	2.69%	1.76	68.01
P-47	BUFFINGTON STREET	2	244.88	6	Cast Iron	1927	8		75	82.6	30	80	100	92	60	0	100	65.4	8323	2.94%	1.92	68.01
P-942	BUFFINGTON STREET	2	453.41	6	Cast Iron	1927	8		75	83.9	30	80	100	92	60	0	100	65.4	8323	5.45%	3.56	68.01
P-123	BUFFINGTON STREET	2	122.11	6	Cast Iron	1927	8		75	58.3	30	80	100	92	50	0	100	64.4	8323	1.47%	0.94	68.01
P-289	BUFFINGTON STREET	2	202.68	6	Cast Iron	1927	8		75	52.3	30	80	100	92	50	0	100	64.4	8323	2.44%	1.57	68.01
P-577	BUFFINGTON STREET	2	265.28	6	Cast Iron	1927	8		75	50	30	80	100	92	50	0	100	64.4	8323	3.19%	2.05	68.01
P-91	BUFFINGTON STREET	2	102.61	6	Cast Iron	1927	8		75	56.2	30	80	100	92	50	0	100	64.4	8323	1.23%	0.79	68.01
P-414	HINCHEY LANE	2	150.84	6	Transite	1958	9		120	46.2	30	100	75	91	50	0	100	63.7	8323	1.81%	1.15	68.01
P-744	HINCHEY LANE	2	330.25	6	Transite	1958	9		120	50	30	100	75	91	50	0	100	63.7	8323	3.97%	2.53	68.01
P-112	FATIMA DRIVE	2	116.28	6	Transite	1960	11		120	47.1	30	100	50	89	50	0	100	60.8	8323	1.40%	0.85	68.01
P-412	LOURDES ROAD	2	452.14	6	Transite	1964	15		120	45.2	30	100	50	85	50	0	100	60	8323	5.43%	3.26	68.01
P-413	LOURDES ROAD	2	250.87	6	Transite	1964	15		120	39.7	30	100	50	85	50	0	100	60	8323	3.01%	1.81	68.01
P-1043	APOSTLE ROAD	2	556.11	6	Transite	1965	16		120	45.4	30	100	50	84	50	0	100	59.8	8323	6.68%	4.00	68.01
P-215	ELM STREET	3	57.65	6	Transite	1960	11		120	38.6	30	100	50	89	50	0	100	60.8	5495	1.05%	0.64	64.11
P-405	ELM STREET	3	362.89	6	Transite	1960	11	2	120	60.3	30	100	50	89	50	60	100	72.8	5495	6.60%	4.81	64.11
P-404(2)	ELM STREET	3	1381.95	6	Transite	1960	11	1	120	45.7	30	100	50	89	50	50	100	70.8	5495	25.15%	17.81	64.11
P-214	ELM STREET	3	866.77	6	Transite	1960	11		120	35.5	30	100	50	89	50	0	100	60.8	5495	15.77%	9.59	64.11
P-381	ELM STREET	3	952.48	6	Transite	1960	11		120	44.7	30	100	50	89	50	0	100	60.8	5495	17.33%	10.54	64.11
P-382	ELM STREET	3	324.06	6	Transite	1960	11		120	52.5	30	100	50	89	50	0	100	60.8	5495	5.90%	3.59	64.11
P-404(1)	ELM STREET	3	662.18	6	Transite	1960	11		120	38.7	30	100	50	89	50	0	100	60.8	5495	12.05%	7.33	64.11
P-440	ELM STREET	3	409.74	6	Transite	1960	11		120	64.1	30	100	50	89	50	0	100	60.8	5495	7.46%	4.53	64.11
P-441	ELM STREET	3	384.4	6	Transite	1960	11		120	68.7	30	100	50	89	50	0	100	60.8	5495	7.00%	4.25	64.11
P-71	ELM STREET	3	93.04	6	Transite	1960	11		120	73.1	30	100	50	89	50	0	100	60.8	5495	1.69%	1.03	64.11
P-1102	READ STREET	4	634.81	10	Cast Iron	1927	8	4	80	35.1	50	80	100	92	50	80	100	82.4	11001	5.77%	4.76	59.95
P-644	READ STREET	4	285.55	10	Cast Iron	1927	8	1	80	38.9	50	80	100	92	50	50	100	76.4	11001	2.60%	1.98	59.95
P-1067	SHERMAN ROAD	4	588.23	6	Cast Iron	1928	9	1	75	35.2	30	80	100	91	50	50	100	74.2	11001	5.35%	3.97	59.95
P-1175	SHERMAN ROAD	4	766.87	6	Cast Iron	1928	9	1	75	43.6	30	80	100	91	50	50	100	74.2	11001	6.97%	5.17	59.95
P-296	READ STREET	4	171.46	12	Cast Iron	1927	8		85	26.7	70	80	100	92	70	0	100	70.4	11001	1.56%	1.10	59.95
P-357	HOT AND COLD LANE	4	225.67	6	Cast Iron	1950	31	1	75	26	30	80	75	69	70	50	100	69.3	11001	2.05%	1.42	59.95
P-229	READ STREET	4	450.9	10	Cast Iron	1927	8		80	34.1	50	80	100	92	70	0	100	68.4	11001	4.10%	2.80	59.95
P-527	READ STREET	4	256.32	10	Cast Iron	1927	8		80	43.6	50	80	100	92	50	0	100	66.4	11001	2.33%	1.55	59.95
P-183	BERTRAM STREET	4	155.32	1	Galvanized	1927	-12		80	64.8	10	60	100	112	50	0	100	64.4	11001	1.41%	0.91	59.95
P-226	SEAVER STREET	4	176.14	6	Cast Iron	1927	8		75	48.1	30	80	100	92	50	0	100	64.4	11001	1.60%	1.03	59.95
P-355	SEAVER STREET	4	225.11	6	Cast Iron	1927	8		75	45.9	30	80	100	92	50	0	100	64.4	11001	2.05%	1.32	59.95
P-84	SHERMAN ROAD	4	76.49	6	Cast Iron	1928	9		75	39.9	30	80	100	91	50	0	100	64.2	11001	0.70%	0.45	59.95
P-1036	READ STREET	4	546.62	8	Cast Iron	1927	8	1	80	92.5	40	80	100	92	100	50		60.4	11001	4.97%	3.00	59.95
P-242	HOT AND COLD LANE	4	49.1	6	Cast Iron	1950	31		75	26.3	30	80	75	69	70	0	100	59.3	11001	0.45%	0.26	59.95
P-243	HOT AND COLD LANE	4	122.77	6	Cast Iron	1950	31		75	26.8	30	80	75	69	70	0	100	59.3	11001	1.12%	0.66	59.95
P-326	HOT AND COLD LANE	4	219.76	6	Cast Iron	1950	31		75	25.2	30	80	75	69	70	0	100	59.3	11001	2.00%	1.18	59.95
P-329	HOT AND COLD LANE	4	219.99	6	Cast Iron	1950	31		75	24.6	30	80	75	69	70	0	100	59.3	11001	2.00%	1.19	59.95
P-433	HOT AND COLD LANE	4	241.34	6	Cast Iron	1950	31		75	24.6	30	80	75	69	70	0	100	59.3	11001	2.19%	1.30	59.95
P-591	HOT AND COLD LANE	4	269.94	6	Cast Iron	1950	31		75	26.7	30	80	75	69	70	0	100	59.3	11001	2.45%	1.46	59.95
P-1411	HIGHLAND ROAD	4	1092.29	6	Asbestos Cement	1952	3	2	140	81.7	30	100	75	97	60	60		57.9	11001	9.93%	5.75	59.95
P-1060	READ STREET	4	579.98	8	Cast Iron	1927	8	1	80	82.8	40	80	100	92	60	50		56.4	11001	5.27%	2.97	59.95

Somerset IWRMP: Water Main Replacement
Wright-Pierce
June 2019

Pipe Information											Scoring								Project Scoring			
Label	Street_Name	Project Priority	Length (ft)	Diameter (in)	Material	Installation Year	Remaining Service Life	Number of Breaks	Hazen-Williams C	Pressure (psi)	**Pipe Diameter**	**Material**	**Install Year**	**Remaining Life**	**Static Pressure**	**Break History**	**Fire Flow Impact**	**TOTAL**	**Project Length**	**Pipe Segment Percentage of Project**	**Pipe Segment Score**	**Project Total**
P-256	READ STREET	4	76.12	10	Cast Iron	1927	8	1	80	64.9	50	80	100	92	50	50		56.4	11001	0.69%	0.39	59.95
P-835	READ STREET	4	380.16	8	Cast Iron	1927	8		80	90.2	40	80	100	92	100	0		50.4	11001	3.46%	1.74	59.95
P-685	HIGHLAND ROAD	4	311.25	6	Asbestos Cement	1952	3		140	90.2	30	100	75	97	100	0		49.9	11001	2.83%	1.41	59.95
P-956	TRAVERS STREET	4	460.26	2	Galvanized	1950	11	1	80	62.8	10	60	75	89	50	50		47.3	11001	4.18%	1.98	59.95
P-1308	READ STREET	4	588.8	8	Cast Iron	1927	8		80	82.8	40	80	100	92	60	0		46.4	11001	5.35%	2.48	59.95
P-18	READ STREET	4	55.85	10	Cast Iron	1927	8		80	55.8	50	80	100	92	50	0		46.4	11001	0.51%	0.24	59.95
P-251	READ STREET	4	184.92	10	Cast Iron	1927	8		80	58.6	50	80	100	92	50	0		46.4	11001	1.68%	0.78	59.95
P-263	READ STREET	4	192.49	10	Cast Iron	1927	8		80	64.8	50	80	100	92	50	0		46.4	11001	1.75%	0.81	59.95
P-273	READ STREET	4	196.22	10	Cast Iron	1927	8		80	54.7	50	80	100	92	50	0		46.4	11001	1.78%	0.83	59.95
P-279	READ STREET	4	199.52	10	Cast Iron	1927	8		80	71.6	50	80	100	92	50	0		46.4	11001	1.81%	0.84	59.95
P-303	READ STREET	4	209.2	10	Cast Iron	1927	8		80	61.3	50	80	100	92	50	0		46.4	11001	1.90%	0.88	59.95
P-477	READ STREET	4	111.18	10	Cast Iron	1927	8		80	67.2	50	80	100	92	50	0		46.4	11001	1.01%	0.47	59.95
P-634	READ STREET	4	283.48	10	Cast Iron	1927	8		80	50.5	50	80	100	92	50	0		46.4	11001	2.58%	1.20	59.95
P-860	READ STREET	4	396.52	10	Cast Iron	1927	8		80	76.9	50	80	100	92	50	0		46.4	11001	3.60%	1.67	59.95
P-966	RIVERSIDE AVENUE	5	726.63	8	Cast Iron	1927	8	2	60	94.6	70	80	100	92	100	60		65.4	15874	4.58%	2.99	53.63
P-909	DESMOND AVENUE	5	430.22	6	Cast Iron	1927	8	1	75	90.9	70	80	100	92	100	50		63.4	15874	2.71%	1.72	53.63
P-282	RIVERSIDE AVENUE	5	203.19	8	Cast Iron	1927	8	1	60	90.6	70	80	100	92	100	50		63.4	15874	1.28%	0.81	53.63
P-373	RIVERSIDE AVENUE	5	230.16	8	Cast Iron	1927	8	1	60	93.5	70	80	100	92	100	50		63.4	15874	1.45%	0.92	53.63
P-784	RIVERSIDE AVENUE	5	351.57	8	Cast Iron	1927	8	1	60	91.3	70	80	100	92	100	50		63.4	15874	2.21%	1.40	53.63
P-69	RIVERSIDE AVENUE	5	92.37	8	Cast Iron	1927	8	1	60	87.5	70	80	100	92	60	50		59.4	15874	0.58%	0.35	53.63
P-523	DESMOND AVENUE	5	255.13	6	Cast Iron	1927	8		75	94.4	70	80	100	92	100	0		53.4	15874	1.61%	0.86	53.63
P-1002	RIVERSIDE AVENUE	5	499.12	8	Cast Iron	1927	8		60	98.1	70	80	100	92	100	0		53.4	15874	3.14%	1.68	53.63
P-1022	RIVERSIDE AVENUE	5	522.89	8	Cast Iron	1927	8		60	98.3	70	80	100	92	100	0		53.4	15874	3.29%	1.76	53.63
P-1047	RIVERSIDE AVENUE	5	564.06	8	Cast Iron	1927	8		60	96.5	70	80	100	92	100	0		53.4	15874	3.55%	1.90	53.63
P-1123	RIVERSIDE AVENUE	5	663.21	8	Cast Iron	1927	8		60	97	70	80	100	92	100	0		53.4	15874	4.18%	2.23	53.63
P-1151	RIVERSIDE AVENUE	5	706.91	8	Cast Iron	1927	8		60	98.3	70	80	100	92	100	0		53.4	15874	4.45%	2.38	53.63
P-1152	RIVERSIDE AVENUE	5	788.23	8	Cast Iron	1927	8		60	94.4	70	80	100	92	100	0		53.4	15874	4.97%	2.65	53.63
P-1212	RIVERSIDE AVENUE	5	897.81	8	Cast Iron	1927	8		60	96.6	70	80	100	92	100	0		53.4	15874	5.66%	3.02	53.63
P-1220	RIVERSIDE AVENUE	5	916.51	8	Cast Iron	1927	8		60	91.2	70	80	100	92	100	0		53.4	15874	5.77%	3.08	53.63
P-359	RIVERSIDE AVENUE	5	225.91	8	Cast Iron	1927	8		60	92.4	70	80	100	92	100	0		53.4	15874	1.42%	0.76	53.63
P-396	RIVERSIDE AVENUE	5	310.21	8	Cast Iron	1927	8		60	97.1	70	80	100	92	100	0		53.4	15874	1.95%	1.04	53.63
P-397	RIVERSIDE AVENUE	5	779.25	8	Cast Iron	1927	8		60	98.1	70	80	100	92	100	0		53.4	15874	4.91%	2.62	53.63
P-417	RIVERSIDE AVENUE	5	239.11	8	Cast Iron	1927	8		60	94.3	70	80	100	92	100	0		53.4	15874	1.51%	0.80	53.63
P-519	RIVERSIDE AVENUE	5	253.9	8	Cast Iron	1927	8		60	90.4	70	80	100	92	100	0		53.4	15874	1.60%	0.85	53.63
P-565	RIVERSIDE AVENUE	5	263.36	8	Cast Iron	1927	8		60	98.3	70	80	100	92	100	0		53.4	15874	1.66%	0.89	53.63
P-658	RIVERSIDE AVENUE	5	289.28	8	Cast Iron	1927	8		60	94.8	70	80	100	92	100	0		53.4	15874	1.82%	0.97	53.63
P-773	RIVERSIDE AVENUE	5	348.03	8	Cast Iron	1927	8		60	93.1	70	80	100	92	100	0		53.4	15874	2.19%	1.17	53.63
P-853	RIVERSIDE AVENUE	5	410.63	8	Cast Iron	1927	8		60	91.8	70	80	100	92	100	0		53.4	15874	2.59%	1.38	53.63
P-894	RIVERSIDE AVENUE	5	417.34	8	Cast Iron	1927	8		60	98.3	70	80	100	92	100	0		53.4	15874	2.63%	1.40	53.63
P-936	RIVERSIDE AVENUE	5	450.92	8	Cast Iron	1927	8		60	97	70	80	100	92	100	0		53.4	15874	2.84%	1.52	53.63
P-973	RIVERSIDE AVENUE	5	472.65	8	Cast Iron	1927	8		60	95	70	80	100	92	100	0		53.4	15874	2.98%	1.59	53.63
P-121	RIVERSIDE AVENUE	5	699.67	6	Cast Iron	1927	8		75	82.3	70	80	100	92	60	0		49.4	15874	4.41%	2.18	53.63
P-1261	RIVERSIDE AVENUE	5	1545.85	8	Cast Iron	1927	8		60	85.8	70	80	100	92	60	0		49.4	15874	9.74%	4.81	53.63
P-220	RIVERSIDE AVENUE	5	173.87	8	Cast Iron	1927	8		60	89.6	70	80	100	92	60	0		49.4	15874	1.10%	0.54	53.63
P-254	RIVERSIDE AVENUE	5	185.42	8	Cast Iron	1927	8		60	85.3	70	80	100	92	60	0		49.4	15874	1.17%	0.58	53.63
P-493	RIVERSIDE AVENUE	5	248.95	8	Cast Iron	1927	8		60	86.5	70	80	100	92	60	0		49.4	15874	1.57%	0.77	53.63
P-57	RIVERSIDE AVENUE	5	104.67	8	Cast Iron	1927	8		60	82.3	70	80	100	92	60	0		49.4	15874	0.66%	0.33	53.63
P-67	RIVERSIDE AVENUE	5	90.17	8	Cast Iron	1927	8		60	85.3	70	80	100	92	60	0		49.4	15874	0.57%	0.28	53.63
P-1018	SAGAMORE STREET	5	517.09	2	Galvanized	1948	9		80	90.2	10	60	75	91	100	0		42.7	15874	3.26%	1.39	53.63
P-1246	KAUFMAN ROAD	6	1924.76	6	Transite	1955	6	4	110	32.2	30	100	75	94	70	80		62.3	9706	19.83%	12.35	52.16
P-603	LEPES ROAD	6	272.99	6	Transite	1955	6	2	110	39.4	30	100	75	94	50	60		56.3	9706	2.81%	1.58	52.16
P-1080	HILLSIDE AVENUE	6	599.6	6	Transite	1959	10	2	120	36.3	30	100	75	90	50	60		55.5	9706	6.18%	3.43	52.16
P-1188	KAUFMAN ROAD	6	893.17	6	Transite	1955	6	1	110	38.3	30	100	75	94	50	50		54.3	9706	9.20%	5.00	52.16
P-1161	LEPES ROAD	6	735.08	6	Transite	1955	6	1	110	38.3	30	100	75	94	50	50		54.3	9706	7.57%	4.11	52.16
P-427	LEPES ROAD	6	206.06	6	Transite	1955	6	1	110	49.7	30	100	75	94	50	50		54.3	9706	2.12%	1.15	52.16
P-428	LEPES ROAD	6	939.6	6	Transite	1955	6	1	110	36.3	30	100	75	94	50	50		54.3	9706	9.68%	5.26	52.16
P-1072	MELLEN AVENUE	6	593.73	6	Transite	1958	9	1	120	36.5	30	100	75	91	50	50		53.7	9706	6.12%	3.29	52.16
P-915	BODWELL STREET	6	433.41	2	Galvanized	1950	11	2	80	36.3	10	60	75	89	50	60		49.3	9706	4.47%	2.20	52.16
P-439	HILLSIDE AVENUE	6	241.97	6	Transite	1959	10		120	31.4	30	100	75	90	70	0		45.5	9706	2.49%	1.13	52.16
P-251	LEPES ROAD	6	269.43	6	Transite	1955	6		110	55	30	100	75	94	50	0		44.3	9706	2.78%	1.23	52.16
P-429	LEPES ROAD	6	620.8	6	Transite	1955	6		110	43.7	30	100	75	94	50	0		44.3	9706	6.40%	2.83	52.16
P-392	BOWER STREET	6	234.48	6	Transite	1956	7		120	42	30	100	75	93	50	0		44.1	9706	2.42%	1.07	52.16
P-99	BOWER STREET	6	238.35	6	Transite	1956	7		120	46.7	30	100	75	93	50	0		44.1	9706	2.46%	1.08	52.16
P-249	HILLSIDE AVENUE	6	319.2	6	Transite	1959	10		120	50.7	30	100	75	90	50	0		43.5	9706	3.29%	1.43	52.16
P-402	HILLSIDE AVENUE	6	236.43	6	Transite	1959	10		120	42.2	30	100	75	90	50	0		43.5	9706	2.44%	1.06	52.16
P-419	HILLSIDE AVENUE	6	239.4	6	Transite	1959	10		120	43.3	30	100	75	90	50	0		43.5	9706	2.47%	1.07	52.16
P-408	HILLSIDE AVENUE	6	237.73	6	Transite	1959	10		120	45.3	30	100	75	90	50	0		43.5	9706	2.45%	1.07	52.16
P-100	WAHL STREET	6	134	6	Transite	1961	12		120	35.4	30	100	50	88	50	0		40.6	9706	1.38%	0.56	52.16
P-751	BLOSSOM AVENUE	6	335.46	2	Galvanized	1956	17		80	43.3	10	60	75	83	50	0		36.1	9706	3.46%	1.25	52.16
P-466	RIPLEY STREET	7	246.91	6	Cast Iron	1940	21	4	60	97.3	30	80	75	79	100	80		60.3	7354	3.36%	2.02	51.73
P-727	ANGUS STREET	7	323.86	6	Cast Iron	1927	8	1	60	96	30	80	100	92	100	50		59.4	7354	4.40%	2.62	51.73

Somerset IWRMP: Water Main Replacement
Wright-Pierce
June 2019

Pipe Information											Scoring								Project Scoring			
Label	Street_Name	Project Priority	Length (ft)	Diameter (in)	Material	Installation Year	Remaining Service Life	Number of Breaks	Hazen-Williams C	Pressure (psi)	**Pipe Diameter**	**Material**	**Install Year**	**Remaining Life**	**Static Pressure**	**Break History**	**Fire Flow Impact**	**TOTAL**	**Project Length**	**Pipe Segment Percentage of Project**	**Pipe Segment Score**	**Project Total**
P-354	CAREY STREET	7	224.97	6	Cast Iron	1928	9	1	60	94.6	30	80	100	91	100	50		59.2	7354	3.06%	1.81	51.73
P-12	PERKINS STREET	7	638.53	6	Transite	1952	3	2	120	85.6	30	100	75	97	60	60		57.9	7354	8.68%	5.03	51.73
P-983	KEENE STREET	7	483.25	2	Galvanized	1948	9	3	80	96.8	10	60	75	91	100	70		56.7	7354	6.57%	3.73	51.73
P-805	FARREN STREET	7	362.22	6	Cast Iron	1940	21	2	60	95.3	30	80	75	79	100	60		56.3	7354	4.93%	2.77	51.73
P-80	ONEIL ROAD	7	98.61	6	Cast Iron	1930	11	1	60	87.6	30	80	100	89	60	50		54.8	7354	1.34%	0.73	51.73
P-436	RIPLEY STREET	7	241.71	6	Cast Iron	1940	21	1	60	97.6	30	80	75	79	100	50		54.3	7354	3.29%	1.78	51.73
P-729	RIPLEY STREET	7	324.32	6	Cast Iron	1940	21	1	60	98.6	30	80	75	79	100	50		54.3	7354	4.41%	2.39	51.73
P-1344	MASSASOIT STREET	7	494.99	2	Galvanized	1952	13	1	80	97.5	10	60	75	87	100	50		51.9	7354	6.73%	3.49	51.73
P-15	POCASSET STREET	7	391.93	2	Galvanized	1955	16	1	80	93	10	60	75	84	100	50		51.3	7354	5.33%	2.73	51.73
P-14	ANAWAN STREET	7	355	6	Transite	1953	4		120	97.5	30	100	75	96	100	0		49.7	7354	4.83%	2.40	51.73
P-204	ANGUS STREET	7	167.41	6	Cast Iron	1927	8		60	97.6	30	80	100	92	100	0		49.4	7354	2.28%	1.12	51.73
P-378	ANGUS STREET	7	231.77	6	Cast Iron	1927	8		60	91.7	30	80	100	92	100	0		49.4	7354	3.15%	1.56	51.73
P-39	ANGUS STREET	7	72.9	6	Cast Iron	1927	8		60	93.3	30	80	100	92	100	0		49.4	7354	0.99%	0.49	51.73
P-866	BARROWS STREET	7	399.07	6	Cast Iron	1927	8		60	91.7	30	80	100	92	100	0		49.4	7354	5.43%	2.68	51.73
P-372	CAREY STREET	7	229.76	6	Cast Iron	1928	9		60	95.3	30	80	100	91	100	0		49.2	7354	3.12%	1.54	51.73
P-1010	ONEIL ROAD	7	508.62	8	Cast Iron	1930	11		65	85.6	40	80	100	89	60	0		45.8	7354	6.92%	3.17	51.73
P-406	ONEIL ROAD	7	237.52	8	Cast Iron	1930	11		65	88.7	40	80	100	89	60	0		45.8	7354	3.23%	1.48	51.73
P-495	ONEIL ROAD	7	251.89	8	Cast Iron	1930	11		65	89.2	40	80	100	89	60	0		45.8	7354	3.43%	1.57	51.73
P-701	ONEIL ROAD	7	307.95	8	Cast Iron	1930	11		65	88.1	40	80	100	89	60	0		45.8	7354	4.19%	1.92	51.73
P-854	STODDARD STREET	7	392.63	6	Transite	1960	11		120	95.6	30	100	50	89	100	0		45.8	7354	5.34%	2.45	51.73
P-129	ONEIL ROAD	7	125.08	6	Cast Iron	1930	11		60	87.7	30	80	100	89	60	0		44.8	7354	1.70%	0.76	51.73
P-130	ONEIL ROAD	7	242.78	6	Cast Iron	1930	11		60	86.4	30	80	100	89	60	0		44.8	7354	3.30%	1.48	51.73
P-735	RIVERSIDE AVENUE	8	326.51	8	Cast Iron	1927	8	1	60	97.5	40	80	100	92	100	50		60.4	7250	4.50%	2.72	51.13
P-1290	CHATTERTON AVENUE	8	1985.4	6	Transite	1949	0	2	120	56.3	30	100	75	100	50	60		57.5	7250	27.38%	15.75	51.13
P-322	THELMA AVENUE	8	823.13	6	Cast Iron	1927	8	2	75	76.6	30	80	100	92	50	60		56.4	7250	11.35%	6.40	51.13
P-429	PERRON AVENUE	8	240.3	6	Transite	1959	10	1	120	81.2	30	100	75	90	60	50		54.5	7250	3.31%	1.81	51.13
P-849	RIVERSIDE AVENUE	8	468.69	8	Cast Iron	1927	8		60	92.8	40	80	100	92	100	0		50.4	7250	6.46%	3.26	51.13
P-842	OWEN AVENUE	8	387.14	2	Galvanized	1965	26	3	80	87.9	10	60	50	74	60	70		46.8	7250	5.34%	2.50	51.13
P-181	RIVERSIDE AVENUE	8	251.92	8	Cast Iron	1927	8		60	89.8	40	80	100	92	60	0		46.4	7250	3.47%	1.61	51.13
P-839	RIVERSIDE AVENUE	8	384.36	8	Cast Iron	1927	8		60	87.9	40	80	100	92	60	0		46.4	7250	5.30%	2.46	51.13
P-321	THELMA AVENUE	8	1015.9	6	Transite	1949	0		120	57.1	30	100	75	100	50	0		45.5	7250	14.01%	6.38	51.13
P-808	PERRON AVENUE	8	364.23	6	Transite	1959	10		120	87.4	30	100	75	90	60	0		44.5	7250	5.02%	2.24	51.13
P-398	PERRON AVENUE	8	235.82	6	Transite	1959	10		120	72	30	100	75	90	50	0		43.5	7250	3.25%	1.41	51.13
P-432	PERRON AVENUE	8	241.02	6	Transite	1959	10		120	75.4	30	100	75	90	50	0		43.5	7250	3.32%	1.45	51.13
P-437	PERRON AVENUE	8	241.79	6	Transite	1959	10		120	69.1	30	100	75	90	50	0		43.5	7250	3.33%	1.45	51.13
P-637	PERRON AVENUE	8	283.94	6	Transite	1959	10		120	63.8	30	100	75	90	50	0		43.5	7250	3.92%	1.70	51.13
P-1202	WESTHILL AVENUE	9	1621.16	8	Cast Iron	1927	8	3	80	60.2	40	80	100	92	50	70		59.4	7602	21.33%	12.67	51.12
P-722	RIVERSIDE AVENUE	9	320.39	8	Cast Iron	1927	8	2	60	87.6	40	80	100	92	60	60		58.4	7602	4.21%	2.46	51.12
P-1177	NEWHILL AVENUE	9	1511.04	6	Cast Iron	1930	11	3	75	62.2	30	80	100	89	50	70		57.8	7602	19.88%	11.49	51.12
P-503	RIVERSIDE AVENUE	9	250.35	8	Cast Iron	1927	8	1	60	86.8	40	80	100	92	60	50		56.4	7602	3.29%	1.86	51.12
P-1253	RIVERSIDE AVENUE	9	1106.52	8	Cast Iron	1927	8		60	91	40	80	100	92	100	0		50.4	7602	14.56%	7.34	51.12
P-422	WESTHILL AVENUE	9	510.14	6	Cast Iron	1946	27	2	75	58.7	30	80	75	73	50	60		50.1	7602	6.71%	3.36	51.12
P-506	RIVERSIDE AVENUE	9	250.57	8	Cast Iron	1927	8		60	86.3	40	80	100	92	60	0		46.4	7602	3.30%	1.53	51.12
P-171	NEWHILL AVENUE	9	146.22	1.5	Galvanized	1930	-9		80	86.3	10	60	100	109	60	0		44.8	7602	1.92%	0.86	51.12
P-777	WESTHILL AVENUE	9	349.63	6	Cast Iron	1944	25		75	86.8	30	80	75	75	60	0		39.5	7602	4.60%	1.82	51.12
P-726	LONGHILL AVENUE	9	323.76	2	Galvanized	1946	7		80	87.6	10	60	75	93	60	0		39.1	7602	4.26%	1.67	51.12
P-424	WESTHILL AVENUE	9	678.79	6	Cast Iron	1946	27		65	71	30	80	75	73	50	0		38.1	7602	8.93%	3.40	51.12
P-425	WESTHILL AVENUE	9	533.23	6	Cast Iron	1946	27		65	77.1	30	80	75	73	50	0		38.1	7602	7.01%	2.67	51.12
P-1284	COUNTY STREET	10	1687.8	12	Cast Iron	1927	8	1	85	90.3	40	80	100	92	100	50		60.4	25404	6.64%	4.01	51.06
P-234	COUNTY STREET	10	1325.89	10	Cast Iron	1927	8	1	80	92.5	40	80	100	92	100	50		60.4	25404	5.22%	3.15	51.06
P-294	NORTH STREET	10	270.33	12	Cast Iron	1928	9	1	85	90.3	40	80	100	91	100	50		60.2	25404	1.06%	0.64	51.06
P-460	BROOK STREET	10	1896.23	12	Cast Iron	1927	8		85	95.8	40	80	100	92	100	0		50.4	25404	7.46%	3.76	51.06
P-464	BROOK STREET	10	1728.17	12	Cast Iron	1927	8		85	96.8	40	80	100	92	100	0		50.4	25404	6.80%	3.43	51.06
P-515	CHACE AVENUE	10	841.58	12	Cast iron	1927	8		85	99.6	40	80	100	92	100	0		50.4	25404	3.31%	1.67	51.06
P-30	COUNTY STREET	10	67.05	10	Cast Iron	1927	8		80	93.1	40	80	100	92	100	0		50.4	25404	0.26%	0.13	51.06
P-454	COUNTY STREET	10	6284.31	12	Cast Iron	1927	8		85	96.6	40	80	100	92	100	0		50.4	25404	24.74%	12.47	51.06
P-516	COUNTY STREET	10	3347.98	12	Cast iron	1927	8		85	100.9	40	80	100	92	100	0		50.4	25404	13.18%	6.64	51.06
P-519	COUNTY STREET	10	3905.16	12	Cast iron	1927	8		85	98	40	80	100	92	100	0		50.4	25404	15.37%	7.75	51.06
P-868	COUNTY STREET	10	398.98	10	Cast Iron	1927	8		80	94.4	40	80	100	92	100	0		50.4	25404	1.57%	0.79	51.06
P-514	ELM STREET	10	251.58	12	Cast iron	1927	8		85	95.8	40	80	100	92	100	0		50.4	25404	0.99%	0.50	51.06
P-456(1)	HART STREET	10	994.55	12	Cast Iron	1927	8		85	80	40	80	100	92	60	0		46.4	25404	3.91%	1.82	51.06
P-1227	COUNTY STREET	10	1532.11	10	Cast Iron	1927	8		80	79.1	40	80	100	92	50	0		45.4	25404	6.03%	2.74	51.06
P-399	COUNTY STREET	10	256.74	10	Cast Iron	1927	8		80	76.8	40	80	100	92	50	0		45.4	25404	1.01%	0.46	51.06
P-400	COUNTY STREET	10	615.26	10	Cast Iron	1927	8		80	76.8	40	80	100	92	50	0		45.4	25404	2.42%	1.10	51.06
P-1402	LINDEN DRIVE	11	878.13	6	Cast Iron	1956	37	1	75	58.3	30	80	75	63	50	50	100	66.1	5005	17.55%	11.60	50.75
P-856	LORRAINE AVENUE	11	395.25	2	Galvanized	1949	10		80	52.3	10	60	75	90	50	0	100	57.5	5005	7.90%	4.54	50.75
P-461	VIOLET AVENUE	11	244.74	6	Cast Iron	1953	34		75	51.6	30	80	75	66	50	0	100	56.7	5005	4.89%	2.77	50.75
P-1107	WEST COUNTY STREET	11	641.44	6	Cast Iron	1960	41		75	85.3	30	80	50	59	60	0	100	53.8	5005	12.82%	6.90	50.75
P-692	PINE STREET	11	301.24	2	Galvanized	1948	9	3	80	57.6	10	60	75	91	50	70		51.7	5005	6.02%	3.11	50.75
P-1059	HEMLOCK STREET	11	812.34	6	Cast Iron	1949	30	3	75	61.2	30	80	75	70	50	70		51.5	5005	16.23%	8.36	50.75
P-116	JUDY LANE	11	259.03	2	Galvanized	1951	12	1	80	73.2	10	60	75	88	50	50		47.1	5005	5.18%	2.44	50.75

Somerset IWRMP: Water Main Replacement
Wright-Pierce
June 2019

Pipe Information											Scoring								Project Scoring			
Label	Street_Name	Project Priority	Length (ft)	Diameter (in)	Material	Installation Year	Remaining Service Life	Number of Breaks	Hazen-Williams C	Pressure (psi)	**Pipe Diameter**	**Material**	**Install Year**	**Remaining Life**	**Static Pressure**	**Break History**	**Fire Flow Impact**	**TOTAL**	**Project Length**	**Pipe Segment Percentage of Project**	**Pipe Segment Score**	**Project Total**
P-828	BIRCH STREET	11	373.15	1	Galvanized	1948	9		80	79	10	60	75	91	50	0		37.7	5005	7.46%	2.81	50.75
P-119	CEDAR STREET	11	95.66	6	Cast Iron	1948	29		75	75.1	30	80	75	71	50	0		37.7	5005	1.91%	0.72	50.75
P-118	ASH STREET	11	238.35	6	Cast Iron	1949	30		75	79	30	80	75	70	50	0		37.5	5005	4.76%	1.79	50.75
P-485	ASH STREET	11	247.7	6	Cast Iron	1949	30		75	79	30	80	75	70	50	0		37.5	5005	4.95%	1.86	50.75
P-614	CEDAR STREET	11	276.53	6	Cast Iron	1949	30		75	75.9	30	80	75	70	50	0		37.5	5005	5.53%	2.07	50.75
P-117	BIRCH STREET	11	241.15	2	Galvanized	1951	12		80	77.8	10	60	75	88	50	0		37.1	5005	4.82%	1.79	50.75
P-1245	BUTLER STREET	12	1010.54	6	Cast Iron	1927	8	3	75	73.3	30	80	100	92	50	70		58.4	7523	13.43%	7.84	50.01
P-1239	WILBUR AVENUE	12	966.49	8	Cast Iron	1931	12	2	100	60.2	40	80	100	88	50	60		56.6	7523	12.85%	7.27	50.01
P-576	ALDEN PLACE	12	265.14	8	Cast Iron	1931	12	1	80	81.6	40	80	100	88	60	50		55.6	7523	3.52%	1.96	50.01
P-311	WILBUR AVENUE	12	263.48	8	Cast Iron	1931	12	1	100	60.3	40	80	100	88	50	50		54.6	7523	3.50%	1.91	50.01
P-1241	THURBER AVENUE	12	986.68	6	Cast Iron	1931	12	1	75	73.8	30	80	100	88	50	50		53.6	7523	13.12%	7.03	50.01
P-982	ARCH STREET	12	482.25	1	Galvanized	1951	12	1	80	86	10	60	75	88	60	50		48.1	7523	6.41%	3.08	50.01
P-158	ALDEN PLACE	12	138.04	8	Cast Iron	1931	12		80	84.2	40	80	100	88	60	0		45.6	7523	1.83%	0.84	50.01
P-23	WALKER STREET	12	1052.82	6	Cast Iron	1931	12		75	87.1	30	80	100	88	60	0		44.6	7523	14.00%	6.24	50.01
P-1409	WILBUR AVENUE	12	962.35	8	Cast Iron	1931	12		100	72.5	40	80	100	88	50	0		44.6	7523	12.79%	5.71	50.01
P-312	WILBUR AVENUE	12	290.7	8	Cast Iron	1931	12		100	61.9	40	80	100	88	50	0		44.6	7523	3.86%	1.72	50.01
P-584	WILBUR AVENUE	12	267.51	8	Cast Iron	1931	12		100	67.7	40	80	100	88	50	0		44.6	7523	3.56%	1.59	50.01
P-914	WILBUR AVENUE	12	433.08	8	Cast Iron	1931	12		100	60.6	40	80	100	88	50	0		44.6	7523	5.76%	2.57	50.01
P-89	WILBUR AVENUE	12	403.63	8	Transite	1960	11		120	60.2	40	100	50	89	50	0		41.8	7523	5.37%	2.24	50.01
P-424	READ STREET	13	239.84	12	Cast Iron	1927	8	3	85	33.3	70	80	100	92	70	70		64.4	5462	4.39%	2.83	49.65
P-303	READ STREET TANK EASEMENT	13	33.59	12	Cast Iron	1927	8	2	85	23.9	70	80	100	92	70	60		62.4	5462	0.61%	0.38	49.65
P-950	READ STREET	13	457.09	12	Cast Iron	1927	8	1	85	50.9	70	80	100	92	50	50		58.4	5462	8.37%	4.89	49.65
P-59	READ STREET	13	87.79	10	Cast Iron	1927	8	1	80	82.3	50	80	100	92	60	50		57.4	5462	1.61%	0.92	49.65
P-186	READ STREET	13	156.31	10	Cast Iron	1927	8	1	80	78.6	50	80	100	92	50	50		56.4	5462	2.86%	1.61	49.65
P-1015	DOHERTY AVENUE	13	256.18	2	Transite	1948	-1	1	120	82.3	10	100	75	101	60	50		54.7	5462	4.69%	2.57	49.65
P-230	READ STREET	13	52.78	12	Cast Iron	1927	8		85	23.4	70	80	100	92	70	0		50.4	5462	0.97%	0.49	49.65
P-297	READ STREET	13	81.78	12	Cast Iron	1927	8		85	24.1	70	80	100	92	70	0		50.4	5462	1.50%	0.75	49.65
P-396	READ STREET	13	235.65	12	Cast Iron	1927	8		85	30.1	70	80	100	92	70	0		50.4	5462	4.31%	2.17	49.65
P-976	READ STREET	13	419.84	12	Cast Iron	1927	8		85	23.4	70	80	100	92	70	0		50.4	5462	7.69%	3.87	49.65
P-299	READ STREET TANK EASEMENT	13	107.34	12	Cast Iron	1927	8		85	23.4	70	80	100	92	70	0		50.4	5462	1.97%	0.99	49.65
P-304	READ STREET TANK EASEMENT	13	13.69	12	Cast Iron	1927	8		85	22	70	80	100	92	70	0		50.4	5462	0.25%	0.13	49.65
P-245	READ STREET	13	694.26	12	Cast Iron	1927	8		85	38.1	70	80	100	92	50	0		48.4	5462	12.71%	6.15	49.65
P-480	READ STREET	13	59.9	12	Cast Iron	1927	8		85	51.1	70	80	100	92	50	0		48.4	5462	1.10%	0.53	49.65
P-607	READ STREET	13	273.73	12	Cast Iron	1927	8		85	35.3	70	80	100	92	50	0		48.4	5462	5.01%	2.43	49.65
P-302	READ STREET TANK EASEEMENT	13	34.23	10	Cast Iron	1927	8		80	23.4	50	80	100	92	70	0		48.4	5462	0.63%	0.30	49.65
P-305	READ STREET TANK EASEMENT	13	42.55	10	Cast Iron	1927	8		80	23.4	50	80	100	92	70	0		48.4	5462	0.78%	0.38	49.65
P-184	READ STREET	13	155.37	10	Cast Iron	1927	8		80	84.5	50	80	100	92	60	0		47.4	5462	2.84%	1.35	49.65
P-731	READ STREET	13	326.35	10	Cast Iron	1927	8		80	88.4	50	80	100	92	60	0		47.4	5462	5.98%	2.83	49.65
P-159	READ STREET	13	138.83	10	Cast Iron	1927	8		80	75.6	50	80	100	92	50	0		46.4	5462	2.54%	1.18	49.65
P-210	READ STREET	13	168.66	10	Cast Iron	1927	8		80	72.8	50	80	100	92	50	0		46.4	5462	3.09%	1.43	49.65
P-222	READ STREET	13	174.47	10	Cast Iron	1927	8		80	57	50	80	100	92	50	0		46.4	5462	3.19%	1.48	49.65
P-427	READ STREET	13	240.19	10	Cast Iron	1927	8		80	69.2	50	80	100	92	50	0		46.4	5462	4.40%	2.04	49.65
P-579	READ STREET	13	265.83	10	Cast Iron	1927	8		80	64.7	50	80	100	92	50	0		46.4	5462	4.87%	2.26	49.65
P-625	READ STREET	13	280.19	10	Cast Iron	1927	8		80	60.1	50	80	100	92	50	0		46.4	5462	5.13%	2.38	49.65
P-967	MEADOW LANE	13	465.39	2	Galvanized	1943	4		80	75.6	10	60	75	96	50	0		38.7	5462	8.52%	3.30	49.65
P-1172	PLEASANT STREET	14	751.75	12	Cast Iron	1928	9	1	85	75.6	70	80	100	91	50	50		58.2	6261	12.01%	6.99	49.44
P-905	SANDY POINT AVENUE	14	713.14	6	Transite	1953	4	2	120	75	30	100	75	96	50	60		56.7	6261	11.39%	6.46	49.44
P-1019	OLD COLONY AVENUE	14	518.51	8	Cast Iron	1956	37	2	90	93.6	40	80	75	63	100	60		54.1	6261	8.28%	4.48	49.44
P-1085	PLEASANT STREET	14	605.99	12	Cast Iron	1928	9		85	76.8	70	80	100	91	50	0		48.2	6261	9.68%	4.67	49.44
P-1204	PLEASANT STREET	14	862.38	12	Cast Iron	1928	9		85	74.9	70	80	100	91	50	0		48.2	6261	13.77%	6.64	49.44
P-653	PLEASANT STREET	14	532.06	12	Cast Iron	1928	9		85	75	70	80	100	91	50	0		48.2	6261	8.50%	4.10	49.44
P-741	PLEASANT STREET	14	332.16	12	Cast Iron	1928	9		85	78.9	70	80	100	91	50	0		48.2	6261	5.31%	2.56	49.44
P-1144	OLD COLONY AVENUE	14	697.58	8	Transite	1949	0		120	73.1	40	100	75	100	50	0		46.5	6261	11.14%	5.18	49.44
P-1314	PLEASANT STREET	14	506.68	10	Cast Iron	1928	9		80	74.8	50	80	100	91	50	0		46.2	6261	8.09%	3.74	49.44
P-140	OLD COLONY AVENUE	14	129.47	8	Cast Iron	1956	37		90	90.1	40	80	75	63	100	0		42.1	6261	2.07%	0.87	49.44
P-170	SANDY POINT AVENUE	14	199.54	1.5	Galvanized	1954	15		80	94	10	60	75	85	100	0		41.5	6261	3.19%	1.32	49.44
P-887	OLD COLONY AVENUE	14	411.87	8	Cast Iron	1956	37		90	75.6	40	80	75	63	50	0		37.1	6261	6.58%	2.44	49.44
P-1030	CHERRY STREET	15	537.27	6	Cast Iron	1927	8	3	75	88.7	30	80	100	92	60	70		59.4	6657	8.07%	4.79	48.33
P-321	HIGH STREET	15	217.83	10	Cast Iron	1927	8	1	60	88.7	50	80	100	92	60	50		57.4	6657	3.27%	1.88	48.33
P-997	SCHOOL STREET	15	496.04	6	Cast Iron	1927	8	1	75	78.4	30	80	100	92	50	50		54.4	6657	7.45%	4.05	48.33
P-763	HIGH STREET	15	344.39	10	Cast Iron	1927	8		60	93.8	50	80	100	92	100	0		51.4	6657	5.17%	2.66	48.33
P-1351	POPLAR ROAD	15	472.03	1	Galvanized	1927	-12		80	93.8	10	60	100	112	100	0		49.4	6657	7.09%	3.50	48.33
P-927	HIGH STREET	15	443.64	10	Cast Iron	1927	8		60	83.6	50	80	100	92	60	0		47.4	6657	6.66%	3.16	48.33
P-944	HIGH STREET	15	455.91	10	Cast Iron	1927	8		60	83.1	50	80	100	92	60	0		47.4	6657	6.85%	3.25	48.33
P-1328	HIGH STREET	15	460.42	10	Cast Iron	1927	8		60	78.4	50	80	100	92	50	0		46.4	6657	6.92%	3.21	48.33
P-217	HIGH STREET	15	172.27	10	Cast Iron	1927	8		60	74.3	50	80	100	92	50	0		46.4	6657	2.59%	1.20	48.33
P-259	HIGH STREET	15	187.02	10	Cast Iron	1927	8		60	74.7	50	80	100	92	50	0		46.4	6657	2.81%	1.30	48.33
P-563	HIGH STREET	15	263.46	10	Cast Iron	1927	8		60	74.1	50	80	100	92	50	0		46.4	6657	3.96%	1.84	48.33
P-616	HIGH STREET	15	277.69	10	Cast Iron	1927	8		60	74.9	50	80	100	92	50	0		46.4	6657	4.17%	1.94	48.33
P-688	HIGH STREET	15	299.86	10	Cast Iron	1927	8		60	74.1	50	80	100	92	50	0		46.4	6657	4.50%	2.09	48.33
P-194	PLEASANT STREET	15	158.92	10	Cast Iron	1928	9		80	76	50	80	100	91	50	0		46.2	6657	2.39%	1.10	48.33

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Pipe Information											Scoring								Project Scoring			
Label	Street_Name	Project Priority	Length (ft)	Diameter (in)	Material	Installation Year	Remaining Service Life	Number of Breaks	Hazen-Williams C	Pressure (psi)	**Pipe Diameter**	**Material**	**Install Year**	**Remaining Life**	**Static Pressure**	**Break History**	**Fire Flow Impact**	**TOTAL**	**Project Length**	**Pipe Segment Percentage of Project**	**Pipe Segment Score**	**Project Total**
P-338	CLARK STREET	15	221.6	1	Galvanized	1927	-12		80	88.9	10	60	100	112	60	0		45.4	6657	3.33%	1.51	48.33
P-104	AVON STREET	15	112	6	Cast Iron	1927	8		75	74.3	30	80	100	92	50	0		44.4	6657	1.68%	0.75	48.33
P-668	AVON STREET	15	294.69	6	Cast Iron	1927	8		75	76	30	80	100	92	50	0		44.4	6657	4.43%	1.97	48.33
P-958	CHURCH STREET	15	388.3	6	Cast Iron	1927	8		75	74.7	30	80	100	92	50	0		44.4	6657	5.83%	2.59	48.33
P-931	CLARK STREET	15	445.77	6	Cast Iron	1927	8		75	74.9	30	80	100	92	50	0		44.4	6657	6.70%	2.97	48.33
P-883	CHERRY STREET	15	407.82	2	Galvanized	1952	13		80	97.6	10	60	75	87	100	0		41.9	6657	6.13%	2.57	48.33
P-901	CENTRE STREET	16	426.96	6	Cast Iron	1927	8	5	75	74.9	30	80	100	92	50	100		64.4	6528	6.54%	4.21	48.77
P-913	GAY STREET	16	432.76	6	Cast Iron	1927	8	2	75	90.4	30	80	100	92	100	60		61.4	6528	6.63%	4.07	48.77
P-1209	CENTRE STREET	16	886.34	6	Cast Iron	1927	8	2	75	78.9	30	80	100	92	50	60		56.4	6528	13.58%	7.66	48.77
P-975	LINCOLN AVENUE	16	471.82	6	Cast Iron	1930	11	1	75	80.7	30	80	100	89	60	50		54.8	6528	7.23%	3.96	48.77
P-721	GRANT AVENUE	16	407.72	6	Cast Iron	1940	21	1	75	85.1	30	80	75	79	60	50		50.3	6528	6.25%	3.14	48.77
P-1164	HARGREAVES AVENUE	16	742.64	6	Cast Iron	1940	21	1	75	76.6	30	80	75	79	50	50		49.3	6528	11.38%	5.61	48.77
P-128	EVERETT STREET	16	304.56	1	Galvanized	1950	11	1	80	88.7	10	60	75	89	60	50		48.3	6528	4.67%	2.25	48.77
P-878	GARFIELD AVENUE	16	404.7	6	Cast Iron	1927	8		75	83.7	30	80	100	92	60	0		45.4	6528	6.20%	2.81	48.77
P-385	MCKINLEY AVENUE	16	233.29	6	Cast Iron	1927	8		75	87.6	30	80	100	92	60	0		45.4	6528	3.57%	1.62	48.77
P-440	CENTRE STREET	16	242.54	6	Transite	1950	1		120	75.6	30	100	75	99	50	0		45.3	6528	3.72%	1.68	48.77
P-732	LINCOLN AVENUE	16	640.06	6	Cast Iron	1930	11		75	85.3	30	80	100	89	60	0		44.8	6528	9.80%	4.39	48.77
P-681	SANFORD AVENUE	16	297.79	1.5	Galvanized	1930	-9		80	87.8	10	60	100	109	60	0		44.8	6528	4.56%	2.04	48.77
P-924	GRANT AVENUE	16	442.38	6	Cast Iron	1940	21		75	82.4	30	80	75	79	60	0		40.3	6528	6.78%	2.73	48.77
P-816	TYLER AVENUE	16	367.87	6	Cast Iron	1950	31		75	84.5	30	80	75	69	60	0		38.3	6528	5.64%	2.16	48.77
P-508	GRANT AVENUE	16	226.63	6	PVC	2018	99		150	83.3	30	30	0	1	60	0		12.2	6528	3.47%	0.42	48.77
P-1415	PALMER STREET	17	2004.64	6	Cast Iron	1950	31	3	75	92.5	30	80	75	69	100	70		56.3	5983	33.51%	18.86	48.62
P-1369	BORLAND AVENUE	17	539.97	6	Cast Iron	1927	8	1	75	73.6	30	80	100	92	50	50		54.4	5983	9.03%	4.91	48.62
P-1385	BORLAND AVENUE	17	721.12	6	Cast Iron	1927	8	1	75	71.5	30	80	100	92	50	50		54.4	5983	12.05%	6.56	48.62
P-52	PALMER STREET	17	83.95	6	Cast Iron	1950	31	1	75	77.1	30	80	75	69	50	50		47.3	5983	1.40%	0.66	48.62
P-199	BORLAND AVENUE	17	162.71	6	Cast Iron	1927	8		75	73.6	30	80	100	92	50	0		44.4	5983	2.72%	1.21	48.62
P-832	DAVIS STREET	17	374.95	6	Cast Iron	1927	8		75	74.8	30	80	100	92	50	0		44.4	5983	6.27%	2.78	48.62
P-1016	RANGER ROAD	17	514.77	6	Galvanized	1975	36	2	80	79.1	30	60	50	64	50	60		43.8	5983	8.60%	3.77	48.62
P-180	SEWARD AVENUE	17	285.57	6	Transite	1960	11		120	77.1	30	100	50	89	50	0		40.8	5983	4.77%	1.95	48.62
P-318	PALMER STREET	17	798.33	6	Cast Iron	1950	31		75	74.8	30	80	75	69	50	0		37.3	5983	13.34%	4.98	48.62
P-509	RICHMOND ROAD	17	251.41	6	Cast Iron	1951	32		75	71.5	30	80	75	68	50	0		37.1	5983	4.20%	1.56	48.62
P-181	SEWARD AVENUE	17	245.35	6	Transite	1983	34		120	79	30	100	25	66	50	0		33.7	5983	4.10%	1.38	48.62
P-314	PLEASANT STREET	18	541.32	6	Transite	1952	3	1	120	94.7	30	100	75	97	100	50		59.9	4939	10.96%	6.56	48.60
P-182	PLEASANT STREET	18	1208.73	6	Cast Iron	1954	35	2	75	92.6	30	80	75	65	100	60		53.5	4939	24.47%	13.09	48.60
P-295	NORTH STREET	18	308.98	12	Cast Iron	1928	9		85	86	70	80	100	91	60	0		49.2	4939	6.26%	3.08	48.60
P-994	NORTH STREET	18	491.44	12	Cast Iron	1928	9		85	82.4	70	80	100	91	60	0		49.2	4939	9.95%	4.90	48.60
P-1075	NORTH STREET	18	594.01	12	Cast Iron	1928	9		85	76.7	70	80	100	91	50	0		48.2	4939	12.03%	5.80	48.60
P-168	NORTH STREET	18	703.54	6	Cast Iron	1955	36	1	75	79.5	30	80	75	64	50	50		46.3	4939	14.24%	6.59	48.60
P-327	CAROL STREET	18	326.22	6	Transite	1955	6		120	76.7	30	100	75	94	50	0		44.3	4939	6.60%	2.93	48.60
P-1176	PLEASANT STREET	18	764.98	6	Cast Iron	1954	35		75	79.5	30	80	75	65	50	0		36.5	4939	15.49%	5.65	48.60
P-949	VERMONT AVENUE	19	2136.32	8	Transite	1961	12	2	120	48.1	40	100	50	88	50	60		53.6	4525	47.21%	25.31	48.30
P-855	MASSACHUSETTS AVENUE	19	393.16	10	Transite	1961	12	1	120	67.4	50	100	50	88	50	50		52.6	4525	8.69%	4.57	48.30
P-1207	MASSACHUSETTS AVENUE	19	1352.86	10	Transite	1961	12		120	46.1	50	100	50	88	50	0		42.6	4525	29.90%	12.74	48.30
P-838	MASSACHUSETTS AVENUE	19	384.43	10	Transite	1961	12		120	70.8	50	100	50	88	50	0		42.6	4525	8.50%	3.62	48.30
P-536	WATUPPA AVENUE	19	258.12	2	Galvanized	1955	16		80	68.5	10	60	75	84	50	0		36.3	4525	5.70%	2.07	48.30
P-1315	PROSPECT STREET	20	1034.96	8	Cast Iron	1927	8	5	80	73.7	40	80	100	92	50	100		65.4	5667	18.26%	11.94	48.08
P-455	PROSPECT STREET	20	243.87	8	Cast Iron	1927	8	2	80	60.5	40	80	100	92	50	60		57.4	5667	4.30%	2.47	48.08
P-284	LUTHER AVENUE	20	367.29	8	Cast Iron	1945	26	2	80	63.7	40	80	75	74	50	60		51.3	5667	6.48%	3.32	48.08
P-1136	LUTHER AVENUE	20	682.9	8	Cast Iron	1945	26	1	80	64.1	40	80	75	74	50	50		49.3	5667	12.05%	5.94	48.08
P-1127	PROSPECT STREET	20	962.68	8	Cast Iron	1927	8		80	78.6	40	80	100	92	50	0		45.4	5667	16.99%	7.71	48.08
P-32	PROSPECT STREET	20	236.39	8	Cast Iron	1927	8		80	62.2	40	80	100	92	50	0		45.4	5667	4.17%	1.89	48.08
P-826	PROSPECT STREET	20	372.83	8	Cast Iron	1927	8		80	64.1	40	80	100	92	50	0		45.4	5667	6.58%	2.99	48.08
P-285	LUTHER AVENUE	20	297.28	8	Cast Iron	1945	26		80	67.3	40	80	75	74	50	0		39.3	5667	5.25%	2.06	48.08
P-286	TO HIGH SCHOOL	20	387	6	Cast Iron	1945	26		75	67.3	30	80	75	74	50	0		38.3	5667	6.83%	2.62	48.08
P-102	HATHAWAY ROAD	20	110.08	2	Galvanized	1948	9		80	63	10	60	75	91	50	0		37.7	5667	1.94%	0.73	48.08
P-750	HATHAWAY ROAD	20	335.52	2	Galvanized	1948	9		80	63.7	10	60	75	91	50	0		37.7	5667	5.92%	2.23	48.08
P-1105	WORDELL ROAD	20	636.1	6	Cast Iron	1951	32		75	62.2	30	80	75	68	50	0		37.1	5667	11.22%	4.16	48.08
P-1347	SHAWOMET AVENUE	21	888.01	6	Transite	1943	-6	4	120	59.9	30	100	75	106	50	80		62.7	6843	12.98%	8.14	47.34
P-1391	BUXTON AVENUE	21	1040.17	6	Transite	1943	-6	3	120	68.8	30	100	75	106	50	70		60.7	6843	15.20%	9.23	47.34
P-990	SHOVE STREET	21	488.13	8	Galvanized	1950	11	1	80	59.7	40	60	75	89	50	50		50.3	6843	7.13%	3.59	47.34
P-526	MARIGOLD AVENUE	21	255.93	6	Cast Iron	1950	31	1	75	59.1	30	80	75	69	50	50		47.3	6843	3.74%	1.77	47.34
P-1040	SHAWOMET AVENUE	21	551.59	6	Transite	1943	-6		120	68.8	30	100	75	106	50	0		46.7	6843	8.06%	3.76	47.34
P-348	PROSPECT STREET	21	223.17	8	Cast Iron	1927	8		80	61.4	40	80	100	92	50	0		45.4	6843	3.26%	1.48	47.34
P-610	PROSPECT STREET	21	275.18	8	Cast Iron	1927	8		80	61.2	40	80	100	92	50	0		45.4	6843	4.02%	1.83	47.34
P-831	PROSPECT STREET	21	374.74	8	Cast Iron	1927	8		80	59.9	40	80	100	92	50	0		45.4	6843	5.48%	2.49	47.34
P-115	SHOVE STREET	21	222.08	8	Galvanized	1950	11		80	57.9	40	60	75	89	50	0		40.3	6843	3.25%	1.31	47.34
P-1021	SPRUCE STREET	21	917.68	2	Galvanized	1948	9		80	59.7	10	60	75	91	50	0		37.7	6843	13.41%	5.06	47.34
P-110	MARIGOLD AVENUE	21	211.66	6	Cast Iron	1950	31		75	52.9	30	80	75	69	50	0		37.3	6843	3.09%	1.15	47.34
P-612	MARIGOLD AVENUE	21	275.95	6	Cast Iron	1950	31		75	55.8	30	80	75	69	50	0		37.3	6843	4.03%	1.50	47.34
P-689	MARIGOLD AVENUE	21	301.54	6	Cast Iron	1950	31		75	61.8	30	80	75	69	50	0		37.3	6843	4.41%	1.64	47.34
P-486	WOODBINE AVENUE	21	247.85	2	Copper	1951	12		80	54.2	10	60	75	88	50	0		37.1	6843	3.62%	1.34	47.34

Somerset IWRMP: Water Main Replacement
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Pipe Information											Scoring								Project Scoring			
Label	Street_Name	Project Priority	Length (ft)	Diameter (in)	Material	Installation Year	Remaining Service Life	Number of Breaks	Hazen-Williams C	Pressure (psi)	Pipe Diameter	Material	Install Year	Remaining Life	Static Pressure	Break History	Fire Flow Impact	TOTAL	Project Length	Pipe Segment Percentage of Project	Pipe Segment Score	Project Total
P-520	BOWKER TERRACE	21	254.28	6	Cast Iron	1952	33		75	72.7	30	80	75	67	50	0		36.9	6843	3.72%	1.37	47.34
P-713	DIAS TERRACE	21	315.27	1.5	Galvanized	1954	15		80	58.2	10	60	75	85	50	0		36.5	6843	4.61%	1.68	47.34
P-621	WILBUR AVENUE	22	429.35	8	Transite	1961	12	3	120	92.1	40	100	50	88	100	70		60.6	2498	17.18%	10.41	46.75
P-61	KENNETH AVENUE	22	549.45	2	Galvanized	1954	15	1	80	86.9	10	60	75	85	60	50		47.5	2498	21.99%	10.45	46.75
P-1390	WILBUR AVENUE	22	685.77	6	Transite	1961	12		120	98.8	30	100	50	88	100	0		45.6	2498	27.45%	12.52	46.75
P-62	RANDOLF STREET	22	237.01	2	Galvanized	1954	15		80	98.7	10	60	75	85	100	0		41.5	2498	9.49%	3.94	46.75
P-1077	KATHLEEN AVENUE	22	596.9	2	Cast Iron	1954	35		80	97	10	80	75	65	100	0		39.5	2498	23.89%	9.44	46.75
P-535	BRAYTON AVENUE	23	258.1	8	Transite	1960	11	2	120	60.2	40	100	50	89	50	60		53.8	4479	5.76%	3.10	46.45
P-449	BRAYTON AVENUE	23	580.71	8	Transite	1960	11	1	120	86.1	40	100	50	89	60	50		52.8	4479	12.97%	6.85	46.45
P-143	BRAYTON AVENUE	23	129.94	8	Transite	1960	11	1	120	60.4	40	100	50	89	50	50		51.8	4479	2.90%	1.50	46.45
P-345	SLADES FERRY AVENUE	23	1123.55	6	Cast Iron	1949	30	1	75	88.8	30	80	75	70	60	50		48.5	4479	25.09%	12.17	46.45
P-448	BRAYTON AVENUE	23	500.92	8	Transite	1960	11		120	95.9	40	100	50	89	100	0		46.8	4479	11.18%	5.23	46.45
P-146	BRAYTON AVENUE	23	130.86	8	Transite	1960	11		120	62.2	40	100	50	89	50	0		41.8	4479	2.92%	1.22	46.45
P-220	BRAYTON AVENUE	23	712.33	8	Transite	1960	11		120	67	40	100	50	89	50	0		41.8	4479	15.90%	6.65	46.45
P-402	BRAYTON AVENUE	23	530.96	8	Transite	1960	11		120	74.8	40	100	50	89	50	0		41.8	4479	11.85%	4.96	46.45
P-403	BRAYTON AVENUE	23	252.29	8	Transite	1960	11		120	67.5	40	100	50	89	50	0		41.8	4479	5.63%	2.35	46.45
P-543	BRAYTON AVENUE	23	259.26	8	Transite	1960	11		120	58.7	40	100	50	89	50	0		41.8	4479	5.79%	2.42	46.45
P-462	MOHAWK ROAD	24	244.74	6	Transite	1956	7	1	120	66.4	30	100	75	93	50	50		54.1	8187	2.99%	1.62	46.27
P-540	MOHAWK ROAD	24	259.3	6	Transite	1956	7	1	120	53.5	30	100	75	93	50	50		54.1	8187	3.17%	1.71	46.27
P-571	MOHAWK ROAD	24	264.21	6	Transite	1956	7	1	120	59.7	30	100	75	93	50	50		54.1	8187	3.23%	1.75	46.27
P-794	MOHAWK ROAD	24	746.56	6	Transite	1956	7	1	120	51.4	30	100	75	93	50	50		54.1	8187	9.12%	4.93	46.27
P-811	MOUNT HOPE ROAD	24	1181.33	8	Transite	1960	11	1	120	52.6	40	100	50	89	50	50		51.8	8187	14.43%	7.47	46.27
P-757	WATUPPA AVENUE	24	525.43	2	Galvanized	1955	16	1	80	66.8	10	60	75	84	50	50		46.3	8187	6.42%	2.97	46.27
P-1139	BOURN AVENUE	24	683.73	6	Transite	1954	5		120	83.8	30	100	75	95	60	0		45.5	8187	8.35%	3.80	46.27
P-1310	BOURN AVENUE	24	247.22	6	Transite	1954	5		120	74	30	100	75	95	50	0		44.5	8187	3.02%	1.34	46.27
P-389	BOURN AVENUE	24	234.17	6	Transite	1954	5		120	70.7	30	100	75	95	50	0		44.5	8187	2.86%	1.27	46.27
P-391	BOURN AVENUE	24	234.42	6	Transite	1954	5		120	78.2	30	100	75	95	50	0		44.5	8187	2.86%	1.27	46.27
P-783	BOURN AVENUE	24	352.5	6	Transite	1954	5		120	68	30	100	75	95	50	0		44.5	8187	4.31%	1.92	46.27
P-1170	MOHAWK ROAD	24	747.78	6	Transite	1956	7		120	60.7	30	100	75	93	50	0		44.1	8187	9.13%	4.03	46.27
P-449	MOHAWK ROAD	24	243.21	6	Transite	1956	7		120	59.9	30	100	75	93	50	0		44.1	8187	2.97%	1.31	46.27
P-774	MOHAWK ROAD	24	348.09	6	Transite	1956	7		120	59.9	30	100	75	93	50	0		44.1	8187	4.25%	1.88	46.27
P-267	MOUNT HOPE ROAD	24	520.53	8	Transite	1960	11		120	66	40	100	50	89	50	0		41.8	8187	6.36%	2.66	46.27
P-795	MOUNT HOPE ROAD	24	356.94	8	Transite	1960	11		120	68.5	40	100	50	89	50	0		41.8	8187	4.36%	1.82	46.27
P-136	WATUPPA AVENUE	24	127.9	6	Cast Iron	1966	47	1	75	67.3	30	80	50	53	50	50		41.6	8187	1.56%	0.65	46.27
P-301	STETSON LANE	24	208.64	2	Galvanized	1956	17		80	80.7	10	60	75	83	60	0		37.1	8187	2.55%	0.95	46.27
P-702	KING PHILIP AVENUE	24	308.47	6	Cast Iron	1955	36		75	66.8	30	80	75	64	50	0		36.3	8187	3.77%	1.37	46.27
P-775	EDDY LANE	24	351.63	2	Galvanized	1956	17		80	75.4	10	60	75	83	50	0		36.1	8187	4.30%	1.55	46.27
P-371	GARDNER AVENUE	25	229.76	6	Cast Iron	1927	8	1	75	90.5	30	80	100	92	100	50		59.4	7060	3.25%	1.93	46.18
P-1155	MERIBAH STREET	25	723.5	6	Cast Iron	1927	8	1	75	90.5	30	80	100	92	100	50		59.4	7060	10.25%	6.09	46.18
P-1228	GRANDVIEW AVENUE	25	933.79	6	Cast Iron	1935	16	2	75	67.8	30	80	100	84	50	60		54.8	7060	13.23%	7.25	46.18
P-1163(2)	LUTHER AVENUE	25	822.92	6	Cast Iron	1945	26	3	75	76.9	30	80	75	74	50	70		52.3	7060	11.66%	6.10	46.18
P-109	GARDNER AVENUE	25	265.36	6	Cast Iron	1927	8		75	91.8	30	80	100	92	100	0		49.4	7060	3.76%	1.86	46.18
P-759	ANNETTE AVENUE	25	339.39	1.5	Galvanized	1927	-12		80	85.3	10	60	100	112	60	0		45.4	7060	4.81%	2.18	46.18
P-1213	JOHNSON STREET	25	896.67	6	Cast Iron	1927	8		75	68.3	30	80	100	92	50	0		44.4	7060	12.70%	5.64	46.18
P-886	GRANDVIEW AVENUE	25	411.57	1.5	Galvanized	1939	0		80	86.5	10	60	100	100	60	0		43	7060	5.83%	2.51	46.18
P-1163(1)	LUTHER AVENUE	25	197.54	6	Cast Iron	1945	26		75	73.5	30	80	75	74	50	0		38.3	7060	2.80%	1.07	46.18
P-323	BERUBE AVENUE	25	426.13	6	Cast Iron	1952	33		75	82.6	30	80	75	67	60	0		37.9	7060	6.04%	2.29	46.18
P-1150	HARRISON AVENUE	25	704.78	2	Galvanized	1951	12		80	75.1	10	60	75	88	50	0		37.1	7060	9.98%	3.70	46.18
P-237	RONALD AVENUE	25	179.5	2	Galvanized	1952	13		80	73.5	10	60	75	87	50	0		36.9	7060	2.54%	0.94	46.18
P-596	HARRISON AVENUE	25	271.01	6	Cast Iron	1952	33		75	69	30	80	75	67	50	0		36.9	7060	3.84%	1.42	46.18
P-324	BERUBE AVENUE	25	299.57	2	Cast Iron	1952	33		80	85.4	10	80	75	67	60	0		35.9	7060	4.24%	1.52	46.18
P-798	DURFEE COURT	25	358.85	2	Galvanized	1963	24		80	89.6	10	60	50	76	60	0		33.2	7060	5.08%	1.69	46.18
P-1138	PROSPECT STREET	26	680.58	8	Cast Iron	1927	8	2	80	59.5	40	80	100	92	50	60		57.4	6172	11.03%	6.33	44.73
P-76	PROSPECT STREET	26	904.07	8	Cast Iron	1927	8	2	80	64.7	40	80	100	92	50	60		57.4	6172	14.65%	8.41	44.73
P-445	BRAYTON AVENUE	26	242.61	8	Transite	1960	11	1	120	48.5	40	100	50	89	50	50		51.8	6172	3.93%	2.04	44.73
P-180	PROSPECT STREET	26	152.19	8	Cast Iron	1927	8		80	58.6	40	80	100	92	50	0		45.4	6172	2.47%	1.12	44.73
P-476	PROSPECT STREET	26	246.56	8	Cast Iron	1927	8		80	57	40	80	100	92	50	0		45.4	6172	3.99%	1.81	44.73
P-348	BRAYTON AVENUE	26	434.31	8	Transite	1960	11		120	46.3	40	100	50	89	50	0		41.8	6172	7.04%	2.94	44.73
P-349	BRAYTON AVENUE	26	258.49	8	Transite	1960	11		120	46.4	40	100	50	89	50	0		41.8	6172	4.19%	1.75	44.73
P-401	BRAYTON AVENUE	26	236.47	8	Transite	1960	11		120	50.9	40	100	50	89	50	0		41.8	6172	3.83%	1.60	44.73
P-448	BRAYTON AVENUE	26	242.87	8	Transite	1960	11		120	47.9	40	100	50	89	50	0		41.8	6172	3.93%	1.64	44.73
P-469	BRAYTON AVENUE	26	245.69	8	Transite	1960	11		120	48.9	40	100	50	89	50	0		41.8	6172	3.98%	1.66	44.73
P-107	ARRUDA AVENUE	26	450.72	6	Transite	1960	11		120	74.8	30	100	50	89	50	0		40.8	6172	7.30%	2.98	44.73
P-566	FIRST STREET	26	263.09	2	Galvanized	1950	11		80	55.9	10	60	75	89	50	0		37.3	6172	4.26%	1.59	44.73
P-885	FIRST STREET	26	414.74	2	Galvanized	1950	11		80	48.9	10	60	75	89	50	0		37.3	6172	6.72%	2.51	44.73
P-1005	FOURTH STREET	26	505.08	6	Cast Iron	1950	31		75	56.3	30	80	75	69	50	0		37.3	6172	8.18%	3.05	44.73
P-1167	FOURTH STREET	26	754.35	6	Cast Iron	1950	31		75	46.3	30	80	75	69	50	0		37.3	6172	12.22%	4.56	44.73
P-317	SECOND STREET	26	140.5	1.5	Galvanized	1963	24		80	48.5	10	60	50	76	50	0		32.2	6172	2.28%	0.73	44.73
P-749	LAFAYETTE STREET	27	334.17	6	Transite	1948	-1	2	120	72.8	30	100	75	101	50	60		57.7	9006	3.71%	2.14	44.36
P-1403	LAFAYETTE STREET	27	899.38	6	Transite	1948	-1	1	120	62.8	30	100	75	101	50	50		55.7	9006	9.99%	5.56	44.36
P-1098	LAFAYETTE STREET	27	627.67	6	Transite	1948	-1		120	40.6	30	100	75	101	50	0		45.7	9006	6.97%	3.18	44.36

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Pipe Information											Scoring								Project Scoring			
Label	Street_Name	Project Priority	Length (ft)	Diameter (in)	Material	Installation Year	Remaining Service Life	Number of Breaks	Hazen-Williams C	Pressure (psi)	Pipe Diameter	Material	Install Year	Remaining Life	Static Pressure	Break History	Fire Flow Impact	TOTAL	Project Length	Pipe Segment Percentage of Project	Pipe Segment Score	Project Total
P-1112	LAFAYETTE STREET	27	667.65	6	Transite	1948	-1		120	66.5	30	100	75	101	50	0		45.7	9006	7.41%	3.39	44.36
P-532	LAFAYETTE STREET	27	257.17	6	Transite	1948	-1		120	72.8	30	100	75	101	50	0		45.7	9006	2.86%	1.30	44.36
P-572	LAFAYETTE STREET	27	264.42	6	Transite	1948	-1		120	73.1	30	100	75	101	50	0		45.7	9006	2.94%	1.34	44.36
P-586	LAFAYETTE STREET	27	267.98	6	Transite	1948	-1		120	67.7	30	100	75	101	50	0		45.7	9006	2.98%	1.36	44.36
P-752	LAFAYETTE STREET	27	337.99	6	Transite	1948	-1		120	68.1	30	100	75	101	50	0		45.7	9006	3.75%	1.72	44.36
P-792	LAFAYETTE STREET	27	355.59	6	Transite	1948	-1		120	57.1	30	100	75	101	50	0		45.7	9006	3.95%	1.80	44.36
P-912	LAFAYETTE STREET	27	434.32	6	Transite	1948	-1		120	72.8	30	100	75	101	50	0		45.7	9006	4.82%	2.20	44.36
P-134	HENRI STREET	27	247.28	6	Transite	1957	8		120	73.5	30	100	75	92	50	0		43.9	9006	2.75%	1.21	44.36
P-785	HENRI STREET	27	353.26	6	Transite	1957	8		120	74	30	100	75	92	50	0		43.9	9006	3.92%	1.72	44.36
P-827	KAY STREET	27	372.85	6	Transite	1957	8		120	72.7	30	100	75	92	50	0		43.9	9006	4.14%	1.82	44.36
P-144	CYPRESS ROAD	27	415.65	6	Transite	1958	9		120	63.3	30	100	75	91	50	0		43.7	9006	4.62%	2.02	44.36
P-850	REDWOOD ROAD	27	390.97	6	Transite	1958	9		120	54.1	30	100	75	91	50	0		43.7	9006	4.34%	1.90	44.36
P-145	SCENIC DRIVE	27	193.45	6	Transite	1958	9		120	52.8	30	100	75	91	50	0		43.7	9006	2.15%	0.94	44.36
P-135	EVANS STREET	27	309.03	6	Cast Iron	1960	41	1	75	72.7	30	80	50	59	50	50		42.8	9006	3.43%	1.47	44.36
P-450	CROWN COURT	27	243.23	6	Transite	1975	26		120	71.7	30	100	50	74	50	0		37.8	9006	2.70%	1.02	44.36
P-394	QUEEN STREET	27	234.6	6	Transite	1975	26		120	72.8	30	100	50	74	50	0		37.8	9006	2.60%	0.98	44.36
P-643	QUEEN STREET	27	285.55	6	Transite	1975	26		120	71.7	30	100	50	74	50	0		37.8	9006	3.17%	1.20	44.36
P-664	QUEEN STREET	27	292.51	6	Transite	1975	26		120	72.8	30	100	50	74	50	0		37.8	9006	3.25%	1.23	44.36
P-841	TIFFANY DRIVE	27	565.54	6	Transite	1975	26		120	71.6	30	100	50	74	50	0		37.8	9006	6.28%	2.37	44.36
P-345	DUMONT AVENUE	27	230.11	1.5	Galvanized	1954	15		80	72.6	10	60	75	85	50	0		36.5	9006	2.55%	0.93	44.36
P-906	EVANS STREET	27	425.93	6	Cast Iron	1960	41		75	72.7	30	80	50	59	50	0		32.8	9006	4.73%	1.55	44.36
P-129	TAFT AVENUE	28	1036.16	6	Cast Iron	1931	12	1	75	72.9	30	80	100	88	50	50		53.6	4945	20.95%	11.23	44.13
P-252	PATTERSON AVENUE	28	185.07	2	Galvanized	1950	11	1	80	72.7	10	60	75	89	50	50		47.3	4945	3.74%	1.77	44.13
P-1199	PURRINGTON STREET	28	833.16	6	Transite	1950	1		120	70.9	30	100	75	99	50	0		45.3	4945	16.85%	7.63	44.13
P-133	PURRINGTON STREET	28	367.31	6	Transite	1950	1		120	74.2	30	100	75	99	50	0		45.3	4945	7.43%	3.36	44.13
P-375	PURRINGTON STREET	28	231.01	6	Transite	1950	1		120	74	30	100	75	99	50	0		45.3	4945	4.67%	2.12	44.13
P-241	BANVILLE STREET	28	180.84	6	Cast Iron	1935	16		75	73.1	30	80	100	84	50	0		42.8	4945	3.66%	1.57	44.13
P-293	BANVILLE STREET	28	204.9	6	Cast Iron	1935	16		75	72.9	30	80	100	84	50	0		42.8	4945	4.14%	1.77	44.13
P-332	BANVILLE STREET	28	220.37	6	Cast Iron	1935	16		75	72.7	30	80	100	84	50	0		42.8	4945	4.46%	1.91	44.13
P-380	BANVILLE STREET	28	231.77	6	Cast Iron	1939	20		75	74.5	30	80	100	80	50	0		42	4945	4.69%	1.97	44.13
P-1097	PATTERSON AVENUE	28	624.21	2	Galvanized	1950	11		80	72.7	10	60	75	89	50	0		37.3	4945	12.62%	4.71	44.13
P-1073	HARMON AVENUE	28	592.69	6	Cast Iron	1955	36		75	72.7	30	80	75	64	50	0		36.3	4945	11.98%	4.35	44.13
P-410	HARMON AVENUE	28	237.78	6	Cast Iron	1955	36		75	72.7	30	80	75	64	50	0		36.3	4945	4.81%	1.75	44.13
P-331	FERNCROFT ROAD	29	186.75	2	Galvanized	1949	10	1991.72	80	39.1	10	60	75	90	50	100		57.5	9487	1.97%	1.13	43.75
P-374	IRVING AVENUE	29	230.83	6	Cast Iron	1950	31	3	75	38.8	30	80	75	69	50	70		51.3	9487	2.43%	1.25	43.75
P-1260	MASON AVENUE	29	1158.37	6	Cast Iron	1950	31	2	75	38.8	30	80	75	69	50	60		49.3	9487	12.21%	6.02	43.75
P-1214	BUTTERNUT ROAD	29	897.71	6	Asbestos Cement	1969	20	1	140	60	30	100	50	80	50	50		49	9487	9.46%	4.64	43.75
P-1223	CHATEAU DRIVE	29	923.6	6	Asbestos Cement	1970	21	1	140	54.1	30	100	50	79	50	50		48.8	9487	9.74%	4.75	43.75
P-88	FRANKLIN ROAD	29	597.96	6	Cast Iron	1953	34	1	75	30.6	30	80	75	66	70	50		48.7	9487	6.30%	3.07	43.75
P-83	MARIA AVENUE	29	180.76	2	Galvanized	1947	8	1	80	48.1	10	60	75	92	50	50		47.9	9487	1.91%	0.91	43.75
P-82	SAINT MICHAELS AVENUE	29	429.55	6	Cast Iron	1947	28	1	75	44.9	30	80	75	72	50	50		47.9	9487	4.53%	2.17	43.75
P-236	IRVING AVENUE	29	179.49	6	Cast Iron	1950	31	1	75	37.6	30	80	75	69	50	50		47.3	9487	1.89%	0.89	43.75
P-228	HAZELHURST ROAD	29	176.66	6	Cast Iron	1948	29		75	34.4	30	80	75	71	70	0		39.7	9487	1.86%	0.74	43.75
P-788	HAZELHURST ROAD	29	677.04	6	Cast Iron	1948	29		75	34	30	80	75	71	70	0		39.7	9487	7.14%	2.83	43.75
P-888	CHATEAU DRIVE	29	412.71	6	Asbestos Cement	1970	21		140	55.8	30	100	50	79	50	0		38.8	9487	4.35%	1.69	43.75
P-1215	FRANKLIN ROAD	29	901.97	6	Cast Iron	1953	34		75	34.1	30	80	75	66	70	0		38.7	9487	9.51%	3.68	43.75
P-1076	SAINT MICHAELS AVENUE	29	596.26	6	Cast Iron	1947	28		75	50.5	30	80	75	72	50	0		37.9	9487	6.28%	2.38	43.75
P-250	HAZELHURST ROAD	29	184.75	6	Cast Iron	1948	29		75	35.2	30	80	75	71	50	0		37.7	9487	1.95%	0.73	43.75
P-329	FERNCROFT ROAD	29	76.93	6	Cast Iron	1949	30		75	39.5	30	80	75	70	50	0		37.5	9487	0.81%	0.30	43.75
P-358	IRVING AVENUE	29	225.91	6	Cast Iron	1950	31		75	36.7	30	80	75	69	50	0		37.3	9487	2.38%	0.89	43.75
P-945	MASON STREET	29	456.06	6	Cast Iron	1950	31		75	70.8	30	80	75	69	50	0		37.3	9487	4.81%	1.79	43.75
P-81	IRVNG AVENUE	29	236.02	6	Cast Iron	1950	31		75	40.2	30	80	75	69	50	0		37.3	9487	2.49%	0.93	43.75
P-332	FERNCROFT ROAD	29	758.04	6	Cast Iron	1952	33		75	38.1	30	80	75	67	50	0		36.9	9487	7.99%	2.95	43.75
P-1135	CLEARVIEW AVENUE	30	677.01	10	Transite	1961	12	1	120	52.7	50	100	50	88	50	50		52.6	12398	5.46%	2.87	43.68
P-1169	CLEARVIEW AVENUE	30	748.09	10	Transite	1961	12	1	120	60.8	50	100	50	88	50	50		52.6	12398	6.03%	3.17	43.68
P-1234	CLEARVIEW AVENUE	30	953.37	10	Transite	1961	12	1	120	43.1	50	100	50	88	50	50		52.6	12398	7.69%	4.04	43.68
P-1186	EASTVIEW AVENUE	30	954.33	8	Transite	1961	12	1	120	61.3	40	100	50	88	50	50		51.6	12398	7.70%	3.97	43.68
P-1236	EASTVIEW AVENUE	30	955.46	8	Transite	1961	12	1	120	44.4	40	100	50	88	50	50		51.6	12398	7.71%	3.98	43.68
P-1079	EASTVIEW AVENUE	30	599.14	10	Transite	1961	12		120	77.7	50	100	50	88	50	0		42.6	12398	4.83%	2.06	43.68
P-270	EASTVIEW AVENUE	30	245.15	10	Transite	1961	12		120	74	50	100	50	88	50	0		42.6	12398	1.98%	0.84	43.68
P-1149	CONNECTICUT AVENUE	30	702.93	8	Transite	1961	12		120	51.1	40	100	50	88	50	0		41.6	12398	5.67%	2.36	43.68
P-1210	CONNECTICUT AVENUE	30	1017.76	8	Transite	1961	12		120	61.1	40	100	50	88	50	0		41.6	12398	8.21%	3.42	43.68
P-1116	EASTVIEW AVENUE	30	655.06	8	Transite	1961	12		120	52.4	40	100	50	88	50	0		41.6	12398	5.28%	2.20	43.68
P-1211	HIGHVIEW AVENUE	30	1656.96	8	Transite	1961	12		120	43	40	100	50	88	50	0		41.6	12398	13.37%	5.56	43.68
P-1219	HIGHVIEW AVENUE	30	1039.31	8	Transite	1961	12		120	62.3	40	100	50	88	50	0		41.6	12398	8.38%	3.49	43.68
P-350	PLACE AVENUE	30	223.91	8	PVC	1969	50	1	110	61.3	40	30	50	50	50	50		37	12398	1.81%	0.67	43.68
P-1262	HIGHVIEW AVENUE	30	1179.22	8	Cast Iron	1961	42		90	51.9	40	80	50	58	50	0		33.6	12398	9.51%	3.20	43.68
P-651	WATUPPA AVENUE	30	287.95	8	Cast Iron	1961	42		90	70.8	40	80	50	58	50	0		33.6	12398	2.32%	0.78	43.68
P-601	PLACE AVENUE	30	273.32	8	PVC	1969	50		110	61.1	40	30	50	50	50	0		27	12398	2.20%	0.60	43.68
P-365	ROUNSEVILLE AVENUE	30	228.63	6	Ductile Iron	1963	44		110	51.4	30	20	50	56	50	0		26.2	12398	1.84%	0.48	43.68
P-468	WOOD STREET	31	245.64	6	Cast Iron	1944	25	1	75	80.7	30	80	75	75	60	50		49.5	5327	4.61%	2.28	43.58

Somerset IWRMP: Water Main Replacement
Wright-Pierce
June 2019

Pipe Information											Scoring								Project Scoring			
Label	Street_Name	Project Priority	Length (ft)	Diameter (in)	Material	Installation Year	Remaining Service Life	Number of Breaks	Hazen-Williams C	Pressure (psi)	Pipe Diameter	Material	Install Year	Remaining Life	Static Pressure	Break History	Fire Flow Impact	TOTAL	Project Length	Pipe Segment Percentage of Project	Pipe Segment Score	Project Total
P-761	ORCHARD STREET	31	340.75	6	Cast Iron	1948	29	1	75	82.7	30	80	75	71	60	50		48.7	5327	6.40%	3.11	43.58
P-1222	WOOD STREET	31	941.74	6	Cast Iron	1944	25	1	75	60.6	30	80	75	75	50	50		48.5	5327	17.68%	8.57	43.58
P-760	WOOD STREET	31	340.86	6	Cast Iron	1944	25	1	75	69	30	80	75	75	50	50		48.5	5327	6.40%	3.10	43.58
P-834	WOOD STREET	31	379.27	6	Cast Iron	1944	25	1	75	76.6	30	80	75	75	50	50		48.5	5327	7.12%	3.45	43.58
P-890	WOOD STREET	31	413.85	6	Cast Iron	1944	25	1	75	73.1	30	80	75	75	50	50		48.5	5327	7.77%	3.77	43.58
P-858	WOOD STREET	31	395.42	6	Cast Iron	1944	25		75	85.9	30	80	75	75	60	0		39.5	5327	7.42%	2.93	43.58
P-756	ORCHARD STREET	31	338.51	6	Cast Iron	1948	29		75	84	30	80	75	71	60	0		38.7	5327	6.35%	2.46	43.58
P-1089	WOOD STREET	31	609.04	6	Cast Iron	1944	25		75	72.7	30	80	75	75	50	0		38.5	5327	11.43%	4.40	43.58
P-1323	WOOD STREET	31	539.14	6	Cast Iron	1944	25		75	71.3	30	80	75	75	50	0		38.5	5327	10.12%	3.90	43.58
P-800	WOOD STREET	31	360.36	6	Cast Iron	1944	25		75	75.1	30	80	75	75	50	0		38.5	5327	6.76%	2.60	43.58
P-276	HERBERT STREET	31	422.76	1.5	Galvanized	1948	9		80	79.5	10	60	75	91	50	0		37.7	5327	7.94%	2.99	43.58
P-36	JACKSON AVENUE	32	1066.77	6	Transite	1952	3	2	110	58.8	30	100	75	97	50	60		56.9	6460	16.51%	9.40	42.95
P-34	ELLENWOOD AVENUE	32	480.72	2	Galvanized	1951	12	3	80	66.2	10	60	75	88	50	70		51.1	6460	7.44%	3.80	42.95
P-313	NORA AVENUE	32	287.94	2	Galvanized	1953	14	2	80	63.2	10	60	75	86	50	60		48.7	6460	4.46%	2.17	42.95
P-1168	CRESTVIEW AVENUE	32	747.57	2	Galvanized	1955	16	2	80	71.2	10	60	75	84	50	60		48.3	6460	11.57%	5.59	42.95
P-343	WILLIAMS COURT	32	238.43	1.5	Galvanized	1966	27	3	80	55.9	10	60	50	73	50	70		45.6	6460	3.69%	1.68	42.95
P-310	NORA AVENUE	32	175.21	2	Galvanized	1962	23	1	80	63.2	10	60	50	77	50	50		42.4	6460	2.71%	1.15	42.95
P-1066	RICE AVENUE	32	585.48	6	Cast Iron	1951	32		65	55.6	30	80	75	68	50	0		37.1	6460	9.06%	3.36	42.95
P-195	RICE AVENUE	32	159.33	6	Cast Iron	1951	32		65	55.9	30	80	75	68	50	0		37.1	6460	2.47%	0.92	42.95
P-683	RICE AVENUE	32	298.97	6	Cast Iron	1951	32		65	58.1	30	80	75	68	50	0		37.1	6460	4.63%	1.72	42.95
P-147	LAWTON STREET	32	130.94	6	Cast Iron	1952	33		65	66.2	30	80	75	67	50	0		36.9	6460	2.03%	0.75	42.95
P-201	LAWTON STREET	32	163.58	6	Cast Iron	1952	33		65	65.9	30	80	75	67	50	0		36.9	6460	2.53%	0.93	42.95
P-313	LAWTON STREET	32	213.09	6	Cast Iron	1952	33		65	63.9	30	80	75	67	50	0		36.9	6460	3.30%	1.22	42.95
P-37	LAWTON STREET	32	318.41	6	Cast Iron	1952	33		65	66.5	30	80	75	67	50	0		36.9	6460	4.93%	1.82	42.95
P-633	LAWTON STREET	32	282.88	6	Cast Iron	1952	33		65	62.3	30	80	75	67	50	0		36.9	6460	4.38%	1.62	42.95
P-712	LAWTON STREET	32	314.6	6	Cast Iron	1952	33		65	65.1	30	80	75	67	50	0		36.9	6460	4.87%	1.80	42.95
P-1092	PARSON LANE	32	612.4	6	Cast Iron	1960	41		75	63.9	30	80	50	59	50	0		32.8	6460	9.48%	3.11	42.95
P-309	NORA AVENUE	32	140.84	2	Galvanized	1962	23		80	63	10	60	50	77	50	0		32.4	6460	2.18%	0.71	42.95
P-31	NORA AVENUE	32	124.41	6	Cast Iron	1962	43		75	63.2	30	80	50	57	50	0		32.4	6460	1.93%	0.62	42.95
P-32	NORA AVENUE	32	117.95	6	Cast Iron	1962	43		75	62.3	30	80	50	57	50	0		32.4	6460	1.83%	0.59	42.95
P-412	BRIAR ROAD	33	238.22	6	Transite	1957	8	2	120	65.2	30	100	75	92	50	60		55.9	8320	2.86%	1.60	42.75
P-150	BROOKSIDE ROAD	33	615.81	6	Transite	1959	10	1	120	67.9	30	100	75	90	50	50		53.5	8320	7.40%	3.96	42.75
P-1352	PETER DRIVE	33	506.39	6	Transite	1975	26	2	120	56.7	30	100	50	74	50	60		49.8	8320	6.09%	3.03	42.75
P-188	BEVERLY STREET	33	429.21	6	Transite	1975	26	1	120	60.8	30	100	50	74	50	50		47.8	8320	5.16%	2.47	42.75
P-287	DEER STREET	33	485.57	2	Galvanized	1950	11	1	80	68.1	10	60	75	89	50	50		47.3	8320	5.84%	2.76	42.75
P-499	ANN STREET	33	249.68	6	Transite	1955	6		120	61.5	30	100	75	94	50	0		44.3	8320	3.00%	1.33	42.75
P-573	BRIAR ROAD	33	264.75	6	Transite	1957	8		120	62.6	30	100	75	92	50	0		43.9	8320	3.18%	1.40	42.75
P-153	GREENWOOD ROAD	33	249.6	6	Transite	1957	8		120	64	30	100	75	92	50	0		43.9	8320	3.00%	1.32	42.75
P-1130	MIDLAND ROAD	33	672.39	6	Transite	1957	8		120	62.4	30	100	75	92	50	0		43.9	8320	8.08%	3.55	42.75
P-152	MIDLAND ROAD	33	117.65	6	Transite	1957	8		120	65.2	30	100	75	92	50	0		43.9	8320	1.41%	0.62	42.75
P-590	MIDLAND ROAD	33	270.65	6	Transite	1957	8		120	60.7	30	100	75	92	50	0		43.9	8320	3.25%	1.43	42.75
P-125	BROOKSIDE ROAD	33	123.22	6	Transite	1959	10		120	67.9	30	100	75	90	50	0		43.5	8320	1.48%	0.64	42.75
P-288	DEER STREET	33	519.26	6	Transite	1960	11		120	64.1	30	100	50	89	50	0		40.8	8320	6.24%	2.55	42.75
P-151	WOODRIDGE ROAD	33	248.7	6	Transite	1960	11		120	63.9	30	100	50	89	50	0		40.8	8320	2.99%	1.22	42.75
P-480	WOODRIDGE ROAD	33	247.33	6	Transite	1960	11		120	62.4	30	100	50	89	50	0		40.8	8320	2.97%	1.21	42.75
P-892	PAUL DRIVE	33	416.67	6	Transite	1967	18		120	56.7	30	100	50	82	50	0		39.4	8320	5.01%	1.97	42.75
P-191	BEVERLY STREET	33	157.76	6	Transite	1975	26		120	60.1	30	100	50	74	50	0		37.8	8320	1.90%	0.72	42.75
P-362	BEVERLY STREET	33	227.24	6	Transite	1975	26		120	59.8	30	100	50	74	50	0		37.8	8320	2.73%	1.03	42.75
P-510	BRUSHWOOD DRIVE	33	256.08	6	Transite	1975	26		120	60.7	30	100	50	74	50	0		37.8	8320	3.08%	1.16	42.75
P-155	DOMINGOS STREET	33	403.04	6	Transite	1975	26		120	56.3	30	100	50	74	50	0		37.8	8320	4.84%	1.83	42.75
P-569	GERTRUDE STREET	33	264.28	6	Transite	1975	26		120	63.3	30	100	50	74	50	0		37.8	8320	3.18%	1.20	42.75
P-758	GERTRUDE STREET	33	341.54	6	Transite	1975	26		120	64.7	30	100	50	74	50	0		37.8	8320	4.11%	1.55	42.75
P-154	PAULA STREET	33	325.14	6	Transite	1975	26		120	59	30	100	50	74	50	0		37.8	8320	3.91%	1.48	42.75
P-553	PAULA STREET	33	261.04	6	Transite	1975	26		120	59.8	30	100	50	74	50	0		37.8	8320	3.14%	1.19	42.75
P-908	DEMARCO STREET	33	428.47	2	Galvanized	1975	36		80	59	10	60	50	64	50	0		29.8	8320	5.15%	1.53	42.75
P-1106	GRAND ARMY OF THE REPUBLIC HIGHWAY	34	637.24	10	Transite	1960	11		120	82.7	50	100	50	89	60	0		43.8	4840	13.17%	5.77	42.66
P-78	G.A.R. HIGHWAY	34	2901.79	10	Transite	1960	11		120	74.8	50	100	50	89	50	0		42.8	4840	59.96%	25.66	42.66
P-76	G.A.R. HIGHWAY	34	1300.59	6	Transite	1960	11		120	82.7	30	100	50	89	60	0		41.8	4840	26.87%	11.23	42.66
P-216	SOUTH STREET	35	34.06	12	Cast Iron	1948	29		65	98.3	70	80	75	71	100	0		46.7	3408	1.00%	0.47	42.02
P-217	SOUTH STREET	35	465.95	12	Cast Iron	1948	29		65	98.3	70	80	75	71	100	0		46.7	3408	13.67%	6.38	42.02
P-998	SOUTH STREET	35	496.69	10	Cast Iron	1948	29		65	92.1	50	80	75	71	100	0		44.7	3408	14.57%	6.51	42.02
P-1257	SOUTH STREET	35	1165.23	10	Cast Iron	1948	29		80	85.1	50	80	75	71	60	0		40.7	3408	34.19%	13.92	42.02
P-154	SOUTH STREET	35	135.1	10	Cast Iron	1948	29		65	83.1	50	80	75	71	60	0		40.7	3408	3.96%	1.61	42.02
P-889	SOUTH STREET	35	413.54	10	Cast Iron	1948	29		65	84.1	50	80	75	71	60	0		40.7	3408	12.13%	4.94	42.02
P-933	SOUTH STREET	35	448.54	10	Cast Iron	1948	29		65	87	50	80	75	71	60	0		40.7	3408	13.16%	5.36	42.02
P-492	CLAY STREET	35	248.97	6	Cast Iron	1948	29		75	89.4	30	80	75	71	60	0		38.7	3408	7.31%	2.83	42.02
P-678	CAROLINE AVENUE	36	296.88	6	Transite	1962	13	3	120	62.4	30	100	50	87	50	70		54.4	9969	2.98%	1.62	41.60
P-676	HEZEKIAH STREET	36	296.21	6	Transite	1962	13	2	120	64.4	30	100	50	87	50	60		52.4	9969	2.97%	1.56	41.60
P-562	DOOLITTLE COURT	36	262.9	8	Transite	1960	11	1	120	57.8	40	100	50	89	50	50		51.8	9969	2.64%	1.37	41.60
P-331	SUMMERFIELD AVENUE	36	221.68	6	Transite	1961	12	1	120	86.5	30	100	50	88	60	50		51.6	9969	2.22%	1.15	41.60
P-747	SARAH AVENUE	36	333.1	6	Transite	1961	12	1	120	77.3	30	100	50	88	50	50		50.6	9969	3.34%	1.69	41.60

Somerset IWRMP: Water Main Replacement
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Pipe Information											Scoring								Project Scoring			
Label	Street_Name	Project Priority	Length (ft)	Diameter (in)	Material	Installation Year	Remaining Service Life	Number of Breaks	Hazen-Williams C	Pressure (psi)	**Pipe Diameter**	**Material**	**Install Year**	**Remaining Life**	**Static Pressure**	**Break History**	**Fire Flow Impact**	**TOTAL**	**Project Length**	**Pipe Segment Percentage of Project**	**Pipe Segment Score**	**Project Total**
P-818	MCARTHUR AVENUE	36	370.49	8	Transite	1977	28	2	120	62.8	40	100	50	72	50	60		50.4	9969	3.72%	1.87	41.60
P-1050	CAROLINE AVENUE	36	567.65	6	Cast Iron	1966	47	4	75	52.3	30	80	50	53	50	80		47.6	9969	5.69%	2.71	41.60
P-1049	CONTENT STREET	36	565.04	6	Cast Iron	1964	45	2	75	52.6	30	80	50	55	50	60		44	9969	5.67%	2.49	41.60
P-673	CORNHILL ROAD	36	295.37	6	Cast Iron	1965	46	2	75	52.6	30	80	50	54	50	60		43.8	9969	2.96%	1.30	41.60
P-515	DOOLITTLE COURT	36	253.41	8	Transite	1960	11		120	60.6	40	100	50	89	50	0		41.8	9969	2.54%	1.06	41.60
P-978	RODNEY AVENUE	36	478.01	6	Transite	1961	12		120	77.3	30	100	50	88	50	0		40.6	9969	4.80%	1.95	41.60
P-755	SARAH AVENUE	36	337.5	6	Transite	1961	12		120	71.5	30	100	50	88	50	0		40.6	9969	3.39%	1.37	41.60
P-446	SUMMERFIELD AVENUE	36	256.93	6	Transite	1961	12		120	74.9	30	100	50	88	50	0		40.6	9969	2.58%	1.05	41.60
P-447	SUMMERFIELD AVENUE	36	251.19	6	Transite	1961	12		120	78.7	30	100	50	88	50	0		40.6	9969	2.52%	1.02	41.60
P-521	BETSY B. AVENUE	36	254.46	6	Transite	1962	13		120	73.8	30	100	50	87	50	0		40.4	9969	2.55%	1.03	41.60
P-980	BETSY B. AVENUE	36	480.51	6	Transite	1962	13		120	71.5	30	100	50	87	50	0		40.4	9969	4.82%	1.95	41.60
P-765	CAROLINE AVENUE	36	344.64	6	Transite	1962	13		120	66	30	100	50	87	50	0		40.4	9969	3.46%	1.40	41.60
P-90	CAROLINE AVENUE	36	236.66	6	Transite	1962	13		120	71.2	30	100	50	87	50	0		40.4	9969	2.37%	0.96	41.60
P-848	HEZEKIAH STREET	36	389.35	6	Transite	1962	13		120	66.9	30	100	50	87	50	0		40.4	9969	3.91%	1.58	41.60
P-307	PATTON AVENUE	36	210.6	1.5	Galvanized	1942	3		80	57.8	10	60	75	97	50	0		38.9	9969	2.11%	0.82	41.60
P-635	PATTON AVENUE	36	283.58	1.5	Galvanized	1942	3		80	59.8	10	60	75	97	50	0		38.9	9969	2.84%	1.11	41.60
P-197	MCARTHUR AVENUE	36	161.22	8	Transite	1977	28		120	57.6	40	100	50	72	50	0		38.4	9969	1.62%	0.62	41.60
P-231	MCARTHUR AVENUE	36	177.53	8	Transite	1977	28		120	59.5	40	100	50	72	50	0		38.4	9969	1.78%	0.68	41.60
P-299	MCARTHUR AVENUE	36	208.22	8	Transite	1977	28		120	60.6	40	100	50	72	50	0		38.4	9969	2.09%	0.80	41.60
P-665	MCARTHUR AVENUE	36	293.97	8	Transite	1977	28		120	69.3	40	100	50	72	50	0		38.4	9969	2.95%	1.13	41.60
P-93	MCARTHUR AVENUE	36	166.73	8	Transite	1977	28		120	55.4	40	100	50	72	50	0		38.4	9969	1.67%	0.64	41.60
P-135	BUCKNER COURT	36	127.8	2	Galvanized	1950	11		80	64.1	10	60	75	89	50	0		37.3	9969	1.28%	0.48	41.60
P-525	BUCKNER COURT	36	255.43	2	Galvanized	1950	11		80	62.8	10	60	75	89	50	0		37.3	9969	2.56%	0.96	41.60
P-1053	SULLIVAN AVENUE	36	571.62	8	Cast Iron	1964	45		90	54.9	40	80	50	55	50	0		33	9969	5.73%	1.89	41.60
P-696	SULLIVAN AVENUE	36	305.92	8	Cast Iron	1964	45		90	66.9	40	80	50	55	50	0		33	9969	3.07%	1.01	41.60
P-877	SULLIVAN AVENUE	36	414.72	8	Cast Iron	1964	45		90	73.8	40	80	50	55	50	0		33	9969	4.16%	1.37	41.60
P-684	CORNHILL ROAD	36	299.35	6	Cast Iron	1965	46		75	54.9	30	80	50	54	50	0		31.8	9969	3.00%	0.95	41.60
P-984	BRAYTON AVENUE	37	484.23	8	Transite	1960	11	7	120	52.5	40	100	50	89	50	100		61.8	6754	7.17%	4.43	41.36
P-105	BRAYTON AVENUE	37	112.23	8	Transite	1960	11	1	120	57	40	100	50	89	50	50		51.8	6754	1.66%	0.86	41.36
P-1069	BRAYTON AVENUE	37	590.42	8	Transite	1960	11	1	120	56.3	40	100	50	89	50	50		51.8	6754	8.74%	4.53	41.36
P-707	BOIVIN AVENUE	37	311.28	1.5	Galvanized	1930	-9		80	85	10	60	100	109	60	0		44.8	6754	4.61%	2.06	41.36
P-738	WILLOW AVENUE	37	328.19	1.5	Galvanized	1930	-9		80	74.3	10	60	100	109	50	0		43.8	6754	4.86%	2.13	41.36
P-969	WILLOW AVENUE	37	466.63	1.5	Galvanized	1930	-9		80	75.4	10	60	100	109	50	0		43.8	6754	6.91%	3.03	41.36
P-342	BRAYTON AVENUE	37	222.15	8	Transite	1960	11		120	57.1	40	100	50	89	50	0		41.8	6754	3.29%	1.37	41.36
P-407	FOLEY AVENUE	37	237.61	6	Cast Iron	1950	31		75	80.6	30	80	75	69	60	0		38.3	6754	3.52%	1.35	41.36
P-917	FOLEY AVENUE	37	434.4	6	Cast Iron	1950	31		75	85	30	80	75	69	60	0		38.3	6754	6.43%	2.46	41.36
P-650	FAIRVIEW AVENUE	37	287.89	6	Galvanized	1959	20		80	63.8	30	60	75	80	50	0		37.5	6754	4.26%	1.60	41.36
P-993	FAIRVIEW AVENUE	37	491	6	Galvanized	1959	20		80	61.9	30	60	75	80	50	0		37.5	6754	7.27%	2.73	41.36
P-820	HAROLD AVENUE	37	370.92	1.5	Galvanized	1949	10		80	72	10	60	75	90	50	0		37.5	6754	5.49%	2.06	41.36
P-102	FOLEY AVENUE	37	274.01	6	Cast Iron	1950	31		75	61.9	30	80	75	69	50	0		37.3	6754	4.06%	1.51	41.36
P-1024	FOLEY AVENUE	37	530.62	1	Galvanized	1950	11		80	52.5	10	60	75	89	50	0		37.3	6754	7.86%	2.93	41.36
P-103	FOLEY AVENUE	37	269.05	6	Cast Iron	1950	31		75	66.2	30	80	75	69	50	0		37.3	6754	3.98%	1.49	41.36
P-539	FOLEY AVENUE	37	266.56	6	Cast Iron	1950	31		75	68.4	30	80	75	69	50	0		37.3	6754	3.95%	1.47	41.36
P-654	FOLEY AVENUE	37	288.44	6	Cast Iron	1950	31		75	74.3	30	80	75	69	50	0		37.3	6754	4.27%	1.59	41.36
P-720	SMITH AVENUE	37	316.85	1.5	Galvanized	1968	29		80	80.6	10	60	50	71	60	0		32.2	6754	4.69%	1.51	41.36
P-974	SMITH AVENUE	37	471.71	1.5	Galvanized	1968	29		80	81.2	10	60	50	71	60	0		32.2	6754	6.98%	2.25	41.36
P-780	WARREN STREET	38	377.42	6	Cast Iron	1950	31	1	75	92.4	30	80	75	69	100	50		52.3	6418	5.88%	3.08	41.29
P-680	MARBLE STREET	38	300.57	6	Cast Iron	1943	24	1	75	75.9	30	80	75	76	50	50		48.7	6418	4.68%	2.28	41.29
P-1003	GROVE AVENUE	38	1337.5	6	Cast Iron	1927	8		75	73.5	30	80	100	92	50	0		44.4	6418	20.84%	9.25	41.29
P-138	VICTOR STREET	38	356.45	6	Transite	1955	6		120	76.3	30	100	75	94	50	0		44.3	6418	5.55%	2.46	41.29
P-206	VICTOR STREET	38	168.33	6	Transite	1955	6		120	74.9	30	100	75	94	50	0		44.3	6418	2.62%	1.16	41.29
P-962	MARBLE STREET	38	464.87	6	Cast Iron	1943	24		75	88.2	30	80	75	76	60	0		39.7	6418	7.24%	2.88	41.29
P-1055	FLORES AVENUE	38	573.42	2	Galvanized	1948	9		80	85.4	10	60	75	91	60	0		38.7	6418	8.93%	3.46	41.29
P-1141	MARBLE STREET	38	702.87	6	Cast Iron	1943	24		75	77.6	30	80	75	76	50	0		38.7	6418	10.95%	4.24	41.29
P-1389	SEYMOUR AVENUE	38	683.53	2	Galvanized	1951	12		80	83.4	10	60	75	88	60	0		38.1	6418	10.65%	4.06	41.29
P-149	NORMAN AVENUE	38	132.72	2	Galvanized	1952	13		80	83.7	10	60	75	87	60	0		37.9	6418	2.07%	0.78	41.29
P-882	NORMAN AVENUE	38	407.1	2	Galvanized	1952	13		80	85.9	10	60	75	87	60	0		37.9	6418	6.34%	2.40	41.29
P-1086	SEBASTIAN STREET	38	606.26	2	Galvanized	1952	13		80	76.3	10	60	75	87	50	0		36.9	6418	9.45%	3.49	41.29
P-139	VICTOR STREET	38	306.84	2	Galvanized	1953	14		80	79.7	10	60	75	86	50	0		36.7	6418	4.78%	1.75	41.29
P-1095	MERTON STREET	39	623.54	6	Cast Iron	1949	30	2	75	28.7	30	80	75	70	70	60		51.5	2783	22.40%	11.54	41.07
P-411	MERTON STREET	39	238.11	6	Cast Iron	1949	30	2	75	29.6	30	80	75	70	70	60		51.5	2783	8.56%	4.41	41.07
P-776	ADAMS STREET	39	349	6	Cast Iron	1949	30		75	31.4	30	80	75	70	70	0		39.5	2783	12.54%	4.95	41.07
P-96	ADAMS STREET	39	71.6	6	Cast Iron	1949	30		75	29	30	80	75	70	70	0		39.5	2783	2.57%	1.02	41.07
P-97	ADAMS STREET	39	68.65	6	Cast Iron	1949	30		75	28.7	30	80	75	70	70	0		39.5	2783	2.47%	0.97	41.07
P-213	WAHL STREET	39	170.06	6	Cast Iron	1949	30		75	30.3	30	80	75	70	70	0		39.5	2783	6.11%	2.41	41.07
P-38	WAHL STREET	39	70.08	6	Cast Iron	1949	30		75	34.1	30	80	75	70	70	0		39.5	2783	2.52%	0.99	41.07
P-484	HILLSIDE AVENUE	39	355.06	6	Ductile Iron	1959	40		130	(N/A)	30	20	75	60	100	0		34.5	2783	12.76%	4.40	41.07
P-852	RANDALL AVENUE	39	392.4	6	PVC	1949	30		110	30.3	30	30	75	70	70	0		34.5	2783	14.10%	4.86	41.07
P-928	RANDALL AVENUE	39	444.54	6	PVC	1949	30		110	29.6	30	30	75	70	70	0		34.5	2783	15.97%	5.51	41.07
P-254	BRAYTON POINT ROAD	40	178.49	8	Cast Iron	1955	36		80	41.5	40	80	75	64	50	0		37.3	10356	1.72%	0.64	40.42
P-1233	BRAYTON POINT ROAD	40	1136.86	8	Cast Iron	1955	36	2	110	48	40	80	75	64	50	60		49.3	10356	10.98%	5.41	40.42

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Pipe Information											Scoring								Project Scoring			
Label	Street_Name	Project Priority	Length (ft)	Diameter (in)	Material	Installation Year	Remaining Service Life	Number of Breaks	Hazen-Williams C	Pressure (psi)	**Pipe Diameter**	**Material**	**Install Year**	**Remaining Life**	**Static Pressure**	**Break History**	**Fire Flow Impact**	**TOTAL**	**Project Length**	**Pipe Segment Percentage of Project**	**Pipe Segment Score**	**Project Total**
P-989	BRAYTON POINT ROAD	40	488.02	8	Cast Iron	1955	36	2	110	58.1	40	80	75	64	50	60		49.3	10356	4.71%	2.32	40.42
P-278	BRAYTON POINT ROAD	40	199.25	8	Cast Iron	1955	36	1	110	57	40	80	75	64	50	50		47.3	10356	1.92%	0.91	40.42
P-656	BRAYTON POINT ROAD	40	288.87	8	Cast Iron	1955	36	1	110	60.1	40	80	75	64	50	50		47.3	10356	2.79%	1.32	40.42
P-947(2)	BRAYTON POINT ROAD	40	450.99	8	Cast Iron	1955	36	1	110	63	40	80	75	64	50	50		47.3	10356	4.36%	2.06	40.42
P-387	BRAYTON POINT ROAD	40	233.58	8	Cast Iron	1955	36		80	34.8	40	80	75	64	70	0		39.3	10356	2.26%	0.89	40.42
P-533	BRAYTON POINT ROAD	40	257.19	8	Cast Iron	1955	36		80	32.1	40	80	75	64	70	0		39.3	10356	2.48%	0.98	40.42
P-921	BRAYTON POINT ROAD	40	437.93	8	Cast Iron	1955	36		80	28.7	40	80	75	64	70	0		39.3	10356	4.23%	1.66	40.42
P-1267	1400 BRAYTON POINT ROAD EASEMENT	40	1225.39	10	Cast Iron	1955	36		80	48	50	80	75	64	50	0		38.3	10356	11.83%	4.53	40.42
P-1309	BRAYTON POINT ROAD	40	1032.7	8	Cast Iron	1955	36		80	83.8	40	80	75	64	60	0		38.3	10356	9.97%	3.82	40.42
P-178	BRAYTON POINT ROAD	40	150.1	8	Cast Iron	1955	36		80	37.2	40	80	75	64	50	0		37.3	10356	1.45%	0.54	40.42
P-253	BRAYTON POINT ROAD	40	81.46	8	Cast Iron	1955	36		80	39.9	40	80	75	64	50	0		37.3	10356	0.79%	0.29	40.42
P-277	BRAYTON POINT ROAD	40	198.97	8	Cast Iron	1955	36		80	36.5	40	80	75	64	50	0		37.3	10356	1.92%	0.72	40.42
P-34	BRAYTON POINT ROAD	40	68.73	8	Cast Iron	1955	36		80	37.4	40	80	75	64	50	0		37.3	10356	0.66%	0.25	40.42
P-870	BRAYTON POINT ROAD	40	399.7	8	Cast Iron	1955	36		80	39.4	40	80	75	64	50	0		37.3	10356	3.86%	1.44	40.42
P-1331	BRAYTON POINT ROAD	40	673.87	8	Cast Iron	1955	36		110	60.3	40	80	75	64	50	0		37.3	10356	6.51%	2.43	40.42
P-1408	BRAYTON POINT ROAD	40	1386.31	8	Cast Iron	1955	36		110	55.2	40	80	75	64	50	0		37.3	10356	13.39%	4.99	40.42
P-363	BRAYTON POINT ROAD	40	227.87	8	Cast Iron	1955	36		110	60.2	40	80	75	64	50	0		37.3	10356	2.20%	0.82	40.42
P-339	BRAYTON POINT ROAD	40	221.67	8	Cast Iron	1955	36		110	58.8	40	80	75	64	50	0		37.3	10356	2.14%	0.80	40.42
P-704	BRAYTON POINT ROAD	40	310.12	8	Cast Iron	1955	36		110	59	40	80	75	64	50	0		37.3	10356	2.99%	1.12	40.42
P-1038	TOWN DUMP	40	707.54	6	Cast Iron	1955	36		75	49.9	30	80	75	64	50	0		36.3	10356	6.83%	2.48	40.42
P-1263	NORTH STREET	41	1200.49	6	Cast Iron	1955	36	1	75	87.1	30	80	75	64	60	50		47.3	3668	32.73%	15.48	40.22
P-1259	NORTH STREET	41	1157.33	6	Cast Iron	1955	36		75	81.7	30	80	75	64	60	0		37.3	3668	31.55%	11.77	40.22
P-1268	NORTH STREET	41	1310.32	6	Cast Iron	1955	36		75	73.1	30	80	75	64	50	0		36.3	3668	35.72%	12.97	40.22
P-1266	BRIAN AVENUE	42	1220.68	8	Cast Iron	1975	56	3	90	50.4	40	80	50	44	50	70		44.8	8542	14.29%	6.40	39.84
P-413	REGAN ROAD	42	238.26	8	Cast Iron	1975	56	3	90	43	40	80	50	44	50	70		44.8	8542	2.79%	1.25	39.84
P-1270	CALVIN AVENUE	42	1253.35	6	Cast Iron	1975	56	2	75	50.1	30	80	50	44	50	60		41.8	8542	14.67%	6.13	39.84
P-1264	FOLSOM AVENUE	42	1203.86	8	Cast Iron	1975	56	1	90	51.2	40	80	50	44	50	50		40.8	8542	14.09%	5.75	39.84
P-364	REGAN ROAD	42	227.78	8	Cast Iron	1975	56	1	90	43	40	80	50	44	50	50		40.8	8542	2.67%	1.09	39.84
P-1265	RILEY AVENUE	42	1208.77	8	Cast Iron	1975	56	1	90	51.2	40	80	50	44	50	50		40.8	8542	14.15%	5.77	39.84
P-1269	DENHAM AVENUE	42	1237.87	6	Cast Iron	1975	56	1	75	50.3	30	80	50	44	50	50		39.8	8542	14.49%	5.77	39.84
P-1142	SAMSON AVENUE	42	693.98	6	Cast Iron	1975	56	1	75	48.3	30	80	50	44	50	50		39.8	8542	8.12%	3.23	39.84
P-454	REGAN ROAD	42	243.78	8	Cast Iron	1975	56		90	43	40	80	50	44	50	0		30.8	8542	2.85%	0.88	39.84
P-475	REGAN ROAD	42	246.47	8	Cast Iron	1975	56		90	43	40	80	50	44	50	0		30.8	8542	2.89%	0.89	39.84
P-1178	FOLSOM AVENUE	42	767.13	6	Cast Iron	1975	56		75	43	30	80	50	44	50	0		29.8	8542	8.98%	2.68	39.84
P-1195	HARBOR VIEW BOULEVARD	43	825.17	6	Transite	1963	14		120	59.6	30	100	50	86	50	0		40.2	2196	37.57%	15.11	38.42
P-1327	HARBOR VIEW BOULEVARD	43	276.41	6	Transite	1963	14		120	59.4	30	100	50	86	50	0		40.2	2196	12.59%	5.06	38.42
P-182	HARBOR VIEW BOULEVARD	43	154.64	6	Transite	1963	14		120	73.3	30	100	50	86	50	0		40.2	2196	7.04%	2.83	38.42
P-306	HARBOR VIEW BOULEVARD	43	210.53	6	Transite	1963	14		120	63.1	30	100	50	86	50	0		40.2	2196	9.59%	3.85	38.42
P-337	HARBOR VIEW BOULEVARD	43	221.41	6	Transite	1963	14		120	70	30	100	50	86	50	0		40.2	2196	10.08%	4.05	38.42
P-502	WILLIAM J. HIGGINS ROAD	43	250.15	2	Galvanized	1960	21		80	70.4	10	60	50	79	50	0		32.8	2196	11.39%	3.74	38.42
P-534	HANLEY ROAD	43	257.76	2	Galvanized	1963	24		80	73	10	60	50	76	50	0		32.2	2196	11.74%	3.78	38.42

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CWMP
Comprehensive Wastewater
Management Plan

TOWN OF SOMERSET, MA

JANUARY 2020

Comprehensive Wastewater Management Plan

WRIGHT-PIERCE
Engineering a Better Environment

COMPREHENSIVE WASTEWATER MANAGEMENT PLAN

FOR THE

TOWN OF SOMERSET, MA

JANUARY 2020

PREPARED BY:

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TOWN OF SOMERSET

COMPREHENSIVE WASTEWATER MANAGEMENT PLAN

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SECTION 1

INTRODUCTION

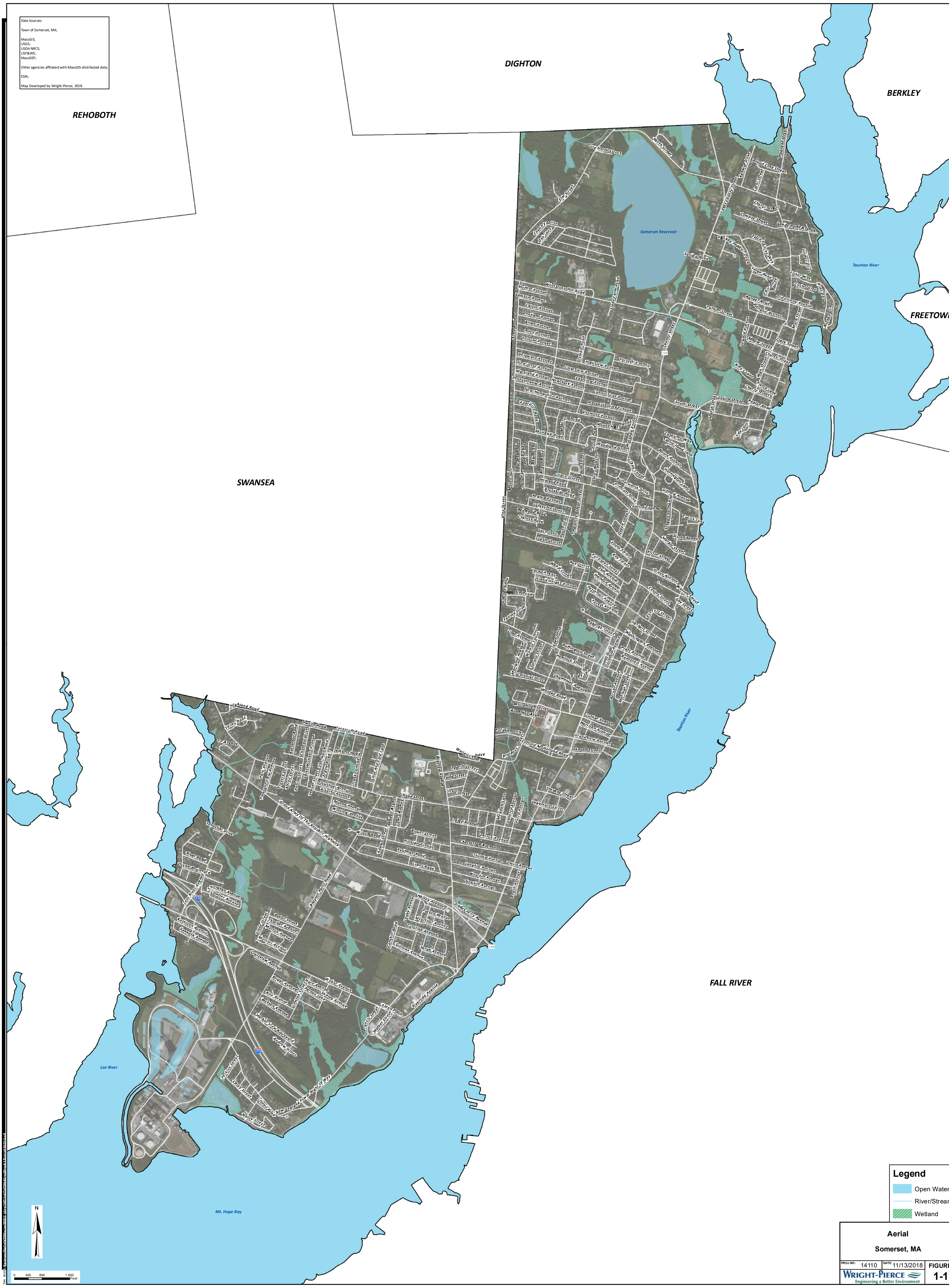
1.1 BACKGROUND INFORMATION

The Town of Somerset is primarily a suburban community located in Bristol County, approximately 20 miles southeast of Providence, RI and 44 miles south of Boston. The Town is comprised of 8.11 square miles of land area and 1.2 square miles of water surface area. Somerset is bordered by Swansea to the northwest; Dighton to the north; the Taunton River to the east; Mt. Hope Bay to the south; and Lee's River to the southwest. Refer to **Figure 1-1** for an aerial view of Somerset and its surrounding communities.

Interstate 195 crosses through the town and provides access to Providence, RI to the west and Fall River to the East. Route 6 also crosses east to west through the Town to connect to the surrounding communities. In addition, Route 138 runs north to south, and contains the commercial center of the town, located in central Somerset.

1.2 PURPOSE AND SCOPE OF SERVICES

In March 2018, the Town of Somerset (the Town) retained Wright-Pierce to prepare an Integrated Water Resource Management Plan (IWRMP), which will be used as a water, wastewater, and stormwater planning tool to guide the Town for the next two decades. A copy of the scope of services is included in **Appendix A**. The Town continues its efforts to evaluate, update, and improve its water resources infrastructure to remain in compliance with its regulatory requirements.



Aerial

Somerset, MA

PROJ NO: 14110	DATE: 11/13/2018	FIGURE: 1-1

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1.3 REVIEW OF PRIOR PLANNING EFFORTS

The Town of Somerset has been involved in the wastewater planning process in various forms over the last several decades. The Town has undertaken sewer collection system studies including manhole inspections, GIS mapping, and Infiltration and Inflow (I/I) studies. The I/I control plan work commenced in the Spring of 2018 and includes flow metering, I/I analysis and recommendations for Sewer System Evaluation Survey (SSES) tasks that will ultimately lead to sewer system rehabilitation. The Town has also undertaken treatment plant upgrades, including replacement of the influent screw pumps and mechanical screens, conversion from gas to liquid hypochlorite disinfection, and an upgrade to the facility's SCADA system. The Town is also currently conducting an energy assessment at the treatment plant and expects such to be completed in 2019. The Town has also completed upgrades at several of their wastewater pumping stations.

The Town's current National Pollutant Discharge Elimination System (NPDES) permit, #MA0100676, was issued by the EPA in 2004. The Town is expecting its new draft permit to be issued by Summer of 2019. The Town has had ongoing discussions with EPA and the Massachusetts Department of Environmental Protection (MassDEP) regarding what the draft permit will contain for new/revised discharge limits, schedule, and possible treatment plant upgrades required to meet the new limits. The draft permit is anticipated to include stricter limits on nitrogen as a mass-based limit.

In preparation for impending facility upgrades that will be needed to comply with new nitrogen limits, the Town is developing a Comprehensive Wastewater Management Plan (CWMP), as part of the larger Integrated Water Resources Management Plan (IWRMP). This document is prepared in accordance with the MassDEP's *Guide to Comprehensive Wastewater Management Planning (1996)*.

1.4 STAKEHOLDERS

The Town of Somerset understands the importance for the involvement of the citizens and interested stakeholders in Somerset as part of the CWMP process. The stakeholders include the Somerset Board of Selectman, the Water Pollution Control Facilities Department (Sewer), the Water Department, the Highway Department, Board of Water & Sewer Commissioners, Board of

Health, Conservation Commission, Planning Board; citizens of Somerset; MassDEP; Department of Fish, Wildlife and Environmental Law Enforcement (DFWELE), Natural Heritage Program; Water Resources Commission (WRC); Executive Office of Energy and Environmental Affairs (EOEEA); The Taunton River Wild & Scenic Commission; and officials from neighboring communities. Town of Somerset staff has provided input regarding the development of the existing conditions effort. The report for the CWMP will be available for review and comment by all interested stakeholders. There also will be opportunity for the public and interested stakeholders to provide input for the CWMP during a public meeting as part of the CWMP effort.

1.5 REGULATORY REQUIREMENTS

This CWMP for the Town of Somerset has been prepared in compliance with the Massachusetts Department of Environmental Protection Guide to Comprehensive Wastewater Management Planning, published in January 1996.

1.6 PROJECT FUNDING

This CWMP, as part of the Integrated Water Resource Management Plan, is funded 50 percent by the Town, while the remaining 50 percent is provided by the US Economic Development Administration (EDA). This funding was secured through the Southeastern Regional Planning & Economic Development District (SRPEDD) to assist in dealing with the impacts faced by the closure of the Brayton Point Power Generation Facility.

The Massachusetts State Revolving Fund (SRF) Program provides low interest loans to communities to fund qualified wastewater projects. The Town of Somerset is funding the CWMP and IWRMP with Town and EDA resources, but intends to fund future upgrades to the WPCF utilizing SRF loan funding.

Section 2
Town Planning and Metrics

SECTION 2

TOWN PLANNING AND METRICS

Readily available reports, plans, initiatives and studies were reviewed to compile existing and future conditions that impact, or may affect, the CWMP for the Town of Somerset. The sources utilized include, but are not limited to, the following information from the following sources:

- The Town of Somerset (including the Water, Sewer, Planning, Assessor's, and Board of Health Departments);
- Southeastern Regional Planning and Economic Development District (SRPEDD)
- Executive Office of Energy and Environmental Affairs (EOEEA);
- United States Environmental Protection Agency (US EPA), and
- United States Geologic Survey (USGS)
- Other reports, evaluations or studies completed for the Town of Somerset.

2.1 CONDITIONS IN PLANNING AREA

2.1.1 Planning Area and Planning Period

The planning area includes the entire Town of Somerset, with a focus on areas that could potentially create additional demand on the Town's sanitary sewer system and WPCF. Currently, the existing collection system is being evaluated separately from the CWMP as part of an Infiltration/Inflow (I/I) control plan project. Follow-on work will include a Sewer System Evaluation Survey (SSES) and ultimately sewer rehabilitation projects. The focus includes those areas that have been or may be impacted by failed or poorly performing on-site wastewater disposal systems (Title 5 septic systems) and areas of existing development. In addition, the planning area considers floodplains, priority habitats, and historic districts that may influence the evaluation.

This CWMP is based on a planning period of 20 years. The initial (study) year of the CWMP is 2018 and the horizon of the planning period is 2038.

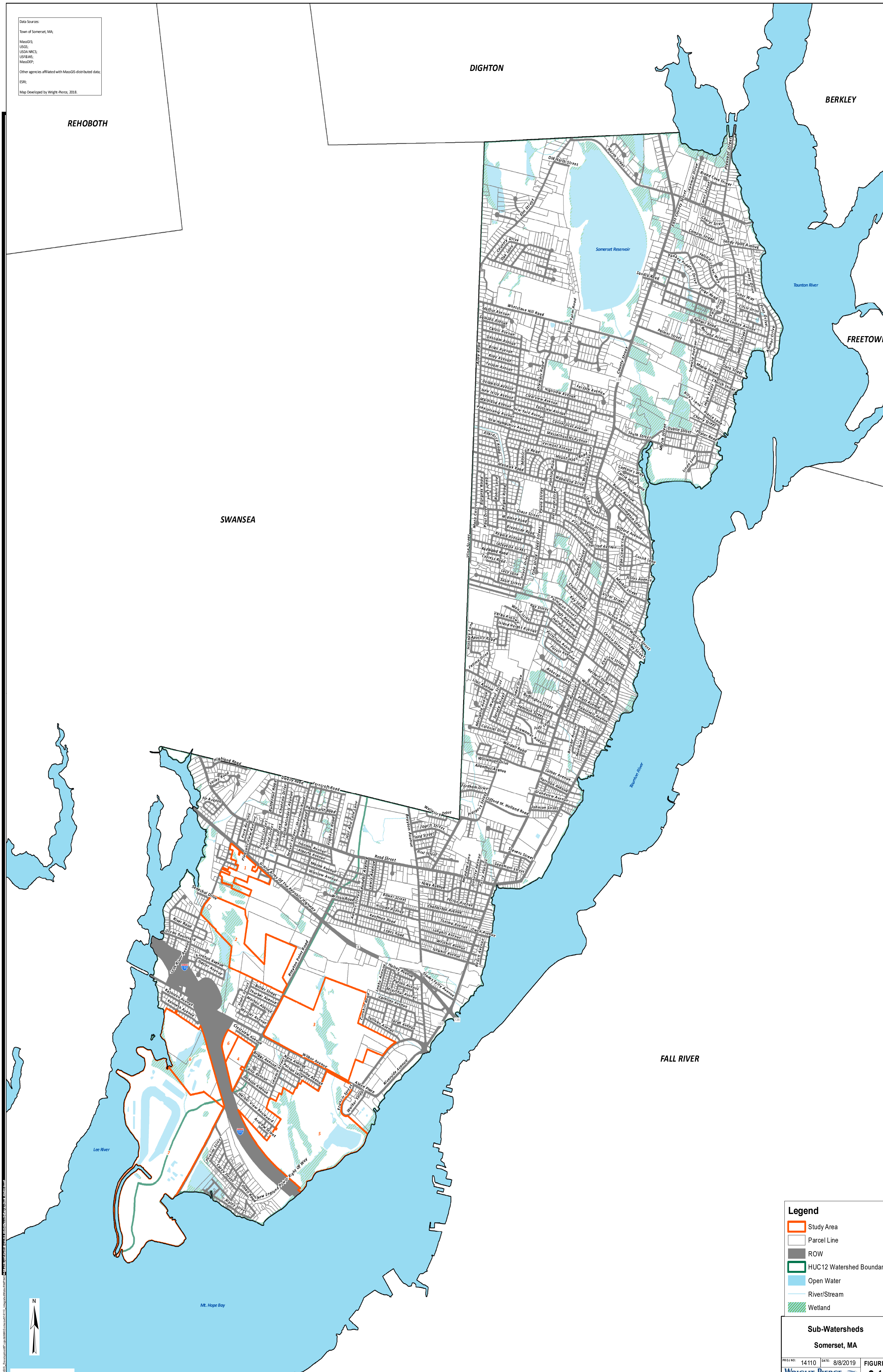
2.2 BASIN WIDE INITIATIVES AND OTHER PLANS FOR THE TOWN'S WASTERSHED BASINS

At local, state and federal levels of government, initiatives have been established to promote a balance between economics and the environment. This section of the CWMP focuses on the environmental initiatives and plans that have been developed to minimize environmental impacts to the sub-watershed basins within the Town of Somerset.

Somerset has several water resources, as it has several inland waterways and approximately 23 acres of wetlands. The only large body of water within the town is the Somerset reservoir, which has a capacity of 1.4 billion gallons and a watershed of 1.8 square miles. Below is a description of the sub-watershed basins, a list of initiatives and plans that have been established, and the impacts that those initiatives may have on the CWMP.

2.2.1 Description of the Town's Watersheds

Watersheds define the flow of surface waters and groundwater flow. Somerset lies within the Lees River Subwatershed, part of the Mt. Hope Bay Watershed, to the west, and, the Lower Taunton River Watershed, part of the Taunton River Watershed to the east. Approximately 83% (4,208 acres) of Somerset's land area is located within the Lower Taunton River Watershed. Inland waterways tend to be narrow and low to moderate flow, draining the town to the larger, tidal, Taunton River(Somerset Master Plan, 2006). The sub-watersheds of Somerset are shown in **Figure 2-1**. These watersheds are discussed in detail in the next section.



Sub-Watersheds

Somerset, MA

PROJ NO: 14110	DATE: 8/8/2019	FIGURE: 2-1

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2.2.1.1 Lower Taunton River Watershed

As stated prior, approximately 83% (4,208 acres) of Somerset's land area is located within the Lower Taunton River Watershed. The Taunton River Watershed, located in the coastal plain of southeastern Massachusetts, is the state's second largest watershed and is recognized for its rich ecological, recreational, and cultural resources. The Taunton River, which is its main artery, is the longest undammed tidal river in New England and has been designated by the National Park Service as a National Wild and Scenic River. The location, topography, and economy of the Taunton River Watershed make it vulnerable to the potential effects of climate change and development pressures, including downstream threats due to sea level rise, storm surges and upstream threats associated with heavy rainfalls and flooding. In 2014, the USEPA published a report, Strengthening the Resilience of the Taunton River Watershed: A Tool to Prioritize Local Action, to help mitigate some of the environmental issues pertaining to this watershed.

2.2.1.2 Mt. Hope Bay Watershed

The Mount Hope/Narragansett Bay Watershed is fed by the Blackstone River and Ten Mile River Watersheds that border it. The watershed drains into Mount Hope Bay and five smaller rivers, including the Lees, Cole, Kickamuit, Palmer, and Runnins Rivers. These rivers all empty into Narragansett Bay. The Mt. Hope Bay Watershed is 112 square miles and encompasses all or part of eight cities and towns. It hosts a great variety of wildlife including the Kemp's Ridley Sea Turtle, which is an endangered sea turtle species (Mount Hope and Narragansett Bay Watershed Five-Year Action Plan, 2004).

2.2.1.3 Somerset Reservoir Watershed

The Somerset Reservoir Watershed encompasses 1.8 square miles and extends into Dighton and Taunton. It lies off Whetstone Hill Road, Elm Street and North Street and almost 50 percent of the reservoir is in the Town of Dighton (to the north). The watershed has a capacity of 1.4 billion gallons as it serves as one of the Town's drinking water sources. The Labor in Vain Brook flows into and out of the reservoir, and the reservoir is further supplemented with water pumped from the Segregansett River in Dighton.

2.2.2 Initiatives/Plans Relating to the Town's Watershed Basin and their Potential Impacts on the CWMP

The following bylaws, regulations, and studies will be taken into consideration for preserving and protecting the watersheds within the Town of Somerset. A summary of the initiatives and their potential impacts on this CWMP follows.

2.2.2.1 Local Level – Town of Somerset

Somerset has the following regulatory mechanisms to protect natural and historic resources:

- 2017 Open Space and Recreation Plan: An Open Space and Recreation Plan is a blueprint for how a community will grow without losing its valued open space and recreational assets. Factors that affect open space are identified and examined during the planning process, and strategies the community may use to protect and enjoy its character, natural resources and open spaces are identified. Among other benefits, open space protection can provide profound economic benefits by helping to avoid the costly mistakes of misusing or overwhelming available resources.
- Open Space and Recreation Plans are an eligibility requirement for participation in EOEEA's open space grant programs offered through the Division of Conservation Services (DCS). Open space grants are partnerships between state and local agencies and are based on recommendations the applicant community makes independently in its Open Space and Recreation Plan.

2.2.2.2 Regional Level

The Taunton River Watershed Alliance is a regional agency in the Taunton River watershed that monitors water quality and works to preserve the integrity of the watershed. The Taunton River Wild & Scenic and River Study committee have been successful in classifying the Taunton River as a Wild & Scenic River in Massachusetts, as it is the longest undammed river in the State.

2.2.2.3 State Level

At the State level, MassDEP has studied several water bodies in the Town of Somerset. The studies have identified that not all of Somerset's waterbodies meet state and federal water quality standards. Most have not been evaluated by MassDEP including stretches of the Taunton River, and Lees River in Somerset. The following were evaluated by MassDEP with the results listed:

- Broad Cove identified as impaired by pathogens
- Somerset Reservoir is identified as impaired by mercury in fish tissue
- The Segregansett River is identified as impaired by low flow alterations, rather than pollutants

2.2.2.4 Federal Level

The 1972 enactment of the Federal Water Pollution Control Act Amendments, currently referred to as the Clean Water Act (CWA), is the founding act for surface water quality protection for the United States. Regulatory statutes are in place to reduce direct pollutant discharges into waterways, to finance wastewater treatment facilities and to manage polluted runoff. In the 1980s, favorable funding created improvements to wastewater treatment facilities and EPA-State partnerships were formed. Evolution of CWA programs over the last decade have shifted from a program-by-program, source-by-source, pollutant-by-pollutant approach to more holistic watershed-based strategies. Under the watershed approach, equal emphasis is placed on protecting healthy waters and restoring impaired water bodies. A full array of issues is addressed, not just those subject to CWA regulatory authority. Involvement of stakeholder groups in the development and implementation of strategies for achieving and maintaining state water quality and other environmental goals is another hallmark of EPA's approach.

In June 2014 the EPA published Strengthening the Resilience of the Taunton River Watershed: A Tool to Prioritize Local Action. The report's objective is to identify and prioritize areas for conservation that will protect and preserve the natural areas within the watershed.

2.3 THE BUILT AND HUMAN ENVIRONMENT

2.3.1 Town Government

Somerset's form of government consists of a three-member board of Selectmen, a Town Administrator, and is governed by traditional New England Open Town Meetings. The Board of Selectmen is comprised of three members, each elected to serve a three-year term. They are the chief elected officials for the Town and among their many duties, they approve warrants for Town Meeting, implement all votes adopted at Town Meeting, enforce Town bylaws and policies, and appoint members to various committees and boards. The Board of Selectmen also serve as the Board of Health and Licensing Board. The Town Administrator is the Chief Administrative Officer of the Town and serves as the Personnel Director and Chief Procurement Officer. The primary duties of the Town Administrator are the day to day administration of the Town's general government. The Town Administrator is appointed for a three-year term by the Board of Selectmen and may be appointed for successive terms of appointment. Somerset has regularly scheduled open town meetings with special town meetings held as necessary and called for by the Selectmen.

The Somerset Board of Health enforces Massachusetts General Laws, State Environmental and Sanitary Codes, and Town of Somerset Ordinances and Regulations. The Board of Health has the primary responsibility of protecting and improving the public health and well-being of the local community. The enforcement and inspection activities ensure a safe and healthy environment in which to live and work. The Board of Health has jurisdiction over all on-site wastewater disposal systems in the Town.

The Planning Board consists of five elected officials that oversee this department. The Panning Board administers the Rules and Regulations governing the subdivision of land within the boundaries of Somerset. In addition, the Planning Board is the Special Permit granting authority under the zoning by-law for certain uses within the Watershed Protection District and Open Space communities. As part of the interdepartmental cooperation, the Planning Board provides technical assistance and written recommendations to the Zoning Board on planned developments and provides recommendations for town meeting on street acceptance and zoning changes.

2.3.2 Population/Demographic Characteristics

The. United States Census Bureau (USCB) states the population of the entire Town of Somerset to be 18,165. The demographic breakdown in 2010 was 47.5 percent male and 52.5 percent female; 97.4 percent white, 0.4 percent black or African American, 0.1 percent American Indian and Alaska Native, 0.8 percent Asian, 0.3 percent "some other race", and 1.0 percent two or more races. The median age was 45.4. Somerset's historical and projected future growth population is shown in Table 2-1 and is depicted in Figure 2-2. Future population projections were taken from the UMASS Donahue Institute, which project a 0.02 percent decrease in population in 2020 from 2010, and a 0.03 percent decrease in population from 2020 to 2030. The projected decrease is likely due to the recently observed decrease in 2010. Population projections were also collected from SRPEDD, which conversely showed a projected increase in population. Population projections from both sources have been considered.

As of the census in 2010, there were 18,165 people, 7,087 households, and 5,118 families residing in Somerset. The population density was 2,242.6 inhabitants per square mile. There were 7,087 housing units at an average density of 874.9 per square mile.

There were 7,087 households, of which 25.6 percent had children under the age of 18 living with them; 56.6 percent were married couples living together; and 27.8 percent were non-families. 23.4 percent of all households were made up of individuals and 13.5 percent had someone living alone who was 65 years of age, or older. The average household size was 2.53 and the average family size was 2.97.

Age Distribution

The population was spread out with 19.3 percent under the age of 18, 4.7 percent from 20 to 24, 23.3 percent from 25 to 44, 29.1 percent from 45 to 64, and 21.5 percent who were 65 years of age, or older. The median age was 45.4 years.

Median Income

The median income for a household was $68,900, and the median income for a family was $82,176. Males had a median income of $40,581 versus $29,837 for females. The per capita income was $31,544. About 7.3 percent of the population was below the poverty line.

TABLE 2-1

ESTABLISHED AND PROJECTED POPULATION CHANGES

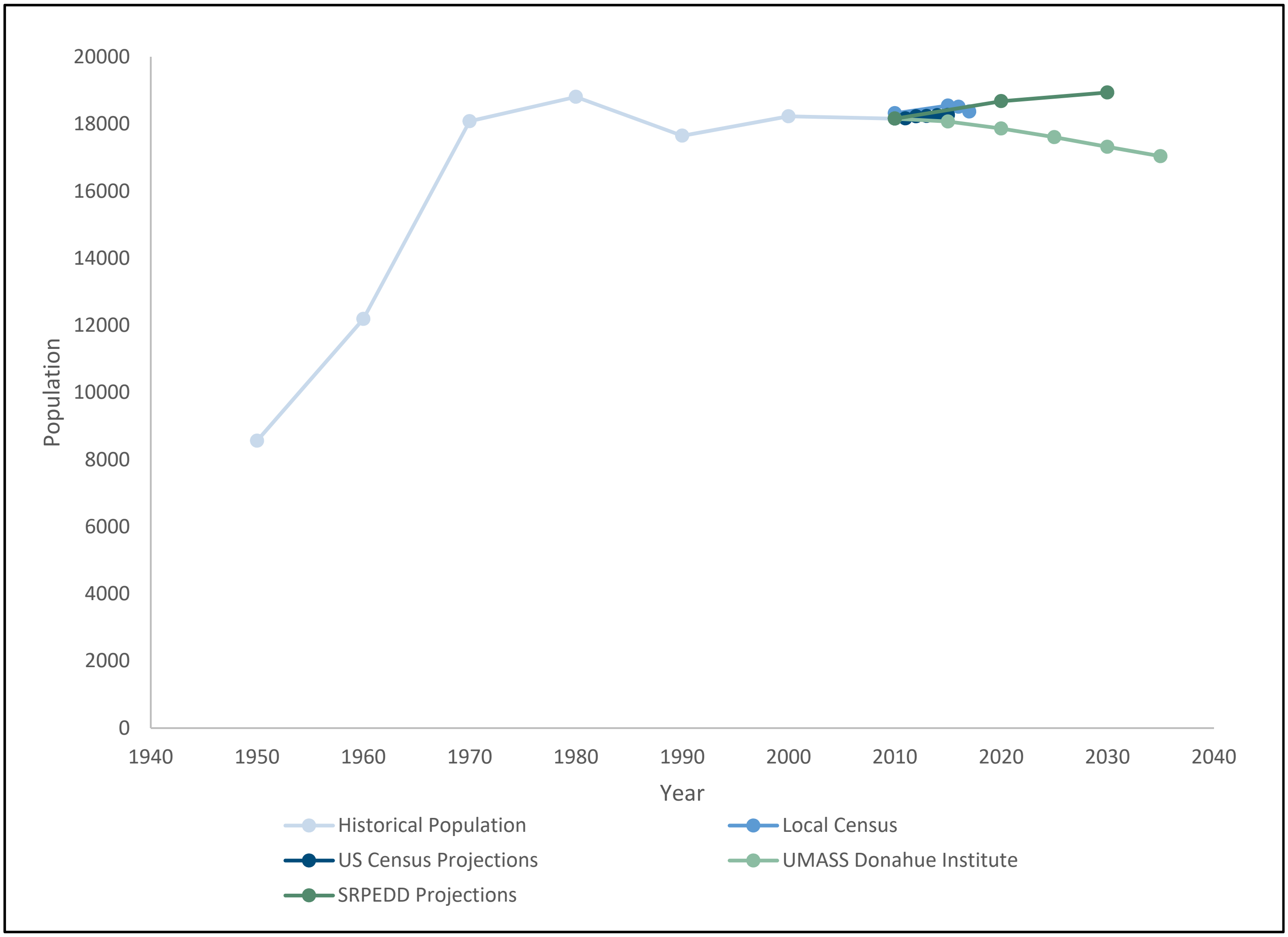
(1950-2030)

Year	UMASS Donahue Institute Projection	UMASS Increase in Population from Previous Decade	SRPEDD Projections	SRPEDD Increase in Population from Previous Decade
1950	8,566	45.9%	8,566	45.9%
1960	12,196	47.4%	12,196	47.4%
1970	18,088	48.3%	18,088	48.3%
1980	18,813	4.0%	18,813	4.0%
1990	17,655	-6.6%	17,655	-6.6%
2000	18,234	3.2%	18,234	3.2%
2010	18,165	-0.004%	18,165	-0.004%
2020*	17,810	-0.02%	18,685	2.9%
2030*	17,325	-0.03%	18,945	1.3%

*Future Population and Build-out provided by UMASS Donahue Institute

FIGURE 2-2

PROJECTED POPULATION CHANGES 1950-2035



2.3.3 Economy

Since the completion of the 1983 Open Space and Recreation Plan, Somerset has remained fairly consistent in terms of numbers employed, employment by industry and number of employers/establishments. During the same period of time, payroll and wages have approximately doubled, reflecting higher minimum wage and pay scales as well as the cost of living and the cost of doing business.

The most significant changes in employment have occurred in construction, which peaked during the late 1980's building boom and bottomed out in 1992 but has made a moderate recovery during *the recent building cycle. Still, employment within the construction field is less than 50% of its 1986 peak. The manufacturing employment cycle also peaked during the late 1980's building boom and, like construction, bottomed during the recession in 1992. Manufacturing has more recently been holding steady between 300 and 322 over the four-year period, 1998-2001.*

The years 1991 and 1992 were peak years for unemployment (between 10 to 11%) due to the recession. For several years following, Somerset exceeded the state unemployment average, even if slightly, during a period of moderate recovery. Since 2001, Somerset's unemployment rate has been lower than the state average. Somerset's unemployment rate for 2003 was 5.1% compared to the state average of 5.8%. (Somerset Master Plan, 2006) Somerset's labor and employment rates are included in **Table 2-2**.

TABLE 2-2

LABOR FORCE, EMPLOYMENT AND UNEMPLOYMENT

Year	Labor Force	Employed	Unemployed	Unemployment Rate
2017	9,191	8,818	373	4.1
2016	9,099	8,706	393	4.3
2015	9,137	8,641	496	5.4
2014	9,171	8,562	609	6.6
2013	9,127	8,399	728	8.0
2012	9,089	8,373	716	7.9
2011	9,066	8,310	756	8.3
2010	9,158	8,252	906	9.9

Source: Massachusetts Executive Office of Labor and Workforce Development

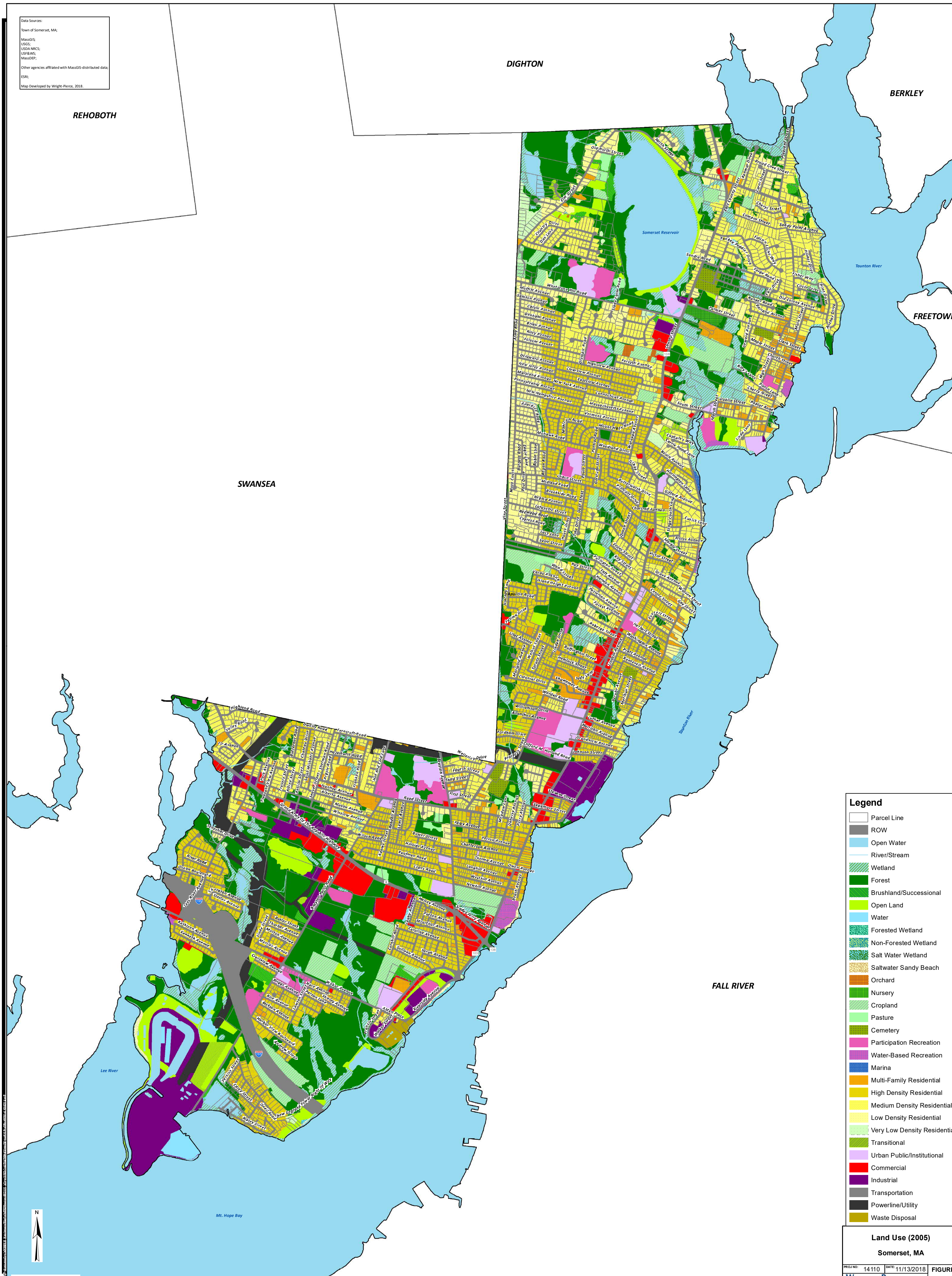
2.3.4 Land Use

The major land uses within the Town of Somerset are included in **Table 2-3** and shown in **Figure 2-3**.

TABLE 2-3
LAND USE

Land Classification	Total Acres	Percent of Total Area in Town
Residential		
Single-Family	2,015	46.1%
Other Residential	223	5.1%
Commercial	224	5.1%
Industrial	120	2.7%
Agricultural	77	1.8%
Recreation	16	0.4%
Public & Non-Profit		
Town of Somerset	786	18.0%
Other	201	4.6%
Vacant Land		
Developable	410	9.4%
Potentially Developable	217	5.0%
Undevelopable	80	1.8%
Total	4,369	100%

Source: Somerset 2006 Master Plan



Land Use (2005)

Somerset, MA

PROJ NO: 14110	DATE: 11/13/2018	FIGURE:
WRIGHT-PIERCE Engineering a Better Environment		2-3

2.3.4.1 Chapter 61 Land

Chapter 61 lands are privately held properties governed for tax purposes by Massachusetts General Law (MGL) Chapter 61. Chapter 61, 61A, and 61B are designed to encourage the preservation and enhancement of the Commonwealth's forests, valuable farmland and recreational open space. It offers significant local tax benefits to property owners willing to make a long-term commitment to forestry, farming and preserving land for outdoor activities. In exchange for these benefits, the municipality in which the land is located is given the right to recover some of the tax benefits afforded the owner when the land is removed from classification and an option to purchase the property should the land be sold or used for non-classified uses.

The owner must notify by certified mail the selectmen, assessors, planning board and conservation commission of the town of any intention to sell or convert the land for those uses. If the owner plans to sell the land, the town has the right to match a bona fide offer to purchase it. If the owner plans to convert it, the town has the right to purchase it at its fair market value, which is determined by an impartial appraisal. The town may also assign its option to a nonprofit, conservation organization. The owner cannot sell or convert the land until at least 120 days after the mailing of the required notices or until the owner has been notified in writing that the option will not be exercised, whichever is earlier.

The Town has a limited history of purchasing land under Chapter 61A, and 61B. As of 2018, there were 2 parcels totaling 1.76 acres that contained Chapter 61A (Agriculture) Land.

2.3.5 Town Planning Efforts/Proposed Developments

2.3.5.1 Chapter 40B/40R Planning

Massachusetts Law Chapter 40B enables local Zoning Boards of Appeals (ZBAs) to approve affordable housing developments under flexible rules if at least 20 percent of the units have long-term affordability restrictions. Its goal is to encourage the production of at least 10 percent of the housing units to be affordable housing in all communities throughout the Commonwealth. There are no 40B/R plans in development for Somerset.

2.3.5.2 New and Proposed Developments in Somerset

The Town of Somerset has two proposed developments. The proposed developments are Fairfield Commons and a subdivision of Luther's Landing. Fairfield Commons will be in Lot 231, which is located between Route 6 and Lepes Road. The subdivision of Luther's Landing is adjacent to County Street and next to Luther Avenue. The proposed subdivision is expected to have five single family homes that will be served by the Town's public sewer.

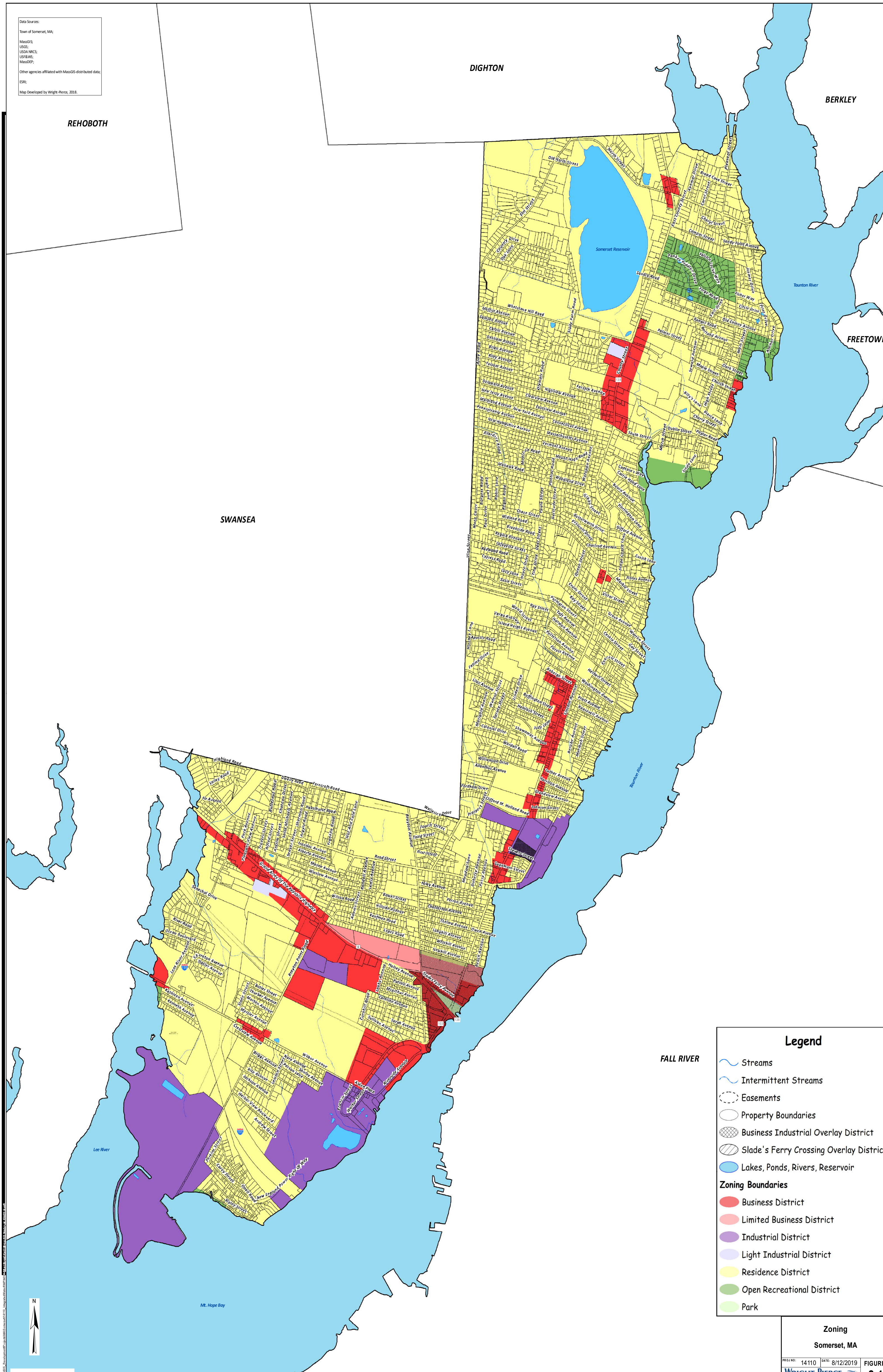
2.3.6 Zoning

Somerset employs residential, business, limited business, light industrial, open recreational and industrial zones at a 20,000 square foot minimum. The town also has special protection overlay districts for watershed protection, water resources protection and floodplains.

The Watershed Protection District was established in September of 1978 to provide protection to the drainage area of the surface water reservoir in the northwest portion of town. The Flood Plain District adopted in June of 1985 covers all special flood hazard areas on the Somerset Flood Insurance Rate Map (FIRM). The Water Resources Protection District was adopted in April of 1986 and covers waterways and related wetland resource areas. Where these protective zoning tools were adopted during periods of significant (late 1970's) and moderate (late 1980's) growths, shows that planners and town officials were considering the impacts of long-term growth on the town's natural resources. How to gauge the impact of growth on recreational needs can be more difficult to predict. It is not just the influx of new residents, but the shifting age of the existing population. That will create increased demands for specific recreation programs. (Current Somerset Zoning Bylaws)

2.3.6.1 Residential Zones

The Town has one zoning designation which applies to all residential households. The residential zoning districts encompass most of the Town, as the Town is largely a residential community. The residential zone is intended for single family dwellings; however, some other residential uses can be granted in this district through special permit granted by the Planning Board. Refer to **Figure 2-4** for the Town's zoning plan.


Data Sources:
Town of Somerset, MA;
MassGIS;
USGS;
USDA NRCS;
USF&WS;
MassDEP;
Other agencies affiliated with MassGIS-distributed data;
ESRI;
Map Developed by Wright-Pierce, 2018.
DIGHTON
BERKLEY
REHOBOTH
FREETOWN
SWANSEA
FALL RIVER
Somerset Reservoir
Taunton River
Lee River
Mt. Hope Bay
Legend
Streams
Intermittent Streams
Easements
Property Boundaries
Business Industrial Overlay District
Slade's Ferry Crossing Overlay District
Lakes, Ponds, Rivers, Reservoir
Zoning Boundaries
Business District
Limited Business District
Industrial District
Light Industrial District
Residence District
Open Recreational District
Park
N
0 400 800 1,600 Feet
Zoning
Somerset, MA
PROJ NO: 14110
DATE: 8/12/2019
FIGURE: 2-4
WRIGHT-PIERCE
Engineering a Better Environment

2.3.6.2 Commercial, Business and Industrial Districts

The four zoning designations that provide for business and industrial uses are as follows:

1. **Business District** – The Business district is primarily in two areas of the Town: along route 6, and different sections along County Road (Route 138). The business district along route 6 encompasses the entire corridor, with some mixed industrial use along the route as well. Route 138 includes two sections of business districts, one of them is located between Riverside Avenue and Washington Avenue, and the other is located north of this, between South Street and Palmer Street.
2. **Limited Business –** The Limited Business district is located near the eastern end of the Business district along Route 6 and encompasses a portion of the Slades Ferry Crossing District. The Limited Business district is intended for business uses, excluding hotels and other transient oriented uses.
3. **Industrial District** – The Industrial districts within the town include the two decommissioned power generation sites - Brayton Point and Montaup, which are still intended for industrial use. There is also an undeveloped industrial district bordered by Wilbur Avenue to the North and I-195 to the South, along the Taunton River. The industrial district is intended to be used for most industrial uses.
4. **Limited Industrial** – The Limited Industrial district is the smallest district within the Town. Its intended use is for mix of business and industrial use. There are two limited industrial sites within the town, which are both located inside larger business districts. The limited industrial sites are located within the business district on Route 6, and another is located within the business district on Route 138.

2.3.6.3 Overlay Districts and Other Special Use Provisions

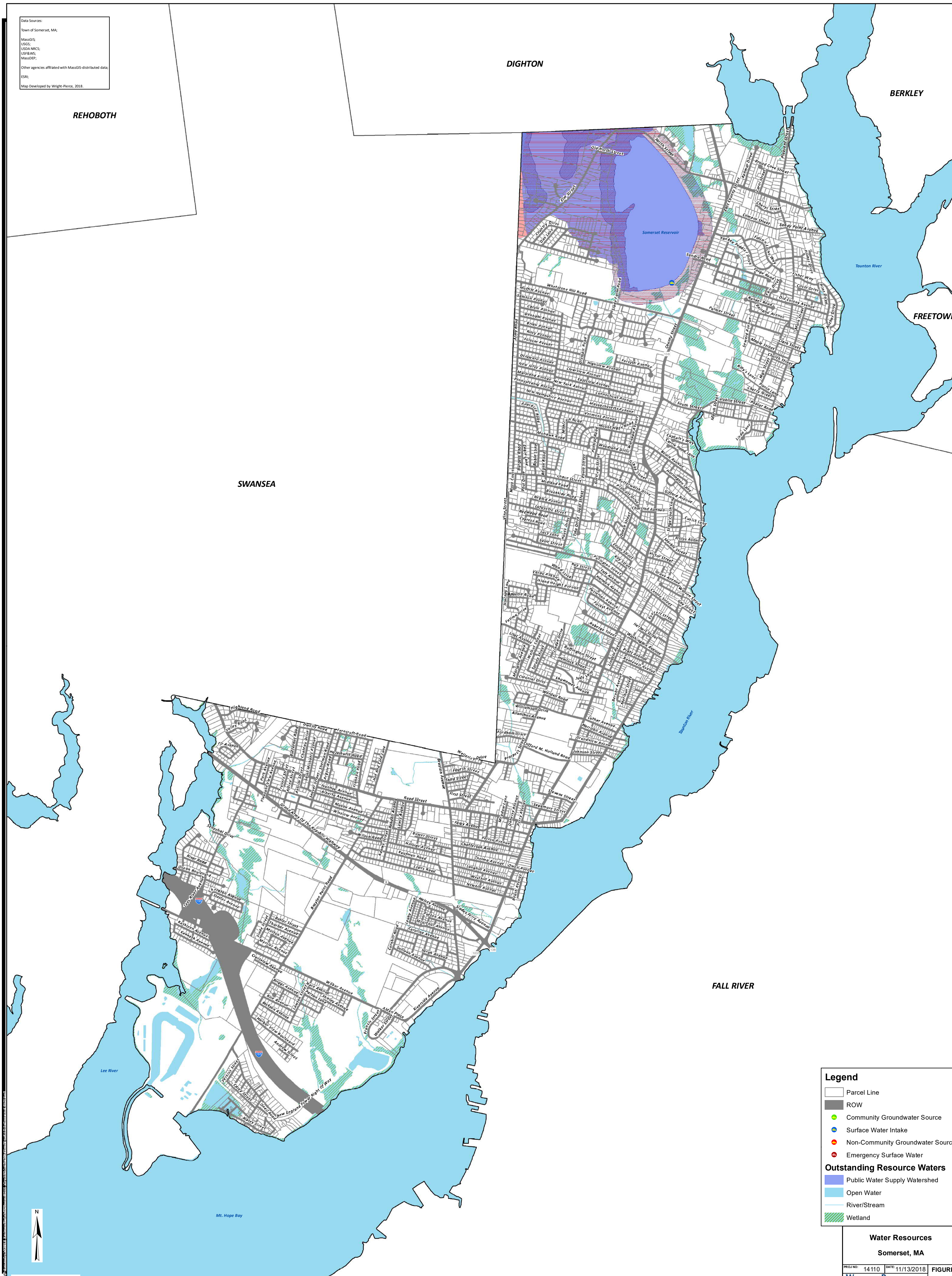
The Town of Somerset's current zoning practice utilizes several special "overlay zones" or other special use provisions to direct land uses, where normal zoning mechanisms are difficult to apply. The overlay and special districts include the following: (Current Somerset Zoning Bylaws)

- ***Watershed Protection District** – The Watershed protection district was established in 1978 and encompasses the entire Somerset Reservoir watershed. The purpose of the special use* *district is to protect and conserve natural resources, including ground and surface water within the Town of Somerset. The district includes undeveloped land surrounding the reservoir, as well as some residential neighborhoods located southwest of the reservoir.*

- ***Water Resources Protection District*** *– The Water Resources Protection District was established in 1986 and is located around water resources throughout the Town, including rivers, streams, wetlands, ponds, etc. The Water Resources Protection District was established to:*
    - *Insure that development and use of land within the district will not endanger the health, safety or welfare of the occupants of such land as well as of the general public.*
    - *Preserve and protect the groundwater resources, streams, ponds, marshes, and other watercourses and their adjourning land in the Town of Somerset from encroachment and degradation.*
    - *Retain the natural storage capacity of the watershed.*

Refer to **Figure 2-5** for the Town's Watershed Protection District plan.

- ***Floodplain District*** *– The Floodplain overlay district includes all special flood hazard areas within the Town of Somerset designated as, AE or VE, on the Bristol County Flood Insurance Rate Map (FIRM) issued by the Federal Emergency Management Act (FEMA) for the administration of the National Flood Insurance Program. The Floodplain District Zoning regulations are intended to prevent alterations to the land that would increase potential flood damage.*
- ***Slades Ferry Crossing District*** *– The Slades Ferry Crossing Overlay district was adopted in 2013 to allow for development, redevelopment and infill mix of compatible commercial and residential uses and open space more varied than is generally available under conventional zoning. The provisions of the district are further intended to promote and encourage redevelopment of the Slade's Ferry/ Old Route 6 business area and transform it into a vibrant, attractive, livable mixed-use location with a sense of place, as well as support and strengthen the development of a riverfront park. A primary component of redevelopment in this area is integrating pedestrian and bicycle friendly connections within the mixed-use area and to the Riverfront Park and adjacent residential areas.*



Water Resources

Somerset, MA

PROJ NO: 14110	DATE: 11/13/2018	FIGURE: 2-5

WRIGHT-PIERCE Engineering a Better Environment

- ***Business Industrial Overlay District*** *– The purpose of the Business Overlay District is to encourage a mix of commercial and industrial uses in certain areas of the Industrial District. The overlay district is to encourage redevelopment and infill development in the areas zoned for industrial uses in a manner that establishes controls that will facilitate development while protecting the public interest; to protect and enhance the value of land and buildings and provide for a variety of business and residential uses in areas that are currently zoned for industrial uses, but abut areas for business and residential uses; and , toward these ends, to allow greater utilization of commercial developments.*

2.3.7 Build-out Analysis

A town wide build-out analysis was conducted by the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA). **Table 2-4** lists the general results of the study. (Somerset Master Plan, 2006).

TABLE 2-4

BUILD-OUT IMPACT ON TOWN OF SOMERSET

Parameter	Unit
Additional Developable Area	1,157 acres
Additional Residential Units	1,618 Units
Additional Residents	4,285 capita
Additional School Children	833 capita

2.3.8 Open Space

The Town of Somerset has made great efforts to procure land to have those lands become protected open spaces. Currently, the Town has approximately 90 acres designated as outdoor recreation. Parcels were considered open space if they met one of the following criteria:

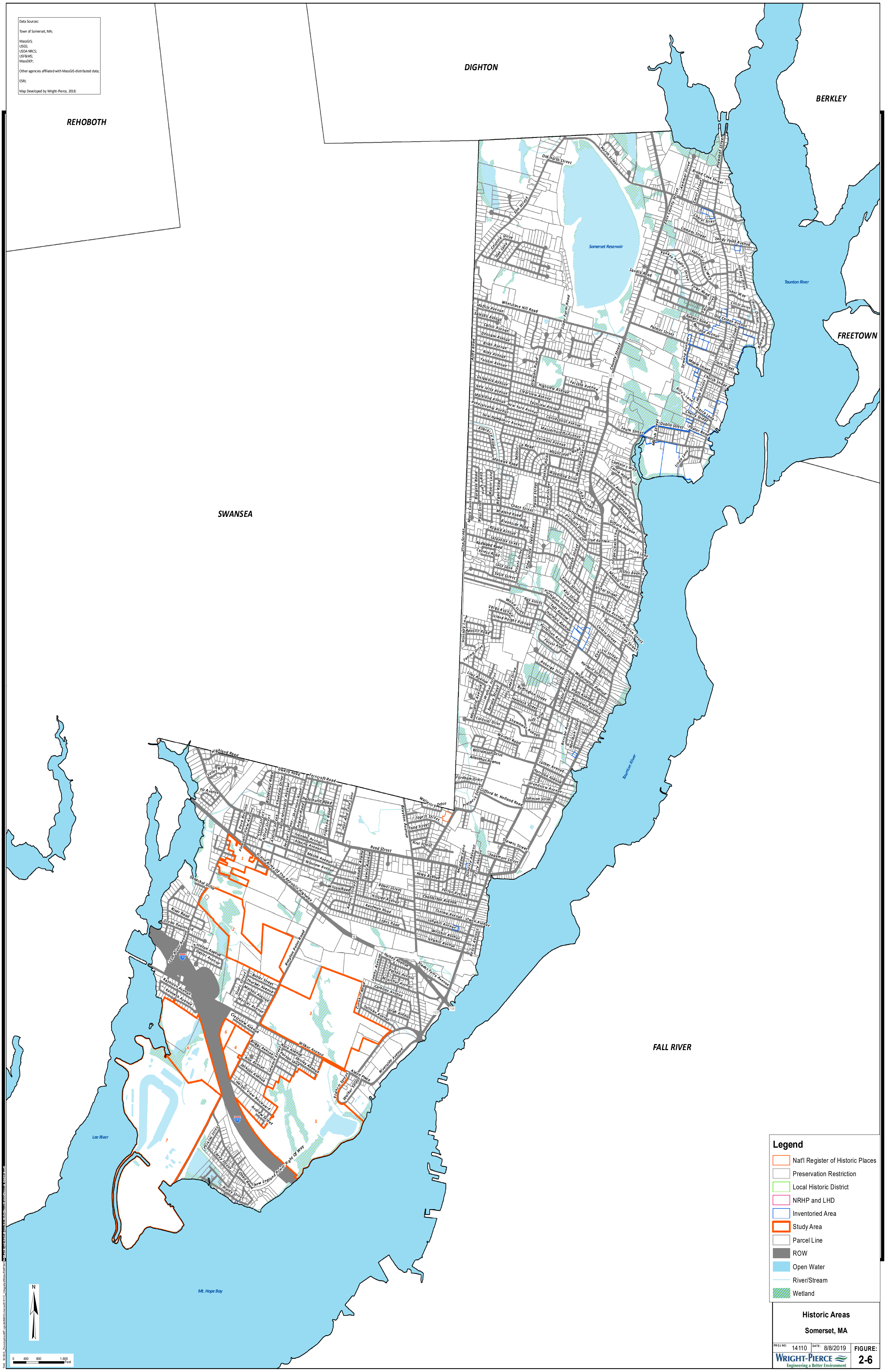
- Considered open space by Mass GIS
- Designated Chapters 61, 61A, and 61B
- Owned by the Town

- Listed as a priority protection area

2.3.9 Historic Areas

A map depicting historic areas of Town is shown in **Figure 2-6**. Review of the National Register of Historic Places indicates that Somerset has two nationally recognized areas, the Montaup Site and the Borden Flats Lighthouse.

The Massachusetts Historical Commission (MHC) administers the National Register program in Massachusetts. The Town has a Historical Society, which is the local organization tasked with identifying and protecting Somerset's historic assets.



Data Sources:
Town of Somerset, MA;
MassGIS;
USGS;
USDA NRCS;
USF&WS;
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Map Developed by Wright-Pierce, 2018.
REHOBOTH
DIGHTON
BERKLEY
FREETOWN
SWANSEA
FALL RIVER
Somerset Reservoir
Taunton River
Lee River
Mt. Hope Bay
Legend
Nat'l Register of Historic Places
Preservation Restriction
Local Historic District
NRHP and LHD
Inventoried Area
Study Area
Parcel Line
ROW
Open Water
River/Stream
Wetland
Historic Areas
Somerset, MA
PROJ NO: 14110
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FIGURE: 2-6
WRIGHT-PIERCE
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2.4 NATURAL ENVIRONMENT

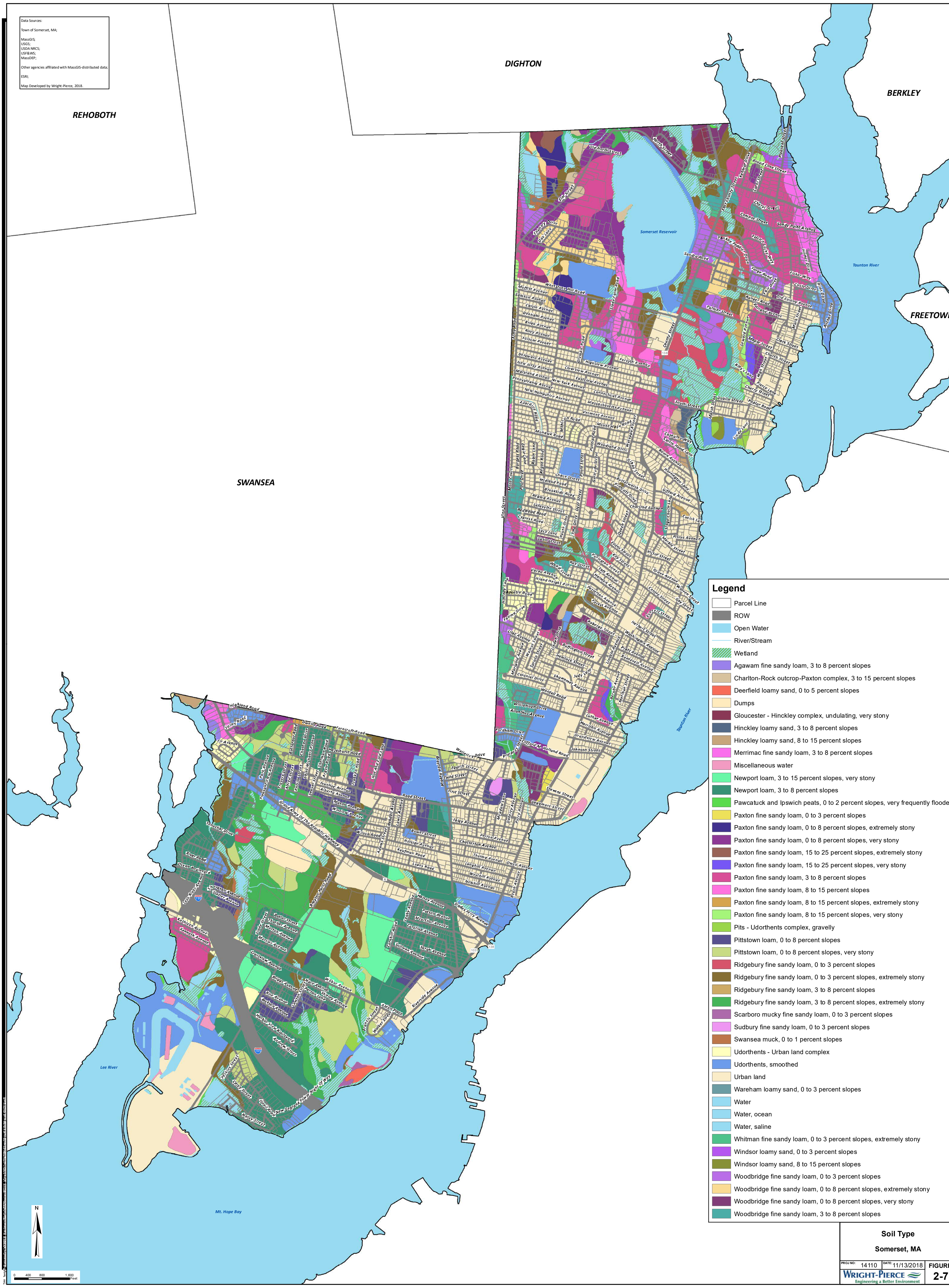
2.4.1 Climate

According to the 2017 Somerset Conservation Recreation and Open Space Plan, the normal temperature ranges from 29.7 degrees Fahrenheit in January to 72.6 degrees Fahrenheit in July. The average precipitation for Somerset is 45.3 inches per year.

2.4.2 Soils

The southern half of Somerset is a peninsula with the terrain of the land rising gradually on three sides from the shoreline up to an elevation of approximately 180 feet above mean sea level. This elevation occurs in the area near Hot and Cold Lane, in the vicinity of the Swansea town line. In the northern section of the town the land slopes gradually westward to elevations of from 120 to 140 feet above mean sea level. Stony soils prevail in the western part of town, while good textured, well-watered loam prevails in the eastern part. The MassGIS Soil Map for Somerset is included as **Figure 2-7**. *The predominant soil associations found within the Town of Somerset are Paxton-Woodbridge-Whitman Association, Urban Land Association, and Newport-Urban Land-Udorthents.*

Paxton-Woodbridge-Whitman Association consists of upland hills and ridges dissected by many small drainage ways. The association is composed of about 25 percent Paxton soils, 15 percent Woodbridge soils, 10 percent Whitman soils, and 50 percent minor soils. Soils range from nearly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USF&WS;
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Map Developed by Wright-Pierce, 2018.
REHOBOTH
DIGHTON
BERKLEY
FREETOWN
SWANSEA
Somerset Reservoir
Taunton River
Lee River
Mt. Hope Bay
Legend
Parcel Line
ROW
Open Water
River/Stream
Wetland
Agawam fine sandy loam, 3 to 8 percent slopes
Charlton-Rock outcrop-Paxton complex, 3 to 15 percent slopes
Deerfield loamy sand, 0 to 5 percent slopes
Dumps
Gloucester - Hinckley complex, undulating, very stony
Hinckley loamy sand, 3 to 8 percent slopes
Hinckley loamy sand, 8 to 15 percent slopes
Merrimac fine sandy loam, 3 to 8 percent slopes
Miscellaneous water
Newport loam, 3 to 15 percent slopes, very stony
Newport loam, 3 to 8 percent slopes
Pawcatuck and Ipswich peats, 0 to 2 percent slopes, very frequently flooded
Paxton fine sandy loam, 0 to 3 percent slopes
Paxton fine sandy loam, 0 to 8 percent slopes, extremely stony
Paxton fine sandy loam, 0 to 8 percent slopes, very stony
Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony
Paxton fine sandy loam, 15 to 25 percent slopes, very stony
Paxton fine sandy loam, 3 to 8 percent slopes
Paxton fine sandy loam, 8 to 15 percent slopes
Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony
Paxton fine sandy loam, 8 to 15 percent slopes, very stony
Pits - Udorthents complex, gravelly
Pittstown loam, 0 to 8 percent slopes
Pittstown loam, 0 to 8 percent slopes, very stony
Ridgebury fine sandy loam, 0 to 3 percent slopes
Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony
Ridgebury fine sandy loam, 3 to 8 percent slopes
Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony
Scarboro mucky fine sandy loam, 0 to 3 percent slopes
Sudbury fine sandy loam, 0 to 3 percent slopes
Swansea muck, 0 to 1 percent slopes
Udorthents - Urban land complex
Udorthents, smoothed
Urban land
Wareham loamy sand, 0 to 3 percent slopes
Water
Water, ocean
Water, saline
Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony
Windsor loamy sand, 0 to 3 percent slopes
Windsor loamy sand, 8 to 15 percent slopes
Woodbridge fine sandy loam, 0 to 3 percent slopes
Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony
Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony
Woodbridge fine sandy loam, 3 to 8 percent slopes
N
0 400 800 1,600 Feet
Soil Type
Somerset, MA
PROJ NO: 14110
DATE: 11/13/2018
FIGURE: 2-7
WRIGHT-PIERCE
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level to moderately steep and are generally well drained but also have a firm substratum at depths ranging from 15 to 26 inches that restricts the movement of water and the development of roots.

The Urban Land consists of areas that have been altered or obscured by structures and development activities with the result that the identification of soils is not practical. Slopes range from zero to 25 percent. These soils are 80 percent urbanized and 20 percent minor soils. The minor soils consist of Paxton, Woodbridge and Udorthents. This association is found in the central areas of Somerset and accounts for 39 percent of the town's land area.

Newport-Urban Land-Udorthents is composed of about 25 percent Newport soils, 25 percent urbanized areas, 10 percent cut and fill, and 40 percent minor soils. The association covers approximately 35 percent of Somerset and is located in the southern part of town, primarily below Route 6. In addition to the areas of Urban Land and Udorthents, this association consists of areas of upland hills and ridges. The Newport soils, while deep and well drained, also have a very firm substratum at approximately 28 inches that restricts the movement of water and the development of roots. This is the main limitation on development in this area. The minor soils in this association are Ridgebury, Pittstown, and Windsor. (Somerset Conservation, Recreation, and Open Space Plan, 2004).

2.4.3 Topography and Hydrology

The southern half of Somerset is a peninsula with the terrain of the land rising gradually on three sides from the shoreline up to an elevation of approximately 180 feet above mean sea level. This elevation occurs in the area near Hot and Cold Lane, in the vicinity of the Swansea town line. In the northern section of the two the land slopes gradually westward to elevations of from 120 to 140 feet above mean sea level. Stony soils prevail in the western part of town, while good textured, well-watered loam prevails in the eastern part. **Figure 2-8** *shows the topography in Somerset.*

Somerset lies within the Lees River Sub-watershed, part of Mt. Hope Bay Watershed, to the west, and, the Lower Taunton River Watershed, part of the Taunton River Watershed, to the east. Approximately 83% (4,208 acres) of Somerset's land area is located within the Lower Taunton River Watershed. Inland waterways tend to be narrow and low to moderate flow, such as Buffinton

Brook and Labor in Vain Brook, draining the town to the larger, tidal, Taunton River. Wetlands and marsh border these streams, as do the significant inland flood plain areas of the town.

The Taunton River coastline is home to Pierce Beach and Waterfront Park, two heavily used recreation areas in Somerset. These coastal amenities provide fishing, swimming and boating opportunities. There are several areas along the coast that provide excellent passive recreational and scenic viewing opportunities, such as Broad Cove, Anchor Drive and Mt. Hope Bay Vista Park.

The only large water body within the town is the Somerset Reservoir. This surface water impoundment lies off of Whetstone Hill Road, Elm Street, and North Street. The reservoir has a capacity of 1.4 billion gallons and a watershed of approximately 1.8 square miles, almost 50 percent of which is located in the Town of Dighton, to the north. (Somerset Conservation, Recreation, and Open Space Plan, 2004).

Data Sources:
Town of Somerset, MA;
MassGIS;
USGS;
USDA NRCS;
USF&WS;
MassDEP;
Other agencies affiliated with MassGIS-distributed data;
ESRI;
Map Developed by Wright-Pierce, 2018.
REHOBOTH
DIGHTON
BERKLEY
FREETOWN
SWANSEA
FALL RIVER
Somerset Reservoir
Taunton River
Lee River
Mt. Hope Bay
N
Legend
10-Ft Contour Interval
Open Water
River/Stream
Wetland
Topography
Somerset, MA
PROJ NO: 14110
DATE: 11/13/2018
FIGURE: 2-8
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2.4.4 Environmentally Sensitive Areas

2.4.4.1 ACEC

The Areas of Critical Environmental Concern (ACEC) Program falls under the Department of Environmental Management, EOEEA, and was established in 1975. Since that time, 30 ACECs, comprised of 268,000 acres, have been designated in Massachusetts ranging from the Berkshires to the North Shore, to Cape Cod. Currently, no ACECs are designated in the Town of Somerset.

2.4.4.2 Wetlands

Over its 5,051 acres of land area, Somerset retains 814 acres of forestland, 97 acres of salt marsh and 23 acres of inland wetland areas/ Over 90% of the forested land is made up of hardwoods, including white oak and red maple. The remaining forested land is made up of a mix of hardwood and softwood, including Atlantic white cedar and Eastern white pine.

The wetland areas of the Town are characterized by red maple, white cedar, sumac, spicebush and alder. Salt marsh vegetation is extremely valuable to the ecology of the Taunton River and Mt. Hope Bay Watersheds. Somerset's 97 acres of salt marsh are comprised of salt meadow cord grass and salt marsh cord grass. This is a limited and threatened resource on the landscape of the bay and has been targeted for preservation and restoration by the Taunton River Wild & Scenic Study Committee and Save the Bay (RI). Large, contiguous areas of salt marsh are found along Broad Cove with more linear patterns occurring along the eastern coast of the Town.

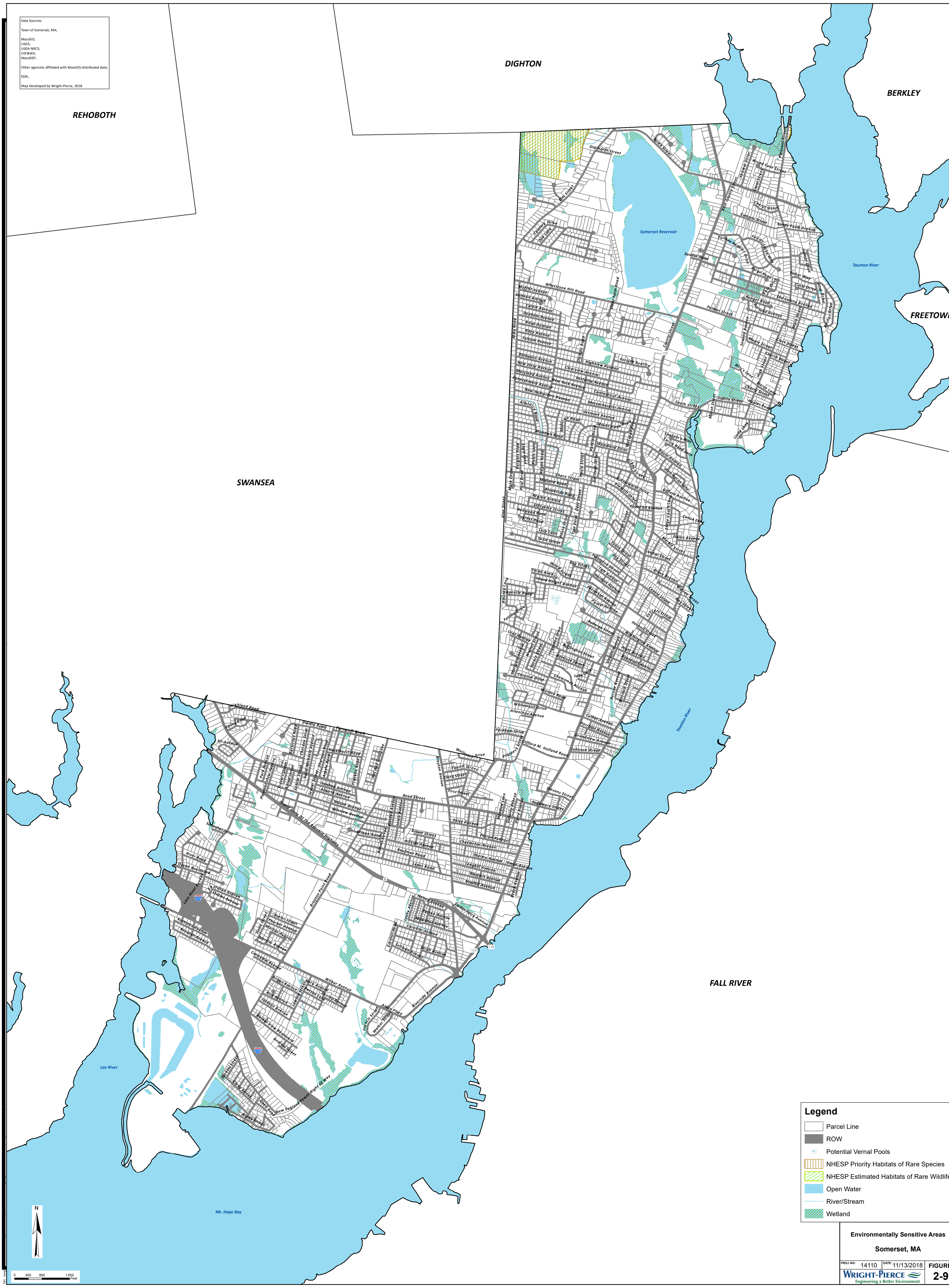
Somerset also has a wonderful scenic drive along its tidal eastern coastline. The drive along Route 138, Riverside Drive, South Street, High Street, and Pleasant Street, roughly parallels the Taunton River. This route is highlighted by views of the coastal marsh, shade covered roadways, river scenes, and historic homes. (Somerset Master Plan, 2006).

2.4.4.3 Species Habitat

The Massachusetts Division of Fisheries and Wildlife, Natural Heritage & Endangered Species Program (NHESP) has a goal to protect the state's native biological diversity through a comprehensive program of biological inventory and scientific research, species and habitat management and restoration, environmental impact review, and conservation planning. This *agency contains the BioMap. The BioMap identifies those areas of Massachusetts most in need of protection in order to conserve biodiversity for generations to come. Refer to* **Figure 2-9** *for the NHESP environmentally sensitive areas locations.*

The NHESP states that Somerset currently has only two species of special concern, the Spotted Turtle and the Purple Tiger Beetle. While the Spotted Turtle was only added to the atlas in 2003, the Purple Tiger Beetle is a historical record, having last been observed in 1907. Somerset also contains a small area of "Core Habitat" on the NHESP BioMap. Core Habitat consists of the most viable habitat for rare plants, rare animals and natural communities. This area in Somerset is located in the northwest corner of the town, near the reservoir, and is part of a larger area that extends predominantly north into Dighton and slightly west into Swansea.

Northeastern Somerset, from Broad Cove along the coast of the Taunton River to the Waterfront Park area, contains Critical Supporting Watershed Land, according to the NHESP Living Waters Map. The Taunton River, along this same stretch of Somerset's coastline, contains Core Habitat (that extends north and east over the course of the river). On the Living Waters Map, Core Habitat is defined as identifying important habitats for rare aquatic plants and animals and exemplary freshwater habitats. Critical Supporting Watershed is the portion of a Core Habitat's watershed with the greatest potential to sustain or degrade Core Habitat ecosystems. These locations in northeastern Somerset reflect the tidal influence of the bay and the strong freshwater contribution to the estuary by the Taunton River. (Somerset Conservation, Recreation, and Open Space Plan, 2004).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Mt. Hope Bay
Legend
Parcel Line
ROW
Potential Vernal Pools
NHESP Priority Habitats of Rare Species
NHESP Estimated Habitats of Rare Wildlife
Open Water
River/Stream
Wetland
N
0 400 800 1,600
Feet
Environmentally Sensitive Areas
Somerset, MA
PROJ NO: 14110
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FIGURE: 2-9
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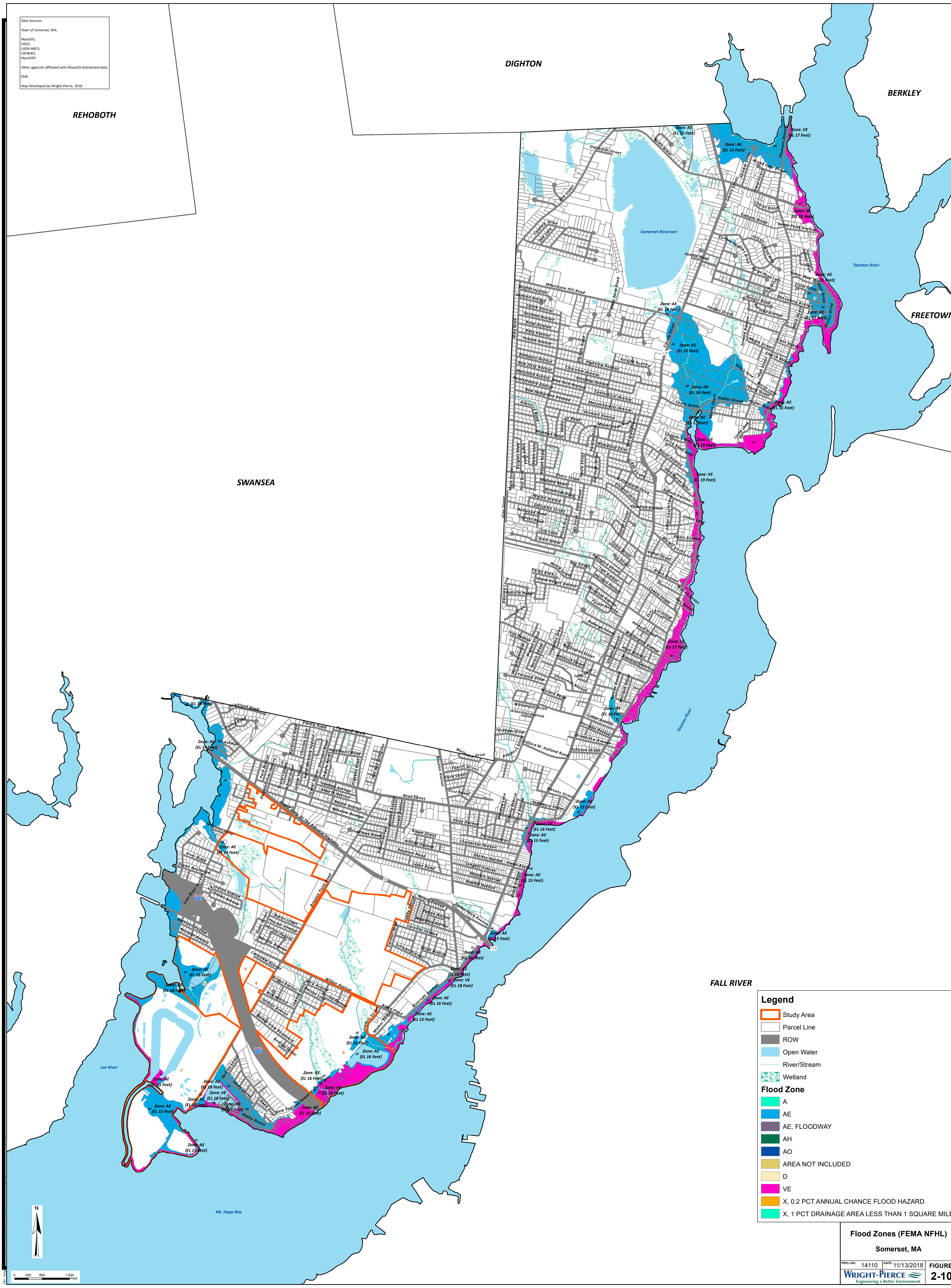
2.4.4.4 Wildlife Management Areas

Somerset has no designated Wildlife Management Areas (WMAs) protected through State legislation for the purpose of wildlife conservation and open space preservation.

2.4.4.5 Flood Plains

Flood plains located in Somerset have been identified through the Federal Emergency Management Agency (FEMA). FEMA is an independent federal agency under the U.S. Department of Homeland Security, with the charge of reducing the loss of life and property from all types of hazards. FEMA's Federal Insurance Administration runs the National Flood Insurance Program. This program offers federally backed flood insurance coverage to residents in more than 19,000 participating communities. As part of this program, Flood Insurance Rate Maps (FIRMs) are used to distinguish flood plains and determine the need for insurance. Refer to **Figure 2-10** for the floodplain map for the Town.

The flood zones are delineated for the 100-year flood boundary (Zone A), the 500-year flood boundary, areas of minimal flooding, and areas of undetermined but possible flood hazards (Zone D). According to FEMA, the most recent mapping available were generated in 2014. The most extensive flood plain areas are found along the Taunton and Lees Rivers. Widths of flood plains vary according to topography. Change in the types of land uses in Town will influence the size of the flood plains. Careful review of drainage controls for proposed developments will be necessary to avoid increasing flood problems.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Taunton River
Lee River
Mt. Hope Bay
Legend
Study Area
Parcel Line
ROW
Open Water
River/Stream
Wetland
Flood Zone
A
AE
AE, FLOODWAY
AH
AO
AREA NOT INCLUDED
D
VE
X, 0.2 PCT ANNUAL CHANCE FLOOD HAZARD
X, 1 PCT DRAINAGE AREA LESS THAN 1 SQUARE MILE
Flood Zones (FEMA NFHL)
Somerset, MA
PROJ NO: 14110
DATE: 11/13/2018
FIGURE: 2-10
WRIGHT-PIERCE
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2.4.5 Regional Water Quality

The Taunton River is designated as a Class B water by the State of Massachusetts. This means that it should meet the requirements of a warm water fishery and the criteria for the primary and secondary contact recreation. The river often does not meet this designated use standard. High levels of nutrients and bacteria, excessive plant growth and low dissolved oxygen have placed several sections of the Taunton River and its tributaries on the state list of impaired waters under section 303(d) of the Clean Water Act.

The majority of the nutrient and bacteria load to the Taunton River comes from sewage treatment plant discharges. Several sewage treatment plants discharge treated wastewater to the Taunton River and its tributaries, degrading water quality and aquatic habitat while causing the closing of shellfish beds in the lower river. The Taunton River from the Route 24 bridge in Taunton to the Berkley Bridge is on the 303(d) list for pathogens and the Taunton River below the Berkley Bridge to mouth of the river is listed for pathogens and organic enrichment/low dissolved oxygen. The Assonet River is listed for pathogens from the Route 24 bridge in Freetown to confluence with the Taunton River.

Water quality in the lower river has also been severely impacted by the discharge of heated effluent from the Brayton Point power plant in Somerset. This water-cooled, coal-fired plant discharges to Mount Hope Bay, resulting in the loss of groundfish such as winter flounder. The EPA has issued a draft permit calling for a 95% reduction in heated water discharged to the bay. (Somerset Master Plan, 2006). The Brayton Point power plant has been decommissioned as of May 2017, reducing its impact to the water quality of the Taunton River.

The Town of Somerset also participated in a Stream Team Survey of the town, including the coastal Mt. Hope Bay and Taunton River areas, as well as inland streams, brooks and tributaries. The survey was carried out in conjunction with the Massachusetts Riverways Program and the Taunton River Wild & Scenic River Study Committee. In general, the survey yielded several areas in need of clean-up because of debris, some areas of minor erosion and sedimentation, several pipes (some of which were discharging to the river) that need further investigation, and few areas of compromised stormwater conveyance structures (pipes, culverts, etc..). The most glaring problem *was found in Mallard Point, where an area of exposed fly ash was discovered. Children frequently play in this town-owned area.* (Somerset Master Plan, 2006).

2.4.6 Air Quality

Somerset was previously home to two electric power plants: the Brayton Point Power Station, and the Montaup Power Station. The Montaup facility was decommissioned in 2010, and the Brayton Point Facility was decommissioned in May of 2017. These two facilities have been the two largest impacts on air quality within the Town, however their impacts are now eliminated. The following is taken from the 2006 Town Master Plan:

Somerset is home to two electric power plants, Brayton Point Station, at Brayton Point, and Montaup Electric on Riverside Avenue. Both plants have caused concerns over air quality in the region in the past, particularly over the last twenty years. Currently, the Brayton Point facility has been the focus of local, state and interstate attention as the federal EPA has grappled with air and water quality issues related to the plant's operation.

The Brayton Point Station site consists of approximately 250 acres of land on Brayton Point, a peninsula in Somerset. The site is bordered by the Lee River to the west, the Taunton River to the east, a residential neighborhood and U.S. 195 to the north, and Mount Hope Bay to the south. The industrial facility, which operated from 1960 to 2017m generated approximately 1,600 megawatts (MW) of power. It consisted of three boilers fired primarily by coal and one boiler fired by fuel oil and natural gas (Units 1, 2, 3 and 4 respectively), and associated air pollution control systems, including four emission stacks. The power plant used a fly ash separation system to process 260,000 tons of coal fly ash from Units 1, 2, and 3. Fifty percent of the fly ash, which is low-carbon ash, was sold to as a product for concrete manufacturing. The remaining high carbon ash was disposed of in landfills or sent to cement kilns. (Somerset Master Plan, 2006).

2.4.7 Groundwater

The Somerset Water Department uses groundwater and surface water for water supply for the Town. Groundwater is supplied from Well # 2, which is located in Dighton, MA. The well is a 37-foot deep gravel-packed well that currently pumps water at approximately 200 gallons per minute. The well only provides water to the Main Street Village section of the Town, while the remaining residents source of supply is surface water from the Somerset Reservoir that is treated at the Town's Water Treatment Plant.

Due to the Town's large water distribution system, nearly all residents of the Town are supplied drinking water from the Town's Water Department. There are a few private wells installed in Town used for irrigation or drinking water purposes, however it is a very small amount. The Board of Health last took inventory of private wells in 2002. The list of private wells known to the Board of Health is included in **Appendix B**.

2.4.8 Noise

DEP has a Sound Policy that includes sound impact analyses for certain applications. In Somerset, DEP's regulations on sound are enforced by the Board of Health. According to the Board of Health, the primary source of potential noise problems in Somerset is from vehicular traffic; particularly, areas near Route 6, and 138. The Board of Health also investigates noise impacts (along with odor impacts) of potential businesses in town. In some cases, the town may require a mitigation plan. The town has access to sound monitoring equipment through DEP.

Section 3
Unsewered Study Areas

SECTION 3

UNSEWERED STUDY AREAS

3.1 INTRODUCTION

As previously presented in this report, approximately ninety-nine percent of Somerset residents rely upon the Town's municipal system to collect, transport, treat and dispose of its wastewater. Somerset is unique in that they have regulations in place where a resident or other property owner must connect to the Town sewer system if they sell their property/building, or their existing septic system "fails". However, there are a limited number of properties (largely residential), that still rely upon individual onsite (Title 5) wastewater disposal (septic) systems, as they have not had a recent property transfer, or their septic system has not failed. If operated under the right conditions, septic systems can provide a cost-effective solution for reliable wastewater treatment and disposal (minimal nutrient reduction from septic systems). Favorable conditions include appropriate soils (adequate percolation rates), adequate depth to groundwater, sufficient depth to bedrock, and spatial lot sizes, among other factors.

Under this phase of the CWMP, a Town-wide needs assessment was conducted for the non-sewered areas to evaluate whether conventional, on-site septic systems can provide adequate treatment for sanitation and environmental protection now and through the 20-year planning period.

3.2 ONSITE SUBSURFACE WASTEWATER DISPOSAL SYSTEMS

The total acreage for the Town of Somerset is approximately 8.1 square miles, of which, nearly all is served by the municipal sewer system. There are some onsite Title 5 wastewater disposal systems that exist within town, due to proper continuing operation of the system. Currently, the Somerset Board of Health (BOH) does not allow the installation of any onsite systems, and any onsite system discovered during a property transfer is required to connect to the public sewer before the transfer is complete.

The Somerset Board of Health is responsible for enforcing Massachusetts General Laws, State Environmental and Sanitary Codes, Town Ordinances and Regulations. Further, the Board of

Health has the primary responsibility of protecting and improving the public health and well-being of the Somerset Community. Currently, The Board of Health does not have records of Title 5 system construction, repair, and inspections, due to the limited occurrence of onsite systems because of the limited systems installed within the Town. A database of title 5 systems would help the Town identify potential failing onsite systems, and the need for potential connections to the sewer system. Due to their being no Town managed listing of onsite systems, identification of on-site systems was difficult. Recently the Town has switched its sewer service billing system from a tax system to a user fee system. All residents are required to pay the sewer use fee regardless if they are connected to the municipal sewer. As a result, there have been several residents that have selected to enter an Opt-out Agreement, allowing them to not pay for the sewer fee until they are required to connect to the sewer system. The Town has entered into four such agreements, and these are currently the only title 5 systems currently known to the Town. Copies of these agreements are included in **Appendix E**.

For many communities, regulations such as Title 5 have been used to institute standards for design, construction and operations of septic tanks.

As stated in MassDEP's 310 CMR 15, the purpose of Title 5 provisions are *intended to provide safe, efficient, and economical means of collecting, transporting and disposing of septage. Title 5 also maintains an affiliation with the Environmental Protection regulations which determine the siting constraints within which wastewater handling systems may be installed.*

Parameters that must be considered for inclusion in elevation criteria include: soil classification, structure, texture, depth, drainage and permeability, ground and surface water location and season high elevation, geology, topography and climate. Each of these factors plays a role in the proper treatment of effluent from a septic system, and if not considered appropriately, can contribute to improper or incomplete treatment. Additionally, the hydraulic conductivity and the hydraulic gradient at the disposal site should be appropriately assessed to determine whether the site is capable of transmitting the volume of water that will be discharged from the system.

According to 310 CMR 15.03 (7), *Title 5 regulations currently require that in siting septic tanks, leaching structures, and the other appurtenances associated with a septic tank/soil absorption system, certain minimum horizontal separation distances must be maintained.*

Setbacks distances refer to the horizontal or lateral distance between the various components of the septic tank/soil absorption system and areas, or items of concern. Generally, the specified separation distances are intended to provide adequate transport time for the passage of the effluent through the soil where the concentrations of contaminants are expected to be reduced by filtration, straining, physical-chemical processes, biological activity and dilution and dispersion.

Setbacks from surface water bodies are generally considered necessary to reduce the risk of contamination by pathogenic micro-organisms and the harmful eutrophication effects instilled by the introduction of high concentrations of nitrates and phosphates. The only conventional means of protecting surface water bodies is through designs which promote proper treatment in the unsaturated zone and the maintenance of low septic system densities which allow for adequate dilution.

The majority of states use 100 feet for private wells and between 100 to 200 feet for public wells.

A Zone II is a wellhead protection area that has been determined by hydro-geologic modeling and approved by the Department of Environmental Protection's (DEP) Drinking Water Program (DWP). Zone II was developed for predicting future nitrate loading under steady state conditions in zones of contribution to water supplies. The Drinking Water Regulations require Wellhead Protection By-Laws to prohibit the use of individual sewage disposal systems which discharge more than 440 gallons per acre.

If a septic system is not properly maintained, failures that impact the homeowner and environment may occur. Failed septic systems can lead to sewage backup in one's home, groundwater contamination and/or private well contamination and wastewater surfacing onto their property. In terms of the public's wellbeing, a failed septic system can lead to water supply contamination and impacts on surrounding water bodies, which may include, algae blooms, dead fish and closing of public swim areas (beaches, lakes etc.).

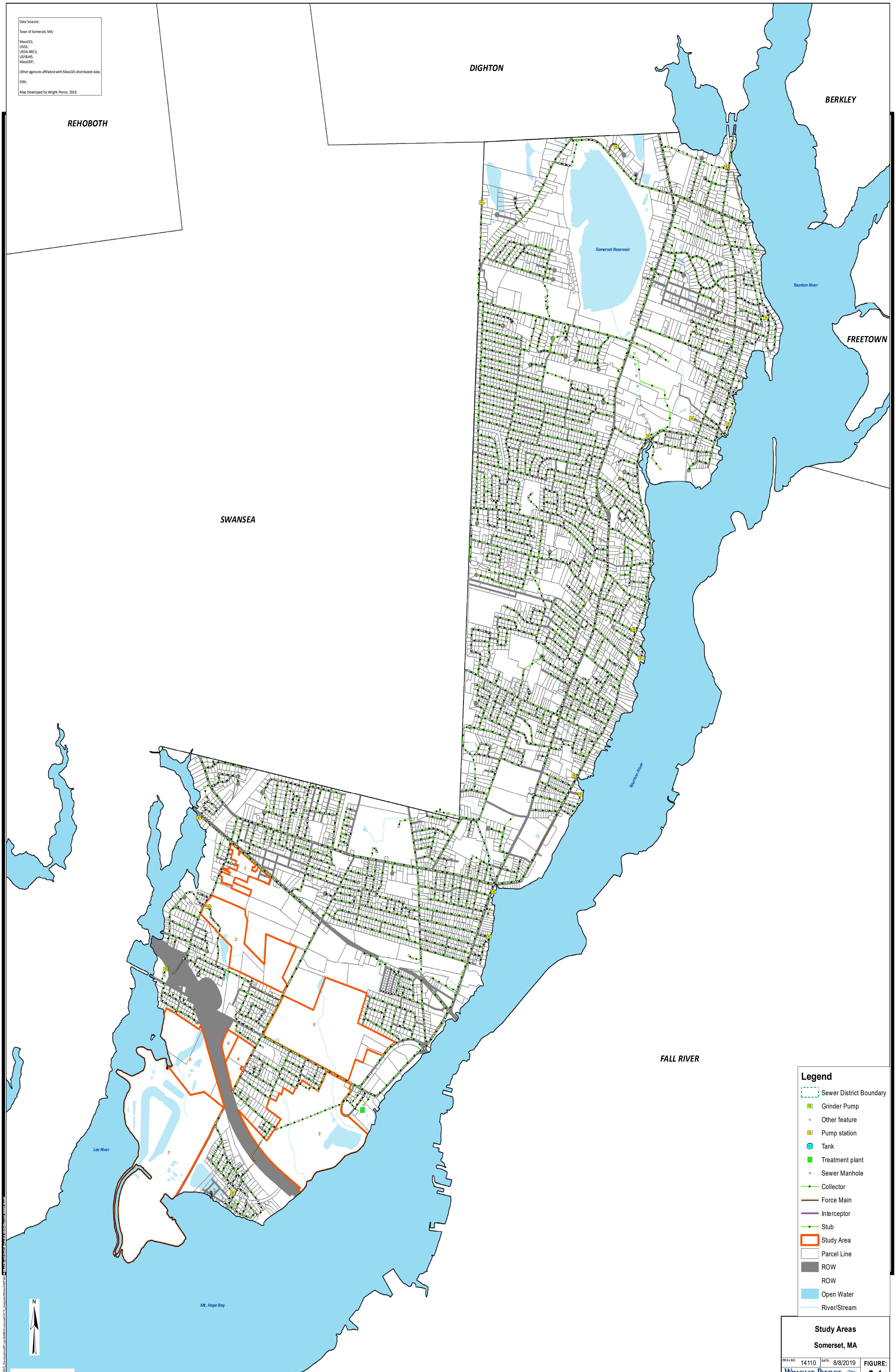
Education and public relations are an important aspect of septic system management. When the public is aware of the environmental consequences, they can help prevent ground water contamination and understand the proper siting, design, installation and maintenance of septic systems.

Signs that a septic system may be failing include:

- Sewage surfacing over the drainfield (especially during wet weather events)
- Sewage backup
- Algae growth over the drainfield
- Slow draining toilets or drains, and
- Sewage odors in and around the household.

3.3 SEWER SERVICE NEEDS AREAS

The overall purpose of this evaluation is to determine if there are any immediate needs for municipal sewer extensions within Somerset. It is understood that there are very few individual septic systems currently in operation in Somerset. It is estimated that there may be a few hundred homes still operating septic systems, however it is reported that all of these properties should have connection to the municipal sewer available in the street. Given that the average residential parcel size in Somerset is approximately ½ - 1-acre, individual onsite septic systems are largely not a suitable method of wastewater disposal. To complete the needs assessment, the non-sewered areas were divided into seven study areas based on geographical location and various other physical and environmental criteria. The non-sewered areas in Somerset are largely undeveloped areas. Gravity sewer is available on nearly every developed street as shown on the Study Areas map **Figure 3-1**. The evaluation of the seven study areas considers the existing conditions of each study area (i.e., in current undeveloped state, lot size, etc.). It is assumed that developable areas near a municipal sewer will connect to the municipal sewer system. Projected future flows from build-out scenarios within these study areas are included in Section 4 of this report.



Study Areas

Somerset, MA

PROJ NO: 14110 DATE: 8/8/2019

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FIGURE: 3-1

Each study area was assessed using a two-tiered system. For Tier 1, each parcel of land within the study area was examined for primary and secondary ranking criteria. Primary criteria include soil/drainage conditions, depth to groundwater, depth to bedrock, on-site private water systems, and parcel size. Secondary criteria include drinking water protection zone proximity, areas with regulated setbacks, flood plain classification, habitat areas, and historic district. In the Tier 2 analysis, other criteria, such as existing zoning restrictions, were used to supplement the Tier 1 analysis. After the two-tiered analysis was completed, specific "needs areas", if any, can be identified. A more detailed discussion of the methodology used to rank the study areas is presented in the following sections.

3.3.1 Determination of Study Area Boundaries

As shown in **Figure 3-1**, a total of seven study areas were created and analyzed as part of this CWMP. The study areas are all located in non-sewered and non-developed areas located outside of the Town's existing sanitary sewer collection system. The boundaries for each of the study areas are based on a number of criteria and environmental conditions. Protected open space parcels and other non-developable parcels (including Chapter 61, 61A, 61B and other protected lands) were removed from the development of study areas. Study areas were also developed based on surrounding physical characteristics such as street location, parcel size, topography, surface water, watersheds or other visual observations made while visiting the areas. A summary of the study areas' number of parcels and area is shown below in **Table 3-1**.

TABLE 3-1

STUDY AREAS SUMMARY

Study Area	Number of Parcels	Area (acres)
1 – Route 6	4	18
2 – Brayton Point Road, West	3	67
3 – Brayton Point Road/ Wilbur Ave	3	130
4 – Interstate 195	2	15
5 – Taunton River, waterfront	2	144
6 – Lees River, waterfront	3	65
7 – Brayton Point	1	235
Totals:	18	674

3.3.1.1 Study Area Descriptions

The following sections provide a detailed description of the evaluation for each individual study area and its overall needs assessment.

3.3.1.1.1 *Study Area 1 – Route 6*

As shown in **Figure 3-1**, Study Area 1 is located in the western part of Somerset. It is located along the route 6 corridor, near the Swansea and Somerset border. This study area encompasses approximately 18 acres and is comprised of 4 parcels. The area has some poor soils, but some very good soils. Outside of the surface waters, the depth to groundwater is greater than 10 feet. There is no bedrock impact in this area and the lots are greater than one acre. There are no drinking water protection zones. There is no flooding impact in the area. There are no vernal pool locations or estimated habitat areas. Area 1 also does not contain any historical districts.

Based on our evaluation, Study Area 1 received a total score of 6 points and was categorized as a Low needs category area.

Study area 1 is primarily located in commercial and light industrial zoning areas. The properties that are located along route 6 have municipal sewer access, however there are some properties that do not have road frontage on route 6 and would require sewer extensions to connect to the sewer. The Town does not anticipate future development at these parcels. This study area will not be further evaluated due to the low needs ranking and no anticipated development within the area.

3.3.1.1.2 *Study Area 2 – Brayton Point Road, West*

Study Area 2 is located in the south western part of Somerset, west of Brayton Point Road and just north of I-195. This study area encompasses approximately 67 acres and is comprised of 3 parcels. The area has predominantly poor soils. Outside of the surface waters, the depth to groundwater is greater than 10 feet. There is no bedrock impact in this area and the lots are greater than one acre. There are no drinking water protection zones. There is a small flooding impact in the area. There are no vernal pool locations or estimated habitat areas. Area 1 also does not contain any historical districts.

Based on our evaluation, Study Area 2 received a total score of 11 points and was categorized as a Low needs category area. Study Area 2 is located in residential zoning but is not likely for future development. The parcels located in this area are currently owned by National Grid, and they have not indicated any interest in selling or developing these parcels. This area is not further evaluated due to the low needs ranking and low possibility of future development within the planning period.

3.3.1.1.3 *Study Area 3 – Brayton Point Road/ Wilbur Avenue*

Study Area 3 is located in the south eastern part of Somerset. It is located south of the route 6 corridor and east of Brayton Point Road. This study area encompasses approximately 130 acres and is comprised of 3 parcels. The area has some poor soils around the wetlands, but some very good soils. Outside of the surface waters, the depth to groundwater is greater than 10 feet. There is no bedrock impact in this area and the lots are greater than one acre. There are no drinking water protection zones. There is no flooding impact in the area. There are 5 potential vernal pool locations and no estimated habitat areas. Area 3 also does not contain any historical districts.

Based on our evaluation, Study Area 3 received a total score of 9 points and was categorized as a Low needs area under existing conditions. The Town has indicated that this area contains a large parcel that is currently Town-owned, but they are pursuing possible development options. The parcel is located in residential zoning; however, the Town is currently evaluating other potential uses that would offer the best benefit to the Town. The impact of future wastewater flows generated from this area is discussed in Section 5.

3.3.1.1.4 *Study Area 4 – Interstate 195*

Study Area 4 is located in the south western part of Somerset. It is located just north of I-195 and west of Brayton Point Road. This study area encompasses approximately 15 acres and is comprised of 2 parcels. The area has very good soils. The depth to groundwater is greater than 10 feet. There is no bedrock impact in this area and the lots are greater than one acre. There are no drinking water protection zones. There is no flooding impact in the area. There are no vernal pool locations or estimated habitat areas. Area 4 also does not contain any historical districts.

Based on our evaluation, Study Area 4 received a total score of 0 points and was categorized as a Low needs category area. This area is currently owned by National Grid, which has made no indication of future development in this area. If this area were developed, the area could readily be serviced by the municipal sewer, due to its proximity to the sewer on Brayton Point Road. Because there is not any expected development in this area in the near future, the future wastewater contributions are not further considered.

3.3.1.1.5 *Study Area 5 – Taunton River, Waterfront*

Study Area 5 is located in the south eastern part of Somerset. It is located just north of I-195 and along the Taunton River waterfront. This study area encompasses approximately 144 acres and is comprised of 2 parcels. The area has a significant amount of wetlands and surface water which has led to some very poor to poor soils. Outside of those areas the soils are very good to good. Outside of the surface waters and riverfront, the depth to groundwater is greater than 10 feet. There is no bedrock impact in this area and the lot is greater than one acre. There are no drinking water protection zones. There is significant flooding impact around the riverfront but none as you get further inland on the parcel. There are 2 potential vernal pool locations but no estimated habitat areas. Area 5 also does not contain any historical districts.

Based on our evaluation, Study Area 5 received a total score of 16 points and was categorized as a Low needs category area. Study area 5 contains two parcels that are currently in industrial zoning and undeveloped. It is not clear that there are any future development plans for this area. Due to the uncertainty of development in this area, this study area is not further evaluated for future flow impacts. There is currently a sewer main that runs through this parcel from Harbor View Boulevard to the WPCF. It is likely that if this parcel were developed, the property would be connected to this sewer line.

3.3.1.1.6 *Study Area 6 – Lees River, Waterfront*

Study Area 6 is located in the south western part of Somerset. It is located just south of I-195 and is on the Lee River waterfront. This study area encompasses approximately 65 acres and is comprised of 3 parcels. The area has some very poor to poor soils around the surface waters and wetlands, but some very good soils in the north west corner. Outside of the surface waters, the depth to groundwater is greater than 10 feet. There is no bedrock impact in this area and the lots are greater than one acre. There are no drinking water protection zones. There is significant flooding impact in the area around the river front and the surface waters. There are no vernal pool locations or estimated habitat areas. Area 6 also does not contain any historical districts.

Based on our evaluation, Study Area 6 received a total score of 15 points and was categorized as a Low needs category area. The area is currently owned by National Grid and it does not seem that there are any future plans for development within this area. The area is located along the Lees River Waterfront, and adjacent to the former power plant. This area will not be further evaluated as it received a low needs ranking and does not seem that there are any plans for development in the near future. If the areas in this parcel were developed into smaller residential lots, the study area could likely become a high needs area, due to the smaller lot sizes. Connection to the municipal sewer system would likely be completed by extension of the sewers located on Home Street or Brayton Point Road.

3.3.1.1.7 *Study Area 7 – Brayton Point*

Study Area 7 is located in the south western part of Somerset. It is located at the tip of the peninsula with river frontage on both the Lee and Taunton Rivers. This study area encompasses approximately 235 acres and is comprised of 1 parcel. The soil condition is unknown for this parcel as it is mostly paved. Outside of the surface waters, the depth to groundwater is greater than 10 feet. There is no bedrock impact in this area and the lots are greater than one acre. There are no drinking water protection zones. There is flooding impact around the river frontage areas and along some of the low laying areas in the middle of the parcel. There are no vernal pool locations or estimated habitat areas. Area 1 also does not contain any historical districts.

Based on our evaluation, Study Area 7 received a total score of 12 points and was categorized as a Low needs category area. The area is located in industrial zoning and is currently in transition from a coal-burning power plant and will be the site of a new industrial use, however the exact use is still not clear. For the near term, the site is currently being advertised as a staging site for future off-shore wind farms located in Southeastern Massachusetts and on the Cape. It is not expected that the planned short-term use will generate new wastewater loads in excess of those generated by the former power plant. There is currently a connection to the municipal sewer for the power plant, that would be used for future wastewater disposal at this site. It appears that there is currently no need for further evaluation of future flow contributions. If the area is further developed and sub-divided for multiple users, then future flows should be further considered. It is likely that if the sewer is extended further to the coast for future development, then a new pump station will likely be required to convey wastewater into the gravity system, due to the area's topography.

3.3.2 Needs Rating Methodology

The needs assessment rating methodology focused on avoiding sanitary problems, protecting the Town's drinking water supplies, reducing nutrients to surface waters, and maintaining community character. Each of these study areas was evaluated using a two-tiered approach to assess the wastewater needs for that study area. Each study area received a score based on the analysis criteria. Then, all study areas were ranked based on the scores. The study areas with a score greater than 25 are considered as "high needs areas". Depending on several evaluative criteria, a "needs area" may or may not be well suited to utilize a conventional, onsite septic system to provide adequate means of treatment and environmental protection throughout the 20-year planning period. Any identified unsewered "needs areas" are typically then further evaluated for alternative solutions, including connection to the Town's existing wastewater collection system; septage and/or nutrient management plans; innovative/alternative (I/A) systems; or decentralized or communal collection and treatment systems.

3.3.2.1 Tier 1

For the Tier 1 assessment, each study area was evaluated based on a study-area-wide approach. This assessment was derived from the data received from various stakeholders, including the Board of Water and Sewer Commissioners, Board of Health, Planning Board, Assessors' Office, Massachusetts Geographical Information System (MassGIS), and the Natural Resources Conservation Services (NRCS). The Tier 1 primary and secondary criteria are summarized below:

Primary Criteria (Ranking 0 to 10)	Secondary Criteria (Ranking 0 to 5)
• Soil Type / Drainage Class • Depth to High Groundwater Elevation • Depth to Bedrock • Lot Sizes • Private Wells	• Drinking Water Protection Districts • Surface Water Protection - Areas with Regulated Setbacks (Title 5 restrictions) • Flood Plains • Priority/ Estimated Habitat Areas • Historic Districts

Each of the above listed primary criteria were ranked from 0 to 10. A score of "0" represents that a criterion had no negative impact, while a score of "10" means that the criterion had the most negative impact. To differentiate the importance of primary criteria from secondary criteria, the scoring for the secondary criteria ranged only from 0 to 5 points. The maximum number of points that a study area could receive is 75 points. After all of the study areas were analyzed and each study area received its total score, the study areas were placed into prioritized needs categories as discussed later in this section.

The following sections provide a more detailed discussion for the primary and secondary evaluative criteria and their scoring systems.

3.3.2.2 Primary Criteria

There were five primary criteria conditions that were analyzed to determine if individual onsite septic systems could serve as viable options for the parcels within the study areas. A brief discussion of each evaluative criterion is presented in the following paragraphs.

3.3.2.2.1 *Soil Type / Drainage Class*

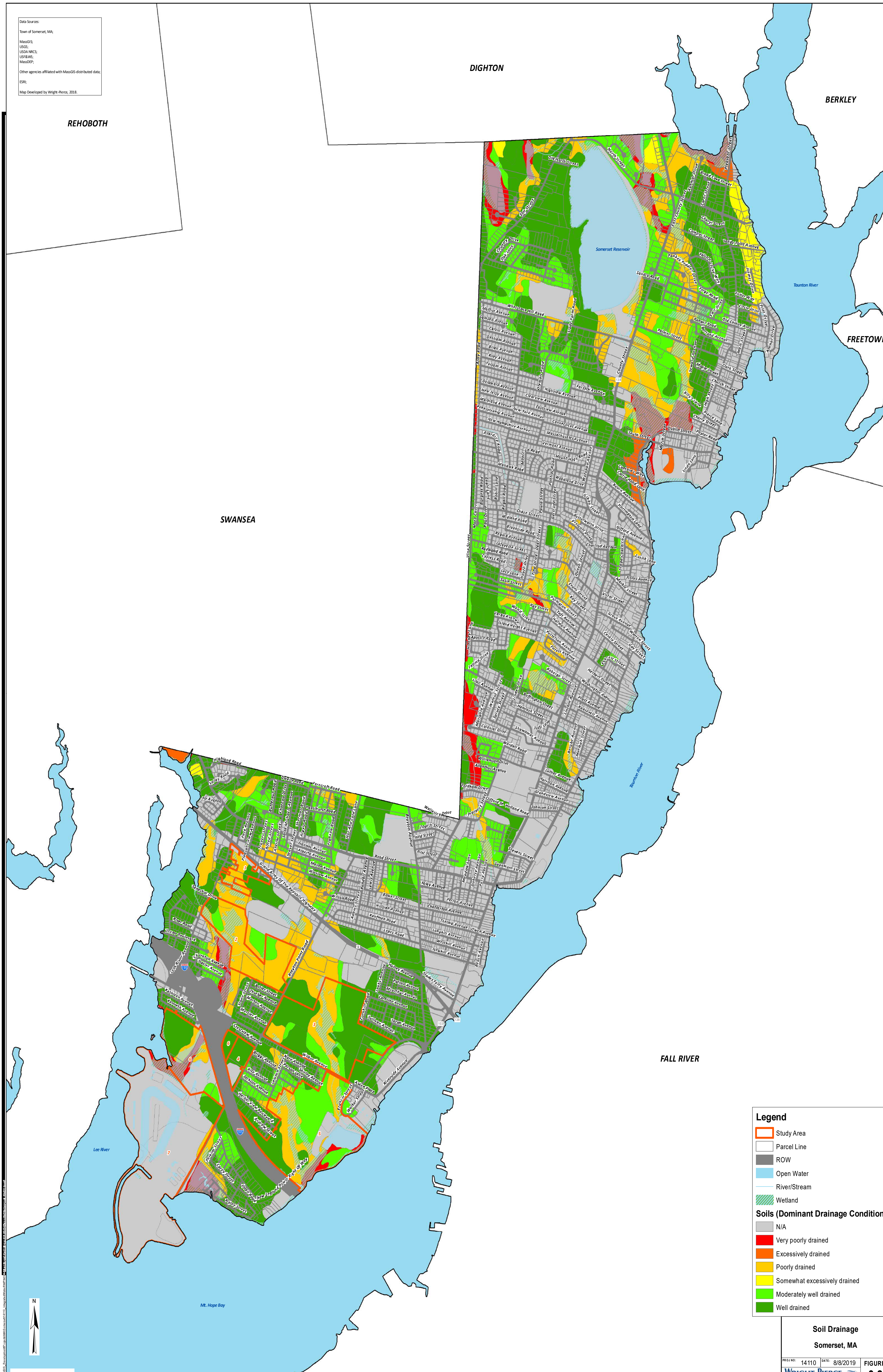
Each of the study areas were evaluated based on its soil drainage qualities. Soil classifications were determined using NRCS data. Each soil type in the Town of Somerset was classified using NRCS drainage categories.

It is noted that the NRCS data considers soils classified as excessively drained as a severe soil type. These gravelly soils are often noted to have 'fast perc's of less than 2 minutes per inch (mpi). Title 5 does allow septic systems to be constructed under these conditions, but it must have a 5-foot separation to groundwater. Only a 4-foot separation to groundwater is required for perc rates above 2 mpi. The soil drainage class ranking system is included in **Table 3-2**. **Figure 3-2** shows the Soil Type / Drainage class.

TABLE 3-2

SOIL DRAINAGE CLASS RANKING SYSTEM

Soils/Drainage Class	Score
Very Poorly Drained	10
Excessively Drained	8
Poorly Drained	6
Somewhat Excessively Drained	4
Moderately Well Drained	2
Well Drained	0



Soil Drainage

Somerset, MA

PROJ NO: 14110 DATE: 8/8/2019 FIGURE: 3-2

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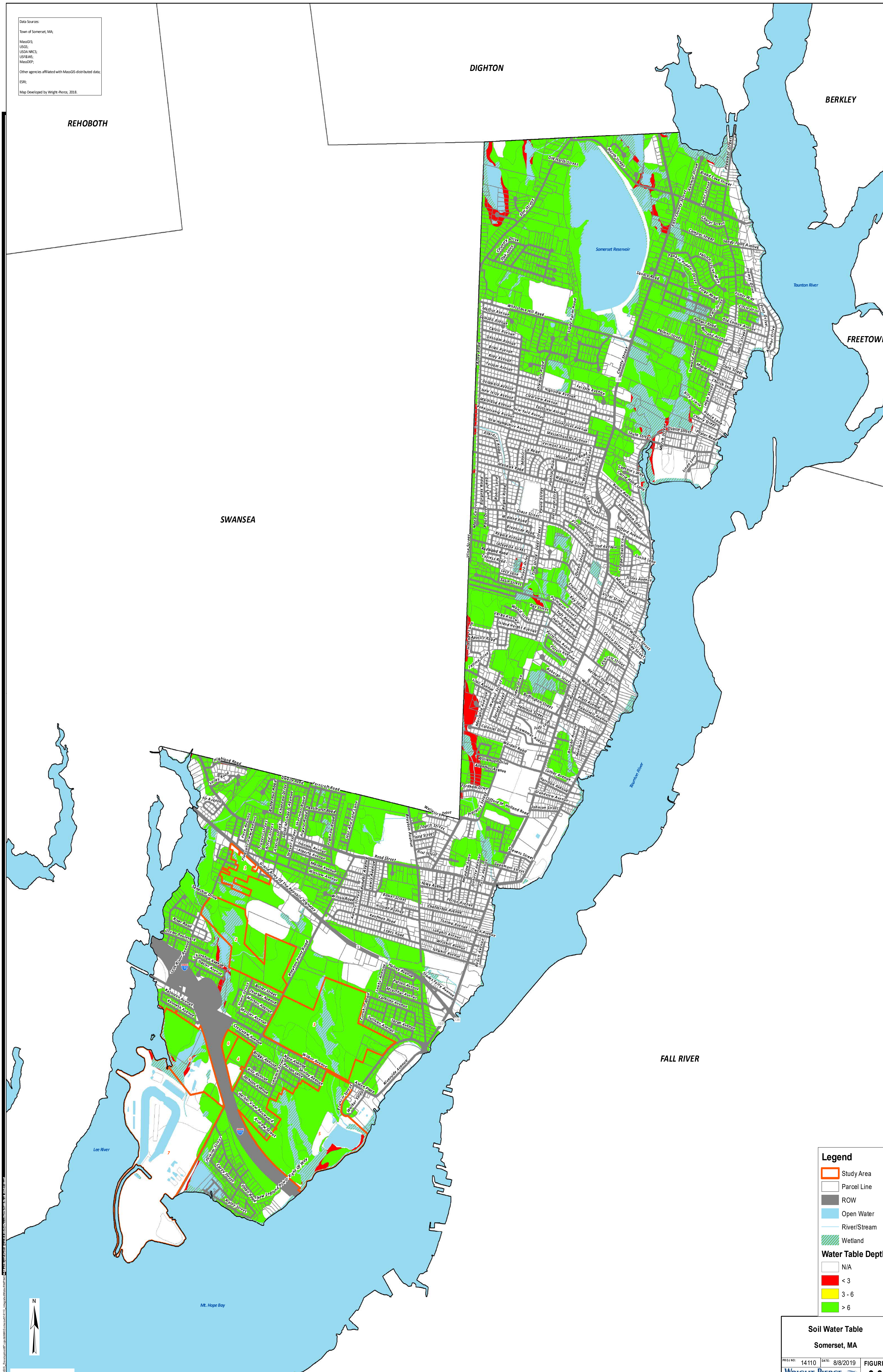
3.3.2.2.2 *Depth to High Groundwater Elevation*

An estimate of the annual maximum high groundwater elevation was determined from the best available information obtained from NCRS. The State's Title 5 regulations mandate particular requirements for on-site wastewater disposal systems in regard to groundwater elevation. Specifically, these regulations require a minimum vertical separation distance from the bottom of the on-site wastewater disposal system to the top of the seasonal high groundwater elevation of 4 feet in soils where the percolation rate is greater than 2 mpi and 5 feet in soils where the percolation rate is less than or equal to 2 mpi. The ranking system for the depth to water table is included in **Table 3-3** below. **Figure 3-3** shows the High Groundwater elevation map.

TABLE 3-3

DEPTH TO HIGH WATER TABLE RANKING SYSTEM

Depth to High Groundwater Elevation	Score
Less than 4 feet	10
4 - 6 feet	5
Greater than 6 feet	0



Data Sources:
Town of Somerset, MA;
MassGIS;
USGS;
USDA NRCS;
USF&WS;
MassDEP;
Other agencies affiliated with MassGIS-distributed data;
ESRI;
Map Developed by Wright-Pierce, 2018.
DIGHTON
BERKLEY
REHOBOTH
Somerset Reservoir
Taunton River
FREETOWN
SWANSEA
Taunton River
FALL RIVER
Lee River
Mt. Hope Bay
Legend
Study Area
Parcel Line
ROW
Open Water
River/Stream
Wetland
Water Table Depth
N/A
< 3
3 - 6
> 6
N
0 400 800 1,600
Feet
Soil Water Table
Somerset, MA
PROJ NO: 14110
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FIGURE: 3-3
WRIGHT-PIERCE
Engineering a Better Environment

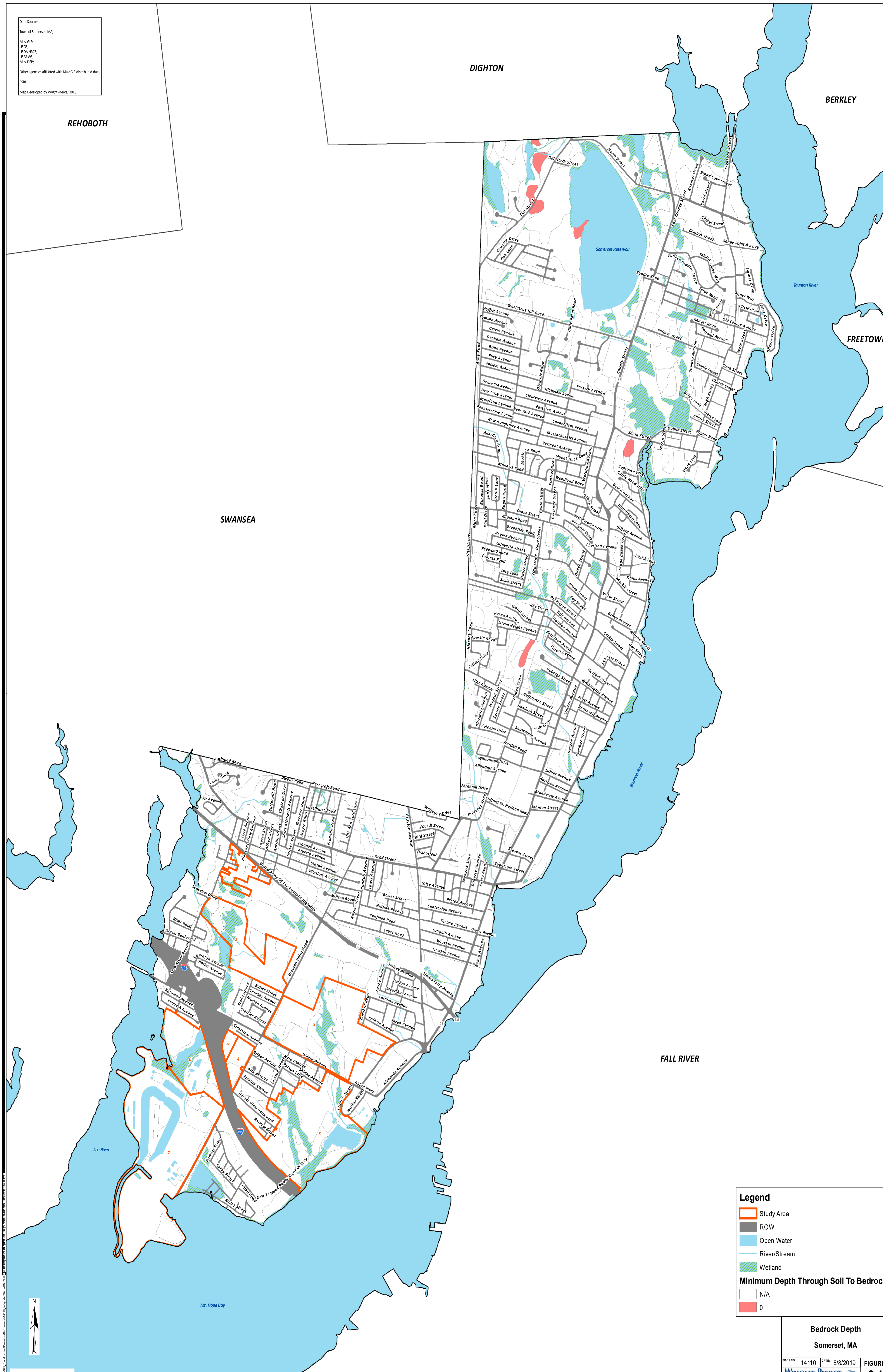
3.3.2.2.3 *Depth to Bedrock*

Another primary criterion used as part of the Tier 1 evaluation ranking system was the depth to bedrock as shown in **Table 3-4** below. NCRS typical soil type descriptions relative to bedrock depth were used for each of the Study Areas as appropriate to approximate the depth to bedrock. No soil exploration (borings) were performed as part of this evaluation. Engineering design standards/practices recommend a depth to bedrock greater than 6.5 feet or it could negatively impact the septic system design. The 6.5-foot depth to bedrock is derived from standards that recommend 6-inches of top soil (cover), four feet for the subsurface disposal system and two feet of aggregate below the system. While it is possible to install septic systems in areas with shallow bedrock, these septic systems are generally costlier to design and build. **Figure 3-4** shows the Depth to Bedrock map.

TABLE 3-4

DEPTH TO BEDROCK RANKING SYSTEM

DEPTH TO BEDROCK	SCORE
Less than 4 feet	10
4-6.5 feet	5
Greater than 6.5 feet	0



Data Sources:
Town of Somerset, MA;
MassGIS;
USGS;
USDA NRCS;
USF&WS;
MassDEP;
Other agencies affiliated with MassGIS-distributed data;
ESRI;
Map Developed by Wright-Pierce, 2018.
REHOBOTH
DIGHTON
BERKLEY
FREETOWN
SWANSEA
FALL RIVER
Somerset Reservoir
Taunton River
Lee River
Mt. Hope Bay
Legend
Study Area
ROW
Open Water
River/Stream
Wetland
Minimum Depth Through Soil To Bedrock
N/A
0
Bedrock Depth
Somerset, MA
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FIGURE: 3-4
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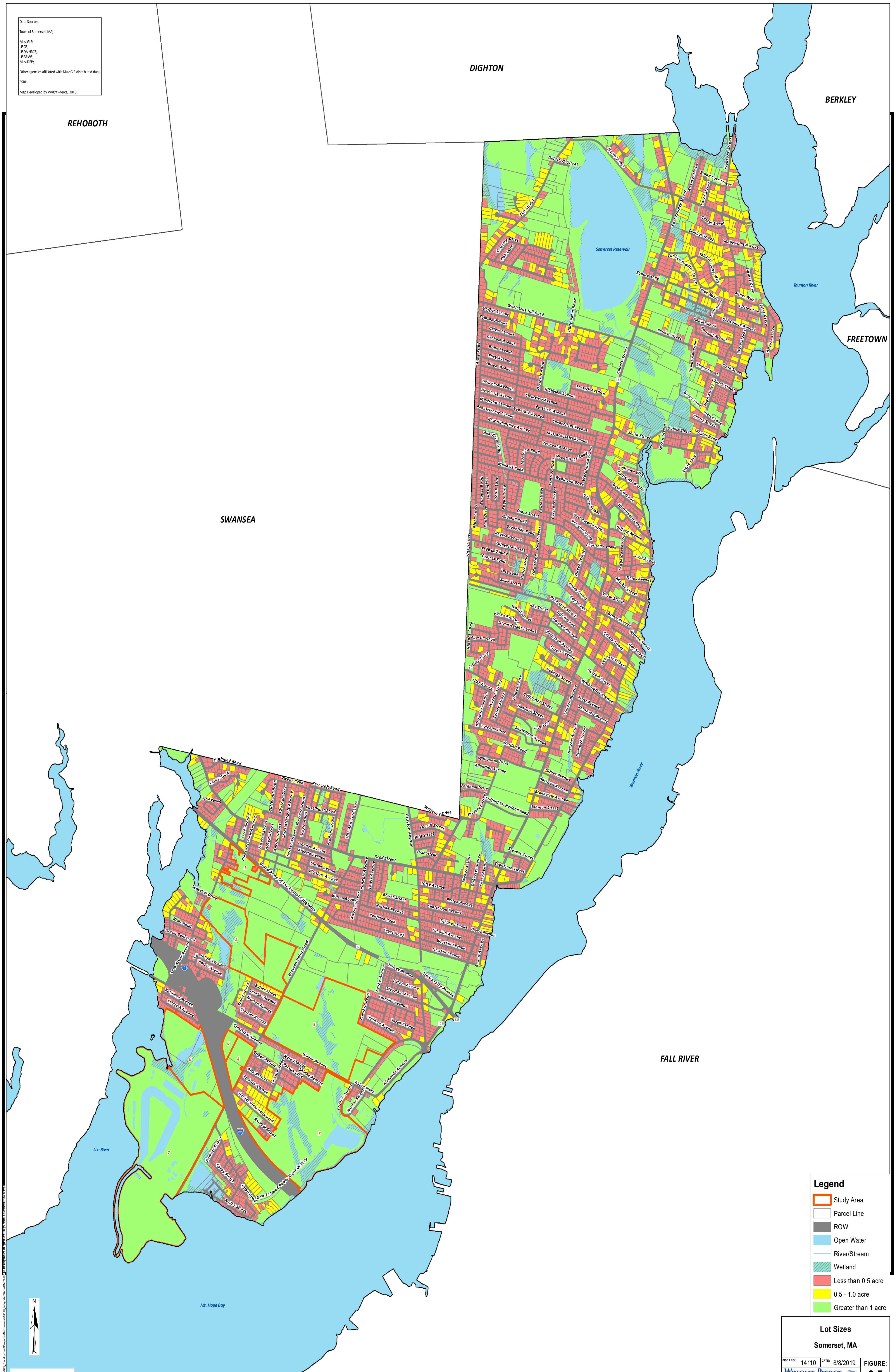
3.3.2.2.4 *Lot Size*

Each of the parcel's size (area) was a primary criterion that was included as part of the Tier 1 evaluation. Smaller lot sizes, less than ½ acre, rated higher in the ranking system, as shown in **Table 3-5**, for its anticipated inability to comply with all of the Title 5 requirements. **Figure 3-5** shows the lot size map.

TABLE 3-5

LOT SIZE RANKING SYSTEM

Lot Sizes	Score
Less than 0.5 acre	10
0.5 - 1.0 acre	6
Greater than 1 acre	0



Lot Sizes

Somerset, MA

PROJ NO: 14110 DATE: 8/8/2019

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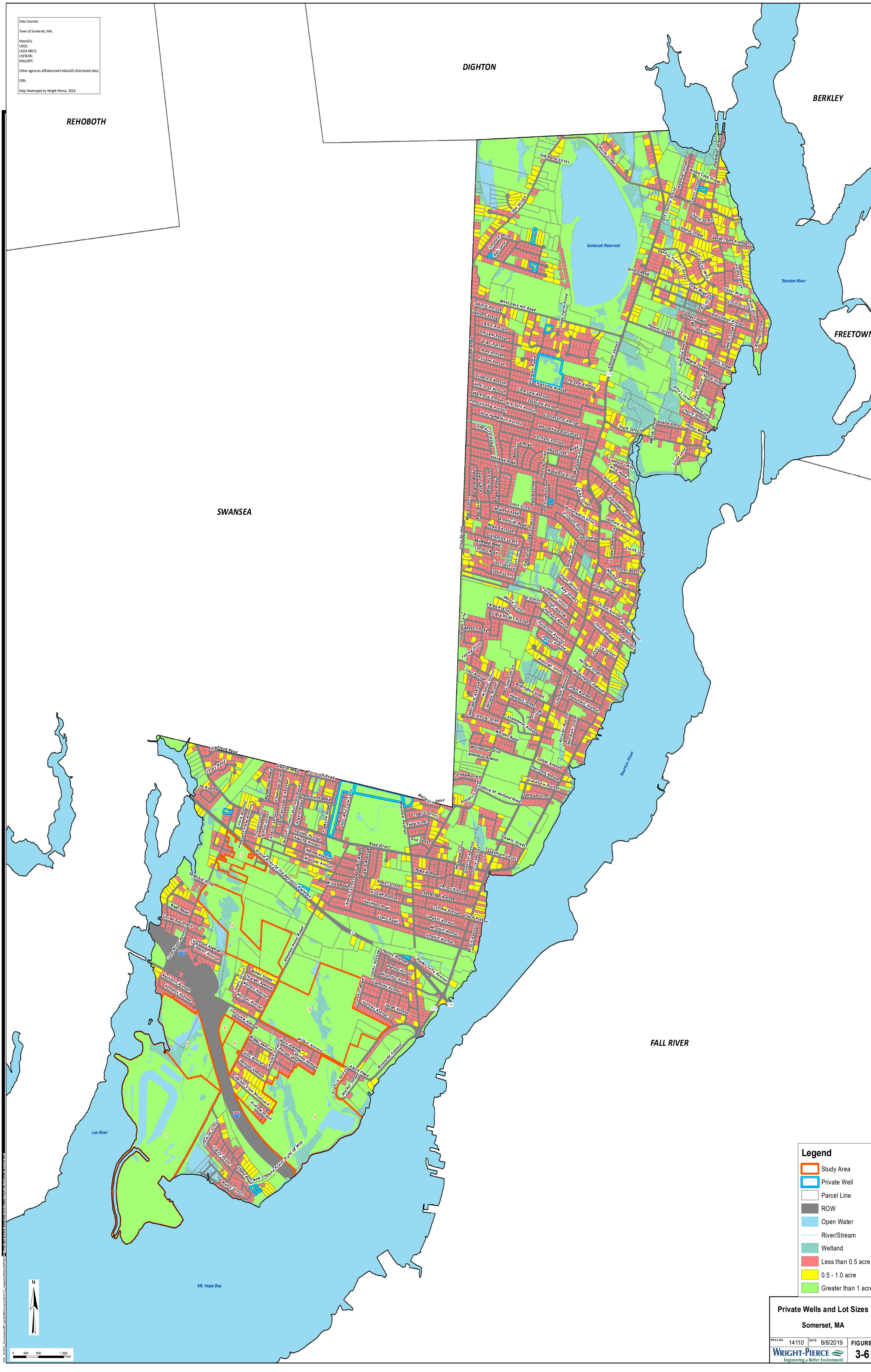
FIGURE: 3-5

3.3.2.2.5 *Private Wells*

The final primary criterion for the Tier 1 analysis is the location of private wells. If a particular parcel has a private well and it is less than a ½ acre, it scored the highest possible points for this evaluation (as shown in **Table 3-6** below). With smaller lots, it becomes more difficult to repair failed septic systems and still comply with Tile 5 requirements. More specifically, the protection radius (100 feet) around a private well eliminates potential areas where a new septic system could be installed. **Figure 3-6** shows the private well map.

TABLE 3-6
PRIVATE WELL RANKING SYSTEM

Private Wells	Score
Private Well on a Lot Less than 0.5 acre	10
Private Well on a Lot between 0.5 - 1 acre	5
Private Well on a Lot Greater than 1 acre	2
No Private Well	0


Data Sources:
Town of Somerset, MA;
MassGIS;
USGS;
USDA NRCS;
USF&WS;
MassDEP;
Other agencies affiliated with MassGIS-distributed data;
ESRI;
Map Developed by Wright-Pierce, 2018.
REHOBOTH
DIGHTON
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FREETOWN
SWANSEA
FALL RIVER
Somerset Reservoir
Taunton River
Lee River
Mt. Hope Bay
Legend
Study Area
Private Well
Parcel Line
ROW
Open Water
River/Stream
Wetland
Less than 0.5 acre
0.5 - 1.0 acre
Greater than 1 acre
N
0 400 800 1,600
Feet
Private Wells and Lot Sizes
Somerset, MA
PROJ NO: 14110
DATE: 8/8/2019
FIGURE: 3-6
WRIGHT-PIERCE
Engineering a Better Environment

3.3.2.3 Secondary Criteria

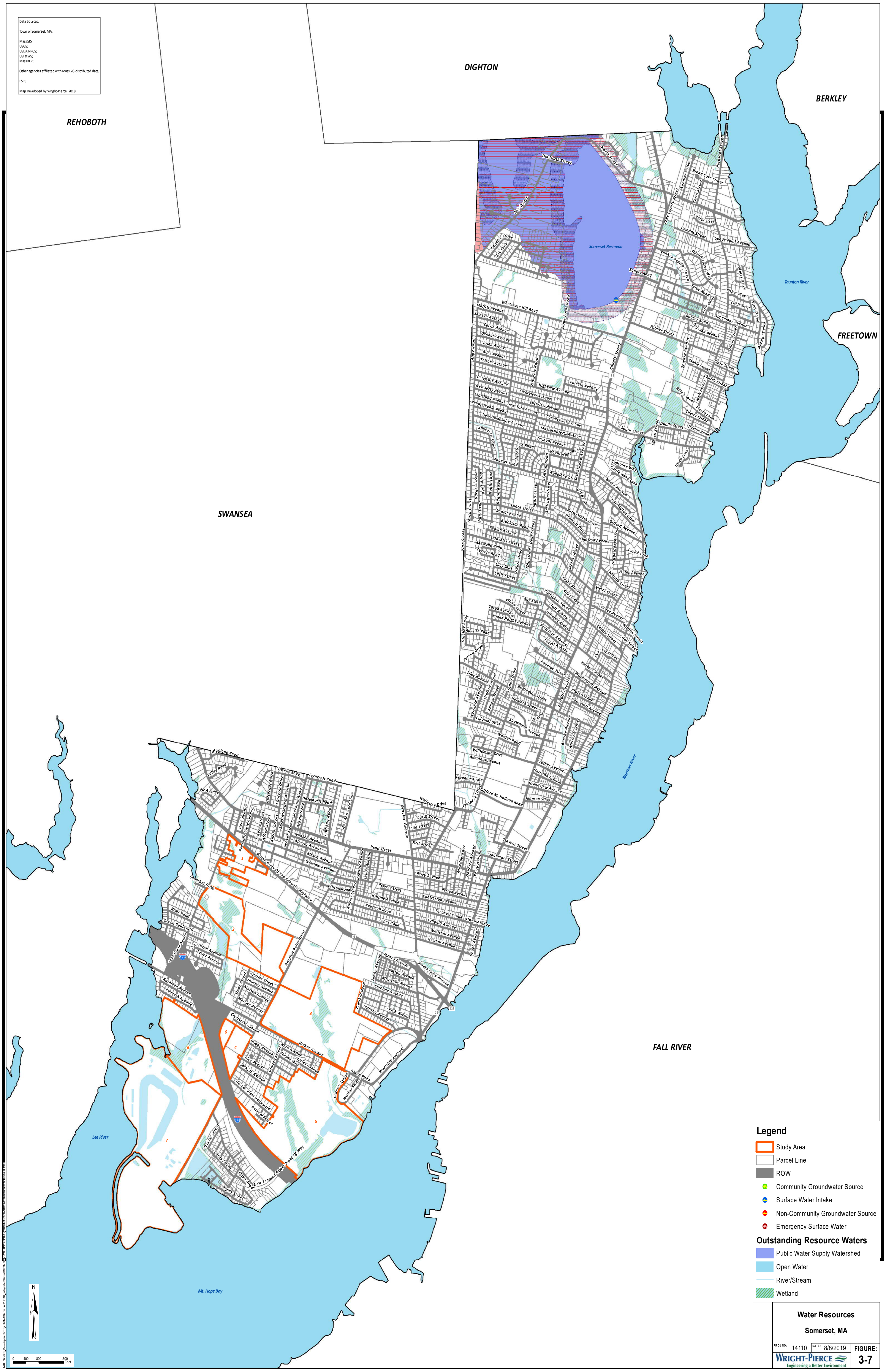
The following six secondary evaluative criteria were analyzed as part of the Tier 1 evaluation to determine if the parcel's septic system would remain a viable option for wastewater disposal over the 20-year planning period.

3.3.2.3.1 *Drinking Water Protection*

For this secondary criterion, each study area was examined to determine whether it was located within, or partly within, or outside of the Town's Drinking Water Protection District (DWPD). If an area was located within the DWPD, the area was further examined to determine to what extent the area was within the DWPD and it was assigned the appropriate score based on the ranking system presented below in **Table 3-7**. The DWPD includes surface water protection areas (Zone A and B) and groundwater protection areas (Zone I, Zone II, and Interim Wellhead Protection Area (IWPA) zones). **Figure 3-7** shows the Drinking Water Protection zones.

TABLE 3-7
DRINKING WATER PROTECTION DISTRICT RANKING SYSTEM

Drinking Water Protection District	Score
Within DWPD	3
Greater than 50% of Parcel Within DWPD	2
Less than 50% of Parcel Within DWPD	1
Not Within DWPD	0



Water Resources

Somerset, MA

PROJ NO: 14110	DATE: 8/8/2019	FIGURE: 3-7

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Engineering a Better Environment

3.3.2.3.2 *Surface Water Protection - Areas with Regulated Setbacks*

The Town of Somerset's freshwater ponds are all impacted, to varying extents, by development within their watersheds. Various EPA/ DEP documents have identified nitrogen, phosphorus, and bacteria as contaminants of principal concern that lead to the degradation of such water bodies. These nutrient sources have been attributed to discharges from WWTP's, on-site Title 5 septic systems, lawn fertilization, stormwater runoff, atmospheric deposition, and the recycling from bottom sediments.

Surface water impacts were assessed utilizing Massachusetts Title 5 regulated setback requirements. The State requires that the buffer area be 50 feet around all hydrologic features and wetlands, except within the drainage basin for a public surface water supply, where the buffer zones are 100 feet around wetland features, 200 feet around streams and ponds, and 400 feet around public surface water supplies. If the parcel of land was completely located with the Title 5 regulated setback, then it would have had a high score of 5 points for this secondary criterion. The complete ranking systems for State regulated setbacks for water bodies are summarized in **Table 3-8** below.

TABLE 3-8

AREAS WITHIN REGULATED SETBACKS RANKING SYSTEM

Areas Within Regulated Setbacks	Score
Within Title 5 Regulated Setback	5
Greater than 50% of Parcel Within Regulated Setback	3
Less than 50% of Parcel Within Regulated Setback	2
Not Within Regulated Setback	0

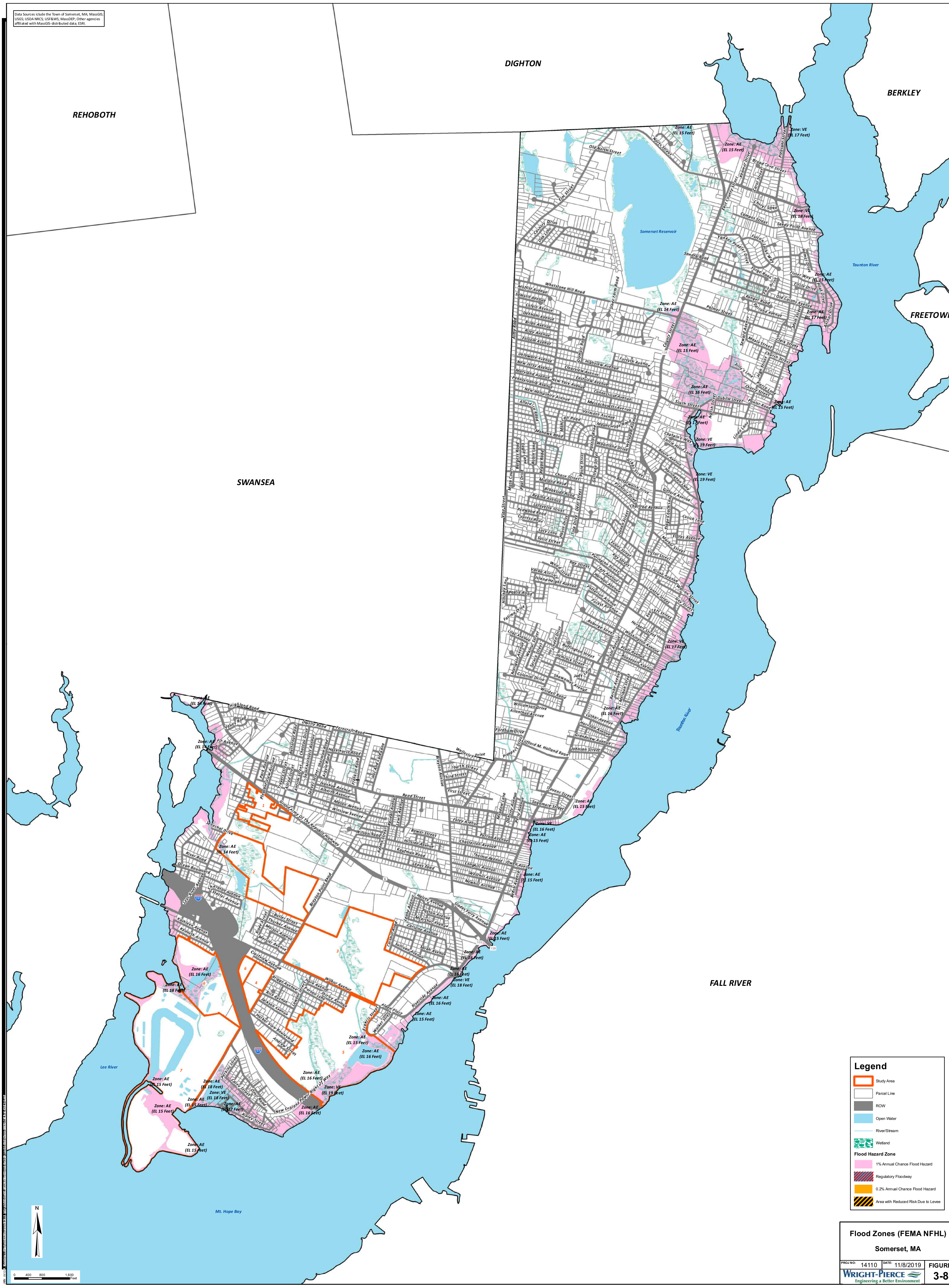
3.3.2.3.3 *Floodplains*

Location of floodplains was the next secondary criterion that was analyzed. Areas within the 100 or 500-year Federal Emergency Management Agency (FEMA) floodplains were identified utilizing MassGIS data. If an area was located within a 100-year floodplain, it was assessed a score of three (3) as identified in the ranking system shown below in **Table 3-9**. An area located within the 500-year floodplain was assessed a score of (1). **Figure 3-8** shows the floodplains map.

TABLE 3-9

FLOODPLAIN RANKING SYSTEM

Floodplains	Score
Within 100-year Floodplain	3
Within 500-year Floodplain	1
Not within floodplain	0


Data Sources iclude the Town of Somerset, MA; MassGIS; USGS; USDA NRCS; USF&WS; MassDEP; Other agencies affiliated with MassGIS-distributed data; ESRI.
DIGHTON
BERKLEY
REHOBOTH
FREETOWN
SWANSEA
FALL RIVER
Somerset Reservoir
Taunton River
Lee River
Mt. Hope Bay
Legend
Study Area
Parcel Line
ROW
Open Water
River/Stream
Wetland
Flood Hazard Zone
1% Annual Chance Flood Hazard
Regulatory Floodway
0.2% Annual Chance Flood Hazard
Area with Reduced Risk Due to Levee
Flood Zones (FEMA NFHL)
Somerset, MA
PROJ NO: 14110
DATE: 11/8/2019
FIGURE: 3-8
WRIGHT-PIERCE
Engineering a Better Environment

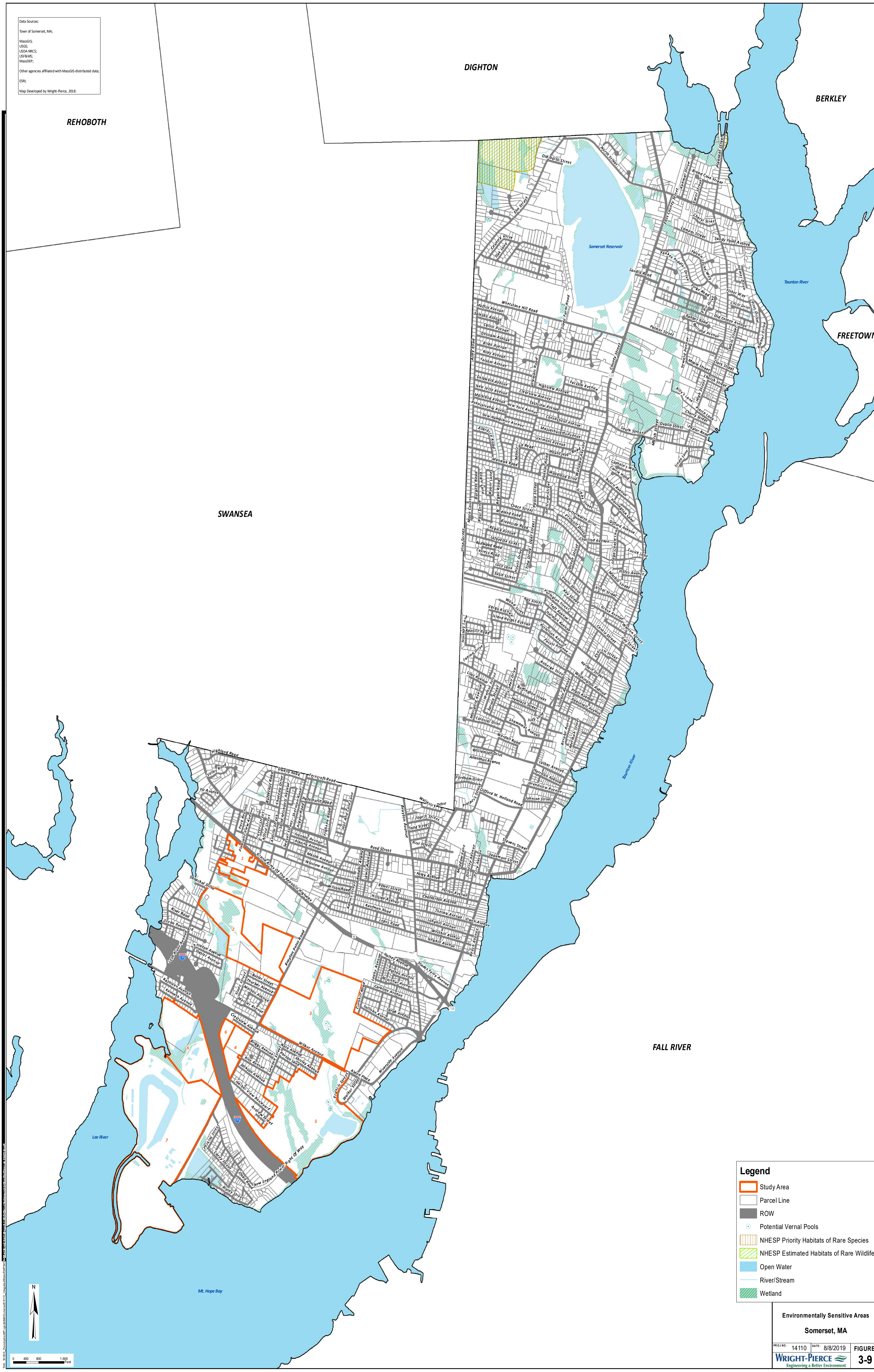
3.3.2.3.4 *Priority/Estimated Habitat Areas & Areas of Critical Environmental Concern (ACEC)*

Failing on-site wastewater disposal systems could potentially damage or destroy Priority/Estimated Habitat Areas and/or ACECs, which could cause some species to become endangered or extinct. No ACECs are present in Somerset, however there are many potential vernal pools and areas with existing habitats. The ranking system for protecting priority/estimated habitat areas is included in **Table 3-10**. **Figure 3-9** shows the habitat area map.

TABLE 3-10

PRIORITY/ESTIMATED HABITAT AREAS

Priority/Estimated Habitat Areas	Score
Within Habitat Areas	5
Not within Habitat Areas	0


Data Sources:
Town of Somerset, MA;
MassGIS;
USGS;
USDA NRCS;
USF&WS;
MassDEP;
Other agencies affiliated with MassGIS-distributed data;
ESRI;
Map Developed by Wright-Pierce, 2018.
REHOBOTH
DIGHTON
BERKLEY
SWANSEA
FREETOWN
FALL RIVER
Somerset Reservoir
Taunton River
Lee River
Mt. Hope Bay
Legend
Study Area
Parcel Line
ROW
Potential Vernal Pools
NHESP Priority Habitats of Rare Species
NHESP Estimated Habitats of Rare Wildlife
Open Water
River/Stream
Wetland
N
0 400 800 1,600 Feet
Environmentally Sensitive Areas
Somerset, MA
PROJ NO: 14110
DATE: 8/8/2019
FIGURE: 3-9
WRIGHT-PIERCE
Engineering a Better Environment

3.3.2.3.5 *Historic Districts*

The Historic District areas within the Town of Somerset where on-site wastewater disposal systems are inconvenient and/or aesthetically displeasing to property owners or neighbors were also evaluated. If a parcel of land was located within a historic district, it was assigned a score of five (5) as shown in the ranking system for in **Table 3-11**. Our evaluation determined that municipal sewer is available within the historic district area of Somerset, and that there were no study areas located within a historic district.

TABLE 3-11
HISTORIC DISTRICTS

Historic District	Score
Within Historic District	5
Not within Historic District	0

3.3.2.4 Tier 2

The purpose of the Tier 2 analysis was to evaluate: (1) if a given area showed consistent need; (2) areas where there was a conflict in need (e.g. areas that did not show a need in the first tier, but are known to be problem areas); and (3) areas of no need, where existing on-site septic systems are adequate. The Tier 2 assessment was based on records obtained from MassGIS, the Town's Health Department and the Planning Department.

3.3.2.4.1 *Onsite Septic System Failures*

The Town's Health Department requires all septic systems to be in accordance with Title 5 regulations. Somerset is different from most Town's in that they have regulations in place that force the property owner to hook up to the Town sewer system if their septic system fails or if they sell their property. Title 5 also requires a reserve area to be located on the property, such that it can be used in case the primary on-site wastewater disposal system fails. Setback requirements are also specified in the Title 5 code, which identifies the minimum horizontal separation required between the onsite septic system and drinking water well, property lines and wetlands. If a property does not comply with the regulations, then it is considered a failed system. Due to the limited numbers of septic systems installed in Somerset, there were no available records of failed systems, and thus did not impact this evaluation.

3.3.2.4.2 *Zoning*

The last Tier 2 evaluation criterion included a review of the Town's zoning districts. For the most part, the Town's residential and commercial areas are already near build-out and have municipal sewer service already available. It is our understanding that the Town generally foresees the desire for additional development within several of the non-sewered areas identified in this evaluation, specifically study areas 6 and 7.

The anticipation for future development in these areas is largely due to the loss of the coal-burning power plant located on Brayton Point. The future use of this site is still unclear, but it will likely remain an industrial user of the collection system. It is our understanding that areas that are flagged for future development and are zoned as residential or commercial will need to connect to the sewer system if the municipal sewer is available nearby. Refer to **Figure 2-4** for the zoning map.

3.3.3 STUDY AREA NEEDS ASSESSMENT

3.3.3.1.1 *Tier 1 Needs Assessment*

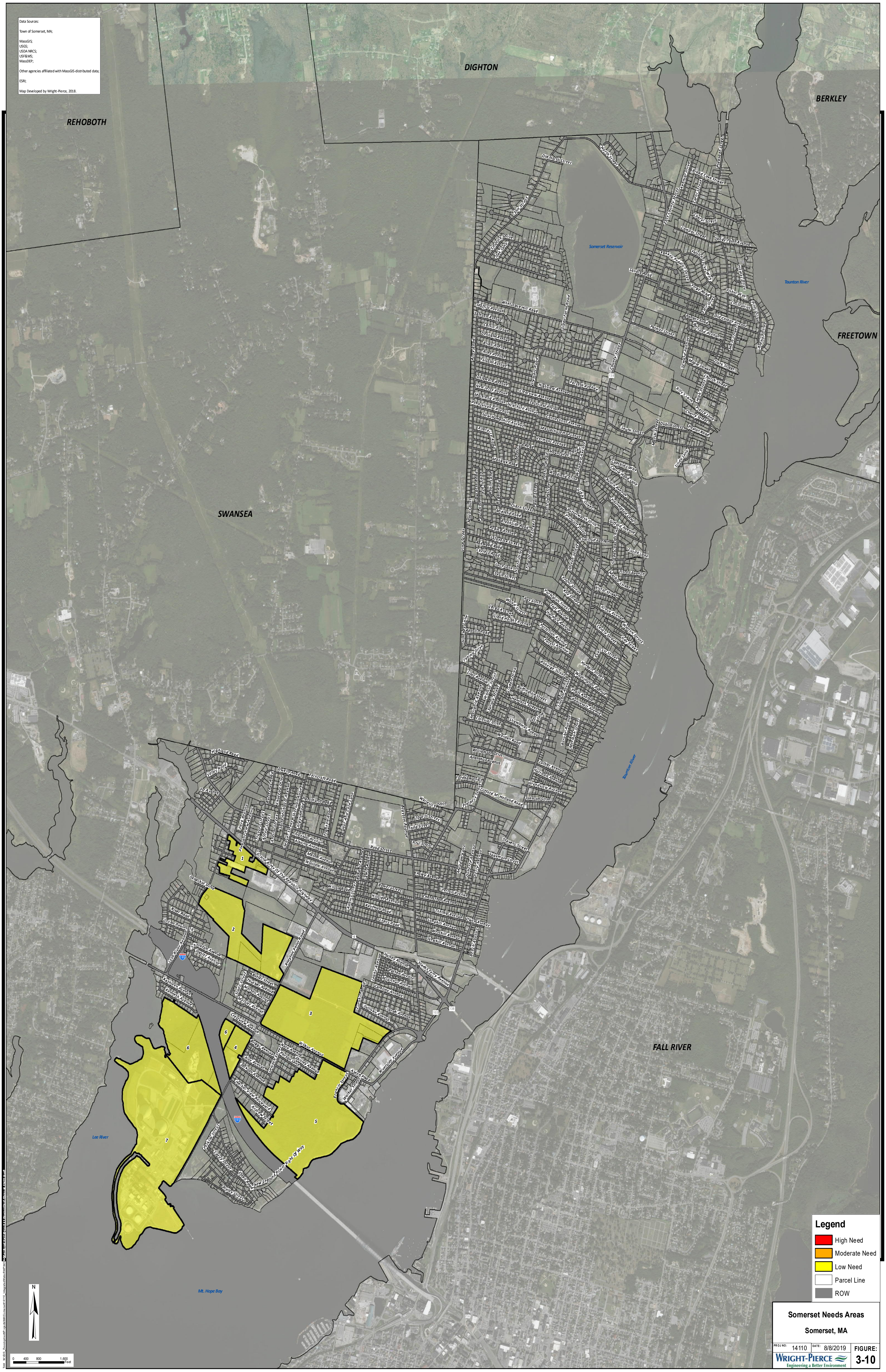
Each of the sevem Study Areas were ranked based on its total score and placed into one of three "needs" categories as shown below:

Needs Category	Total Points
Low	0 to 20 total points
Average	21 to 40 total points
High	41 to 75 total points

A complete summary of the Tier 1 evaluation including primary and secondary criteria ranking scores for each of the 7 study areas is shown in **Table 3-12**. **Figure 3-10** shows the study areas by color code.

All seven study areas scored a total of 16 points or less and were subsequently placed into the Low needs category. These Low needs category areas had similar physical characteristics, including well-draining soils and lot sizes larger than one acre, which are good candidates for well operating septic systems.

Two of the seven Study Areas have been identified as potential future development areas and were subsequently placed into the Future Development category. Study areas 3 (Wilbur Ave/Brayton Point Road) and 7 (Brayton Point) were indicated as areas for future development. The Future Development study areas were identified as potentially developable areas due to proximity to the existing sewer collection system, as well as a new interest in developing former undeveloped lands due to the loss of the former Brayton Point Power Facility.



Somerset Needs Areas

Somerset, MA

PROJ NO: 14110	DATE: 8/8/2019	FIGURE:
WRIGHT-PIERCE Engineering a Better Environment		3-10

TABLE 3-12

STUDY AREA SCORING

Study Area	Primary Criteria (Ranking from 0 to 10)						Secondary Criteria (Ranking from 0 to 5)						Total Score	Study Area Ranking
	Soils/ Drainage Class	Depth to Water Table	Depth to Bedrock	Lot Sizes	Private Wells	Primary Subtotal	Drinking Water Protection District	Areas with Regulated Setbacks (Title 5)	Flood Plains	Priority/ Estimated Habitat Areas	Historic District	Secondary Subtotal		
1	5	1	0	0	0	**6**	0	0	0	0	0	**0**	**6**	**Low**
2	6	2	0	1	0	**9**	0	1	1	0	0	**2**	**11**	**Low**
3	4	2	0	0	0	**6**	0	1	0	2	0	**3**	**9**	**Low**
4	0	0	0	0	0	**0**	0	0	0	0	0	**0**	**0**	**Low**
5	6	5	0	0	0	**11**	0	2	2	1	0	**5**	**16**	**Low**
6	6	4	0	0	0	**10**	0	3	2	0	0	**5**	**15**	**Low**
7	5	2	0	0	0	**7**	0	3	2	0	0	**5**	**12**	**Low**

3.3.3.2 Tier 2 Needs Assessment

As previously described, the Tier 2 evaluation included a review of Health Department records for Title 5 failure results to determine if study areas showed consistent needs; areas with a conflict; or areas of no need where the existing onsite septic system is adequate. In summary, it was concluded that the Tier 2 evaluation did substantiate the results of the Tier 1 investigation.

3.3.3.3 Needs Assessment Summary

The needs assessment concluded with all sevem study areas being categorized as having Low needs under existing conditions. This evaluation shows that there is no immediate need for sewer extension, but if new development is to occur this could be changed. Study areas 3 and 7, which have been targeted for future development will be further analyzed to determine what future wastewater flows could be generated from within the study areas, and possible impacts on the collection system. The study areas that are not targeted for future development will be discontinued from further evaluation as it has been determined that these parcels do not show a need to be connected to the collection system, and development of the area is unlikely.

3.4 ALTERNATIVES IDENTIFICATION AND SCREENING

Typically, a CWMP report will present recommendations for wastewater management alternatives in the identified needs areas or development areas in a town. Specific recommendations by needs area take into account the appropriateness of utilizing septage management plans, nutrient management plans, alternative collection systems, I/A systems, communal systems, local and/or regional wastewater collection, treatment and disposal facilities, and residuals treatment and disposal. However, because the Town of Somerset requires all properties to connect to the existing collection system, and the infrastructure is already in place, this analysis is not required for future development areas of Somerset (Study Area 3).

Section 4
Gravity Collection System and I/I Control Plan

SECTION 4

GRAVITY COLLECTION SYSTEM AND I/I CONTROL PLAN

4.1 INTRODUCTION

The current wastewater collection system for the Town of Somerset is shown in **Figure 4-1**. The Town's collection system was first constructed in the 1960's, around the same time the WPCF was constructed. The collection system features a main interceptor sewer that runs north to south along the Taunton River coastline, on Riverside Avenue. The main interceptor sewer varies in size from 10 to 30-inches in diameter at the WPCF. There are 8 pump stations located along the main interceptor sewer to help convey wastewater from the northern and inland sections of Town to the WPCF in the southern area of Town (there are 17 pump stations total). These 8 stations were constructed during the same period as the main sewer interceptor and include:

- Main Street Pump Station
- Dublin Street Pump Station
- Grove Avenue Pump Station
- Gay Street Ejector Station
- Luther Avenue Pump Station
- Durfee Court Ejector Station
- Foley Avenue Pump Station
- Owen Avenue Ejector Station

The initial collection system primarily consisted of the sewer service areas along Riverside Avenue, as well as a small sewer service area located at the southern point of the Town that is serviced by the Angus Street Pump Station. As the Town continued to develop through the 1970s and 1980s, more developments were constructed, which included sewer extensions and the addition of several pump stations located in inland sections of Town. The newer stations that were constructed in the 1970's include:

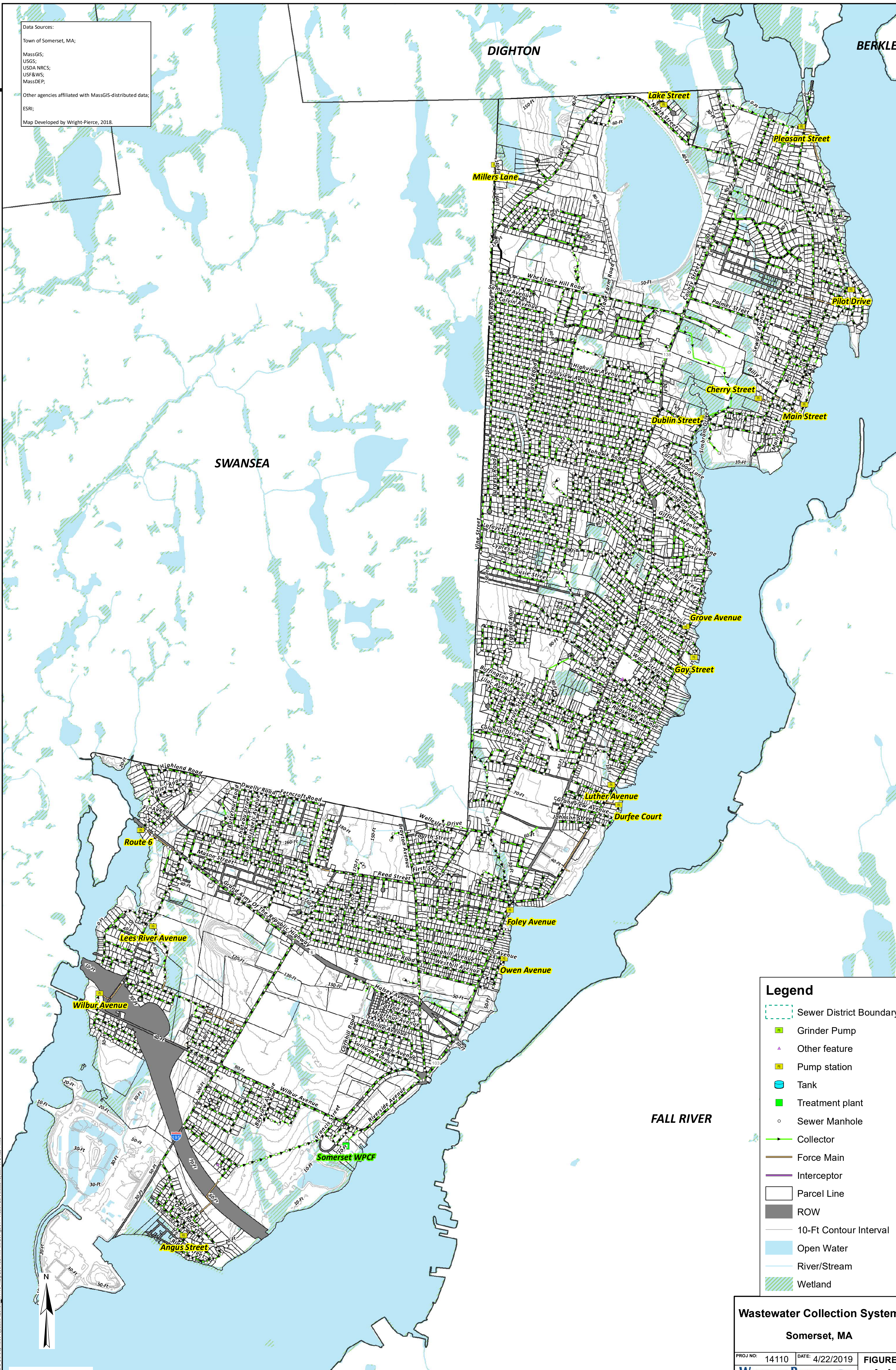
- Lees River Avenue Pump Station
- Wilbur Avenue Ejector Station
- Route 6 Ejector Station
- Pleasant Street Pump Station
- Pilot Drive Pump Station
- Millers Lane Pump Station
- Cherry Street Pump Station

In total, the collection system consists of approximately 500,000 linear feet of gravity sewer, approximately 20,000 linear feet of force main, and 2,345 sanitary sewer manholes. The collection system includes both new and older sewer piping, and no combined sewers are believed to be connected to the collection system. Wastewater collected is comprised mostly of residential flow, with some commercial and industrial wastewater. The Town does not currently have any intermunicipal agreements for sewer collection from adjacent towns, however there are several Swansea residents connected to the collection system through the Millers Lane Pump Station, due to its location on the border of Swansea and Somerset. The Venus De Milo Restaurant in Swansea is also connected to the Somerset collection system, and pumps directly to the Route 6 Pump Station.

4.2 EXISTING INTERMUNICIPAL AGREEMENTS

The Town of Somerset does not have any current Intermunicipal Agreements (IMA), however there is a possibility for agreements to be entered in the future, as the Town is in discussion regarding the potential formation of a Sewer District or an IMA, involving the surrounding Towns of Swansea and Dighton (Dighton to a lesser extent than Swansea). Refer to Section 3.4.49 for additional information regarding IMA's.

As previously mentioned, there are a limited number of Swansea residents served by the Miller's Lane Pump Station, located on the Swansea/Somerset border. This arrangement does not currently have an official IMA in place, however the homes are connected due to the proximity of the pump station. The Venus De Milo Restaurant in Swansea is connected to the Somerset wastewater collection system via the Route 6 Pump Station (there is an Agreement between the town and Venus De Milo).



Wastewater Collection System

Somerset, MA

PROJ NO: 14110 DATE: 4/22/2019 FIGURE: 4-1

WRIGHT-PIERCE Engineering a Better Environment

4.3 SEWER USE REGULATIONS

As with many communities, Somerset has a variety of local bylaws, regulations, and policies designed to control wastewater disposal to the groundwater and to the Town's wastewater system.

The following departments and/or regulatory mechanisms specific to wastewater disposal were identified, and are discussed further below:

- Board of Health Regulations and Procedures
- Sewer Connection and Extension Policy
- Sewer Use Regulation

4.3.1 Board of Health Regulations and Procedures

The Board of Health in Somerset is responsible for regulating all on-site disposal systems in Town. They utilize the DEP, State Environmental Code (Title 5, 310 CMR 15.00), along with related sections of the regulations exclusively to regulate disposal systems. The State regulations outline general provisions and enforcement; siting of systems; design, construction, repair, and replacement; inspection and maintenance; procedures for local upgrade approvals and variances; and transportation and disposal of septage.

4.3.2 Sewer Extension and Connection Policy

The Town established a Sewer Connection Policy in 2003, as Section 1 of Article II of the Sanitary Sewer Rules and Regulations. The sewer connection policy is as follows:

Requirement to connect. The owner of any house, building or property used for human occupancy, employment, recreation, or other purposes, situated within the Town and abutting on any street, alley, or right-of-way in which there is now located or may in the future be located a public sanitary sewer of the Town, is hereby required at his expense to install suitable toilet facilities therein, and to connect such facilities directly with the proper public sewer in accordance with the provisions of these rules and regulations, within one (1) year after date of official notice to do so.

The sewer extension policy allows for additional connections to the sewer system within the sewer service area, providing that the property has access to an existing sewer line and meets the other requirements stated in the policy. Specifically, the developer must comply with the following:

- A permit must be obtained from the Water Pollution Control Department before any person may connect to a Town sewer line.
- Before connection to the sewer is authorized an inspection of the property must occur to ensure that downspouts and sump pumps will not be discharged to the sewer.
- The fee for such a permit shall be set by the Board of Water and Sewer Commissioners.

4.3.3 Sewer Use Regulations

Sewer use regulations within the Town of Somerset are applied to all properties within the Town which are connected to the Town of Somerset's wastewater collection system. The current "Sanitary Sewer Rules and Regulations" were adopted as of January 1, 2003. The objectives of these sewer regulations are:

- To prevent the introduction of pollutants into the municipal wastewater system, which will interfere with the operation of the WPCF.
- To prevent the introduction of pollutants into the municipal wastewater system, that will pass through the system inadequately treated, into receiving waters or atmosphere or otherwise be incompatible with the system.

The Water Pollution Control Department is responsible for administrating the provisions outlined in the Sewer Regulations.

4.4 PLANS FOR SEWER EXPANSION

The Town of Somerset does not have any current plans for municipal sewer expansion. The Town has been in communication with the neighboring Town of Swansea to discuss the possibility of a sewer district being formed or an intermunicipal Agreement (IMA) to allow for municipal sewer expansion of several areas in the Route 6 corridor of Swansea. Discussions are in the preliminary phase at this time and there will need to be significant progress between the two communities before the Town can formalize any official expansion plans. Initial evaluation of Somerset's average wastewater flow to the WPCF suggest that that there may be available average flow capacity available for Swansea (design average flow for the WPCF is 4.2 mgd and the current average daily flow is approximately 3.3 mgd ~ potentially 0.9 mgd of average flow capacity available). One potential scenario includes Somerset utilizing 0.5 mgd of available average flow capacity making up to 0.4 mgd of average flow available for “others” (Swansea, for example). Further analysis of a sewer district or IMA with Swansea would be required by the Town as discussed in the Needs Analysis section, as more information becomes available. Also, the environmental impacts will need to be reviewed, such as the “inter-basin transfer” of water from one watershed to another (which would be the case for certain areas of Swansea).

Based on discussions with the Town of Somerset, it is assumed that the Town of Dighton will not be entering into an agreement with the Town of Somerset to convey and treat any of its sanitary wastewater.

There have not been any discussions with the current owner of the former Brayton Point power plant for its projected sewer flows once the land is re-developed. The nearest Town sewer is 8-inches in diameter. Evaluation of flows and existing municipal wastewater system capacity will need to be evaluated once the details of the new development are fully understood and the average and peak wastewater flows from the development are known. For now, it is assumed that the wastewater flows from the new development will be similar to the flows generated from the former Brayton Point power plant facilities.

4.5 WASTEWATER GRAVITY COLLECTION SYSTEM

4.5.1 Existing Conditions

The Town of Somerset’s wastewater collection system consists of approximately 110 miles of gravity sewers, approximately 2,345 manholes, and 17 pump stations. The collection system includes both new and old sewer piping. Wastewater collected is comprised mostly of residential flow with some commercial and industrial wastewater. The collection system conveys wastewater to the WPCF and consists of gravity pipes ranging in diameter from 6 to 30 inches. The most prevalent sewer pipe material in the system is asbestos cement. The Town provides wastewater service to approximately 6,500 customers.

The early collection system primarily consisted only of the sewer service area along Riverside Avenue, as well as a small sewer service area located at the southern point of the Town that is serviced by the Angus Street Pumping station. As the Town continued to develop through the 1970s and 1980s, more developments were constructed, which included sewer extensions and the addition of several pumping stations located throughout inland sections of the Town.

In 2019, the Town created a new identification system for its manholes and updated their GIS database with the new manhole IDs.

The Town is aware of infiltration issues throughout parts of the collection system. Two areas of particular concern are Chase Street and the neighborhood near the Somerset Berkley Regional High School. Also, sewers located in an easement west of Colonial Drive have significant infiltration because of the high groundwater level and the adjacent brook.

Over the years, the Town has made repairs as necessary to its sewer collection system, which has reduced some I/I. Approximately 10 years ago, the Town upgraded the Dublin Street and Grove Street Pump Stations. At the same time, they replaced a collapsed sewer that was downstream of the Luther Avenue Pump Station force main. Also, the Town replaced the gravity sewer in County Street and relocated the gravity sewer upstream of the Dublin Street Pump Station (the original location was in a wet, marshy area).

The sewer GIS data does not have any pipe invert elevations. The GIS data is missing the installation year for about half of the sewers. There is a small quantity of piping that do not have pipe materials labeled.

4.5.2 Future Flows Analysis

Study Area 3 may be developed in the near future. The Town owns a large parcel in this study area, and the Town is pursuing possible development options. The parcel is located in residential zoning; however, the Town is currently evaluating other potential uses that would offer the best benefit to the Town. It is premature at this time to estimate the amount of wastewater from potential commercial and/or industrial development. The sewer connection would most likely be on Wilbur Avenue, which has a 12-inch diameter sewer that flows to the WPCF. There should be hydraulic capacity in the 12-inch diameter sewer, but that could change if Town of Swansea connects to the wastewater collection system upstream of these sewers (via Route 6 at Lees River Avenue). A more detailed hydraulic analysis should be performed once more information is available regarding development of this parcel.

The Brayton Point area is included in Study Area 7. The existing Brayton Point sewer connection is south of Route 195 and connects to an 8-inch diameter sewer that flows into Angus Street Pump Station. This pump station has a capacity of 300 gpm (432,000 gpd). The average dry day flow at flow meter M26, which is downstream of the Angus Street Pump Station, is 50,000 gpd. There is hydraulic capacity in the sewers and at the Angus Street Pump Station for flow from Brayton Point. It is likely that if the sewer is extended further to the coast for future development, a new pump station will be required to convey wastewater into the gravity system, due to the area's topography. A more detailed hydraulic analysis will need to be performed once more information is available regarding the re-development of this area.

If the Town of Swansea were to connect to the Somerset wastewater collection system, it is assumed that the connection would be along Route 6. The capacity of Route 6 Pump Station is 288,000 gpd, which would be a limiting factor in the amount of flow Swansea could discharge to Somerset. If Swansea were to discharge an average daily flow of 400,000 gpd to Somerset via the Route 6 corridor, the existing Route 6 Pump Station capacity would need to be increased.

As part of an evaluation completed by the Town of Swansea in June 2019, it was determined that the most effective approach to connecting Swansea flow to Somerset via the Route 6 corridor is to connect via force main at the existing sewer manhole at the Route 6 and Lees River Avenue intersection. Initial analysis indicates that the downstream Lees River Pump Station has available capacity for some additional flow, but an additional 400,000-500,000 gpd of additional average daily flow may require capacity upgrades to the station (addition of a third pump or replace existing pumps with larger capacity pumps). The 12-inch diameter force main for the Lees River Avenue pump station and downstream gravity sewers (10-inch to 15-inch in diameter) between the force main discharge and the WPCF would need to be evaluated in more detail from a hydraulic capacity standpoint if a Swansea connection were to move forward and when more specific information is available. The June 2019 evaluation makes the assumption that the existing force main for Lees

River Avenue pump station and all gravity sewer to the WPCF would need to be replaced and or rehabilitated as part of receiving wastewater flow from Swansea via the Route 6 corridor.

4.5.3 Recommended Plan

The recommended plan for the collection system is to focus on removing sources of I/I by first locating the sources using sewer system evaluation survey (SSES) field work. Then, focus on rehabilitating or replacing sewer pipes and manholes with significant sources of I/I and/or structural defects or condition problems. As manhole inspections are performed during SSES phases, the pipe data including materials and inverts can be entered into the Town's GIS database. The recommended plan is further described in Section 4.6.

The sewer GIS data does not have any pipe invert elevation data. The GIS data is also missing the installation year for about half of the sewers. There is a small quantity of pipes that do not have pipe materials labeled. The recommendation is to enter the pipe material and pipe invert elevations when manhole inspections are completed as part of the sewer system evaluation survey (SSES).

The Town should continue to repair and/or replace sewer assets (pipe and manholes) on an as-needed and emergency basis (sewer main or lateral service piping break, for example).

4.6 INFILTRATION/INFLOW

4.6.1 Introduction

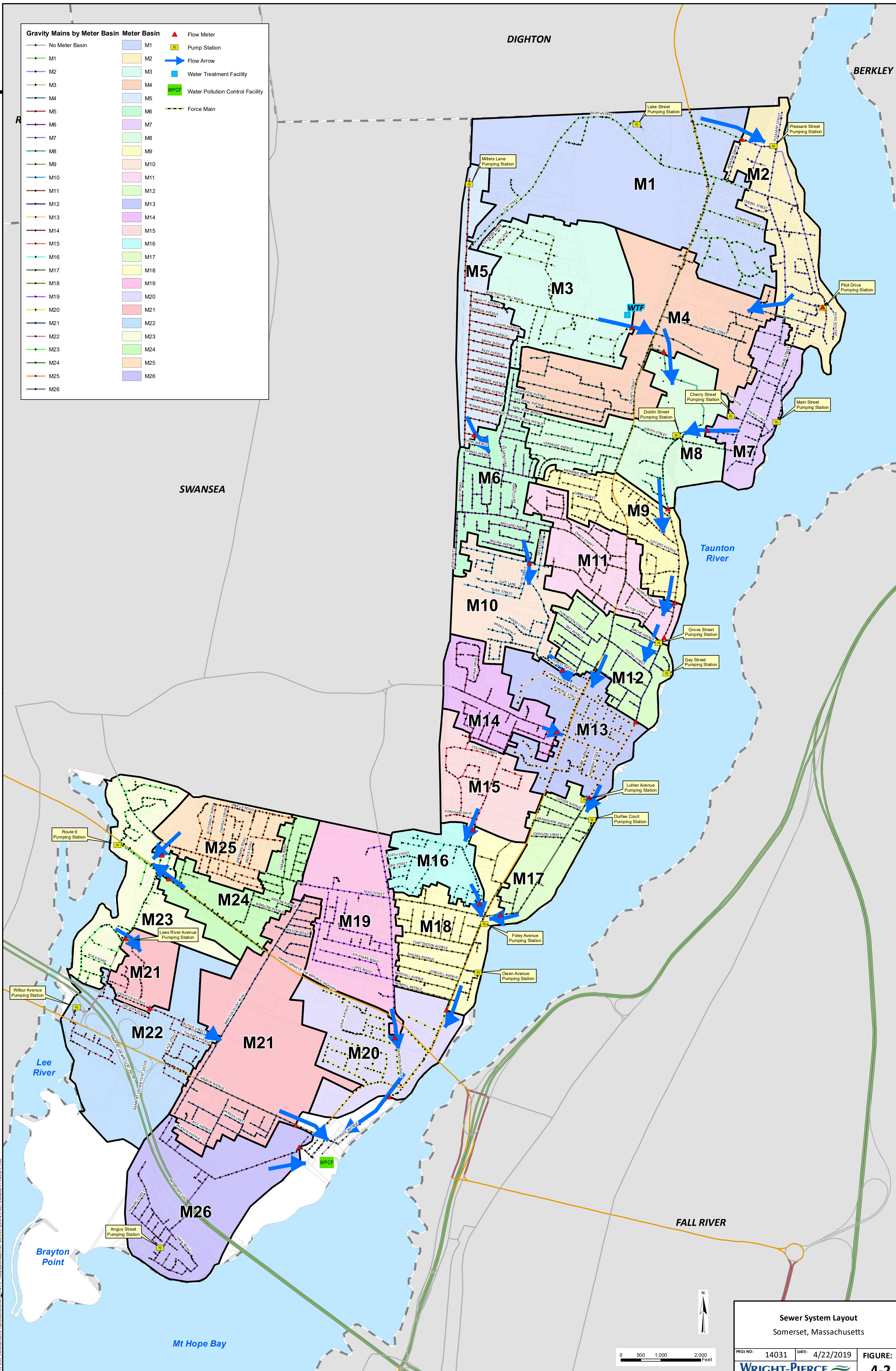
In 2018, Wright-Pierce evaluated the existing collection system for potential Infiltration/ Inflow (I/I) impacts to assist in determining collection system needs. Infiltration refers to groundwater entering the sanitary sewer system though structurally compromised sewers, loose joints, etc, while inflow refers to stormwater entering the system, which is more often impacted directly by wet weather events. Inflow can enter a sanitary sewer system through multiple pathways including defective manhole structures, cross connections between sanitary and storm sewers, and illicit connections to sewers such as downspouts, sump pumps, and area drains. The study evaluated wet-weather impacts on the collection system through assessment of 26 identified sewer basins. Each of the 26 sewer basins were flow-metered to determine the wet-weather impacts to the collection system. A map of the collections system and 26 metering basins is included in **Figure 4-2.**

The flow metering program was conducted in the spring 2018 and was completed over an 11-week period. During this period, there were six rainfall events that produced 0.5-inches of rain or greater. At the end of the flow metering period, the data was uploaded and evaluated through Sliicer, an online I/I analysis tool.

4.6.2 Flow Metering Results

Based on the spring 2018 monitoring data, an estimated 2.3 MGD of infiltration and 6.62 MG of inflow were estimated in the project area. Infiltration was impacted by relatively high groundwater levels observed in the spring 2018. Infiltration rates were normalized based on collection system "size" (sewer pipe length and diameter) for a comparison across the meter basins. The relative "size" of each meter basin was calculated by multiplying the diameter of each pipe size by its relative length and converting to miles (inch-diameter-mile (IDM)). The pipe lengths and diameters were obtained from the Town's geographic information system (GIS) data. **Table 4-1** summarized the base infiltration (BI) results and ranking for the meter basins. The ranking is based on the 4,000 gallons per day per inch-diameter mile (gpd/IDM) guidelines per MassDEP.

Any meter basin with a net BI unit rate equal to or greater than 4,000 gpd/IDM is highlighted red or yellow with top five highest meter basins being highlighted in red.



Gravity Mains by Meter Basin
No Meter Basin
M1
M2
M3
M4
M5
M6
M7
M8
M9
M10
M11
M12
M13
M14
M15
M16
M17
M18
M19
M20
M21
M22
M23
M24
M25
M26
Meter Basin
Flow Meter
Pump Station
Flow Arrow
Water Treatment Facility
Water Pollution Control Facility
Force Main
DIGHTON
BERKLEY
SWANSEA
FALL RIVER
Taunton River
Lee River
Brayton Point
Mt Hope Bay
Lake Street Pumping Station
Pleasant Street Pumping Station
Millers Lane Pumping Station
Pilot Drive Pumping Station
Cherry Street Pumping Station
Dublin Street Pumping Station
Main Street Pumping Station
Grove Street Pumping Station
Gay Street Pumping Station
Luther Avenue Pumping Station
Durfee Court Pumping Station
Route 6 Pumping Station
Lees River Avenue Pumping Station
Foley Avenue Pumping Station
Owen Avenue Pumping Station
Wilbur Avenue Pumping Station
Angus Street Pumping Station
WTF
WPCF
0 500 1,000 2,000 Feet
Sewer System Layout
Somerset, Massachusetts
PROJ NO: 14031
DATE: 4/22/2019
FIGURE: 4-2
WRIGHT-PIERCE
Engineering a Better Environment

TABLE 4-1

SUMMARY OF BASE INFILTRATION (BI) BY METER BASIN

Meter Basin	Net BI MGD)	Net BI Unit Rate (GPD/IDM)	BI Ranking
M15	0.17	11,670	1
M16	0.16	8,968	2
M11	0.19	6,252	3
M6	0.26	5,980	4
M23	0.16	5,563	5
M5	0.16	5,524	6
M20-13-17-18	0.65	4,469	7
M4	0.16	3,735	8
M14	0.08	3,329	9
M24	0.05	2,246	10
M1	0.08	1,940	11
M22	0.04	1,596	12
M26	0.03	1,111	13
M3	0.03	840	14
M25	0.02	658	15
M10	0.01	289	16
M19	0.01	265	17
M2	0.01	211	18
M7	0.003	122	19
M9-8	0.00	0	20
M12	0.00	0	20
M21	0.00	0	20
TOTAL	**2.30**		

1. Red and yellow highlights represent meter basins prioritized for further SSES investigations for infiltration sources (≥ 4,000 gpd/IDM).

Table 4-2 summarizes the inflow results and ranking for the meter basins. The ranking is based on MassDEP's 80 percent threshold. Meter basins that account for at least 80 percent of the total system inflow volume are highlighted red or yellow. The top five meter basins with highest inflow volume are highlighted in red.

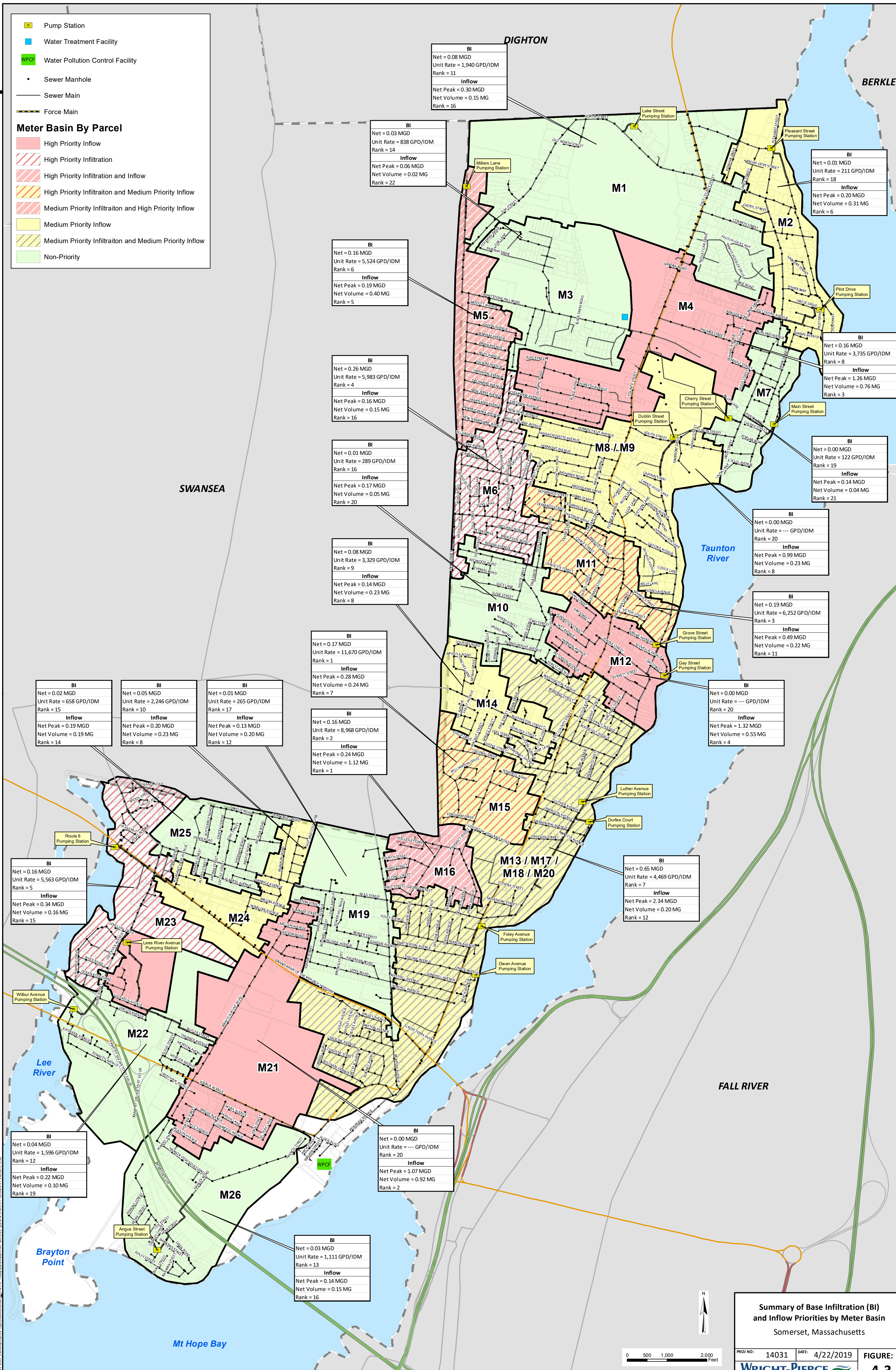
TABLE 4-2

SUMMARY OF INFLOW BY METER BASIN

Meter Basin	Net Peak Inflow Rate[1,2] (MGD)	Net Inflow Volume[2] (MG)	Percent Total Inflow	Cumulative Percent	Inflow Ranking
M16	0.24	1.12	16.9%	17.0%	1
M21	1.07	0.92	13.9%	31.0%	2
M4	1.26	0.76	11.5%	42.0%	3
M12	1.32	0.55	8.3%	51.0%	4
M5	0.19	0.40	6.0%	57.0%	5
M2	0.20	0.31	4.7%	61.0%	6
M15	0.28	0.24	3.6%	65.0%	7
M14	0.14	0.23	3.5%	68.0%	8
M24	0.20	0.23	3.5%	72.0%	8
M9-8	0.99	0.23	3.5%	75.0%	8
M11	0.49	0.22	3.3%	79.0%	11
M20-13-17-18	2.34	0.20	3.0%	82.0%	12
M19	0.13	0.20	3.0%	85.0%	13
M25	0.19	0.19	2.9%	88.0%	14
M23	0.34	0.16	2.4%	90.0%	15
M26	0.14	0.15	2.3%	92.0%	16
M6	0.16	0.15	2.3%	95.0%	17
M1	0.30	0.15	2.3%	97.0%	18
M22	0.22	0.10	1.5%	99.0%	19
M10	0.17	0.05	0.8%	99.0%	20
M7	0.14	0.04	0.6%	100.0%	21
M3	0.06	0.02	0.3%	100.0%	22
TOTALS	**10.6**	**6.60**			

1. Peak inflow is determined over a 1-hour period
2. Inflow results for a 1-year, 6-hour design storm
3. Red and yellow highlights represent meter basins prioritized for further SSES investigations for inflow sources (top 80%).

The results of the I/I study are displayed in **Figure 4-3**. The figure shows the basins prioritized by their infiltration and/or inflow needs and highlights the areas that require further sewer system evaluation survey (SSES) investigations.


Pump Station
Water Treatment Facility
WPCF Water Pollution Control Facility
Sewer Manhole
Sewer Main
Force Main
Meter Basin By Parcel
High Priority Inflow
High Priority Infiltration
High Priority Infiltration and Inflow
High Priority Infiltraiton and Medium Priority Inflow
Medium Priority Infiltraiton and High Priority Inflow
Medium Priority Inflow
Medium Priority Infiltraiton and Medium Priority Inflow
Non-Priority
DIGHTON
BERKLEY
SWANSEA
Taunton River
FALL RIVER
Lee River
Brayton Point
Mt Hope Bay
M1
M2
M3
M4
M5
M6
M7
M8 / M9
M10
M11
M12
M13 / M17 / M18 / M20
M14
M15
M16
M19
M21
M22
M23
M24
M25
M26
BI Net = 0.08 MGD Unit Rate = 1,940 GPD/IDM Rank = 11 Inflow Net Peak = 0.30 MGD Net Volume = 0.15 MG Rank = 16
BI Net = 0.03 MGD Unit Rate = 838 GPD/IDM Rank = 14 Inflow Net Peak = 0.06 MGD Net Volume = 0.02 MG Rank = 22
BI Net = 0.16 MGD Unit Rate = 5,524 GPD/IDM Rank = 6 Inflow Net Peak = 0.19 MGD Net Volume = 0.40 MG Rank = 5
BI Net = 0.26 MGD Unit Rate = 5,983 GPD/IDM Rank = 4 Inflow Net Peak = 0.16 MGD Net Volume = 0.15 MG Rank = 16
BI Net = 0.01 MGD Unit Rate = 289 GPD/IDM Rank = 16 Inflow Net Peak = 0.17 MGD Net Volume = 0.05 MG Rank = 20
BI Net = 0.08 MGD Unit Rate = 3,329 GPD/IDM Rank = 9 Inflow Net Peak = 0.14 MGD Net Volume = 0.23 MG Rank = 8
BI Net = 0.17 MGD Unit Rate = 11,670 GPD/IDM Rank = 1 Inflow Net Peak = 0.28 MGD Net Volume = 0.24 MG Rank = 7
BI Net = 0.16 MGD Unit Rate = 8,968 GPD/IDM Rank = 2 Inflow Net Peak = 0.24 MGD Net Volume = 1.12 MG Rank = 1
BI Net = 0.02 MGD Unit Rate = 658 GPD/IDM Rank = 15 Inflow Net Peak = 0.19 MGD Net Volume = 0.19 MG Rank = 14
BI Net = 0.05 MGD Unit Rate = 2,246 GPD/IDM Rank = 10 Inflow Net Peak = 0.20 MGD Net Volume = 0.23 MG Rank = 8
BI Net = 0.01 MGD Unit Rate = 265 GPD/IDM Rank = 17 Inflow Net Peak = 0.13 MGD Net Volume = 0.20 MG Rank = 12
BI Net = 0.16 MGD Unit Rate = 5,563 GPD/IDM Rank = 5 Inflow Net Peak = 0.34 MGD Net Volume = 0.16 MG Rank = 15
BI Net = 0.04 MGD Unit Rate = 1,596 GPD/IDM Rank = 12 Inflow Net Peak = 0.22 MGD Net Volume = 0.10 MG Rank = 19
BI Net = 0.03 MGD Unit Rate = 1,111 GPD/IDM Rank = 13 Inflow Net Peak = 0.14 MGD Net Volume = 0.15 MG Rank = 16
BI Net = 0.00 MGD Unit Rate = --- GPD/IDM Rank = 20 Inflow Net Peak = 1.07 MGD Net Volume = 0.92 MG Rank = 2
BI Net = 0.65 MGD Unit Rate = 4,469 GPD/IDM Rank = 7 Inflow Net Peak = 2.34 MGD Net Volume = 0.20 MG Rank = 12
BI Net = 0.00 MGD Unit Rate = --- GPD/IDM Rank = 20 Inflow Net Peak = 1.32 MGD Net Volume = 0.55 MG Rank = 4
BI Net = 0.19 MGD Unit Rate = 6,252 GPD/IDM Rank = 3 Inflow Net Peak = 0.49 MGD Net Volume = 0.22 MG Rank = 11
BI Net = 0.00 MGD Unit Rate = --- GPD/IDM Rank = 20 Inflow Net Peak = 0.99 MGD Net Volume = 0.23 MG Rank = 8
BI Net = 0.00 MGD Unit Rate = 122 GPD/IDM Rank = 19 Inflow Net Peak = 0.14 MGD Net Volume = 0.04 MG Rank = 21
BI Net = 0.16 MGD Unit Rate = 3,735 GPD/IDM Rank = 8 Inflow Net Peak = 1.26 MGD Net Volume = 0.76 MG Rank = 3
BI Net = 0.01 MGD Unit Rate = 211 GPD/IDM Rank = 18 Inflow Net Peak = 0.20 MGD Net Volume = 0.31 MG Rank = 6
Lake Street Pumping Station
Pleasant Street Pumping Station
Millers Lane Pumping Station
Pilot Drive Pumping Station
Cherry Street Pumping Station
Dublin Street Pumping Station
Main Street Pumping Station
Grove Street Pumping Station
Gay Street Pumping Station
Luther Avenue Pumping Station
Durfee Court Pumping Station
Foley Avenue Pumping Station
Owen Avenue Pumping Station
Route 6 Pumping Station
Lees River Avenue Pumping Station
Wilbur Avenue Pumping Station
Angus Street Pumping Station
WPCF
N
0 500 1,000 2,000 Feet
Summary of Base Infiltration (BI) and Inflow Priorities by Meter Basin
Somerset, Massachusetts
PROJ NO: 14031
DATE: 4/22/2019
FIGURE: 4-3
WRIGHT-PIERCE Engineering a Better Environment

4.6.3 Recommended SSES Work

Based on the results from the flow metering and infiltration/inflow (I/I) analysis, preliminary recommendations for sanitary sewer evaluation survey (SSES) work were made for the meter basins.

Using the MassDEP criteria, **Table 4-3** summarizes the recommended SSES work for each meter basin. The recommended quantity of each type of recommended SSES work is shown in **Table 4-4**. The following types of SSES work are recommended in meter basins, which are identified to have infiltration issues: manhole inspections, night flow isolations, and closed-circuit television (CCTV) inspection. For meter basins with inflow issues, typical types of SSES work are: manhole inspections, smoke testing, dye testing, and building inspections.

The planning level cost estimates for the six phases of SSES are shown in **Table 4-5**. These planning-level costs were developed using standard cost estimating procedures consistent with industry standards utilizing unit cost information. The detailed project cost information for the recommended SSES phases is presented in the Town's *I/I Control Plan (December 2018)*. The estimated cost for all six SSES phases is $2,189,000 (based on an ENR index of 11,170 from September 2018).

4.6.3.1 Schedule

The implementation schedule shown in **Table 4-6** includes provisions for the recommended SSES tasks over the next 13 years. The first phase of SSES work is proposed to commence 2021.

This schedule focuses on finding the sources of I/I in the sanitary sewer system. Based on the findings from the SSES tasks, the Town should perform rehabilitation, repair, or replacement of sewer assets to address the issues found. Also, it is recommended that the Town perform post-rehabilitation flow monitoring to document the estimated amount of I/I removed from its sewer collection system, when feasible.

TABLE 4-3

PLANNED SSES RECOMMENDATIONS

Meter Basin	Infiltration Priority	Inflow Priority	CCTV Inspection	Night Flow Isolation	Manhole Inspection	Smoke Testing	Dye Testing	Building Inspection	Flow Monitoring
M1	No	No	No	No	No	No	No	No	No
M2	No	Yes	No	No	Yes	No	No	Yes	No
M3	No	No	No	No	No	No	No	No	No
M4	No	Yes	No	No	Yes	Yes	Yes	Yes	No
M5	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
M6	Yes	No	Yes	Yes	Yes	No	No	No	No
M7	No	No	No	No	No	No	No	No	No
M9/M8	No	Yes	No	No	Yes	Yes	Yes	Yes	No
M10	No	No	No	No	No	No	No	No	No
M11	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
M12	No	Yes	No	No	No	No	No	Yes	No
M14	No	Yes	No	No	Yes	No	No	Yes	No
M15	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
M16	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
M19	No	Yes	No	No	Yes	No	No	Yes	No
M20/M13/ M17/M18	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
M21	No	Yes	No	No	Yes	Yes	Yes	Yes	No
M22	No	No	No	No	No	No	No	No	No
M23	Yes	No	Yes	Yes	Yes	No	No	No	No
M24	No	Yes	No	No	Yes	No	No	Yes	No
M25	No	No	No	No	No	No	No	No	No
M26	No	No	No	No	No	No	No	No	No
Totals	**7**	**13**	**7**	**7**	**14**	**4**	**4**	**13**	**1**

1. Gray highlights represent “high priority” areas.

TABLE 4-4

RECOMMENDED SSES WORK QUANTITIES

Meter Basin	CCTV Inspections (LF)	Night Flow Isolations (EA)	Manhole Inspections (EA)	Smoke Testing (LF)	Dye Testing (LF)	Building Inspections (EA)	Flow Monitoring (EA)
M2	0	0	116	0	0	61	0
M4	0	0	114	26,620	13	69	0
M5	18,760	19	81	18,760	9	68	0
M6	26,550	27	123	0	0	78	0
M9/M8	0	0	188	43,580	22	58	0
M11	17,690	18	92	0	0	48	0
M12	0	0	97	0	0	57	0
M14	0	0	77	0	0	61	0
M15	9,380	10	42	0	0	65	0
M16	11,190	12	51	0	0	55	0
M20/M13/M17/M18	75,530	76	345	75,530	3	235	6
M21	0	0	121	22,750	12	29	0
M23	17,870	18	99	0	0	0	0
M24	0	0	77	14,110	7	55	0
TOTAL	**176,970**	**180**	**1,623**	**201,350**	**100**	**930**	**6**

Section 5
Wastewater Pump Stations

SECTION 5

WASTEWATER PUMP STATIONS

5.1 INTRODUCTION

There are currently 17 pump stations located throughout Somerset’s wastewater collection system as shown on **Figure 4-1**. **Table 5-1** summarizes each of the pump stations currently being operated and maintained by the Town’s Water Pollution Control Department.

A detailed discussion of each pump station currently being operated and maintained by the Water Pollution Control Department staff is presented below.

5.2 EXISTING CONDITIONS

5.2.1 Angus Street Pump Station

The Angus Street Pump Station was originally constructed in the late 1960’s as a flooded suction, can-type pump station and was converted to a submersible type station in 2009. The station serves the area of Somerset located south of I-195. The station pumps wastewater approximately 1,930 feet, across route I-195, and discharges to the gravity system located on Hanley Road. The pump station has a rated capacity of 300 gpm at 92-feet of TDH. The station has a permanent standby generator to provide backup power. A Mission Remote Terminal Unit (RTU) transmits alarm conditions to the WPCF staff.

5.2.2 Cherry Street Pump Station

The Cherry Street Pump Station was constructed in 1976 to serve seven houses on Cherry Street, west of High Street. The two-horsepower submersible grinder type pump station conveys wastewater, approximately 390 feet to the intersection of Cherry and High Streets, through a 2-inch diameter PVC forcemain. The pump station has a rated capacity of 100 gpm at 75-feet of TDH. There is no standby generator installed at this site, but a pigtail connection is available for a portable generator connection. A Mission RTU transmits alarm conditions to the WPCF staff.

TABLE 5-1
SOMERSET'S WASTEWATER PUMP STATIONS

Pump Station Location/Name	Type	Most Recent Update	No. Pumps	Rated Capacity (gpm)	TDH (feet)	Motor (Hp)	Voltage	Phase	Cycle (Hz)	Standby Generator	Generator Fuel
Angus Street	Submersible	2009	2	300	92	15	277/480V	3 phase, 4 wire	60	Yes	Natural Gas
Cherry Street	Submersible Grinder	1976	2	100	75	2	120/240V	1 phase, 3 wire	60	No (Pigtail connection available)	N/A
Dublin Street	Flooded Suction	2012	3	1,700	40	25	480V	3 phase, 3 wire	60	Yes	Natural Gas
Durfee Court	Submersible Grinder	1995	2	160 max	160 max	2	120/240V	1 phase, 3 wire	60	No (Pigtail connection available)	N/A
Foley Avenue	Flooded Suction	1995	3	2,600	60	75	277/480V	3 phase, 4 wire	60	Y	Natural Gas
Gay Street	Submersible Grinder	1995	2	220 max	40.8 max	2	120/240V	1 phase, 3 wire	60	No (Pigtail connection available)	N/A
Grove Avenue	Flooded Suction	2008	3	1,900	34	25	277/480V	3 phase, 4 wire	60	Y	Natural Gas
Lake Street	Submersible Grinder	1990	2	40	33	2	120/240V	1 phase. 3 wire	60	Y	Natural Gas
Lees River Avenue	Flooded Suction	2015	2	1,200	130	75	277/480V	3 phase, 4 wire	60	Y	Natural Gas
Luther Avenue	Flooded Suction	1990	3	2,200	62	75	277/480V	3 phase, 4 wire	60	Y	Natural Gas
Main Street	Flooded Suction	1967	2	700	58	20	277/480V	3 phase, 4 wire	60	Y	Diesel
Millers Lane	Submersible Grinder	1976	2	58	105	2	120/240V	1 phase, 3 wire	60	No (Pigtail connection available)	N/A
Owen Avenue	Submersible Grinder	1995	2	160 max	160 max	2	120/240V	1 phase, 3 wire	60	No (Pigtail connection available)	N/A
Pilot Drive[1]	Flooded Suction	1976	2	X	X	25	277/480V	3 phase, 4 wire	60	Y	Diesel
Pleasant Street	Flooded Suction	1976	2	350	26	5	120/208V	3 phase, 4 wire	60	Y	Diesel
Route 6	Flooded Suction	1992	2	200	45	7.5	120/208V	3 phase, 4 wire	60	Y	Natural Gas
Wilbur Avenue	Flooded Suction	1992	2	200	45	7.5	120/208V	3 phase, 4 wire	60	Y	Natural Gas

[1]Town to confirm pump station capacity (gpm) and TDH for stations highlighted yellow

5.2.3 Dublin Street Pump Station

The Dublin Street Pump Station was constructed in 1968 and upgraded in 2012. The station is a flooded-suction type station, that is equipped with three 25-horsepower Fairbanks-Morse pumps rated for 1,700 gpm at 40 feet of TDH. The pump station conveys wastewater approximately 1,300 feet through a 12-inch diameter DI forcemain. A bypass connection on the forcemain was installed during the 2012 upgrade. The station has a permanent standby generator for backup power. The station is equipped with a Mission RTU to transmit alarm conditions to the WPCF staff.

5.2.4 Durfee Court Pump Station

The Durfee Court Pump Station was originally constructed in 1967 as an ejector station that was designed to discharge wastewater at 200 gpm at 30 feet of TDH. The station was retrofitted during the 1990's with two, 2 horsepower submersible, grinder type pumps installed in the station's wet well, to convert the station from an ejector, to a submersible grinder type station. The ejector kettle has been left in place, while the station operates as a submersible grinder type station. The station pumps wastewater approximately 450 feet through a 6-inch diameter cast iron forcemain to the main sewer interceptor on Riverside Avenue. The pump station has a maximum capacity of 160 gpm and a maximum TDH of 160 ft. The station does not have a standby generator but does have a pigtail connection for a portable generator connection. The station is equipped with a Mission RTU to transmit alarm conditions to the WPCF staff.

5.2.5 Foley Avenue Pump Station

The Foley Avenue Pump Station was originally constructed in 1967 and then upgraded in 1995. The station is a flooded-suction type station that is equipped with three 75-horsepower pumps that have a design capacity of 2,600 gpm at 60 feet of TDH. The station pumps wastewater approximately 990 feet through a 16-inch diameter cast iron forcemain along the main sewer interceptor on Riverside Avenue. The station has a permanent standby generator for backup power. The station is equipped with a Mission RTU to transmit alarm conditions to the WPCF. The station has a divided wet well that can be used to isolate the wet well into two separate chambers. All gates and valves in the wet well are heavily worn (not operable) and in need of replacement.

5.2.6 Gay Street Pump Station

The Gay Street Pump Station was originally constructed in 1967 as a pneumatic ejector station that was designed to discharge wastewater at 200 gpm at 30 feet of TDH. The station was retrofitted during the 1990's with two, 2 horsepower submersible grinder type pumps installed in the station's wet well (converting the station from a pneumatic ejector to a submersible grinder type station). The original ejector kettle was left in place within the wet well. The station pumps wastewater approximately 430 feet through a 6-inch diameter cast iron forcemain to the main sewer interceptor on Riverside Avenue. The pump station has a maximum capacity of 160 gpm and a maximum TDH of 160 ft. The station does not have a standby generator but does have a pigtail adapter for a portable generator connection. The station is equipped with a Mission RTU to transmit alarm conditions to the WPCF staff. **The WPCF staff reported that the 6-inch diameter forcemain has a crack.**

5.2.7 Grove Avenue Pump Station

The Grove Avenue Pump Station is located along Riverside Avenue and the main sewer interceptor. The station was originally constructed in 1967 and upgraded in 2008. The station is a flooded-suction type pump station that is equipped with three 25-horsepower Fairbanks-Morse pumps that are designed to pump 1,900 gpm at 34 feet of TDH. The station pumps approximately 300 feet through a 16-inch diameter cast iron forcemain before discharging to the gravity sewer interceptor on Riverside Avenue. The forcemain has the capability to be bypassed at the station, if needed during an emergency situation. The station has a permanent standby generator for backup power. A Mission RTU is installed to transmit alarm conditions to the WPCF staff.

5.2.8 Lake Street Pump Station

The Lake Street Pump Station was originally constructed in 1990 by a private developer and was owned, operated and maintained by the developer until 2016, when it was transferred to the Town. The station is a submersible grinder type pump station equipped with two, 2 horsepower grinder pumps. The pump station has a rated capacity of 40 gpm at 33-feet of TDH. The station has a permanent standby generator for backup power. The station has a separate valve vault which contains gate valves and check valves on both discharge lines from the two pumps, as well as an emergency bypass connection on the forcemain. The two pump discharge pipes manifold into one common 2-inch diameter PVC forcemain in the vault, prior to the bypass connection. The Town recently equipped the station with a Mission RTU to transmit alarm conditions to the WPCF staff.

5.2.9 Lees River Avenue Pump Station

The Lees River Avenue Pump Station was originally constructed in 1976 and comprehensively upgraded in 2015. The station is a flooded-suction type station equipped with two, 75-horespower Fairbanks Morse pumps designed to pump 1,200 gpm at 130 feet of TDH. The station pumps approximately 4,000 feet through a 12-inch diameter DI forcemain. A forcemain bypass connection was installed during the 2015 upgrade to the station. A standby generator is located outside of the pump station building for backup power supply during a power outage. A Mission RTU is installed at the station to transmit alarm conditions to the WPCF staff.

5.2.10 Luther Avenue Pump Station

The Luther Avenue Pump Station was originally constructed in 1967 and upgraded in the 1990s. The pump station is equipped with three, 75-horsepower Fairbanks Morse designed for 2,200 gpm at 62-feet of TDH. The station pumps approximately 2,400 feet through a 16-inch diameter cast iron forcemain. The station has a permanent standby generator for backup power. A Mission RTU is installed at the station to transmit alarm conditions to the WPCF staff.

5.2.11 Main Street Pump Station

The Main Street Pump Station was constructed in 1967 and has not received any significant upgrades since its original construction. The pump station is a flooded suction (can-type) station manufactured by Davco within a stand-alone building. The station is equipped with two, 20-horsepower Davco pumps that are designed for 700 gpm at 58 feet of TDH. The pump station discharges through an 8-inch diameter cast iron forcemain that conveys wastewater approximately 1,000 feet from Main Street to the gravity system at the intersection of High Street and Billy's Lane. The pump station has a permanent diesel generator that was installed at the time of the original construction to provide backup power. A Mission RTU at the station transmits alarm conditions to the WPCF staff. It is noted that the parking lot for this station is prone to coastal flooding, however the station is elevated, so it is not directly impacted, but access to the station is impacted during flood conditions.

5.2.12 Miller's Lane Pump Station

The Miller's Lane Pump Station was constructed in 1976 and has not received any significant upgrades since its original construction. The station serves approximately 20 homes, located within Somerset and Swansea, along Miller's Lane. The 2-horespower submersible grinder-type pump pumps wastewater approximately 800 feet south of the station along Miller's Lane through a 2-inch diameter PVC forcemain. The pump station has a rated capacity for a maximum capacity of 58 gpm and a maximum lift of 105-feet of TDH. There is no standby generator installed at this site, but a pigtail adapter is available for a portable generator connection. A Mission RTU transmits alarm conditions to the WPCF staff.

5.2.13 Owen Avenue Pump Station

The Owen Avenue Pump Station was originally constructed in 1967 as an ejector type station that was designed to discharge wastewater at 200 gpm at 30 feet of TDH. The station was retrofitted during the 1990's with two, 2 horsepower submersible grinder type pumps installed within the station's wet well, to convert the station from an ejector to a submersible grinder type station. While the station operates as a submersible grinder type station, the original ejector kettle has been left in place within the wet well. The station pumps wastewater approximately 300 feet through a 2-inch diameter forcemain that has been slip-lined through the original 6-inch diameter cast iron forcemain to the main sewer interceptor on Riverside Avenue. The pump station has a maximum capacity of 160 gpm and a maximum TDH of 160 ft. The station does not have a standby generator but does have a pigtail adapter for a portable generator connection. The station is equipped with a Mission RTU to transmit alarm conditions to the WPCF staff.

5.2.14 Pilot Drive Pump Station

The Pilot Drive Pump Station was originally constructed in 1976. The flooded-suction type station is equipped with two Deming, 25-horsepower pumps. The design operating point of the pump station was not able to be confirmed during the evaluation, however WPCF staff report that the pump operates at an average flow of 500 gpm. The station pumps wastewater approximately 1,000 feet through an 8-inch diameter ductile iron forcemain that is located along a cross country route near the bank of the Taunton River. The station is equipped with its original permanent diesel generator and a Mission RTU is used to transmit alarm conditions to the WPCF staff.

5.2.15 Pleasant Street Pump Station

The Pleasant Street Pump Station was originally constructed in 1976. The flooded-suction type station is equipped with two Deming, 5-horsepower pumps that have a rated capacity of 350 gpm at 26 feet of TDH. The station pumps wastewater approximately 1,600 feet to the gravity system near the intersection of Pleasant Street and Old Colony Avenue through an 8-inch diameter ductile iron forcemain. The station is equipped with its original permanent diesel generator and a Mission RTU is used to transmit alarm conditions to the WPCF staff.

5.2.16 Route 6 Pump Station

The Route 6 Pump Station was originally constructed in 1976 as an ejector station, and later converted in the 1990's to a flooded-suction type station. The station is equipped with two 7-1/2 horsepower Fairbanks Morse pumps that have a rated capacity of 200 gpm at 45 feet of TDH. The station pumps wastewater approximately 950 feet to the gravity system at the intersection of Route 6 and Lees River Avenue through a 6-inch diameter cast iron forcemain. The station is equipped with a natural gas generator that is located behind the building. A Mission RTU transmits alarm conditions to the WPCF staff.

The influent sewer pipe visible in the station's dry pit, as well as the station's wet well shows severe corrosion. The pump station's influent manhole was partially replaced/repaired in 2018 due to similar corrosion issues. It is assumed that the Venus De Milo Restaurant pump station (located along Route 6 in Swansea) is contributing to the corrosion issues at this station due to septic conditions of the influent from the restaurant (the restaurant wastewater is held for long periods of time in a large wet well and only discharged to the Somerset system during early morning hours as a requirement of the agreement between the two parties).

5.2.17 Wilbur Avenue Pump Station

The Wilbur Avenue Pump Station was originally constructed in 1976 as an ejector station, and later converted in the 1990's to a flooded suction type station, similar to the Route 6 Pump Station. The station is equipped with two 7-1/2 horsepower Fairbanks Morse pumps that have a rated capacity of 200 gpm at 45 feet of TDH. The station pumps wastewater approximately 750 feet to the gravity sewer system located on Hilton Street through a 6-inch diameter cast iron forcemain. A portion of the forcemain crosses above I-195, through a utility bay under the Lees River Avenue bridge. The station is equipped with a permanent natural gas generator that is located behind the building. A Mission RTU transmits alarm conditions to the WPCF staff.

5.3 PUMP STATION NEEDS ASSESSMENT

The process of developing a prioritized Capital Improvement Plan (CIP) requires gathering inventory and condition information, which was presented in Section 5.2, as well as information on the risks and consequences of failure. The project team gathered considerable information specific to each pump station based on O&M information provided by the Town; field inspections; and interviews with Town operations staff. An evaluation of each pump station was then performed based on specific relevant technical and other criterion. The criteria was established to provide a uniform approach to the evaluation of each station, as well as provide a repeatable tool for the reassessment of the stations in the future. Each criterion was assigned a point range to account for the criterion's relative importance in the overall assessment of the station. In each category, low scores represent a low likelihood of failure and higher scores represent a higher likelihood of failure.

These evaluations were summarized and then scored. The resulting scores were ranked by score to establish priorities between all seventeen stations. It should be noted that the rankings are intended to inform and guide the pump station capital improvement process and should not be considered a definitive decision regarding pump station priorities. These rankings should be considered in concert with other specific information that has been identified and evaluated for each of the Town's existing pump stations. The final ranking order should also acknowledge other Town infrastructure needs, including water and stormwater systems, and availability of funds.

Section 5.3.1 outlines the criteria developed and used to evaluate each pump station. Section 5.3.2 discusses the evaluation of each station in terms of specific criteria, concluding with **Table 5-2**, that compares the scores for each pump station.

5.3.1 Evaluation Criteria

The pump stations were evaluated, and ranked, based on several evaluative criteria. The criteria included the following:

- Condition of Station
- Age of Station
- Rated capacity
- Safety concerns
- Instrumentation and Communications
- Standby power
- Locational Impacts (environmental & residential impacts, odor, aesthetics, etc.)
- Vulnerability to impact from sea level rise
- Vulnerability to impact from hurricane surge

5.3.1.1 Condition of Station

The overall condition of the station was based on the observations of Wright-Pierce engineers during the site visits which evaluated the following station components:

- Wet well condition
- Dry well condition
- Pump condition
- Piping and valve condition
- Generator condition
- Instrumentation (controls and alarms) condition
- Electrical systems condition
- Site condition (security, access, driveways, parking, bollards, etc.)

Each station was given a score from 1 to 10 based on a composite of all observations of the conditions at each station. The scoring system is based on the following:

- 1-2 = Excellent condition - Needs to be addressed in 15- 20 years
- 3-4 = Good condition - Needs to be addressed in 10-15 years
- 5-6 = Average condition - Needs to be addressed in 5-10 years
- 7-8 = Poor condition - Needs to be addressed in 0-5 years
- 9-10 = Extremely poor condition - Needs to be addressed immediately

5.3.1.2 Age of the Station

Wastewater infrastructure has a finite useful life. While condition is a direct indicator of the likelihood of failure, age provides another factor in the ability of the station to perform as intended. As equipment ages, even in the best condition, the likelihood of failure and performing corrective maintenance is reduced.

The useful life can vary, but for the purposes of determining which pump station and components warrant repair or replacement, the following useful life expectancies were used to help identify potential deficiencies. It is understood that these are generalities and often can be exceeded with proactive, preventive maintenance and good care of the pump station equipment and systems.

- Pump station mechanical components (pumps, motors, valves, instrumentation, etc.) - 20 years
- Pump station piping (site and internal piping) - 25 years
- Pump station structural steel components (dry wells) - 50 years
- Pump station concrete structural components (wet wells and other structures) – greater than 50 years

Based upon the specific components of each station, a composite age score was developed. Each station was given a score from 1 to 10 based on its composite age score. The score was based on the following:

Age (years)	Score
1 to 10	1
11 to 15	2
16 to 20	3
21 to 25	4
26 to 30	5
31 to 35	6
36 to 40	7
41 to 45	8
46 to 50	9
50 plus	10

5.3.1.3 Rated Capacity

The pump stations within the Town's collection system range from a rated capacity of 50 to 2,200 gpm. The larger the flow rate, the more critical the station within the sewer collection system. Additionally, the higher the capacity, the greater the consequence of failure. Therefore, each station was scored based on their rated capacity on a scale of 1 to 5. The scoring was based on the following:

- 1 = Rated capacity less than 100gpm
- 2 = Rated capacity between 100 and 499 gpm
- 3 = Rated capacity between 500 and 999 gpm
- 4 = Rated capacity between 1,000 and 1,499 gpm
- 5 = Rated capacity 1,500 gpm and above

5.3.1.4 Safety Concerns

Safety issues considered include confined space issues and specific access to the pump station wet well, dry pit and/or other structures, pump removal methods, and compliance with current code requirements such as the latest NFPA 820 Standard for Fire Protection in Wastewater Treatment and Collection Facilities. Worker health and safety is a critical component of a stations ability to reliably and safely meet the service requirements. Each station was given a score between 1 and

5. If a station has no safety concerns it was given a score of one. If a station has major safety concerns, such as a dry-pit without a rigid lifeline, it was given a score of five.

5.3.1.5 Instrumentation and Communications

The Town's stations are of varying age, with a range of age from 3 to 42 years old. As a result, the instrumentation and communications (I&C) capabilities varies from station to station. The I&C systems are the "brains" of the stations, which not only operate the stations, but communicate alarms remotely to the Town's operators, so that they may respond in a timely manner.

Based on interviews with the Town's operators, they provided their preference of controls for several stations that have older control systems that are outdated and not ideal.

Since the Town's stations are operated and controlled by various forms of instrumentation, the stations were given scores based on their I&C capabilities, considering both the instrumentation and communication capabilities. All of the Town's pump stations are equipped with "Mission Systems" which transmit station alarms remotely to the Town's operators via the cellular network.

Since all stations have cellular communication, they were given a score based on their current method of control, if they have an updated PLC/OIT based technology or older proprietary style controls. The scoring was based on the following:

- 1 = PLC based Control Panel with Mission System
- 2 = Upgraded Controls, but not preferred by Town
- 3 = Adequate
- 4 = Obsolete, corrosion apparent
- 5 = Obsolete, past useful life

5.3.1.6 Standby Power

All of the Town's wastewater pump stations have permanent-mounted generators (on the stations site) or portable generator connections to provide standby power in the event of a power failure. The Massachusetts Department of Environmental Protection (MassDEP) requires that all wastewater pump stations have the means to provide an independent engine/generator type source of electric power or an alternate source of power, separate and apart from that supplied by the electric utility, for emergency operations. The stations were given a score based on the ability to reliably provide standby power on a scale of 1 to 5. The scoring largely considered the age of the generator, as some were observed to be original to the station. The age of the generator was considered to significantly impact the reliable operation of the station's generator. Scoring is as follows:

- 1 = Generator (1 to 19 years old)
- 2 = Generator (20 to 29 years old/ No generator, but no history of issues)
- 3 = Generator (30 to 39 years old)
- 4 = Generator (40 to 49 years old)
- 5 = Generator (50 years and over)

5.3.1.7 Locational Impacts

Each pump station was considered in terms of locational impacts, both residential and environmental. Residential impacts are those that affect the pump station's neighbors, such as aesthetics, odors, noise, and potential for sewer backups. Environmental impacts are those that would affect the nearby environment. If a pump station were to fail, resulting in a Sanitary Sewer Overflow (SSO), the score reflects the likelihood of raw wastewater entering a nearby body of water or other sensitive resource area. Locational impacts were ranked from 1 to 5 (1 being the lowest score with minor impacts and 5 being the highest score with major impacts).

5.3.1.8 Vulnerability to Impact from Sea Level Rise

In today's everchanging environment, particularly the effects of climate change, coupled with Somerset's location along the ocean, the impact of sea level rise on each pump station was considered. Utilizing the Massachusetts Ocean Resource Information System's (MORIS) Coastal Zone Management's (CZM) online mapping tool, which compiles potential sea level rise data from the National Oceanic and Atmospheric Administration (NOAA), Wright-Pierce was able to identify pump stations that were vulnerable due to the effects of sea level rise at various depths. Vulnerability due to sea level rise were ranked from 0 to 6 based on impact to a station for a particular sea level rise (0 was given to those stations that were not impacted; 1 was the lowest score with minor impact to those stations effected at 6 feet of sea level rise; and 6 being the highest score with major impact to those stations effected at 1 foot of sea level rise).

5.3.1.9 Vulnerability to Impact from Hurricane Surge

The effects of climate change are not only affecting sea-level, but also the warmer ocean temperatures and higher sea levels are expected to intensify the impacts of hurricanes. Again, utilizing the NOAA data within MORIS, Wright-Pierce considered the impacts of hurricane surge at each pump station for various categories of hurricanes. Vulnerability to hurricane surge were ranked from 0 to 4 based on the impact to a station for particular hurricane category force winds (0 was given to those stations that were not impacted by hurricane surge; 1 was the lowest score with minor impact to those stations effected by a category 4 hurricane; and 4 being the highest score with major impact to those stations effected by a category 1 hurricane).

5.3.2 Comparison of Evaluation Results

Each of the evaluations detailed above were then totaled to yield an overall score for each pump station. The scoring system used for the evaluation was developed so that a lower score indicates a better result – the station represents a lower risk/consequence of failure. Conversely, a higher score is intended to indicate a pump station with greater risk/consequence of failure. As previously noted, this is an informative planning/evaluation tool, but should not be considered a definitive answer concerning prioritizing station needs going forward. The resulting scores can be used to help prioritize the implementation plan (schedule and budget) for the specific pump station needs. The pump station improvements have been summarized based on need from highest to lowest priority, in **Table 5-2** below.

TABLE 5-2

SUMMARY OF PUMP STATION EVALUATION AND RANKING

	STATION	DESCRIPTION	YEAR ONLINE	YEAR UPDATED	CAPACITY (GPM)	CONDITION	AGE	RATED CAPACITY	SAFETY CONCERNS	I&C	STANDBY POWER	LOCATIONAL IMPACTS	SEA LEVEL RISE	HURRICANE SURGE	TOTAL
1	Main Street	Flooded Suction	1967	Original	700	8	10	3	5	4	5	5	2	4	46
2	Route 6	Flooded Suction	1976	1992	200	8	5	2	5	4	4	5	0	4	37
3	Pleasant Street	Flooded Suction	1976	Original	350	6	8	2	5	4	4	2	2	3	36
4	Wilbur Avenue	Flooded Suction	1976	1992	200	8	5	2	5	4	4	4	0	3	35
5	Pilot Drive	Flooded Suction	1976	Original	500[2]	6	8	3	5	4	4	2	0	3	35
6	Gay Street	Submersible	1967	1995	50[1]	10	4	1	3	5	2	3	1	4	33
7	Cherry Street	Submersible	1976	Original	50[1]	6	8	1	2	5	2	3	0	3	30
8	Durfee Court	Submersible	1967	1995	50[1]	8	4	1	3	5	2	3	1	3	30
9	Owen Avenue	Submersible	1967	1995	50[1]	8	4	1	3	5	2	3	1	3	30
10	Foley Avenue	Flooded Suction	1967	1995	1,800	4	4	5	3	3	2	3	1	3	28
11	Luther Avenue	Flooded Suction	1967	1990	2,200	4	5	5	3	3	2	3	0	3	28
12	Miller's Lane	Submersible	1976	Original	50[1]	6	8	1	2	5	2	2	0	0	26
13	Dublin Street	Flooded Suction	1967	2012	1,700	2	1	5	3	2	1	3	4	4	25
14	Grove Avenue	Flooded Suction	1967	2008	1,900	3	1	5	3	2	1	3	1	3	22
15	Lake Street	Submersible	1990	1990	50[1]	4	5	1	3	2	3	2	0	0	20
16	Lees River Avenue	Flooded Suction	1976	2015	1,200	1	1	4	1	1	1	2	0	3	14
17	Angus Street	Submersible	1967	2009	300	1	1	2	1	2	1	2	0	2	12

Notes:

1. Pumping capacity for small pump stations were not able to be confirmed. Small submersible pump stations were assumed to have a pumping capacity < 100 gpm for ranking purposes.
2. The design point pumping capacity of the Pilot Drive Pump Station was not able to be verified. The station was reported to pump at 500 gpm based on operator input, and flow run-time history. A flow of 500 gpm was used for ranking purposes.

5.4 RECOMMENDATIONS

Specific recommendations for each pump station are summarized below. For more detailed information regarding specific recommendations related to disciplines (e.g. architectural, structural, mechanical, electrical and I&C), refer to their corresponding technical memorandums located in **Appendix E**.

5.4.1 Angus Street

The Angus Street Pump Station was upgraded and converted to a submersible pump station in 2009. Since the station is fairly new and in good condition, no critical assets associated with the operation of the station will be at the end of their useful life during the capital improvement period, however some discipline specific recommendations have been identified. There are a few normal and high priority discipline-specific recommendations to continue normal operation and maintenance. The recommendation for a new PLC and control system will standardize the station's controls with the newer control systems at other stations.

Based upon the conditional assessment and evaluation, the following list of recommended improvements were identified for the Angus Street Pump Station and are presented in Table 5-3.

TABLE 5-3
RECOMMENDED IMPROVEMENTS TO ANGUS STREET PUMP STATION

High Priority Improvements
Electrical • Provide emergency lighting, exit signs, fire alarms, security, and gas detection systems.
Normal Priority Improvements Structural • Repair the four corners of the cracked concrete foundation.
Process • Install a flow meter on the forcemain discharge. • Inspect existing forcemain; take corrective actions, based on the results.
Mechanical • Insulate the generator exhaust muffler. • Wrap heat trace wiring tight to piping and insulate/jacket piping.
Instrumentation & Controls • Install a new PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches, that functions independently of the PLC.

5.4.2 Cherry Street

Due to the age of the station, its controls and equipment, the Cherry Street Pump Station is recommended to be completely replaced with a new submersible station. The proposed pump station is recommended to include the following:

- Provide two new submersible pumps that will operate in a Lead - Standby configuration. It is assumed the pumps will be rated for approximately 50 – 100 gpm (final pump sizing to be determined during design phase of station upgrades).
- Pumps/motors should be installed on SS circular slide rail system within the wet well.
- Replace concrete top with a new flat top section with a hatch, capable of H20 loading, or with two manhole frames and covers to access the new pumps.
- Install a separate 5-foot diameter precast concrete valve pit for the pump station check valves and isolation gate valves, and bypass/pig launch connection.
- Inspect existing forcemain; take corrective actions, based on the results. Consider increasing the size of the existing 2-inch diameter forcemain.
- The control panel will be NEMA 12 rated painted steel enclosure located within a concrete pad mounted weatherproof stainless-steel enclosure to protect the equipment from damage due to vandalism and the environment.
- Install a dedicated electrical main disconnect.
- Connect pump station monitoring and alarm signals from the new PLC-based control panel to the Town's current telemetry network.
- Install a new permanent backup generator and automatic transfer switch (will need to review constraints to physically locating a permanent generator at this site).
- Install new level controls and instrumentation.
- Install a new PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches, that functions independently of the PLC.
- Install new electrical equipment enclosure mounted on a concrete pad.
- Install new electrical distribution equipment.

TABLE 5-4
RECOMMENDED IMPROVEMENTS TO CHERRY STREET PUMP STATION

Normal Priority Improvements
All Disciplines • Complete Station Replacement, as described in 5.4.2.

5.4.3 Dublin Street

The Dublin Street Pump Station was recently upgraded in 2012 and is generally in good condition. The high priority list of improvements are due to new building code requirements and life safety items.

Based upon the conditional assessment and evaluation, the following list of recommended improvements were identified for the Dublin Street Pump Station and are presented in Table 5-5.

TABLE 5-5
RECOMMENDED IMPROVEMENTS TO DUBLIN STREET PUMP STATION

High Priority Improvements
Structural • Indicate the capacity of all lifting assemblies. • Replace the chains at all openings with safety gates that conform to OSHA regulations. • Install toe plate on the guard in the wet well.
Mechanical • Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature.
Electrical • Provide emergency lighting, exit signs, fire alarms, security, and gas detection systems. • Receptacles and equipment are not compliant with the Class 1 Div. 2 space (refer to mechanical to declassify the space to unclassified).
Normal Priority Improvements Architectural • At chimney, install new flashing over cap and replace step flashing and repoint joints, as needed. • Replace wet well door and hardware. • Replace stair metal edge guards and repair concrete surfaces as needed.
Structural • Replace the broken or missing exterior concrete stair nosings. • Replace the sump cover. • Replace the clip angles anchoring the bottom of the stairs to the concrete slab in the wet well. • Install rigging points to aid in the removal of pumps.
Process • Spot repair pump coatings. • Inspect existing forcemain; take corrective actions, based on the results.

• It was noted that this station is located in a parcel susceptible to future flooding and hurricane surges. Relocation of the station and other flood protection measures should be considered including berms, sealing all wall penetrations, and provisions for sand bagging.
Mechanical • Insulate domestic water piping. • Replace electric heater located in wet well.
Instrumentation & Control • Evaluate and repair/re-program pump controls to alternate pump operation between pump 1 and 2. • Install a new PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches, that functions independently of the PLC.

5.4.4 Durfee Court

The Durfee Court Pump Station was designed and constructed as an ejector station in 1967 and converted to a submersible type station approximately 25 years ago, similar to the Cherry Street, Gay Street, and Owen Avenue Pump Stations. Due to its age and configuration, it is recommended that the station be fully replaced. The proposed pump station is recommended to include the following:

- Replace the submersible grinder station with a new submersible grinder type pump station. The pumps will operate in a lead-standby configuration. It is assumed the pumps will be rated for approximately 250 gpm (final pump sizing to be determined during design phase of station upgrades).
- Install a new 5-foot diameter precast concrete wet well.
- Provide pumps/motors to be installed on SS circular slid rail system within the wet well.

- Install a separate 5-foot diameter precast concrete valve pit for the pump station check valves, isolation gate valves, and bypass/pig launch connection.
- Install a PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches that function independently of the PLC.
- Install wet well level measurement instruments using a submersible pressure transducer suitable for wastewater and float switches for back-up operation and alarm notification.
- Inspect existing forcemain; take corrective actions, based on the results.
- Install a new electrical service, main breaker, and electric control panel.
- Install a new permanent backup generator and automatic transfer switch (will need to review constraints to physically locating a permanent generator at this site).
- Install a new electrical equipment enclosure mounted on a concrete pad.
- New electrical distribution equipment.

TABLE 5-6
RECOMMENDED IMPROVEMENTS TO DURFEE COURT PUMP STATION

Normal Priority Improvements
All Disciplines • Complete Station Replacement, as described in 5.4.4.

5.4.5 Foley Avenue

The Foley Avenue Pump Station was upgraded in 1995. Although, relatively recently upgraded compared to other pump stations within the Town, many of its critical assets are beyond their useful life and need replacement.

Based upon the conditional assessment and evaluation, the following list of recommended improvements were identified for the Foley Avenue Pump Station and are presented in Table 5-7.

TABLE 5-7
RECOMMENDED IMPROVEMENTS TO FOLEY AVENUE PUMP STATION

High Priority Improvements
Structural • Replace the chains at all openings with safety gates that conform to OSHA regulations. • Indicate the capacity of all lifting assemblies. • Replace the clip angles anchoring the bottom of the stairs to the concrete slab in the wet well.
Process • Replace slide gates in wet well. • Inspect existing forcemain; take corrective actions, based on the results.
Mechanical • Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature.
Electrical • Provide emergency lighting, exit signs, fire alarms, security, and gas detection systems. • Receptacles and equipment are not compliant with the Class 1 Div. 2 space (refer to mechanical to declassify the space to unclassified).
Normal Priority Improvements Architectural • Replace asphalt shingle roof. • Replace wood shingle siding with vinyl siding. • Add gutter to one side. • At chimney, install new flashing cap and replace step flashing and repoint joints as needed.
Structural

• Replace the broken or missing exterior concrete stair nosings. • Replace the sump cover. • Install toe plate on the guard in the wet well.
Process • Piping and valving are in fair condition, require some spot coating repair. • Investigate clogging/issues, evaluate if addition of a grinder upstream of the wet well would be beneficial. • Investigate pumping capacity, at times all three pumps need to operate. • Install bypass connection. • Inspect existing forcemain; take corrective actions, based on the results.
Mechanical • Insulate domestic water piping. • Replace electric heater located in wet well.
Instrumentation & Control • Install a new PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches, that functions independently of the PLC.
Electrical • Replace/update pump room and wet well lighting. • Replace the current outdated VFD's. • Complete new electrical distribution equipment for the station. • New incoming electrical service upgrade to the pump station.

5.4.6 Gay Street

The Gay Street Pump Station was designed as an ejector station in 1967 and converted to a submersible grinder station approximately 25 years ago, similar to the Cherry Street, Durfee Court, and Owen Pump Stations. During the conversion the original ejector kettle was left within the wet well. Recently, the Town has discovered that there may be a break within the station's forcemain that is need of repair. Due to the station’s age and configuration, and condition of its forcemain, it is recommended that the station be fully replaced. The proposed pump station is recommended to include the following:

- Investigate condition of forcemain; repair or replace; as necessary.
- Replace the submersible grinder station with a new submersible type pump station. The pumps will operate in a lead-standby configuration. It is assumed the pumps will be rated for approximately 250 gpm (final pump sizing to be determined during design phase of station upgrades).
- Install a new 5-foot diameter precast concrete wet well.
- Provide pumps/motors to be installed on SS circular slid rail system within the wet well.
- Install a separate 5-foot diameter precast concrete valve pit for the pump station check valves, isolation gate valves, and bypass/pig launch connection.
- Install a PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches that function independently of the PLC.
- Install wet well level measurement instruments using a submersible pressure transducer suitable for wastewater and float switches for back-up operation and alarm notification.
- Install a new electrical service, main breaker, and electric control panel.
- Install a new backup generator and automatic transfer switch (will need to review constraints to physically locating a permanent generator at this site).
- Install a new electrical equipment enclosure mounted on a concrete pad.

TABLE 5-8
RECOMMENDED IMPROVEMENTS TO GAY STREET PUMP STATION

High Priority Improvements
All Disciplines • Complete Station Replacement and Forcemain Repair/Rehabilitation, as described in section 5.4.6.

5.4.7 Grove Avenue

The Grove Avenue Pump Station was upgraded in 2008 and is in generally good condition. At the time of the inspection, one pump was out for repair; however other pumps are in relatively good condition and were replaced in 2008, as part of the station's overall upgrade. The majority of the recommended improvements are categorized as high priority due to new building code requirements and life safety items.

Based upon the conditional assessment and evaluation, the following list of recommended improvements were identified for the Grove Avenue Pump Station and are presented in **Table 5-9.**

TABLE 5-9
RECOMMENDED IMPROVEMENTS TO GROVE AVENUE PUMP STATION

High Priority Improvements
<u>Architectural</u> • Investigate possible leak around chimney. At chimney, install new flashing on cap and replace step flashing and repoint joints as necessary.
<u>Structural</u> • Replace the chains at all openings with safety gates that conform to OSHA regulations. • Indicate capacity of all lifting assemblies.
<u>Mechanical</u> • Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature. • Provide an additional RPZ backflow preventer, connected to the existing piping upstream of the existing RPZ, and reroute the utility sink supply piping to the new backflow preventer to allow the potable water supplied to the utility sink to be appropriately isolated from the process water and hose bibs. •
<u>Electrical</u> • Provide emergency lighting, exit signs, fire alarms, security, and gas detection systems. • Receptacles and equipment are not compliant with the Class 1 Div. 2 space (refer to mechanical to declassify the space to unclassified).
Normal Priority Improvements <u>Structural</u> • Modify the pipe support legs to bear on grout pads to elevate the steel above the wet floor. • Sandblast and repaint the gate base plates in the wet well. • Install toe plate on the guard in the wet well. • Install rigging points to aid in the removal of pumps.
<u>Process</u>

• Inspect existing forcemain; take corrective actions, based on the results.
<u>Mechanical</u> • Insulate domestic water piping.
<u>Instrumentation & Control</u> • Install a new PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches, that functions independently of the PLC.
<u>Electrical</u> • Replace/update pump room and wet well lighting. • Complete new electrical distribution equipment for the station. • New incoming electrical service upgrade to the pump station.

5.4.8 Lake Street

The Lake Street Pump Station was originally constructed in 1990 by a private developer and was owned, operated and maintained by the developer until 2016, when ownership and O&M was transferred to the Town. The station is generally in fair condition, however some of the equipment is in need of replacement and/or upgrades.

Based upon the conditional assessment and evaluation, the following list of recommended improvements were identified for the Lake Street Pump Station and are presented in **Table 5-10**.

TABLE 5-10
RECOMMENDED IMPROVEMENTS TO LAKE STREET PUMP STATION

Normal Priority Improvements
<u>Architectural</u> • Replace exterior siding, trim, roof, door and frame, and light fixtures. • Install exterior insulation. • Repaint interior.
<u>Structural</u> • Repair diagonal crack on interior building concrete wall. • Resurface hole in the valve pit concrete slab with cementitious repair material. • Replace corroded pipe supports.
<u>Process</u> • Replace float style level sensors with pressure transduce level sensors. • Replace corroded check valve and isolation gate valves within the buried valve vault. • Inspect existing forcemain; take corrective actions, based on the results.
<u>Mechanical</u> • Replace existing electric unit heater.
<u>Instrumentation & Control</u> • Install a new PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches, that functions independently of the PLC.
<u>Electrical</u> • Update all lighting inside and outside of the pump station including all dry and wet side locations with energy efficient LED type fixtures and bring all lighting levels to IES standards for this type of facility and locations. • Furnish and install a new stand-by generator and equipment including automatic transfer switch. Locate generator outdoors in

a weather-protected enclosure to allow sequence of construction of the station as well as additional space within the building for equipment installations and clearances per NEC requirements.

- Furnish and install legally required emergency lighting and exit signage.
- Furnish and install new VFD equipment with proper harmonic mitigation equipment.
- Furnish and install fire alarm and security systems as required and tie into SCADA telemetry system new equipment.
- Furnish and install new instrumentation and SCADA telemetry equipment. This shall include new pump control panel/RTU and level controls.
- Complete new electrical distribution equipment for the station.
- New incoming electrical service upgrade to the pump station.

5.4.9 Lees River Avenue

The Lee's River Avenue Pump Station was upgraded in 2014/5, however there are a few recommendations that were observed as part of our field visit and are noted in **Table 5-11**. Items in reference to OSHA compliance items given a high priority due to safety.

TABLE 5-11
RECOMMENDED IMPROVEMENTS TO LEE'S RIVER AVENUE PUMP STATION

High Priority Improvements
Structural • Replace the chains at the guard openings with safety gates that comply with OSHA regulations. • Label the monorail and all the lifting assembles with their rated load capacities.
Normal Priority Improvements Structural • Replace the expansion joint sealant at the concrete entrance pads. • Repair all cracked concrete by epoxy injection. • Resurface all exposed reinforcing steel after applying epoxy bonding agent with cementitious repair material. • Replace the corroding pipe supports in the wet well. • Label the monorail and all the lifting assembles with their rated load capacities.
Mechanical • Drain and flush the hydronic heating system, clean existing piping of corrosion and repair leaking joints as necessary. Refill hot water heating system and charge with inhibited propylene glycol solution to a concentration of 30 percent. Replace damaged and removed fiberglass piping insulation. • Replace water damaged fiberglass duct insulation in vicinity of hydronic heating coil. • Engage a testing and balancing company to verify the exhaust fan airflow and make adjustments as necessary to achieve the design requirements. • Insulate cold water piping in service room.

5.4.10 Luther Avenue

The Luther Avenue Pump Station was originally constructed in 1967 and upgraded in the 1990's. The station is in fair condition and several critical systems are nearing the end of their useful life and should be replaced (e.g. pumps and motors).

Based upon the conditional assessment and evaluation, the following list of recommended improvements were identified for the Luther Avenue Pump Station and are presented in **Table 5-12.**

TABLE 5-12
RECOMMENDED IMPROVEMENTS TO LUTHER AVENUE PUMP STATION

High Priority Improvements
Structural • Replace the chains at all openings with safety gates that conform to OSHA regulations. • Indicate the capacity of all lifting assemblies.
Mechanical • Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature. • Provide an additional RPZ backflow preventer, connected to the existing piping upstream of the existing RPZ, and reroute the utility sink supply piping to the new backflow preventer to allow the potable water supplied to the utility sink to be appropriately isolated from the process water and hose bibs. • Replace wet well exhaust fan and associated ductwork and appurtenances.
Electrical • Provide emergency lighting, exit signs, fire alarms, security, and gas detection systems. • Receptacles and equipment are not compliant with the Class 1 Div. 2 space (refer to mechanical to declassify the space to unclassified).
Normal Priority Improvements Architectural

• Replace wet well door hardware. • Replace asphalt shingle roof. • At chimney, install new flashing over cap, replace step flashing, and repoint joints, as needed.
<u>Structural</u> • Repair all cracked concrete by epoxy injection. • Resurface degraded concrete surfaces with cementitious repair material. • Install cover over sump. • Modify the pipe support legs to bear on grout pads to elevate the steel above the wet floor. • Sandblast and repaint the stair nosings in wet well. • Install toe plate on the guard in the wet well. • Install rigging points to aid in the removal of pumps.
<u>Process</u> • Replace sluice gates in wet well. • Replace pumps and motors. • Spot repair pipe coatings in locations. • Replace/refurbish check and gate valves. • Install bypass connection. • Inspect existing forcemain; take corrective actions, based on the results.
<u>Instrumentation & Control</u> • Install a new PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches, that functions independently of the PLC.
<u>Electrical</u> • Replace the outdated VFD's

5.4.11 Main Street

The Main Street Pump Station was constructed in 1967 and has not received any significant upgrades since its original construction. Due to its age, condition, location, access and flooding/storm surge, and safety concerns, the Main Street Pump Station is recommended to be completely replaced with a new submersible type station.

During our evaluation, the Town expressed interest in potentially relocating the station from its current location adjacent to the Village Waterfront Park. The Main Street Pump Station receives flow from Main Street (and its side streets) via gravity piping from the north and south of its existing location. If the Town would like to pursue potential relocation of the station, it is recommended that alternatives be identified and fully vetted during the preliminary design phase of upgrades to the station. If it is determined that the station will ultimately be kept in its current location, it is recommended that the station be upgraded similar to the previously upgraded Angus Street Pump Station (converting the existing into a submersible type station). The proposed pump station is recommended to include the following:

- Further inspection be conducted on the station's existing concrete wet well to determine if the existing structure can be repurposed as a submersible wet well as part of the station's upgrade.
- Replace the flooded suction pumps with new submersible type pumps and motors. The pumps will operate in a Lead - Standby configuration and will be rated for approximately 700 gpm.
- Pumps/motors will be installed on a SS circular slide rail system within the wet well.
- Install a separate 5-foot diameter precast concrete valve pit for the pump station check valves, isolation gate valves, and bypass/pig launch connection.
- Install a PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches, that functions independently of the PLC.
- Construct a new CMU building to house the electrical, controls, and generator to protect the equipment from damage due to vandalism and the environment.

- Install wet well level measurement instruments using a submersible pressure transducer suitable for wastewater and float switches for back-up operation and alarm notification.
- Install a new electrical service, main breaker, and electric control panel.
- Install a new backup generator and automatic transfer switch.
- Connect the new pump station to the existing forcemain.
- Inspect existing forcemain; take corrective actions, based on the results.
- Connect pump station monitoring and alarm signals from the new PLC-based control panel to the Town's cellular telemetry network.
- Install new site security fencing and plantings as a view barrier between the public (using the park and the pumping station).
- Evaluate and make improvements as necessary/feasible to mitigate station flooding and improve station access for Town operations staff.
- It was noted that this station is located in a parcel susceptible to future flooding and hurricane surges. Relocation of the station and other flood protection measures should be considered including berms, sealing all wall penetrations, and provisions for sand bagging

TABLE 5-13
RECOMMENDED IMPROVEMENTS TO MAIN STREET PUMP STATION

High Priority Improvements
<u>All Disciplines</u> • Complete Station Replacement, as described in section 5.4.11.

5.4.12 Miller's Lane

Due to the age of the station, its controls and equipment, the Miller's Lane Pump Station is recommended to be completely replaced with a new submersible station. The proposed pump station is recommended to include the following:

- Provide two new submersible pumps that will operate in a Lead - Standby configuration. It is assumed the pumps will be rated for approximately 50 – 100 gpm (final pump sizing to be determined during design phase of station upgrades).
- Pumps/motors should be installed on a SS circular slide rail system within the wet well.
- Replace concrete top with a new flat top section with a hatch, capable of H20 loading, or with two manhole frames and covers to access the new pumps.
- Install a separate 5-foot diameter precast concrete valve pit for the pump station check valves and isolation gate valves and a bypass/pig launch connection.
- Inspect existing forcemain; take corrective actions, based on the results.
- The control panel will be NEMA 12 rated painted steel enclosure located within a concrete pad mounted weatherproof stainless-steel enclosure to protect the equipment from damage due to vandalism and the environment.
- Install a dedicated electrical main disconnect.
- Connect pump station monitoring and alarm signals from the new PLC-based control panel to the Town's current telemetry network.
- Install a new backup generator and automatic transfer switch (will need to review constraints to physically locating a permanent generator at this site).
- Install new level controls and instrumentation.
- Install a new PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches, that functions independently of the PLC.
- Install new electrical equipment enclosure mounted on a concrete pad.
- Install new electrical distribution equipment.

TABLE 5-14

RECOMMENDED IMPROVEMENTS TO MILLERS LANE PUMP STATION

Normal Priority Improvements
<u>All Disciplines</u> • Complete Station Replacement, as described in section 5.4.12.

5.4.13 Owen Avenue

The Owen Avenue Pump Station was designed as an ejector station in 1967 and converted to a submersible station approximately 25 years ago, similar to the Cherry Street, Durfee Court, and Gay Street Pump Stations. Due to its age and configuration, it is recommended that the station be fully replaced. The proposed pump station is recommended to include the following:

- Replace the submersible grinder station with a new submersible grinder type pump station. The pumps will operate in a lead-standby configuration It is assumed the pumps will be rated for approximately 50 – 100 gpm (final pump sizing to be determined during design phase of station upgrades).
- Install a new 5-foot diameter precast concrete wet well.
- Provide pumps/motors to be installed on SS circular slid rail system within the wet well
- Install a separate 5-foot diameter precast concrete valve pit for the pump station check valves, isolation gate valves, and bypass/pig launch connection.
- Install a PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches that function independently of the PLC.
- Install wet well level measurement instruments using a submersible pressure transducer suitable for wastewater and float switches for back-up operation and alarm notification.

- Inspect existing forcemain; take corrective actions, based on the results.
- Install a new electrical service, main breaker, and electric control panel.
- Install a new backup generator and automatic transfer switch (will need to review constraints to physically locating a permanent generator at this site).
- Install a new electrical equipment enclosure mounted on a concrete pad.
- New electrical distribution equipment.

TABLE 5-15
RECOMMENDED IMPROVEMENTS TO OWENS AVENUE PUMP STATION

Normal Priority Improvements
All Disciplines • Complete Station Replacement, as described in section 5.4.13.

5.4.14 Pilot Drive

The Pilot Street Pump Station was constructed in 1976 and has not received any significant upgrades since its original construction. Due to its age, condition, and non-compliance with current building codes, it is recommended to be upgraded.

Based upon the conditional assessment and evaluation, the following list of recommended improvements were identified for the Pilot Avenue Pump Station and are presented in **Table 5-16**. All recommendations have been listed as high priority due to the station's evaluation score, performed as part of Section 5.3.

TABLE 5-16
RECOMMENDED IMPROVEMENTS TO PILOT STREET PUMP STATION

High Priority Improvements

Architectural
• Replace wood shingle siding with new vinyl siding.
• Since the building is heated, it will be required to comply with current energy codes, which may involve adding rigid insulation to the walls.
• Replace all wood trim with PVC trim.
• Replace windows with new vinyl windows.
• Confirm chimney is still in use.
    • If not, consider removing top portion to below roof deck and install sheathing over it to eliminate possibility of leaks.
    • If chimney is still in service, repoint brick joints as needed and replace step flashing.
• Replace exterior doors, frames, and hardware.
• Repaint interior walls and ceiling.

Structural • Indicate the capacity of all lifting hooks. • Repair the crack in the 6-inch walkway porch slab by epoxy injection and resurface the degraded concrete with cementitious repair material. • Sandblast and repaint the ¼-inch checkered plate stair landing and stair treads. Replace a section of the ¼-inch checkered plate near the 8inch diameter pipe penetration in the east wall. • Replace the pipe penetration sealant in the concrete wall where the leaking liquid is causing the intermediate stair landing checkered plate to corrode. • Replace the CMU block with a permanent pipe support. • Replace the bent guard on the intermediate stair landing. • Replace the sump cover. • Replace the chains at the wet well grating hatch with fall protection that meets OSHA requirements. • Install rigging points to aid in the removal of pumps.
Process • Replace Pump No. 2 and its suction piping, similar to Pump No. 1 and its suction piping. • Replace all check and gate valves. • Install a force main bypass/pig launch connection.
Mechanical

- NFPA 820 requires the space to be ventilated continuously at 6 ACH to declassify the space; the existing fan is likely undersized, and the existing controls are not set up for the fan to run continuously. NFPA 820 allows for the airflow rate to be reduced by 50% if the space is unoccupied and the outside air temperature is below 50°F.
  - Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature.
- NFPA 37 requires that the generator engine room be separated from the rest of the building with a 1-hour fire rating. The existing arrangement does not provide separation between the lower level pump room from the generator engine room; any significant upgrade of the station will likely trigger the requirement to rectify this issue.
- Secondary containment is required for fuel oil storage tanks to prevent environmental contamination in the event of a leak. Replace the existing single wall tank with a new double wall storage tank. Replace associated piping to serve new tank.
- Replace existing electric unit heaters.
- Replace existing RPZ backflow preventer.
- Provide an additional RPZ backflow preventer, connected to the existing piping upstream of the existing RPZ and reroute the utility sink supply piping to the new backflow prevent to allow the potable water supplied to the utility sink to be appropriately isolated from the process water and hose bibs.
- Replace wet well exhaust fan and associated appurtenances.
- Replace electric heater located in wet well.

<u>Instrumentation & Control</u>

- Install a new PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches, that functions independently of the PLC.

<u>Electrical</u>

- Provide emergency lighting, exit signs, fire alarms, security, and gas detection systems.
- Replace/update pump room and wet well lighting.

• Space classification issue in this station. The pump room is open to the upper floor area, classifying the spiral staircase and parts of the upper level as Class 1, Div. 2. None of the equipment and receptacles are properly rated for a Class 1, Div. 2 space (refer to mechanical to declassify the space to unclassified). • Complete new electrical distribution equipment for the station. • New incoming electrical service upgrade to the pump station.

5.4.15 Pleasant Street

The Pleasant Street Pump Station was constructed in 1976 and has not received any significant upgrades since its original construction, similar to the Pilot Street Pump Station. Due to its age, condition, and noncompliance with current building codes, it is recommended to be upgraded.

Based upon the conditional assessment and evaluation, the following list of recommended improvements were identified for the Pleasant Street Pump Station and are presented in Table 5-17. All recommendations have been listed as high priority due to the station's evaluation score, performed as part of Section 5.3.

TABLE 5-17
RECOMMENDED IMPROVEMENTS TO PLEASANT STREET PUMP STATION

High Priority Improvements

<u>Architectural</u>
• Replace wood shingle siding with new vinyl siding.
• Since the building is heated, it will be required to comply with current energy codes, which may involve adding rigid insulation to the walls.
• Replace all wood trim with PVC trim.
• Replace windows with new vinyl windows.
• Confirm chimney is still in use.
  o If not, consider removing top portion to below roof deck and sheathing over it to eliminate possibility of leaks.
  o If chimney is still in use, repoint brick joints as needed and replace step flashing.
• Replace exterior doors, frames, and hardware.
• Repaint interior walls and ceiling.

<u>Structural</u> • Indicate the capacity of all lifting hooks. • Sandblast and repaint the ¼-inch checkered plate stair landing and the base plate of the pipe support. Replace a section of the ¼-inch checkered plate near the 8-inch diameter pipe penetration in the east wall. • Replace the pipe penetration sealant in the concrete wall where the leaking liquid which is causing the intermediate stair landing checkered plate to corrode. • Repair the concrete wall with cementitious material after applying epoxy bonding agent to the exposed wall reinforcement. • Resurface the horizontal exposed reinforcing steel bar after applying epoxy bonding agent with cementitious repair material. • Replace the sump cover. • Install rigging points to aid in the removal of pumps.
<u>Process</u> • Replace pumps and motors. • Replace all check and gate valves. • Install a bypass/pig launch connection.
<u>Mechanical</u> • NFPA 820 requires the space to be ventilated continuously at 6 ACH to declassify the space; the existing fan is likely undersized, and the existing controls are not set up for the fan to run continuously. NFPA 820 allows for the airflow rate to be reduced by 50% if the space is unoccupied and the outside air temperature is below 50°F.   o Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature. • NFPA 37 requires that the generator engine room be separated from the rest of the building with a 1-hour fire rating. The existing arrangement does not provide separation between the lower level pump room from the generator engine room; any significant upgrade of the station will likely trigger the requirement to rectify this issue. • Secondary containment is required for fuel oil storage tanks to prevent environmental contamination in the event of a leak. Replace the existing single wall tank with a new double wall storage tank. Replace associated piping to serve new tank. • Replace existing electric unit heaters. • Replace existing domestic hot water heater with new tankless electric water heater.

• Provide an additional RPZ backflow preventer, connected to the existing piping upstream of the existing RPZ backflow preventer, and reroute the utility sink supply piping to the new backflow preventer to allow the potable water supplied to the utility sink to be appropriately isolated from the process water and hose bibs. • Replace wet well exhaust fan and associated ductwork and appurtenances. • Replace wet well damper actuator. • Replace electric heater located in wet well.
<u>Instrumentation & Control</u> • Install a new PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches, that functions independently of the PLC.
<u>Electrical</u> • Provide emergency lighting, exit signs, fire alarms, security, and gas detection systems. • Replace/update pump room and wet well lighting. • Space classification issue in this station. The pump room is open to the upper floor area, classifying the spiral staircase and parts of the upper level as Class 1, Div. 2. None of the equipment and receptacles are properly rated for a Class 1, Div. 2 space (refer to mechanical to declassify the space to unclassified). • Complete new electrical distribution equipment for the station. • New incoming electrical service upgrade to the pump station.

5.4.16 Route 6

The Route 6 Pump Station was originally constructed in 1976 as an ejector station and converted to a flooded-suction type station in the 1990's, similar to the Wilbur Avenue Pump Station. Due to its age, condition, significant wet well corrosion, limited accessibility for operators, and its high-profile location, the Route 6 Pump Station is recommended to be completely replaced with a new submersible type station. The proposed pump station is recommended to include the following:

- Replace the flooded suction pump station with a new submersible type pump station. The pumps will operate in a Lead - Standby configuration and will be rated for approximately 200 gpm.
- Install a new 6-foot diameter precast concrete wet well; evaluate the use of epoxy lining due to highly corrosive influent coming into the pump station. Pumps/motors will be installed on a SS circular slide rail system within the wet well.
- Install a separate 5-foot diameter precast concrete valve pit for the pump station check valves, isolation gate valves, and bypass/pig launch connection.
- Install a PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches, that functions independently of the PLC.
- Install wet well level measurement instruments using a submersible pressure transducer suitable for wastewater and float switches for back-up operation and alarm notification.
- Install a new electrical service, main breaker, and electric control panel.
- Install a new backup generator and automatic transfer switch.
- Electrical, instrumentation, controls, and generator to be housed in a small building to be aesthetically pleasing to the business located adjacent to the pump station. Proposed building to have appropriate HVAC systems.
- Connect the new pump station to the existing forcemain.
- Inspect existing forcemain; take corrective actions, based on the results.
- Connect pump station monitoring and alarm signals from the new PLC-based control panel to the Town’s cellular telemetry network.
- Install new site security fencing and plantings.
- It was noted that this station is located in a parcel susceptible to future flooding and hurricane surges. Relocation of the station and other flood protection measures should be considered including berms, sealing all wall penetrations, and provisions for sand bagging

TABLE 5-18
RECOMMENDED IMPROVEMENTS TO ROUTE 6 PUMP STATION

High Priority Improvements
<u>All Disciplines</u> • Complete Station Replacement, as described in section 5.4.16.

5.4.17 Wilbur Avenue

The Wilbur Avenue Pump Station was originally constructed in 1976 as a pneumatic ejector station and converted to a flooded-suction type station in the 1990's, similar to the Route 6 Pump Station. Due to its age, condition, interior pipe corrosion, and limited accessibility for operators, the Wilbur Avenue Pump Station is recommended to be completely replaced with a new submersible type station. The proposed pump station is recommended to include the following:

- Replace the flooded-suction pump station with a new submersible type pump station. The pumps will operate in a Lead - Standby configuration and will be rated for approximately 200 gpm.
- Install a new 6-foot diameter precast concrete wet well. Pumps/motors will be installed on SS circular slide rail system within the wet well.
- Install a separate 5-foot diameter precast concrete valve pit for the pump station check valves, isolation gate valves, and bypass/pig launch connection.
- Install a PLC-based pump station control panel with a touch screen operator interface terminal (OIT). The PLC will automatically control the pumps based on wet well level and totalize pump runtimes. Wet well level, equipment status, pump operation setpoints and station alarms will be indicated at the OIT. Manual controls for the pumps shall also be provided. The control panel shall have a pump backup control circuit, using wet well float switches, that functions independently of the PLC.
- The control panel will be NEMA 12 rated painted steel enclosure located within a concrete pad-mounted weatherproof stainless-steel enclosure to protect the equipment from damage due to vandalism and the environment.

- Install wet well level measurement instruments using a submersible pressure transducer suitable for wastewater and float switches for back-up operation and alarm notification.
- Install a new electrical service, main breaker, and electric control panel.
- Install a new backup generator and automatic transfer switch.
- Connect the new pump station to the existing forcemain.
- Inspect existing forcemain; take corrective actions, based on the results.
- Connect pump station monitoring and alarm signals from the new PLC-based control panel to the Town's cellular telemetry network.
- Install new site security fencing and plantings.
- It was noted that this station is located in a parcel susceptible to future flooding and hurricane surges. Relocation of the station and other flood protection measures should be considered including berms, sealing all wall penetrations, and provisions for sand bagging

TABLE 5-19
RECOMMENDED IMPROVEMENTS TO WILBUR AVENUE PUMP STATION

High Priority Improvements
All Disciplines • Complete Station Replacement, as described in section 5.4.17.

5.4.18 Summary of Recommended Pump Station Improvement Cost Estimates

We have summarized the estimated capital costs for improvements to each station in Table 5-20 below. The costs were estimated using similar pump station upgrade bid pricing and should be considered planning level costs for Town budgeting purposes. As the Town moves forward with station upgrades (preliminary and design phases), the cost estimates will be updated and adjusted to reflect the specific details for the upgrades for the given station. Cost estimates are total project costs and include high priority, normal priority and total improvement project costs.

TABLE 5-20
SUMMARY OF TOTAL PROJECT COST ESTIMATES FOR
ALL PUMP STATION RECOMMENDED IMPROVEMENTS

Pump Station	Estimated Costs		
	High Priority	**Normal Priority**	**Total**
Angus Street	$17,000	$384,000	$401,000
Cherry Street	$0	$944,000	$944,000
Dublin Street	$161,000	$447,000	$608,000
Durfee Court	$0	$921,000	$921,000
Foley Avenue	$373,000	$816,000	$1,189,000
Gay Street	$913,000	$0	$913,000
Grove Street	$297,000	$498,000	$795,000
Lake Street	$0	$497,000	$497,000
Lee's River Avenue	$18,000	$517,000	$535,000
Luther Avenue	$269,000	$703,000	$972,000
Main Street	$1,983,000	$0	$1,983,000
Millers Lane	$0	$1,069,000	$1,069,000
Owen Avenue	$0	$933,000	$933,000
Pilot Drive	$1,215,000	$0	$1,215,000
Pleasant Street	$1,226,000	$0	$1,226,000
Route 6	$1,578,000	$0	$1,578,000
Wilbur Avenue	$1,712,000	$0	$1,712,000
Total	**$9,762,000**	**$7,729,000**	**$17,491,000**

5.4.19 Recommended Improvements Implementation Schedule

The recommended improvements implementation schedule is detailed in Table 5-21. This table shows the target year to complete the recommended improvements and the total estimated cost for such improvements. The schedule is based on the results of the pump station evaluation and ranking analysis as summarized in Table 5-2. The intent is to spread the improvement costs over a 15-20-year duration and recognize that the Town needs to balance its wastewater pumping station improvements with other infrastructure improvements (WWTF upgrade, water system improvements, stormwater/drainage system improvements, etc.)

TABLE 5-21

PUMP STATION RECOMMENDED IMPROVEMENTS IMPLEMENTATION PLAN

PUMPING STATION/ EQUIPMENT	TOTAL EST. COSTS PER STATION	PRIORITY EST. COSTS	NORMAL EST. COSTS	CAPITAL IMPROVEMENTS PLAN YEAR																
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
ANGUS STREET	$401,000	$17,000	$384,000																	$401,000
CHERRY STREET	$944,000	$0	$944,000				$944,000													
DUBLIN STREET	$608,000	$161,000	$447,000													$608,000				
DURFEE COURT	$921,000	$0	$921,000		$921,000															
FOLEY AVENUE	$1,189,000	$373,000	$816,000										$1,189,000							
GAY STREET	$913,000	$913,000	$0		$913,000															
GROVE AVENUE	$795,000	$297,000	$498,000														$795,000			
LAKE STREET	$497,000	$0	$497,000															$497,000		
LEES RIVER AVENUE	$535,000	$18,000	$517,000																$535,000	
LUTHER AVENUE	$972,000	$269,000	$703,000											$972,000						
MAIN STREET	$1,983,000	$1,983,000	$0			$1,983,000														
MILLERS LANE	$1,069,000	$0	$1,069,000				$1,069,000													
OWEN AVENUE	$933,000	$0	$933,000		$933,000															
PILOT DRIVE	$1,215,000	$1,215,000	$0					$1,215,000												
PLEASANT STREET	$1,226,000	$1,226,000	$0			$1,226,000														
ROUTE 6	$1,578,000	$1,578,000	$0	$500,000					$1,078,000											
WILBUR AVENUE	$1,712,000	$1,712,000	$0		$1,712,000															
			TOTAL FOR YEAR	$500,000	$4,479,000	$3,209,000	$2,013,000	$1,215,000	$1,078,000	$0	$0	$0	$1,189,000	$972,000	$0	$608,000	$795,000	$497,000	$535,000	$401,000
			TOTAL	$17,491,000																
			AVERAGE COST PER YEAR	$1,221,300																

Section 6
Water Pollution Control Facility

SECTION 6

WATER POLLUTION CONTROL FACILITY

6.1 INTRODUCTION

The Town of Somerset’s Water Pollution Control Facility (WPCF) was originally built in the late 1960’s and was an extended aeration facility. The original facility included grit removal, three aeration tanks, and two chlorine contact tanks and an Operating Building. In the mid to late 1980’s the facility underwent a major upgrade (particulars included below). In 1993 a small upgrade was undertaken to construct an additional chlorine contact tank. In 1997 odor control was installed at the facility. In 2016 the chemical disinfection system was changed from chlorine gas to liquid sodium hypochlorite. SCADA upgrades were also completed a the WPCF over the last few years. Minor equipment replacements have been completed during subsequent years, including two new mechanical screens, screenings wash presses, and two new screw pumps. Most of the equipment and structures are of the 1990 upgrade vintage.

The treatment process consists of preliminary screening and grit removal, primary treatment, conventional activated-sludge secondary treatment, disinfection, solids handling and composting. The composting process has seen limited operation in recent years, and most of the solids, (dewatered cake) created by the process are sent to Synagro for incineration in Woonsocket, RI.

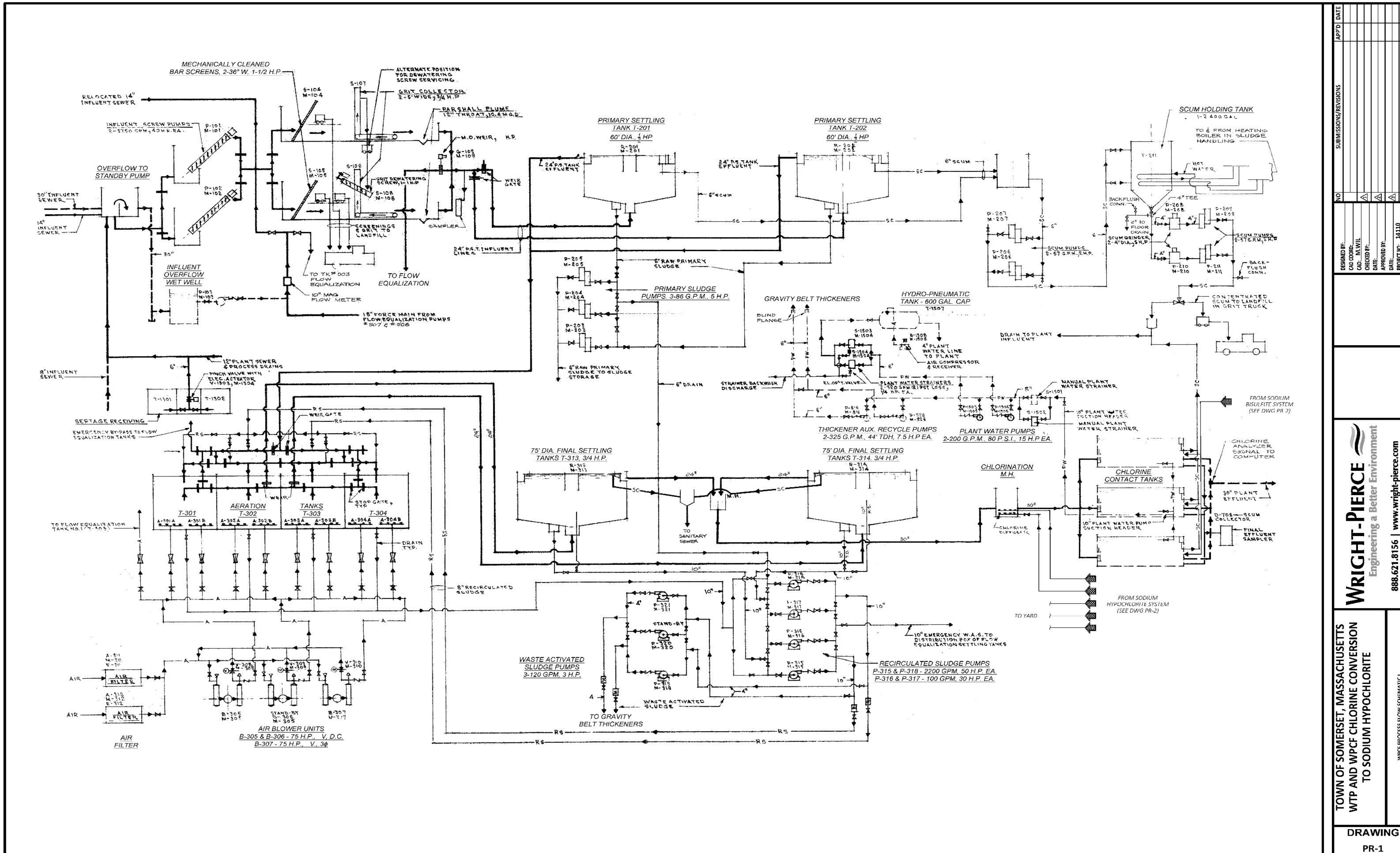
Under the 2004 NPDES Permit (NPDES #MA0100676), the Town of Somerset’s WPCF has a permitted design flow of 4.2 MGD. **Figure 6-1** shows an aerial photo of the WPCF. A simplified process schematic is shown in **Figure 6-2**. A new draft NPDES permit is expected to be received by the Town soon. The permit is discussed in further detail later in this section. Currently (through 2018) the treatment facility has an annual average influent flow of 3.3 MGD.

FIGURE 6-1

SOMERSET WATER POLLUTION CONTROL FACILITY

FIGURE 6-2

WPCF PROCESS FLOW SCHEMATIC



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WTP AND WPCF CHLORINE CONVERSION TO SODIUM HYPOCHLORITE

WPCF PROCESS FLOW SCHEMATIC

DRAWING
PR-1

The WPCF consists of the following processes, equipment, structures, and buildings/rooms:

- **Preliminary Treatment (Headworks) Building**
  - Influent Pump Station
    - Two screw pumps
    - One standby centrifugal pump (located in the Administration Building)
  - Grit and Screening Room
    - Two mechanically-cleaned bar screens
    - One screenings wash press
    - Two grit collector chambers with chain and drag bucket removal and a dewatering screw
  - Scum Room
    - Scum concentrator
    - Scum pumps
  - Electrical Room
    - MCC-5
    - MCC-5-7 (emergency)
  - Generator Room
    - Stand-by generator (GEN-4)
  - Odor Control Room
    - Odor control system
  - Influent sampling and flow measurement
- **Septage Receiving**
  - Tank
  - Manual bar rack
  - Odor Control
- **Flow Equalization**
  - Four rectangular aeration tanks (3 old, 1 new)
    - Coarse-bubble diffuser (new)
    - Mechanical aerators (old)
  - Two circular flow equalization tanks

        - Gravity thickener mechanisms
    - Flow equalization pumps (located in Administration Building basement)
- **Primary Treatment**
    - Primary Clarifier Tanks
        - Covers
        - Mechanisms
    - Primary Sludge Removal
        - Tank
        - Sludge pumps
    - Primary Scum Removal
        - Scum well
        - Scum pumps
        - Scum grinders
    - Odor Control
- **Secondary Treatment**
    - Control/Operations Building
        - Laboratory
        - Control and Break Room
        - Locker Room
        - MCC Room
            - MCC-4
            - MCC-4E
            - ATS-3
            - MCB-MCC-5-7
        - Generator Room
            - GEN-3
        - Lower Level – Pump Room
            - RAS Pumps
            - WAS Pumps
            - Primary Sludge Pumps
        - Lower Level - Blower Room

        - Lower Level – Boiler Room
    - Aeration Tanks
        - Blowers
        - Fine bubble diffusers
        - DO instrumentation
    - Secondary Clarifiers
        - Mechanisms
    - Secondary Sludge Removal
        - RAS Pumps (two large, two small)
        - WAS Pumps
- **Disinfection/Re-Aeration**
    - Chemical Building
    - Disinfection
        - Chlorine contact tanks (2 old, 1 new)
        - Sodium hypochlorite storage tank
        - Sodium hypochlorite feed pumps
    - Dechlorination
        - Sodium bisulfite storage tank
        - Sodium bisulfite feed pumps
    - Reaeration steps in outfall to increase dissolved oxygen (DO) levels
- **Solids Handling & Administration Building**
    - Administrative Area
    - Odor Control
    - Boiler Room
    - Maintenance Area
    - Operator Room
        - SCADA
    - Electrical Room
        - Switchboard
        - Stand-by generator (GEN-1)
        - Automatic transfer switch (ATS-1)

            - MCC-1
            - MCC-1-E
    - Thickening Room
        - Gravity belt thickeners
    - Thickened WAS
        - Tank
            - Aerator
        - TWAS pumps
    - Sludge Blending
        - Tank
            - Aerator
        - Sludge transfer (dewatering feed) pumps
    - Dewatering Room
        - Belt filter presses
        - Polymer system
            - Metering pump
            - Tank
                - Mixer
- **Composting**
    - Bins (structure)
    - Blowers
    - Sludge feed unit
    - Bulking agent feed unit
    - Mixing unit
    - Odor Control
- **Biofilter Building**
    - Biofilter and odor control fans
    - MCC-7
    - MCC-7E
    - ATS-2
    - GEN-2

The following subsections evaluate the WPCF systems in detail to establish the existing conditions and begin the needs assessment for the facility.

6.2 EXISTING CONDITIONS

6.2.1 Equipment and Processes

6.2.1.1 Preliminary Treatment and Pumping

Wastewater flows into the treatment facility through three sewer lines; 30, 14, and 8-inches in diameter. Septage is also received at the WPCF but is limited to septic systems located within the Town of Somerset. However, as most of the properties in Town are connected to the municipal wastewater collection system, there is little to no septage received at the WPCF. The 30-inch diameter sewer, 8-inch diameter sewer, and septage are lifted to the mechanical bar screen channel by the two influent screw pumps, while the 14-inch diameter sewer flows directly to the bar screen channel. Information relating to the screw pumps is included in **Table 6-1**. Both screw pumps were replaced in 2018 and are in excellent condition.

TABLE 6-1

INFLUENT SCREW PUMP DESIGN PARAMETERS

Number of Units:	2
Type:	Inclined Screw
Manufacturer:	Evoqua
Design Flow Rate (each unit):	3,750 gpm
Design Lift (feet):	23.52
Motor Horsepower (Hp):	20
Volt/Phase/Cycle:	460/3/60
Speed (rpm):	1,775
Length (feet):	35.83
Diameter (inches):	48
Year Installed	2018
Typical Service Life	25 Years

There is an influent standby pump located in the sludge handling building pump room that can receive overflow and bypass flow from the screw pump wet well. The standby influent pump design parameters are included in **Table 6-2**. The influent standby pump is nearing 30 years of use, which exceeds its excepted useful life. In addition, the pump is not in routine operation, which can significantly decrease the expected life of this mechanical equipment. However, the motor was rebuilt, and the impeller was replaced in 2017. The standby influent pump was used during the replacement of the two influent screw pumps in 2018.

TABLE 6-2

INFLUENT STANDBY PUMP DESIGN PARAMETERS

Number of Units:	1
Type:	Centrifugal
Manufacturer:	Fairbanks Morse
Design Flow Rate (each unit):	3,750 gpm
TDH (feet):	35
Motor Horsepower (Hp):	60
Volt/Phase/Cycle:	460/3/60
Speed (rpm):	870
Year Installed[1]:	1990
Typical Service Life	20 years

1. Motor rebuilt in 2017

The headworks at the facility consists of mechanically-cleaned climber-type screens followed by a grit removal system that utilizes grit chambers with chain-drag buckets and a dewatering screw. The headworks equipment is located in a 60-foot by 46-foot masonry building just downstream of the screw pumps. Screenings removal consists of two mechanical climber screens and one manually-cleaned bar rack, which is out of service. The mechanical bar screens are self-contained units with equally spaced steel bars. Design parameters relating to the mechanical bar screens are listed in **Table 6-3**. The original mechanical bar screens were installed during the 1990 expansion of the facility. New mechanical screens were installed in 2010 and they appear to be in fair condition.

TABLE 6-3

MECHANICAL BAR SCREEN DESIGN PARAMETERS

Number of Units:	2
Manufacturer:	Waste Tech
Design Flow Rate (each unit):	10.2 mgd
Spacing between bars (inches)	5/8
Total Width (feet)	2.92
Motor Horsepower (Hp):	2
Volt/Phase/Cycle:	460/3/60
Speed (rpm):	1,740
Year Installed:	2010
Typical Service Life:	20 Years

After screenings are removed from the influent stream, wastewater flows to the grit collection channels. The channels are constructed of reinforced concrete with a trapezoidal cross section. There are two grit collection channels. The channels are 3.19 feet wide by 29 feet long. Both channels have grit collection equipment, which consist of a series of buckets attached to chains. The buckets scrape grit off the bottom of the channels and convey grit up to the dewatering screw. There is one common dewatering screw, which is used to dewater grit from both channels. The dewatering screw is an inclined screw inside a metal trough. Spray nozzles are used to clean the grit out of the buckets. Design parameters for the grit collection equipment is included in **Table 6-4** and design information for the dewatering screw is included in **Table 6-5**. The grit tank was not able to be evaluated as it is an enclosed tank, however exterior components of the system showed visible wear. The grit bucket elevator is old technology, but appears to be functioning properly, and there were no complaints from operators regarding grit, despite the age of the equipment.

TABLE 6-4

GRIT COLLECTION DRAG BUCKETS DESIGN PARAMETERS

Number of Units:	2
Manufacturer:	Amwell
Design Capacity	19 c.f./hr.
Motor Horsepower (Hp):	3/4
Volt/Phase/Cycle:	460/3/60
Speed (rpm):	1,140
Year Installed:	1990
Typical Service Life:	20 Years

TABLE 6-5

GRIT DEWATERING SCREW DESIGN PARAMETERS

Number of Units:	1
Manufacturer:	Amwell
Motor Horsepower (Hp):	1
Volt/Phase/Cycle:	460/3/60
Speed (rpm):	1,750
Year Installed:	1990
Typical Service Life:	20 Years

From the grit chambers, wastewater flows to two Parshall flumes for flow measurement and influent sample collection. The Parshall flumes are located just outside and downstream of the preliminary treatment building. The flumes are both equipped with ultrasonic flow transmitters, which measure the flow through the flumes and send signals to a recorder. Samples are also collected at this point for influent analysis of BOD, TSS, and pH. A composite sampler is used to collect the influent samples. The sampler currently collects composite samples at 20-minute intervals, rather than on a flow-paced basis. After wastewater flows through the Parshall flume it is directed to a diversion chamber to evenly distribute flow to the online primary clarifiers and/or the flow equalization tanks.

6.2.1.2 Septage Receiving

The facility includes a septage receiving facility that consists of a concrete tank with two compartments that allows septage to flow to the headworks by gravity after being transferred from a septic tank hauler. Each compartment provides a volume of 12,500 gallons and is equipped with a manually-cleaned bar screen, for removal of large solids. In addition, chlorine can be added at the septage receiving tanks for odor control purposes. Given the few onsite septic systems within the Town, the facility does not get much use and has not been in operation for more than a decade according to plant staff.

6.2.1.3 Flow Equalization

Flow equalization capabilities were added to the WPCF during the 1990 expansion of the facility, through a combination of the conversion of previously existing tankage and equipment (1970 vintage) and construction of new tankage. Flow equalization at the facility consists of two converted primary clarifiers and four aerated flow equalization tanks (three of which were converted from previously existing aeration tanks, and one constructed as part of the 1990 expansion) and two flow equalization pumps.

The flow equalization clarifiers are original to the 1970 facility and are circular reinforced concrete tanks with a central column influent and peripheral overflow structure. The tanks are equipped with a central drive mechanism, which supports and rotates a center cage with two rake arms used for sludge collection. The mechanical equipment within the flow equalization tanks is in very poor condition, and likely not operational. Design information regarding the flow equalization clarifiers and equipment are included in **Table 6-6**.

TABLE 6-6

FLOW EQUALIZATION CLARIFIER DESIGN PARAMETERS

Number of Units:	2
Diameter (feet)	40
Sidewater Depth (feet)	10
Volume Per Tank (gallons)	94,000
Motor Horsepower (Hp)	1/2
Volt/Phase	460/3
Speed (rpm)	1,200
Year Installed:	1970
Typical Service Life[1]:	20 Years

1. Concrete tank life is typically 60 years

The aerated flow equalization tanks are rectangular reinforced concrete tanks and are equipped with fill and drain pipes, overflow gates or pipes, and mechanical aerators or aeration diffusers. The aerated flow equalization tank constructed during the 1990 expansion (Tank T-503) is equipped with coarse bubble diffusers and is supplied air from the secondary treatment system blowers. The three converted flow equalization tanks (Tanks T-504, T-505, and T-506) are equipped with mechanical aerators. All four tanks are 50 feet by 50 feet with a sidewater depth of 17.4 feet, to provide a flow equalization volume of 325,000 gallons per tank. Design information regarding the aeration equipment for tank T-503 is included in **Table 6-7**. Design information regarding the aeration equipment for tanks T-504, T-505, & T-506 are included in **Table 6-8**. The mechanical aerators installed in Tanks T-504, T-505, and T-506 are nearly 50 years old and in very poor condition.

TABLE 6-7

TANK T-503 AERATION EQUIPMENT DESIGN PARAMETERS

Type	Coarse Bubble Diffuser
Number of Aeration Grids	3
Diffusers per Two Side Grid	52
Diffuser per Central Grid	50
Manufacturer	Sanitaire
Air Supply	Secondary Treatment Blowers
Year Installed:	1990
Typical Service Life:	15 Years

TABLE 6-8

TANKS T-504, T-505, & T-506 AERATION EQUIPMENT DESIGN PARAMETERS

Type	Mechanical
Manufacturer	Yeomans
Number of Aerators per Tank	1
Motor Horsepower (Hp)	30
Year Installed:	1970
Typical Service Life:	30 Years

There are two flow equalization pumps that are located in the basement of the sludge handling building. The flow equalization pumps transfer wastewater from the flow equalization wetwell to the influent screenings channel, just downstream of the influent screw pumps. Design information relating to the flow equalization pumps is included in **Table 6-9**. The flow equalization pumps are nearly 30 years old, as they were installed with the 1990 expansion of the facility and are in fair to poor condition due to their age and intermittent use.

TABLE 6-9

FLOW EQUALIZATION PUMP DESIGN PARAMETERS

Number of Units:	2
Type:	Centrifugal
Manufacturer:	Fairbanks Morse
Design Flow Rate (each unit):	1,850 gpm
Motor Horsepower (Hp):	25
Volt/Phase/Cycle:	460/3/60
Speed (rpm):	1,150
Year Installed:	1990
Typical Service Life:	20 Years

6.2.1.4 Primary Treatment

Primary treatment of the influent wastewater is performed in the primary clarifiers. Settleable solids, floating materials, and scum are removed within the clarifiers. Solids that have settled at the bottom of the clarifier are pumped into the primary sludge storage well, located at the sludge dewatering building. Scum from the primary clarifier is pumped to the scum holding tank at the Preliminary Treatment Building. Primary clarifier effluent flows from the primary clarifiers to the aeration tanks for secondary treatment.

The primary clarifiers consist of two circular reinforced concrete tanks. Each tank is equipped with a central influent and peripheral overflow structure. A central drive mechanism, which supports and rotates a center shaft with two rake arms, is used for sludge collection. Both primary clarifiers are covered to help mitigate odor issues. Design information relating to the primary clarifier units is included in **Table 6-10**. The primary clarifiers appear to be in good structural condition. The sludge and scum collection mechanisms appear to be in poor condition due to their age, showing signs of severe corrosion.

TABLE 6-10

PRIMARY CLARIFIER DESIGN PARAMETERS

Number of Units:	2
Diameter (feet)	60
Sidewater Depth (feet)	10
Surface Area Per Tank (Sq. feet)	2,830
Volume Per Tank (gallons)	211,500
Weir Length Per Tank (feet)	188
Influent Pipe Diameter (inches)	24
Effluent Channel Width (feet)	1.5
Manufacturer of Mechanism	Amwell
Motor Horsepower (Hp)	1
Volt/Phase/Cycle	460/3/60
Speed (rpm)	1,700
Year Installed[1]:	1990
Typical Service Life:	20 Years

1. Covers were installed in 1997

The primary sludge pumps, which are located in the basement of the operations building, transfer sludge from the primary clarifiers to the primary sludge wells. The primary sludge wells consist of a primary sludge holding tank with a capacity of 10,200 gallons, and a reserve sludge holding tank with a capacity of 15,200 gallons. The two tanks are hydraulically connected through an overflow connection and are located in the Sludge Handling Building basement. The reserve sludge holding tank is connected to the blended sludge holding tank through an overflow. Both tanks are aerated. The primary sludge pumps show visible signs of wear and are in poor condition. Design information relating to the primary sludge pumps is included in **Table 6-11**.

TABLE 6-11

PRIMARY SLUDGE PUMP DESIGN PARAMETERS

Number of Units:	3
Type	9” Simplex Plunger
Manufacturer	ITT Marlow
Capacity (gpm)	80
TDH (feet)	125
Horsepower (Hp)	5
Speed (rpm)	1,170
Volt/phase/cycle	460/3/60
Year Installed:	1990
Typical Service Life:	20 Years

As previously mentioned, the facility has scum collection equipment including: skimming mechanisms on primary clarifiers, scum transfer pumps with grinders, and a scum holding tank and concentrator. This equipment has not been evaluated as the equipment has reportedly not been in use due to poor and improper operation. Typical pump service life is 20 years and typical grinder service life is 15 years. The scum tank concrete service life is expected to be 60 years.

6.2.1.5 Aeration

The Somerset WPCF included four rectangular aeration tanks equipped with fine-bubble diffused aeration. Each aeration tank is 45 feet by 45 feet with a sidewater depth of 18 feet. Each tank provides a volume of 272,650 gallons for activated-sludge treatment. Influent flows into the tanks through a system of slide gates and channels located in front and between the tanks. The gates are in poor condition, and most are not able to be operated according to facility staff. New dissolved oxygen (DO) probes were installed in 2019, 2 probes per tank. DO probes typically have a service life of 10 years. DO measurements are currently recorded at the end of each day using a portable analyzer, and DO control is evaluated from this measurement. The aeration tank weir gates and control valves are in poor condition. The buried influent valves are not able to be exercised due to their location.

Aeration equipment consists of an air supply system which utilize three positive displacement air blowers located in the operations building. Two blowers are used during normal operations, and one acts as the standby. Air from the blowers is distributed throughout the tanks through fine-bubble air diffusers. Design information regarding the blowers and diffusers is included below in **Tables 6-12** and **6-13.** The blowers are old, not currently operating properly with the current instrumentation/control system and could be replaced with more energy-efficient blowers. Sizing of the blowers is discussed in more detail in the secondary treatment and nutrient removal section.

TABLE 6-12

AERATION BLOWERS DESIGN PARAMETERS

Number of Units:	3
Type	Positive Displacement Rotary
Manufacturer	Dresser Industries
Capacity (SCFM)	1,000
Blower Speed (rpm)	1,180
Horsepower (Hp)	75
Speed (rpm)	1,200
Volt/phase/cycle	460/3/60
Year Installed:	1990
Typical Service Life:	30 Years

TABLE 6-13

AERATION DIFFUSERS DESIGN PARAMETERS

Type	Fine Bubble
Manufacturer	Sanitaire Water Pollution Control Corp.
Number of Grids per Tank:	2
Number of Diffusers per Grid	203
Materials of Construction	
Dropleg	304L Stainless Steel
Header	UPVC
Manifold	UPVC
Diffuser	Fused Alumina
Year Installed:	1990
Typical Service Life:	15 Years

6.2.1.6 Secondary Clarifiers

Following aeration, the mixed liquor flows to the secondary clarifiers for separation of the activated-sludge from the treated wastewater. There are two 75-foot diameter circular secondary clarifiers. The tanks are equipped with a central influent and peripheral overflow structure. Activated-sludge that has settled to the bottom of the clarifier is collected by a central drive mechanism which supports and rotates a center shaft with two rake arms. Design information regarding the secondary clarifiers is included in **Table 6-14**. Design information regarding the sludge collection equipment is included in **Table 6-15**.

TABLE 6-14

SECONDARY CLARIFIER DESIGN PARAMETERS

Number of Units:	2
Diameter (feet)	75
Sidewater Depth (feet)	13
Area, per Tank (sq. feet)	4,418
Volume, per Tank (gallons)	429,600
Year Installed:	1990
Typical Service Life:	60 Years

TABLE 6-15

SECONDARY CLARIFIER SLUDGE COLLECTION EQUIPMENT DESIGN PARAMETERS

Manufacturer	Amwell
Horsepower	1
Speed (rpm)	1,700
Volts/phase/cycle	460/3/60
Direction of Rake Rotation	Clockwise
Speed of Rake Rotation (rpm)	0.42
Year Installed:	1990
Typical Service Life:	20 Years

6.2.1.7 Return Activated Sludge Pumps

The WPCF includes four return activated-sludge (RAS) pumps. The RAS pumps transfer sludge from the center sludge well to the influent of the aeration tanks. The pumps are located in the basement of the operations building, along with a sample tap on the RAS line that is used to determine the concentration of the RAS. The RAS pumps are equipped with a magnetic flow meter to measure RAS flow to the aeration tanks.

Of the four RAS pumps, two are operated more frequently than the other two. Two of the pumps are provided for activated-sludge recirculation during the “conventional” mode of operation, and the remaining two are provided for the “contact stabilization” mode of operation. The facility typically operates in conventional mode, and therefore the pumps intended for conventional operation are used on a more frequent basis. The conventional mode pumps are sized smaller than the other pumps. Because the larger pumps are not used as often, WPCF staff exercise these pumps to ensure that they are in working operation. The 1990 O&M manual refers to the smaller RAS pumps as P-316 & P-317; the larger pumps have tags P-315 & P-318. The four pumps are manifolded together in parallel with common suction and discharge headers. Design information for RAS pumps P-315 & P-318 is included in **Table 6-16**, and design information for RAS pumps P-316 & P-317 is included in **Table 6-17**. The RAS pumps and all associated valves are near the end of their expected useful life and are in poor condition.

TABLE 6-16

RETURN ACTIVATED SLUDGE PUMPS P-315 & P-318 DESIGN PARAMETERS

Number of Units:	2
Type	Horizontal Centrifugal Non-Clog
Manufacturer	Fairbanks Morse
Capacity (gpm)	2,200
TDH (feet)	60
Horsepower (Hp)	50
Speed (rpm)	880
Volt/phase/cycle	460/3/60
Year Installed:	1990
Typical Service Life:	20 Years

TABLE 6-17

RETURN ACTIVATED SLUDGE PUMPS P-316 & P-317 DESIGN PARAMETERS

Number of Units:	2
Type	Horizontal Centrifugal Non-Clog
Manufacturer	Fairbanks Morse
Capacity (gpm)	1,100
TDH (feet)	60
Horsepower (Hp)	30
Speed (rpm)	885
Volt/phase/cycle	460/3/60
Year Installed:	1990
Typical Service Life:	20 Years

6.2.1.8 Waste Activated Sludge Pumps

The waste-activated sludge (WAS) pumps pump excess RAS to the gravity belt thickeners. There are three WAS pumps located in the basement pump room of the operations building. The pumps are arranged so that there are two-duty pumps and one standby pump. The WAS pump suction lines are connected to the discharge lines before the RAS flow meters, so that wasted-activated-sludge is not included in the recirculation flow measurement. Design information relating to the WAS pumps is included in **Table 6-18**.

TABLE 6-18

WASTE ACTIVATED SLUDGE PUMP DESIGN PARAMETERS

Number of Units:	3
Type	Horizontal Centrifugal Non-Clog
Manufacturer	Fairbanks Morse
Capacity (gpm)	120
TDH (feet)	46
Horsepower (Hp)	3
Speed (rpm)	1,800
Volt/phase/cycle	460/3/60
Year Installed:	1990
Typical Service Life:	20 Years

6.2.1.9 Disinfection

The Somerset WPCF disinfects its effluent wastewater using liquid sodium hypochlorite. The facility previously used gaseous chlorine for disinfection but transferred to liquid disinfection in 2016. The disinfection system consists of two bulk storage tanks and four chemical metering pumps. The 2,500-gallon HDPE tanks are filled from a cabinet located on the west exterior face of the chlorination building. The tanks are equipped with separate overflows and vents and are located within proper chemical containment. Design information regarding the hypochlorite bulk storage tanks is included in **Table 6-19**.

TABLE 6-19

SODIUM HYPOCHLORITE STORAGE DESIGN PARAMETERS

Number of Units:	2
Manufacturer	Poly Processing
Volume	2,500 gallons
Diameter (inches)	86
Height (inches)	124
Material	HDPE
Year Installed:	2016
Typical Service Life:	25 Years

The chemical metering pumps can pump sodium hypochlorite to four different locations throughout the facility, including: the sludge thickeners, screw pump wetwell, septage receiving, and the chlorination manhole, used to disinfect the facility's final effluent. All four metering pumps are manifolded together through a common discharge header and any pump can discharge to any of the four locations. Hypochlorite at the chlorination manhole is injected to mix and disinfect the final effluent. Design information relating to the hypochlorite metering pumps is in **Table 6-20**. The effluent then flows through the chlorine contact tank to provide adequate disinfection. The chlorine contact tank design information is in **Table 6-21**. The effluent is then injected with sodium bisulfite for dechlorination. After dichlorination, the effluent is discharged into the Taunton River through a 550-foot-long, 30-inch diameter outfall pipe. Design information relating to the sodium bisulfite metering pumps is in table **Table 6-22** and bisulfite storage design is included in **Table 6-23.**

TABLE 6-20

CHLORINE CHEMICAL METERING PUMP DESIGN PARAMETERS

Number of Units:	4
Type	Peristaltic Metering
Manufacturer	Watson Marlow
Capacity (gph)	0.001-31.7
Pressure (psi)	60
Supply Voltage/Frequency	100-240V/ 50/60 Hz
Year Installed:	2016
Typical Service Life:	10 Years

TABLE 6-21

CHLORINE CONTACT TANK DESIGN PARAMETERS

Number of Tanks[1]:	3
Dimensions:	
Overall Length	172 feet
Channel Width	3.25 feet
Sidewater Depth	12 feet
Detention Time:	
1-unit, average flow	22 minutes
2 units, max hour	20 minutes
3 units, max hour	22 minutes
Year Installed:	1970, 1993
Typical Service Life:	60 Years

1. Two contact tanks are original to 1970 and a new tank was constructed in 1993

TABLE 6-22

BISULFITE CHEMICAL METERING PUMP DESIGN PARAMETERS

Number of Units:	3
Type	Positive displacement
Manufacturer	Liquifram
Capacity (gpd)	14
Pressure (psi)	80
Supply Voltage/Frequency	120V
Year Installed:	1993
Typical Service Life:	10 Years

TABLE 6-23

BISULFITE STORAGE DESIGN PARAMETERS

Number of Units:	1
Volume, gallons	4,000
Diameter (inches)	96
Height (inches)	132
Material	HDPE
Year Installed:	1993
Typical Service Life:	25 Years
Day Tank Volume, gal	55

The WPCF has a plant water system. The system consists of pumps and a hydro-pneumatic tank. There are two pumps with capacities of 200 gpm at 200 feet of TDH. They have 15 Hp motors. They were installed in 1990 and typically have a 20-year service life.

6.2.1.10 Solids Handling

The solids handling processes at the WPCF consists of sludge thickening via gravity belt thickeners (GBT) for the WAS, sludge dewatering via belt filter presses (BFP) for the blend of primary sludge and thickened WAS (TWAS), and sludge stabilization via composting. Alternatively, dewatered sludge can be trucked offsite for disposal. Use of the composting facility and equipment has decreased over the past 10-15 years as the equipment has aged and demand for the product has diminished. Because of the decreased use of composting, the facility has become dependent on solids disposal through a contract with Synagro in Woonsocket, RI, and currently retains the composting ability to provide a redundant means of solids disposal.

The primary sludge (PS) pumps, located in the basement of Operations Building, transfer primary sludge from primary clarifiers to either the primary sludge holding tank or the reserve sludge holding tank, as detailed in Section 3.3.4. Waste-activated sludge from the secondary clarifiers is transferred using WAS pumps to two GBTs for thickening to a solids content of approximately 4 percent (limited by piping). The WAS pumps, detailed in Section 3.3.8, withdraw WAS from the discharge pipe of RAS pumps and fed into the retention tank on each GBT. The filtrate, or the excess water removed from the WAS, flows by gravity to the influent screw pump wetwell via the 8-inch diameter yard gravity sewer. Design information relating to the GBT units is included in **Table 6-24**.

TABLE 6-24

GRAVITY BELT THICKENER DESIGN PARAMETERS

Number of Units:	2
Manufacturer	Kommline-Sanderson
Belt Width, meter	1
Capacity, GPM	135
Unit Surface Area, SF	150
Unit Loading Rate, SF/HR	2
Belt Speed	Variable
Volt/Phase/Cycle	480/3/60
Speed, RPM	1,750
Year Installed:	1990
Typical Service Life:	30 Years

The thickened WAS (TWAS) flows by gravity to a TWAS holding tank, which has a capacity of 10,700 gallons, where it is aerated until it is transferred to the sludge blending tank, which has a capacity of 11,000 gallons. An overflow connects the thickened WAS storage well to the blended sludge storage well. Air mixing is available to keep the sludge mixed and insure a uniform blend for efficient dewatering. The sludge tanks blower design criteria is in **Table 6-25**. The air mixing system is currently out of service due to broken diffusers. Sludge transfer pumps are used to pump from the TWAS tank and PS tank to the blend tank. The blended sludges are pumped to the two BFPs by the filter press feed pumps for dewatering to a solids content of approximately 17 percent.

The sludge transfer pumps and filter feed pumps are positive displacement, plunger-type pumps. Design information relating to the both pumps are included in **Table 6-26**.

TABLE 6-25

SLUDGE TANKS BLOWER DESIGN PARAMETERS

Number of Units:	2
Manufacturer	Roots Universal
Capacity (CFM)	167
Horsepower (Hp)	15
Speed (rpm)	1,200
Volt/phase/cycle	460/3/60
Year Installed:	1990
Typical Service Life:	40 Years

TABLE 6-26

SLUDGE TRANSFER AND FILTER PRESS FEED PUMPS

DESIGN PARAMETERS

Pump Name	Sludge Transfer	Filter Feed
Number of Units	2	2
Manufacturer	ITT Marlow	ITT Marlow
Type	Plunger	Plunger
Diameter	11-inch	9-inch
Capacity, GPM	129	86
TDH, FT	85	125
Motor Horsepower (Hp)	5	5
Volt/Phase/Cycle	460/3/60	460/3/60
Speed (rpm)	1,200	1,200
Year Installed:	1990	1990
Typical Service Life:	20 Years	20 Years

Design information relating to the belt filter press units is included in **Table 6-27**.

TABLE 6-27

BELT FILTER PRESS DESIGN PARAMETERS

Number of Units:	2
Manufacturer	Kommline-Sanderson
Belt Width, meter	1
Capacity, GPM	100
Solids Loading Rate, LBS/HR	1,000-1,200
Dry Solids Loading, LBS/DAY	4,500
Operating Time (HRS/DAY)	6
Unit Loading Rate, SF/HR	2
Belt Control	Pneumatic
Belt Speed, FPM	0-20.7
Motor Horsepower	3
Volt/Phase/Cycle	180/3/60
Motor Speed, RPM	1,750
Agitator Speed, RPM	0-58
Year Installed:	1990
Typical Service Life:	30 Years

A polymer solution is added to the feed of each BFP to enhance the dewatering process. The filtrate, or the excess water removed from BFPs, flows by gravity to the process waste return line and the influent screw pump wetwell. The dewatered cake drops through a chute in the floor to a container where it is trucked over to composting or away from the facility for disposal.

The polymer system consists of discrete storage totes and a polymer dilution and feed (PDF)unit. Polymer is conditioned by dilution and aging followed by pumping a required dosage of polymer solution to the belt filter presses. Each PDF has a diaphragm metering pump. Design information relating to the polymer system is included in **Table 6-28**.

TABLE 6-28

PDF UNITS FOR BFP DESIGN PARAMETERS

Number of Units:	5, 2 for GBT, 3 for BFP
Manufacturer	Stranco (Polyblend 1000/8R)
Diaphragm Pump (per unit)	1
Manufacturer	LMI (DP31-20PB)
Capacity, GPH	60-480
Discharge Pressure, PSI	8
Mixer (per Unit)	1
Motor Horsepower (Hp)	1/3
Motor Speed, RPM	1,725
Power Supply, VAC	120
Year Installed:	1990
Typical Service Life:	20 Years

The solids handling system is overall in fair to poor condition. The non-enclosed nature of thickening and dewatering equipment creates excessive odors and moisture resulting in corrosion of the exposed equipment and instrumentation systems. The polymer system is outdated and in poor condition. The sludge tank air diffuser piping is not functional, and the sludge level measurement instrumentation is not reliably working.

Overall the solids handling facilities are in poor condition due to age and use.

6.2.1.11 Composting

The dewatered sludge, rich in organic matter, is composted to produce a granular and stabilized sludge with little to no biological activity. To enhance the biological process in dewatered sludge, the cake is mixed with a bulking agent (woodchips) and is placed upon an arrangement of perforated air distribution pipes within three-sided concrete bins. Air is fed through the distribution piping with a dedicated blower for each compost bin. A detention time of approximately 21 days in each bin is required before the mixture of dewatered sludge and bulking agent becomes stabilized.

The composting process consists of a sludge feed unit and hopper, bulking agent feed unit and hopper, continuous mixing unit, portable conveyers, eight active composting bins and a front-end loader. Dewatered sludge cake is transported to composting in a 'Reel Auggie' trucking unit. After stablization by composting of sludge is completed, the bulking agent is recovered for reuse. The bulking agent recovery consists of a hopper, conveyers and rotating trommel screen.

Overall, the composting equipment is nearly 30 years old and is in fair condition and performs relatively well. Odor is an issue with active composting and requires a sophisticated control system. The Town has reduced the operations of the composting building in recent years and is rarely used. The composting design information is included in **Table 6-29**.

TABLE 6-29

COMPOSTING DESIGN PARAMETERS

Sludge Hopper and Feed	
Volume (cy)	8
Capacity (cy/hr.)	16
Bulking Agent Hopper	
Volume (cy)	16
Capacity (cy/hr.)	54
Mixing Unit Capacity (cy/hr.)	70
Aeration Blowers	
Number of Units	8
Capacity (cfm)	400
Motor HP	3
Compost Bins	8
Year Installed:	1990
Typical Service Life:	20 Years

6.2.1.12 Odor Control

Odor control facilities were added to the WPCF in the 1997upgrade. There are seven different systems at the facility. They consist of the preliminary treatment building (scum room, grit room, and screenings room), septage receiving, primary clarifiers, solids handling building (sludge storage tanks, dewatering/thickening rooms), compost curing, compost building, and the biofilter. Each system is described below in **Table 6-30**.

TABLE 6-30
ODOR CONTROL DESIGN PARAMETERS

PRELIMINARY TREATMENT ODOR CONTROL	
Odor Control Type	Chemical Wet Scrubber
Year Installed	1997
Typical Service Life	30 Years
Sodium Hypochlorite Storage and Feed	
Storage Tank Volume (gal)	25 day tank, 1,000 gallon bulk tank
Pumps	
Number of Units	1
Capacity	20 GPH
Sodium Hydroxide Storage and Feed	
Storage Tank Volume (gal)	25 day tank, 1,000 gallon bulk tank
Pumps	
Number of Units	3
Capacity	20 GPH
Year Installed:	1997
Typical Service Life:	10 Years
Fans	
Number of Units	2
Capacity	5,500 CFM
Motor	10 Hp
Year Installed:	1997
Typical Service Life:	20 Years
SEPTAGE RECEIVING ODOR CONTROL	
Odor Control Type	Activated Carbon System
Year Installed:	1997
Typical Service Life:	30 Years
Fan	
Number of Units	1
Capacity	1,000 CFM
Motor	8 Hp
Year Installed:	1997
Typical Service Life:	20 Years
PRIMARY CLARIFIER ODOR CONTROL	
Odor Control Type	Chemical Wet Scrubber
Year Installed:	1997
Typical Service Life:	30 Years
Sodium Hypochlorite, Sodium Hydroxide Storage and Feed	
Storage Tank Volume (gal)	5 each
Pumps	1 for each chemical type
Year Installed:	1997
Typical Service Life:	10 Years

Fans	
Number of Units	2
Capacity	5,000 CFM
Motor	8 Hp
Year Installed:	1997
Typical Service Life:	20 Years
SOLIDS HANDLING BUILDING ODOR CONTROL	
Odor Control Type	Chemical Wet Scrubber
Year Installed:	1997
Typical Service Life:	30 Years
Sodium Hypochlorite Storage and Feed	
Storage Tank Volume (gal)	55-gallon drum
Pumps	2
Sodium Hydroxide Storage and Feed	
Storage Tank Volume (gal)	55-gallon drum
Pumps	2
Year Installed:	1997
Typical Service Life:	10 Years
Fans	
Number of Units	3
Capacity	5,500, 3,100, and 1,200 CFM
Motor	10, 15, and 0.5 Hp
Year Installed:	1997
Typical Service Life:	20 Years
COMPOSTING	
Odor Control Type	Chemical Wet Scrubber
Year Installed:	1997
Typical Service Life:	30 Years
Sulfuric Acid Storage and Feed	
Storage Tank Volume (gal)	3,000
Pumps	2
Recirculation Pumps	
Number of Units	2
Motor Hp	5
Fans	
Number of Units	4 (3 composting, 1 curing)
Capacity	12,500 CFM (3) and 2,500 (1)
Motor	10 Hp (4)
Year Installed:	1997
Typical Service Life:	20 Years
BIOFILTER	
Number of Fans	5
Capacity	25,000 (3), 15,000, 10,000 CFM
Motor	100, 60, 40, 20 (2) HP
Year Installed:	1997

All of these systems are approaching the end of their useful life and need to be evaluated against new ventilation requirements in NFPA 820, if the systems should remain in place, and if better technologies are available.

6.2.2 Buildings and Structures

6.2.2.1 Preliminary Treatment (Headworks) Building and Pumping

The headworks building – also known as Preliminary Treatment – was built as part of the upgrades in 1990. It is a masonry building with two stories approximately 60 feet by 43 feet including a screening room, electrical room and operating deck. The lower level includes generator and pump rooms. There is currently no gas detection within the headworks building, which poses a significant safety risk to WPCF operators and is not up to current code.

6.2.2.1.1 Architectural

The Headworks exterior walls are constructed of a concrete (lower level) and CMU (upper level) bearing wall with brick veneer. The roof is cast-in-place concrete, flat, with sloped insulation and built-up roof membrane. There are 5 skylights, 4 over the screening room. The staff have indicated that the skylights have been recently replaced. There are multiple steel grate stairs with aluminum guardrails. The brick veneer is in good condition considering its age. The metal grate stairs are in good condition, showing some signs of minor rust. Exposed concrete surfaces are in good condition. The windows are original steel uninsulated windows and are showing signs of significant corrosion and rusting. Exterior doors are hollow metal doors and frames. They show signs of rusting, particularly around edges and vision panels. Much of the hardware, including knob style handles and hinges and closers, is failing. Interior walls are in need of repainting and interior metals are rusted.

The full architectural memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.1.2 Structural

Much of the Headworks building is not up to current safety codes, mostly dealing with fall protection and labeling. Much of the concrete is cracking, spalling, or missing. The interior rooms of the building are showing significant concrete cracks and exposed aggregate. Much of the metals were observed to be corroded.

The full structural memo can be found in Appendix E. A summary of recommendations is included in the next section.

6.2.2.1.3 Mechanical

6.2.2.1.3.1 General

Hot water for heating is piped via an insulated conduit from the administration building boiler room, through a hot water distribution manhole in the Maintenance Area, to a manhole in the Preliminary Treatment Building Scum Concentrator and Pump Room.

6.2.2.1.3.2 Grit Screening Room

Heating is provided by four hydronic unit heaters with explosion proof motors. The units are severely corroded and in poor condition. The hydronic heating pipe PVC insulation jacketing has failed in many places, but the underlying insulation appears to be in good condition. Any exposed piping has signs of significant corrosion. The vertical rain leader piping paint is chipping and failing and the exposed piping beneath shows significant signs of corrosion.

Air is exhausted from the space by the centralized odor control system installed as part of the 1995 upgrade. The PVC and FRP ductwork appear to be in good condition. The mesh screens at the duct inlets over the screening equipment have been covered with debris. Inlet air is meant to be provided by two louvers with motor operated dampers, but the dampers and associated actuators are significantly corroded and were not operable at the time of observation.

6.2.2.1.3.3 Scum Room / Scum Concentrator and Pump Room

The space is heated by two hydronic unit heaters (one on each level). The units appear to be in good condition. Air is exhausted from the space by the centralized odor control system installed as part of the 1995 upgrade. The PVC and FRP ductwork appear to be in good condition. A sidewall centrifugal exhaust fan is also provided through the wall of the Scum Concentrator and Pump Room. The fan appears to be in fair condition, showing some signs of corrosion. Inlet air is introduced through a louver and associated motor operated damper. The damper and louver appear to be in good condition.

6.2.2.1.3.4 Electrical Room

A roof mounted exhaust fan and associated intake louver with motor operated damper, controlled by a wall-mounted reverse-acting thermostat, provides cooling for the space. The intake louver and damper appear to be in good condition, the roof mounted fan was not accessed for inspection.

6.2.2.1.3.5 Generator Room

The space is heated by a hydronic unit heater which appears to be in good condition. A sidewall propeller exhaust fan and associated intake and exhaust louvers with motor operated damper, controlled by a wall-mounted reverse-acting thermostat, provides cooling for the space. The dampers appear to be in good condition, but the intake louver actuator shows some signs of corrosion. Cooling for the generator is provided by a single pass potable water connection that is drained by an open-ended drain to the waste system.

6.2.2.1.3.6 Odor Control

An electric unit heater provides heating to the space. The unit appears to be in good condition. A roof mounted exhaust fan and associated intake louver with motor operated damper, controlled by a wall-mounted reverse-acting thermostat, provides cooling for the space. The fan and intake appear to be in good condition. An emergency shower/eyewash unit is provided in the space. The unit is served with cold water only. The unit appears to be in relatively good condition. A cast iron hand sink located in the space appears to be in good condition. Hot water for the sink is provided by an instantaneous electric water heater mounted adjacent to the sink.

The full mechanical memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.1.4 Instrumentation and Controls

6.2.2.1.4.1 Influent Screw Pumps

Each influent screw pump is provided with a high-level float that automatically starts and stops the pump based on high water level in the influent pump channel. The Client indicated that rags in the influent raw water tend to hang up the floats and can negatively affect influent screw pump operation. Each of the screw pumps has a vibration sensor and monitoring device that shuts down the screw in the event of high vibration.

6.2.2.1.4.2 Odor Control

Odor Control Fans pull odorous air from the raw water wetwell area, the screening area, and electrical areas of the Headworks Building. Each area is provided with an isolation/evacuation duct actuator with a local control station. The local control station includes a local/remote selector switch and open/close selector switch. When in local, the operator can open/close the actuator. There is a scrubber tower located outside of the Headworks Building with integrated controls for pumping and wash-down/scrubbing of the odorous air. Differential pressure monitoring, sump level monitoring and make-up water controls are also provided. It has not yet been determined if any signals or alarms from the Odor Control system are monitored by SCADA.

6.2.2.1.4.3 Mechanical Bar Screens

The influent pumps provide two influent waste streams, one to each mechanical bar screen channel. Each bar screen has upstream/downstream ultrasonic level sensors wired to transmitters that provide a differential level signal for each mechanical bar screen. High level floats in the bar screen channels were not observed for alarming or operation of the screens. Each screen is provided with a local control station with the following selector switches; Local/Remote, Hand-Off-Auto, Forward-Off-Reverse, and an Emergency Stop Pushbutton. With the screens in Local and Hand Modes, staff can operate the screens in either forward or reverse directions. In Local and Auto, it is presumed there may be an output from the differential level transmitter to reverse the screens on a timed-basis on high differential level to clear the screens of debris. In Remote and Auto Modes, the Headworks Control Panels (located in the adjacent electrical room) provide control of the mechanical bar screens based on differential level from a Siemens Ultrasonic Level Transmitter as determined from setpoints on the local OIT or SCADA. The Emergency Stop pushbutton immediately stops the mechanical bar screens and issues an alarm on the local OIT or SCADA.

6.2.2.1.4.4 Existing Control Panels

There are three programmable logic controller (PLC) based control panels located in the Headworks Building Electrical Room; two mechanical bar screen control panels and a Headworks Control Panel. Each control panel's PLC is connected via copper CAT5 Ethernet Cable and communicates data and status with each other. The Headworks Control Panel communicates with the plant SCADA System via unlicensed radio.

6.2.2.1.4.5 Headworks Building Effluent Flow and Sampling

Wastewater exits from the Headworks Building in two separate channels. Each channel has a Parshall Flume with an ultrasonic level transmitter that calculates open-channel flow for each. The manufacturer of the ultrasonic level transmitter could not be found during the site visit. The effluent of each channel spills into a common wet well where level is measured via an ultrasonic level transmitter. A sampler (considered influent sampling) extracts samples but is not flow-paced.

The full I&C memo can be found in Appendix E. A summary of recommendations is included in the next section.

6.2.2.1.5 Electrical

The preliminary treatment building consists of the influent screw pumps, mechanical bar screens, grit screenings, scum concentrator and pumps, wash press, and conveyor system along with channel level controls and PLC control panel. In addition, stand-by generator No. 4 (GEN-4) is located within a separate generator room at this location.

The electrical room houses motor control center MCC-5 (normal utility power) and houses MCC-5-7 (stand-by power) at this location. These motor control centers are General Electric Company model 8000-line motor control centers and appear to be in good condition based upon the on-site observations.

The electrical room also houses the channel level control panel, mechanical bar screen control panels S-104 and S-105, PLC control panel (PLC-3), wash press and conveyor control panel, and branch circuit transformer and lighting panel RPS. Overall, this electrical room and equipment appears to be in good overall condition.

6.2.2.1.5.1 Grit Screenings Room

The location is a hazardous and corrosive environment and most of the electrical equipment and devices are in poor condition. There is extensive corrosion on most of this equipment and devices. Lighting in this area is also in poor condition. The lighting levels in this area are below the IES standard levels.

6.2.2.1.5.2 Scum Room / Scum Concentrator & Pump Room

The electrical equipment appears to be functional with some signs of corrosion within this area. Lighting levels appear to be below acceptable limits and the lighting fixtures are also showing signs of age and corrosion.

6.2.2.1.5.3 Generator Room

The stand-by generator is an older industrial Caterpillar model 3306B diesel-driven unit, rated at 180 kW. The fuel tank is located outside of the building. There is an automatic transfer switch located within MCC-5-7 within the electrical room and is connected back to the generator. This provides for a split-bussed distribution within the electrical distribution equipment for which the specific equipment connected to this portion of MCC-5-7 is operated on stand-by power.

6.2.2.1.5.4 General Summary

The lighting throughout this building is of the older open type of industrial fluorescent fixtures or recessed fluorescent type fixtures located within finished administration areas. Some of this lighting appears to have been re-lamped with higher efficiency output type fluorescent lamps but still does not provide the levels of lighting efficiencies necessary for these areas. There is no separate emergency lighting battery back up to allow means of egress from within this building location as required to be compliant. There does not appear to be a fire alarm system for this building or facility.

The full electrical memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.2 Flow Equalization Tanks

Flow Equalization Tanks consist of repurposed aeration tanks and gravity thickeners. Three of the Flow Equalization Tanks were constructed in 1968 and were originally the Aeration Tanks. During the 1990 upgrade, new Aeration Tanks were built, and the existing tanks were repurposed for flow equalization. A fourth Flow Equalization Tank was added at that time. It does not have a center area with columns nor weir openings. Two circular gravity thickeners were repurposed for flow equalization tanks.

6.2.2.2.1 Structural

6.2.2.2.1.1 Rectangular Flow Equalization Tanks

The fourth Flow Equalization Tank was empty at the time of inspection. Tank 3 had the water level above the sloped concrete fill so that it could not be observed. Most of the sloped concrete fill could be observed in Tanks 1 and 2, but the base slab was under the water line.

Localized exposed reinforcing bars on the center concrete columns, slab, and in the interior of the tank walls, especially at the bottom of the walls at the top of the sloped concrete fill were observed. Many vertical and horizontal cracks exhibit efflorescence below the weir openings. The expansion joint sealant between the tank constructed in 1968 and the newer fourth tank constructed in 1990 has failed by cracking and debonding. Minor exposed aggregate was observed in the former effluent channel and weir walls. Abandoned corroded embedded bolts remain in the former effluent channel. The mechanism attached to four center concrete columns is corroded. The weir wall and effluent trough exhibit exposed aggregate.

The pressure relief valves were not leaking groundwater during the site visit. It is not clear if they are rusted shut and capable of allowing groundwater to flow into the tanks.

Embedded guard posts are corroding and there are rust stains on the concrete. Some guard post holes have already been patched. Guard is missing toeplates at platforms. Many edges of the tank are missing a guard. If the concrete wall does not extend 3 feet-6 inches above finish grade, then a guard must be installed per OSHA.

6.2.2.2.1.2 Circular Flow Equalization Tanks

The east Flow Equalization Tank was in service and full of liquid. Concrete conditions below the waterline could not be observed. The west Flow Equalization Tank was almost empty. Most of the base slab could not be observed because it was covered with water.

Mild exposed aggregate on weir wall. Slight remnants of a blue coating on the weir wall and launder. This is typical of discoloration left behind on the concrete from a sludge blanket. Metal weirs have been removed and the embedded bolts were left in place around the interior wall perimeter. There are also white inserts around the interior wall perimeter. Embedded guard posts are corroding and there are rust stains on the concrete. There were also some bends in the guard. There were localized areas of exposed reinforcing bars.

In the west tank, the center mechanism arm was severely corroded with complete section loss in some areas.

The full structural memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.2.2 Electrical

The electrical equipment at these structures consists primarily of outdoor motor-driven mechanisms or open tank equipment with dome-type covers. In either case, the electrical components are made up of junction boxes, pull boxes, power receptacles, and control stations for operation of the equipment locally. In addition, there are in most cases local disconnect switches, receptacles, lighting, and stanchion mounting of equipment along with conduit and wiring to the locally mounted equipment.

The electrical equipment and devices mounted outdoors or within domed structures are subjected to harsh environmental conditions. The observations noted for these locations indicate that most of the electrical equipment and devices have signs of corrosion or deterioration due to the conditions. In time, the electrical equipment and devices will be subjected to further deterioration and become prone to possible failures due to the harsh environmental conditions.

The full electrical memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.3 Primary Clarifiers

The Primary Clarifiers were constructed during the 1990 upgrade. The tanks were covered as part of the 1995 Odor Control Upgrade.

6.2.2.3.1 Structural

Tank 1 (west) was full of liquid at the time of inspection and could not be observed below the water line. Tank 2 (east) was offline at the time of inspection and almost completely empty except for the bottom center of the tank.

There are vertical cracks at roughly 3-feet on center around the perimeter of the tank. Many are exhibiting efflorescence. The exterior walls are stained green and black in color. The pavement around the outside perimeter of the tanks is cracked and appears to be settling. Evidence of pavement repair was observed. Gaps several inches wide exist between the pavement and tank in many locations.

The FRP covers (by Synthetics) appear to be in fair condition with some peeling observed at the dormer. FRP covers typically have a life span on the order of 20-40 years, and it should be noted that the FRP covers were fabricated in 1996. The exterior hardware for the covers looked new. Galvanized pipe supports appear to be in good condition with no significant deficiencies. Some of the neoprene pads between the FRP and galvanized support have shifted and are misplaced.

Tank 2 base slab has been scraped by the mechanism and the bottom of the walls every 10 feet (+/-) are worn, which indicates that some part of the mechanism is scraping the wall during rotation. The tank has vertical cracks with liquid staining. The launder wall, launder slab and weir wall have moderate exposed aggregate.

The full structural memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.3.2 Instrumentation and Controls

There are two large covered clarifiers which are currently in operation. Controls appear to be manual only with a local start/stop pushbutton station. It is unclear if run or fault status is monitored by SCADA. Odorous air above the clarifier water is evacuated by the Odor Control System. It could not be determined if there was a high torque shutdown switch integrated into the controls. There was no Emergency Stop pushbutton observed.

There is a scrubber tower located outside between the covered clarifiers with integrated controls for pumping and wash-down/scrubbing of the odorous air. Differential pressure monitoring, sump level monitoring and make-up water controls are also provided. It has not yet been determined if any signals or alarms from the Odor Control system are monitored by SCADA.

The full I&C memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.3.3 Electrical

See section 6.2.2.2.2 for general electrical observations at outdoor tanks.

The full electrical memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.4 Operations Building

The operations building was constructed as part of the 1990 plant upgrades. It is a concrete and masonry structure approximately 87 feet by 52 feet, single story.

6.2.2.4.1 Architectural

Exterior walls are CMU bearing walls with brick veneer. The roof is cast-in-place concrete with built-up roof membrane and gravel ballast. The roof was accessed during the evaluation. Age of the roof is unknown, it may be original to the building. Overall condition of the roof is unknown due to the gravel covering. Exposed concrete surfaces are in good condition. Brick veneer is in fair condition, as there are many areas of spalling and mortar joint failure. Also brick expansion joint sealant is dried and cracked. The windows are original to the building, steel uninsulated windows. The control room has a feature window that projects out beyond the roof perimeter and has sloped glazing top. Staff has indicated that this window has always leaked and continues to leak during heavy storms. This window may have been replaced since 1990 with an aluminum storefront system. The window in the locker room has been removed and replaced with a plywood panel for a through-wall air conditioning unit. The interior and exterior doors are all hollow metal doors and frames. In general, interior doors are in good condition considering their age. Most exterior doors are in good condition although the lower level exterior door shows signs of rusting and hardware failure. Most interior partitions are painted CMU. They are generally in good condition. Ceilings are ACT in most spaces and drywall in bathrooms and locker rooms. In general, they are in good condition. Flooring appears to be an epoxy coating in fair condition. Multiple areas in the laboratory are cracked and missing the finish where equipment and fixtures have been moved. All finishes and fixtures in the bathroom and locker rooms are original and show signs of wear. The layout does not have adequate clearances to comply with current ADA codes.

The full architectural memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.4.2 Structural

The building shows signs of concrete cracking and efflorescence. There are lifting hooks without capacities displayed. A significant gap between concrete slab extension and the gravel borrow on the northeast corner of the building; the 2-inch rigid insulation was visible. The concrete step of the north concrete entrance pad has settled, and the expansion joint sealant has failed. There is a hatch that is open and unprotected.

The full structural memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.4.3 Mechanical

6.2.2.4.3.1 Laboratory

The lab is served by two roof mounted air handling units with hot water heating coils and split system air conditioning units mounted adjacent to each other. The air handling and condensing units were installed as part of the 1990 upgrade and appear to be in relatively poor condition. The units are ducted down to a supply and return air device in the ceiling below; water damage to the ceiling tiles in this area indicates leakage or condensation issues related to the existing ductwork; the air devices appear to be dirty and in relatively poor condition. A ductless split system air conditioning unit has been added to the main area of the lab. The unit appears to be in relatively good condition but appears to have issues with water leakage. Four utility set type fans are used, two supply and two exhaust air and serve the two compensating lab hoods. The fans appear to have been installed as part of the 1990 upgrade and are in relatively poor condition. An emergency shower/eyewash unit is provided in the space. The unit is served with cold water only. The unit appears to be in fair condition.

6.2.2.4.3.2 Control and Break Area

The area is served by a roof mounted air handling unit with hot water heating coil and split system air conditioning unit mounted adjacent to each other. The air handling unit was installed as part of the 1990 upgrade and appears to be in relatively poor condition. The air conditioning condensing unit was replaced in 2009 and appears to be in fair condition but is nearing the end of its expected useful life. The refrigerant piping insulation between the units has failed. The associated air devices appear to be dirty and in relatively poor condition.

6.2.2.4.3.3 Locker Room

A centrifugal roof-mounted exhaust fan provides ventilation for the men's and women's locker rooms. The fan appears to be in fair condition. The men's locker room is provided with cooling by a self-contained, window mounted air conditioning unit mounted in a plywood panel which was installed to replace a window.

6.2.2.4.3.4 Motor Control Room

The space is heated by a hydronic unit heater which appears to be in fairly good condition. The hydronic heating pipe is installed immediately above the electrical equipment. A roof-mounted exhaust fan, controlled by a wall-mounted reverse-acting thermostat, provides cooling for the space. The fan appears to be in fair condition. No dedicated means of make-up air is available; the windows in the space are typically left open to allow air to be introduced to the space.

6.2.2.4.3.5 Generator Room

The space is heated by a hydronic unit heater which appears to be in good condition. A sidewall propeller exhaust fan and associated intake and exhaust louvers with motor operated damper, controlled by a wall-mounted reverse-acting thermostat, provides cooling for the space. The dampers appear to be in good condition. Cooling for the generator is provided by a single pass potable water connection that is drained by an open-ended drain to the waste system.

6.2.2.4.3.6 Lower Level Pump Room

An inline supply fan located in the blower room, ducted through an areaway to a louvered penthouse ventilator at grade (shared with blower room intake), is intended to provide ventilation air to the space. The fan and duct insulation appear to be in relatively poor condition and the fan was not operating at the time of observation. A hydronic heating coil intended to temper the incoming air has been removed. The associated ductwork appears to be in relatively good condition. An inline exhaust fan ducted up to a louvered penthouse ventilator on the roof is located in the space. The fan and associated ductwork appear to be in fair condition, but the unit did not appear to be functional at the time of observation. Heating is provided to the space by two hydronic unit heaters which appear to be in relatively good condition.

6.2.2.4.3.7 Lower Level Blower Room

High temperatures in the space were observed and noted by the staff. As a result, the access areaway doors were left open to induce additional air and allow some heat to escape. The area is intended to be cooled by an inline exhaust fan controlled by a wall-mounted reverse acting thermostat; the air is introduced passively by ductwork up through an areaway to a louvered penthouse ventilator shared with the Pump Room supply. The fan and ductwork appear to be in fair condition. The ductwork appears to be in fairly good condition and the supply ductwork insulation is in fair condition. The air flow provided by the fan does not appear to be adequate to remove the heat produced by the blowers. Heating is provided to the space by a hydronic unit heater which appears to be in relatively good condition.

6.2.2.4.3.8 Lower Level Boiler Room

A Peerless cast iron sectional boiler, rated for a maximum 649 MBH, is located in the dedicated boiler room. The boiler was replaced in 2008 but appears to have significant issues with leaking and corrosion; the unit appears to be functional but in relatively poor condition for its age. The boiler is provided with a Beckett oil-fired burner which appears to be in fair condition. Leakage from the automatic air relief valve has led to substantial corrosion of the air separator. Six in-line pumps circulate hydronic heating water throughout the building. The pumps are in varying states of repair, some pump bodies or motors have been replaced. Most are in fair to poor condition and are showing signs of corrosion. The existing boiler flue piping is uninsulated. Heating is provided to the space by a hydronic unit heater which appears to be in relatively good condition. The original 25kW/250-gallon domestic hot water heater appears to have failed and been abandoned in place. An indirect water heater connected to the boiler system was installed in 2017 to replace the failed water heater and appears to be in excellent condition. The hydronic heating and domestic water piping to the new water heater is uninsulated.

The full mechanical memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.4.4 Instrumentation and Controls

6.2.2.4.4.1 Blower System

There are three VFD driven positive displacement blowers manufactured by Dresser-Roots located in the lower level of the Process Building. Each blower has the following monitor, control, alarming, and shutdown signals:

- Blower Discharge Temperature Indication and Alarm Shutdown
- Blower Discharge Pressure Indication and Alarm Shutdown

- Blower Low Oil and Alarm Shutdown
- Blower Inlet Flow and Pressure
- Blower Inlet Filter Differential Pressure Indication

Aeration control panels provided by the manufacturer were not observed. Operations staff adjust the blower speed either locally at the VFD, or remotely via the SCADA Server (located on the first floor) to deliver the desired airflow to the aeration basins. There are no dissolved oxygen probes or modulating aeration valves at the aeration basins to provide automated dissolved oxygen control. Since the blowers are positive displacement, there are no issues with low turn-down and surge as you would have with centrifugal blowers; however, you can get overheating of motor and blower discharge temperatures at low speeds.

Each blower has a Siemens L300P VFD installed in what appears to be a NEMA 12, fan cooled enclosure. Both VFD enclosures were left open to dissipate heat generated by the VFD. This is usually done to prevent the VFD from overheating and faulting. The front of the VFD enclosure has six (6) holes where pushbuttons and pilot lights were previously located. It is now covered up.

6.2.2.4.4.2 RAS Pumping

There are four RAS pumps located on the lower level of the process building. Each RAS pump is driven by an AC TECH VFD located in a NEMA 3R stainless-steel enclosure with start/stop pushbuttons. There is a separate local control station with two selector switches, presumably for lead-lag/standby selection per the "P315/P316" and "P317/P318" selectors. The RAS Pumps are either controlled locally at the VFD's keypad (start/stop, speed command), or remotely by plant flow-pacing via the PLC/SCADA Server (located on the first floor). RAS flow is recirculated back to the aeration tanks as measured by two ABB magnetic flow meters. The RAS pumps are provided with seal water, but no solenoids to control flow or pressure switches to detect loss of seal water.

6.2.2.4.4.3 WAS Pumping

There are three WAS pumps located on the lower level of the process building. There are two ABB magnetic flow meters with remote flow tubes to measure flow of the WAS Pumps. The WAS Pumps are either controlled locally at the starter located in the MCC, or remotely by flow-pacing/wasting via the PLC/SCADA Server (located on the first floor) to deliver the WAS to the Gravity Belt Thickeners.

6.2.2.4.4.4 Primary Sludge Pumping

There are three Primary Sludge (plunger) Pumps manufactured by ITT Marlo located on the lower level of the process building. Two of the pumps are VFD driven by AC Tech (SMVector) drives while the third pump is constant speed driven with a variable speed mechanical system. The Primary Sludge Pumps are either controlled locally at its respective VFD or starter, or remotely by manual speed adjust via the PLC/SCADA Server (located on the first floor) to deliver the Primary Sludge to the desired locations. There are no pressure switches, emergency stops or local control stations.

6.2.2.4.4.5 Process Building Control Panel

The Process Building Control Panel is a NEMA 12 painted steel, double-door control panel with a lockable handle. There are no pilot lights, selector switches, pushbuttons, or operator interface on the front panel. Inside the panel, the plant processes and SCADA Communications are provided by an Allen-Bradley based PLC (PLC-1) with I/O in both a local, and an expansion rack.

6.2.2.4.4.6 Cellular Alarm Dialer

A cellular alarm dialer by Mission (M100) is located adjacent to the Process Building Control Panel. There are eight discrete status/alarm inputs as defined per the following:

- Zone Pump No. 1
- Zone Pump No. 2
- Zone Pump No. 3
- Influent Channel/Standby Wet Well
- Screw Pump Oiler
- Plant Water or Blowers
- Chlorine Building
- Power Failure

When an alarm signal is generated, the cellular dialer annunciates (dials-out) the alarm in real-time to the Client's customized call schedule/list. In addition, the alarms are available on a secure website portal that operations staff can access with proper login credentials. Alarms can be viewed by computer, cell phone, or tablet.

6.2.2.4.4.7 SCADA Computer

There is a SCADA computer located in the Process Building Office. It is a SCADA Server that initiates communications with the local PLC as well as PLCs on the radio network and updates the information in a tag database. SCADA screens for monitoring and control, alarms, trends are provided. The SCADA Server is running Factory Talk SCADA Software, 100 displays with unlimited (data) tags, by Rockwell Automation.

The full I&C memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.4.5 Electrical

The Operations Building is fed from an underground normal, 1,000-ampere feeder from the outdoor main Switchboard (SWBD-1). In addition, there is a 225-ampere feeder from the stand-by generator (GEN-3) and automatic transfer switch (ATS-3) that also feed stand-by power to this building. Both sources feed portions of the existing motor control center MCC-4 which is split-bussed thus creating MCC-4 (normal) and MCC-4E (stand-by) distribution to this building. The existing motor control center(s) are manufactured by General Electric Company and are Model 8000 Line. This equipment appears to be in good condition and these motor control centers are installed within the electrical room for this building. In addition, there is an existing 180 kW, 225 KVA, Model 3306B, Serial No. F080192483 Caterpillar generator which is rated for stand-by duty. Except for the electrical room, the lighting in this building is typical recessed fluorescent fixtures which were installed to the original facility with some upgrades. These areas are in need of upgrades based upon the age and time of service.

6.2.2.4.5.1 Electrical Room

The layout of the room is acceptable and provides for a suitable location for this equipment. Motor Control Centers MCC-4 (normal) and MCC-4E (stand-by) are located within this room. In addition, there is an automatic transfer switch (ATS-3) rated at 225 amperes and located within one of the sections of MCC-4E for providing stand-by power to this portion of the facility. It also appears that there is a 150 ampere, 277/480 volts, 6-phase breaker within this electrical room MCB-MCC-5-7 which provides stand-by power back to MCC-5-7 located in the preliminary treatment building. This room also houses the dry-type transformers and lighting panelboards for the building. This room also houses the interface equipment for the telephone system equipment.

6.2.2.4.5.2 Generator Room

The stand-by generator is an older Caterpillar model 3306B rated at 180 kW, diesel-driven unit. This is the exact unit which is located and installed within the Preliminary Treatment Building generator room. The fuel tank is located outside of the building. There is an automatic transfer switch (ATS-3) located within MCC-4E which is connected back to the generator. This provides for a split-bussed distribution within the electrical distribution equipment for which the specific equipment is operated on stand-by power. The lighting in this area is also in poor condition. The lighting levels in this area are below the IES standard levels.

6.2.2.4.5.3 Lower Level - Pump Room

There are presently no e-stop pushbutton personnel protection control stations located at the pumps. The local disconnect switches are located on the wall opposite the pumps and not at the specific equipment location. There is no emergency lighting at this location. Open-type industrial fluorescent type lighting fixtures which appear to have been re-lamped.

6.2.2.4.5.4 Lower Level Blower Room

There are three larger blowers located in this room. Two of these blowers are operated on VFD’s. These are older Siemens and Hitachi VFD’s rated at 75 Hp with K factor harmonic mitigation transformers. Each of these transformers are rated at 93 KVA at 480 volts, 6-phase. This room is extremely warm due to the heat rejection from the VFD equipment and the discharge air from the respective blowers. It appears that this VFD equipment is operational, but based upon observations noted, this equipment has been in service for extended periods and has reached its useful operational life.

The full electrical memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.5 Aeration Tanks

The Aeration Tanks were constructed in the 1990 expansion and upgrade. At the time of inspection AT 3 and AT 4 were online and full of liquid. At the time of inspection AT 1 and AT 2 were not empty, but the water level was very low.

6.2.2.5.1 Structural

Both exterior Aeration Tank stairs are wood and only have top-mounted handrail on one side. Many of the guard posts embedded in concrete have cracks around the posts and the concrete has rust stains. The guards are missing toeplates. Several of the guard posts are supported by an aluminum cylinder filled with concrete that is not sitting flush with the concrete walking surface. It should be embedded in concrete.

Cracks stemmed from the expansion joint on the top of the wall. There was spider cracking in the concrete topping and exterior walls in some locations. Mildly exposed aggregate observed on the walls below the normal water level line. The exposed aggregate was observed almost the entire wall height, except for the top few feet. Many vertical cracks were observed, most exhibiting efflorescence. On the visible portion of the exterior walls of the tanks there are many vertical cracks exhibiting efflorescence and on the top of the wall, stemming from the channels. Interior top few feet of wall are green in color and have void holes. Concrete top slab is cracked and spalling, exhibiting biological growth, at one of the slide gate locations where there is an embedded gate frame. Some of the expansion joint sealants are failing. The life expectancy of joint sealant is 10 years. There were concrete cracks and spalling around pipe penetrations on the exterior tank walls. Exterior wall pipe penetration efflorescence staining on the wall below the pipes indicates that there are leaks. The grating is not fastened, and some sections are warped.

The full structural memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.5.2 Instrumentation and Controls

There are two aeration trains; one where mechanical aeration is used as I/I storage EQ tanks and the other is used for fine-bubble aeration. The aeration tank has two dissolved oxygen transmitters; however, the transmitters were not functioning. There do not appear to be any modulating valves or automated aeration delivery at the aeration tanks. Dissolved oxygen is measured, and blower speed is adjusted (increased or decreased) to vary the airflow to the basins. Valves are manually adjusted to apportion the air accordingly.

The full I&C memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.5.3 Electrical

See section 6.2.2.2.2 for general electrical observations at outdoor tanks.

The full electrical memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.6 Final Clarifiers

The Final Clarifiers were constructed during the 1990 upgrade.

6.2.2.6.1 Structural

The Final Clarifier on the east side was empty during the inspection. The Final Clarifier on the west side was full at the time of inspection and could not be observed below the water line.

Exposed aggregate was observed on the launder wall, launder slab and weir wall. Base slab and very bottom of tank appear to be coated with coal tar epoxy. The rotating mechanism has scraped away the coating on the base slab in three ring locations. Launder walls above the waterline are stained green and black. Tank walls exhibit mildly exposed aggregate. Hot dipped galvanized guard posts embedded in top of wall are slightly corroded and concrete is rust stained. Guard is bent in one location. The walls had vertical cracks exhibiting efflorescence. The pressure relief valves were not leaking groundwater during the site visit. It is not clear if they are rusted shut and capable of allowing groundwater to flow into the tanks

West Final Clarifier has algae growth on the launder and weir. The concrete exhibits moderately exposed aggregate. The joint sealant is in fair condition.

Final Scum Manhole appears to be in fair to good condition with no observed deficiencies.

The full structural memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.6.2   Instrumentation and Controls

The final clarifiers are currently not in operation. The Town has high I&I and utilizes the tanks as storage equalization (EQ) during storm events. After the storm even has passed, the Town feeds the wastewater back into the influent pump station for treatment. Controls appear to be manual only with a local start/stop pushbutton station. It is unclear if run or fault status is monitored by SCADA if that tank was put into use.

The full I&C memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.6.3   Electrical

See section 6.2.2.2.2 for general electrical observations at outdoor tanks.

The full electrical memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.7   Chlorine Contact Tank and Chlorine Building

The Chlorination Building was constructed during the 1990 upgrade. Modifications were made in 2016 to change from chlorine gas to sodium hypochlorite for disinfection. The original Chlorine Contact Tanks, which consisted of two tanks, were constructed during the upgrade in 1990. In 1993, there was a Chlorine Contact Tank addition when a third tank was added.

6.2.2.7.1 Structural

The water level in Tank 3 was very low at the time of inspection, however the base slab could not be observed. Tank 1 and Tank 2 were online at the time of inspection and could not be observed below the water line.

The concrete around the building joints is degrading on the underside of the concrete exterior roof slab. The southwest corner of the building foundation has minor spalling.

Many vertical cracks exhibit efflorescence on the portion of the contact tank walls above the normal water level. Cracks were observed on the top slab. There are toe plates missing from guards in many locations. The concrete walls below the normal water line has severely exposed aggregate and has been stained green in color. The walls above the normal water line are streaked with green color and have void holes. The pressure relief valves appear to be in good condition. The joint sealant is degraded. There are wood steps that don't appear to be fastened to the concrete.

The full structural memo can be found in **Appendix E.** A summary of recommendations is included in the next section.

6.2.2.7.2 Instrumentation and Controls

6.2.2.7.2.1 External Alarms, Life-Safety, Chemical Fill Station

The Hypochlorite Building has both an audible alarm horn and a visible alarm beacon mounted to the exterior side of the building. There is an existing level switch located in the containment area that likely generates a chemical spill/containment alarm. There is also a flow switch mounted on the eyewash/shower that detects flow use and issues an alarm and energizes a local alarm horn in the chemical pumping area. There is a chemical fill station that monitors tank level and likely issues an alarm when a high tank level is exceeded. It is undetermined at this time what specific alarms energize the external alarm horn and beacon, but it is assumed that these alarms appear on the local Headworks Control Panel's OIT & SCADA.

6.2.2.7.2.2 Chemical Feed Control Panel

The Chemical Feed Control Panel is a NEMA 4X stainless-steel control panel with a lockable handle and an Allen-Bradley PanelView Plus 1000 OIT (operator interface terminal) and various pilot lights (power on, UPS power, PLC fail, General Alarm) and a reset pushbutton on the front panel. Inside the panel, the plant processes and SCADA Communications are provided by an Allen-Bradley CompactLogix L30ER CPU.

6.2.2.7.2.3 Sodium Hypochlorite Pumping

There are four sodium hypochlorite pumps (Qdose by Watson Marlo) that pump the chemical from two sodium hypochlorite storage tanks. The pumps can be controlled locally (start/stop, speed adjust) on the pump face and remotely via the Chemical Feed Control Panel. Typical disinfection is flow-paced with a chlorine level trim.

Each tank has an ultrasonic level transmitter (Siemens LUT-420) signal to the PLC which monitors tank levels and provides both low and high alarming from the Chemical Feed Control Panel.

The full I&C memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.7.3 Electrical

This building is electrically fed from Motor Control Center MCC-5 located within the Preliminary Treatment Building. Recently this building was completely renovated including all of the electrical equipment. The building houses the disinfection chemicals, equipment, instrumentation, controls, chemical storage, and chemical feed for the facility.

The equipment has been upgraded to maintain a NEMA rating and integrity which will withstand the corrosive environment of the chemicals. There now is separation between the electrical equipment and controls from the chemical equipment for maintaining proper operation and life for this application.

The full electrical memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.8 Sludge Handling and Maintenance Building (Administration)

The Administration Building houses the sludge thickening, storage, blending, conditioning, and dewatering operations, as well as personnel and handicap facilities, and the administrative and maintenance offices for the Sewer Department. Originally designed in 1968, it was one of the original buildings completed in 1972. The building was expanded in 1990 to include maintenance facilities consisting of a 2-bay garage, machine shop, and spare parts storage.

6.2.2.8.1 Architectural

The exterior wall construction is concrete masonry units (CMU) with brick veneer. The brick and CMU are in good condition considering their age. There is a lack of insulation in the exterior walls. The roof age and condition are not known. Most of the windows were replaced in the 1990 addition with steel windows. In general, they are in fair condition considering their age. These types of windows are not energy efficient due to the thermal bridge characteristic of the steel frame and the single non-insulated glazing. Exterior doors and frames are a combination of aluminum and hollow metal. In general, they are in good condition for their age. Some hardware, particularly older units consisting of knob type handles, are in poor condition. Interior doors in Administration area are solid-core wood doors in hollow metal frames. They are in very good condition considering their age. Most of the hardware appears to be lever handle which complies with current ADA codes. Overhead doors are mill-finished aluminum, showing some signs of corrosion although are generally in good condition. Interior walls are a combination of painted CMU and drywall. Floor finishes consist of VCT and Carpet with vinyl base, presumably replaced during the 1990 renovations. The ceilings are acoustical Ceiling tile (ACT). In general, the condition is very good considering their age. The bathrooms are not ADA compliant.

The full architectural memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.8.2 Structural

There are several issues with the concrete, coatings, paint, and metal inside and outside the building including cracks, spalling, and corrosion of metals. The building has many code deficiencies for current safety regulations. Overall, the building is in fair to poor condition. This is mainly due to the wet conditions in the processing rooms.

The full structural memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.8.3 Mechanical

6.2.2.8.3.1 Administrative Area

Cooling is provided to the Conference Room and Offices by ductless split system air conditioning units. The indoor units are wall mounted and the outdoor units located on the roof above. These units were manufactured in 2010 and appear to be in fair to good condition. Heating and ventilation are provided by self-contained air conditioning units with hot water heating coils. The units originally provided cooling to the spaces until the addition of the ductless split system heat pumps. These units were manufactured in 1988 and appear to in fair condition, however, the units only function for heating and have exceeded their expected useful life.

The original toilet rooms are heated by finned tube radiators along the outside wall which appear to be in good condition. No mechanical ventilation is provided to these spaces. The toilet room lavatories are in good condition but the faucets and trim show signs of corrosion. The Women's Room water closet was not functional at the time of observation. The water bubbler located in the corridor was not functional at the time of observation. The remaining fixtures appear to be functional and in good condition.

A hot water baseboard heater with thermostatic valve supplies heat to the handicap toilet room added under the 1990 upgrade. The unit appears to be in fair to good condition. A small roof-mounted exhaust fan provides ventilation to the space. A recessed hot water radiator supplies heat to the corridor.

6.2.2.8.3.2 Sludge Handling Room

A unit ventilator located in the Sludge Handling Room is intended to supply tempered ventilation air to the Sludge Handling Room, Mixing Room, and lower level pump room. The unit was not functional at the time of observation and appears to be in relatively poor physical condition. The unit was installed as part of the 1990 upgrade. The ventilation airflow rates for the areas served by this unit are not adequate to reduce the classification of the spaces from Class 1/Division 2 to unclassified under the current code; as a result, the electrical equipment in the space is not properly rated for the conditions. The supply ductwork in the Sludge Handling Room is in fair condition, showing some signs of corrosion, significant in some areas. The associated air devices are substantially corroded and in poor condition. The ductwork located on the first floor is in poor condition and has been physically damaged or failed in multiple locations. The relief ductwork from the lower level pump room has been modified to allow the air to flow freely between this space and the sludge handling room, the relief vent on the roof has been removed and the opening sealed. Air is exhausted from the Sludge Handling Room and Sludge Garage by the centralized odor control system installed as part of the 1995 upgrade. The FRP ductwork appears to be in good condition, however, as noted above, the airflows are not sufficient for reducing the electrical classification of the space.

Heat is provided by unit heaters located in each space. The units have exceeded their expected useful life and are in generally poor condition. The hydronic heating pipe insulation is in poor condition and has failed in many areas; the exposed piping shows signs of corrosion to varying degrees of severity from minor in the lower level pump room to significant in the Sludge Garage.

6.2.2.8.3.3 Boiler Room

A Weil-McLain cast iron sectional boiler, rated for a maximum 1,267.8 MBH, is located in the dedicated boiler room. The boiler appears to be original, has exceeded its expected useful life, and has been subject to physical damage; the unit appears to be functional but in relatively poor condition. The boiler is provided with a PowerFlame oil-fired burner rated for 750 or 1,875 MBH. The burner was manufactured in 2013 and appears to be in good condition.

Five in-line pumps circulate hydronic heating water throughout the building. The pumps are in varying states of repair, some pump bodies or motors have been replaced. Most are in fair to poor condition and are showing signs of corrosion. Much of the insulation has been damaged, failed, or removed; exposed piping shows signs of corrosion. The existing boiler flue piping is uninsulated and showing signs of corrosion.

6.2.2.8.3.4 Maintenance Area

The maintenance area heating is provided by three hydronic unit heaters. An exhaust fan with flexible tube inlet is provided for welding exhaust, the outlet is ducted to a sidewall exhaust louver with gravity damper. No general or cooling exhaust is provided. The operators noted that the space gets overly hot during the summer months. Cooling is provided to the Maintenance Office by a portable self-contained air conditioning unit ducted to a panel which has been installed to replace a window. Ventilation is provided for the space by a small centrifugal wall exhaust fan which appears to be in relatively poor condition; no makeup air is provided to the space.

6.2.2.8.3.5 Other

The Operators Room is provided with cooling by a self-contained, window-mounted air conditioning unit. No ventilation air is provided.

The MCC room is provided with a unit heater for space heating; no ventilation or cooling are provided. A tank type hot water heater is located in the space; the heater appears to be in good condition.

The full mechanical memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.8.4 Instrumentation and Controls

Instrumentation and controls (I&C) within the sludge handling and maintenance building include:

- Control Building Control Panel (electrical room) controls plant processes and SCADA communications
- Backup Influent Control Panel controls the backup wet weather influent pump
- Dewatering Control Panel (third floor) controls the belt filter presses
- Gravity Belt Thickener Control Panel (third floor) controls the respective Gravity Belt Thickeners
- SCADA computer (Office) uses Factory Talk by Rockwell Automation

The full I&C memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.8.5 Electrical

The Sludge Handling and Maintenance Building is fed from an underground normal source, 800-ampere feeder from the outdoor main Switchboard (SWBD-1). In addition, there is a 400-ampere feeder from the stand-by generator (GEN-1) and automatic transfer switch (ATS-1) that also feeds stand-by power to this building. Both sources feed portions of existing Motor Control Center MCC-1 which is split bussed thus creating MCC-1 (normal) and MCC-1E (stand-by) distribution to this building. The existing motor control center(s) are manufactured by Cutler-Hammer Company and are Uni-Trol model type. This equipment is older style distribution which has seen its useful life expectancy. There are two nine section motor control centers mounted back-to-back and located in the lower level of the building in the main electrical room. In addition, there is an existing 250 kW, 312.5 KVA, Model 500F0036 FC, Serial No. 7N-9668-462-8 Cummins stand-by generator which is rated for continuous duty. This was the original generator designed for the facility which has been abandoned in place due to a bad alternator on this unit. Also, the incoming telephone service, SCADA RTU panel and other electrical distribution equipment is located in this room.

The overall electrical distribution system and equipment located within the specific areas of the building have been in service for an extended period and this equipment needs replacement. This building includes areas such as the maintenance area, boiler room, administration area, dewatering area, lunch room, operator room, sludge pump room, influent pump room, and blower room. These areas consist typically of the following electrical conditions:

- The e-stop push button control stations located near motors and equipment for personnel protection are not code compliant based upon not being maintained push-off type for immediate equipment shut-down. Most of the present e-stop control stations are momentary type which are non-compliant.
- Most of the process equipment is furnished with local disconnect switches for means of lock-out/ tag-out of equipment. There were some locations that do not have this requirement.

- The lighting foot-candle intensity levels are poor and appear to be well below the IES levels required for these types of areas.
- The electrical equipment and devices located in the sludge dewatering area appear to have seen a lot of use. This area is kept clean and is subjected to hose-down and washdown with water. In addition, the area is washed and sprayed down each time it is used which exposes equipment to corrosion and damage. The extended use of the equipment, environmental conditions and frequency of exposure to water reduces the extended life of the equipment.
- The lighting throughout this building is of the older type open, industrial fluorescent fixtures or recessed fluorescent type fixtures located within the finished administrative areas. Some of this lighting appears to have been re-lamped with higher efficiency output type fluorescent lamps, but still does not provide the levels of lighting efficiencies necessary for these areas.
- There is no separate emergency lighting battery back-up to allow means of egress from within the building location as required to be code compliant.
- There does not appear to be a fire alarm system for this building or the facility.

The full electrical memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.9 Composting and Biofilter Buildings

The composting building was constructed as part of the 1990 plant upgrades. It's a pre-engineered steel building with a concrete base and metal wall panels and metal roof. It is single story, approximately 103 feet by 132 feet. The interior of the main space is subdivided by concrete walls defining compost bins. There are large overhead doors on each end.

6.2.2.9.1 Architectural

The exterior metal panels are in fair condition, showing some signs of rusting. The translucent window panels and roof panels are in poor condition, showing significant discoloration due to UV exposure and possibly chemical exposure. There are very few exterior doors, but they show some signs of rusting and hardware failure.

The full architectural memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.9.2 Structural

Concrete frost wall foundation has scrapes from equipment on the walls and slab. Both top and side corner edges of the concrete walls have spalled, and aggregate is showing. The bottom of the steel columns and base plates are corroded on the North side of the building. In some cases, the corrosion is very severe, and the steel is flaking. The bottom half of these columns have been painted yellow. The yellow paint is failing. The grout pad under the columns is spalling under some of the North columns. Some flanges of the steel columns are bent from being hit by equipment. Concrete walls have void holes. Roof purlins under the metal decking are corroding.

The full structural memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.9.3 Mechanical

A packaged through-the-wall air conditioning unit provides cooling for the electrical room. The unit appears to have exceeded its expected useful life and is in fairly poor condition.

The full mechanical memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.9.4 Instrumentation and Controls

6.2.2.9.4.1 Odor Control

Odor Control Fans pull odorous air from the Composting Area and Compost Building. There is a scrubber tower located outside of the Compost Area and Composting Building with integrated controls for pumping and wash-down/scrubbing of the odorous air. Differential pressure monitoring, sump level monitoring and make-up water controls are also provided. The Odor Control system is not monitored by SCADA.

The Compost Area Control Panel is a NEMA 12 painted steel, control panel with a lockable handle. The panel is located in the Composting Building. There are no pilot lights, selector switches, pushbuttons, or operator interface on the front panel. Inside the panel, the plant processes and SCADA communications are provided by an Allen-Bradley based PLC (PLC-5).

The full I&C memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.9.5 Electrical

The compost curing building was locked and there was no access to enter this area. It is our understanding that there is electrical equipment located within the electrical room. In addition, it was observed that this portion of the facility is also fed from the Operations Building and is connected to stand-by power via Motor Control Center MCC-4E.

The Biofilter Building is a large building structure which houses a number of large, odor control fans related to the active Composting Building located across from this Biofilter Building. The Biofilter Building houses Motor Control Centers MCC-7 (normal) and MCC-7E (stand-by) power which is fed from stand-by Generator (GEN-2) located outside of the Biofilter Building. The feed from this generator is wired through Automatic Transfer Switch (ATS-2) which in turn feeds MCC-7E. The normal feed to this building is fed from the main outdoor Switchboard SWBD-1 located outside of the Sludge Handling and Maintenance Building. This feeds the main circuit breaker located at Motor Control Center MCC-7 at the Biofilter Building.

The Biofilter Building also houses the following equipment and based upon the observations noted:

- Motor Control Centers MCC-7 (normal) and MCC-7E (stand-by) are Model 8000-line as manufactured by General Electric Company. The motor control centers appear to be in good condition based upon visual observation.

- There are several larger variable frequency drives which operate the odor control system fans. These are Model 1336 plus variable frequency drives as manufactured by Allen-Bradley Company. Although these are older style drives, they appear to be in good condition based upon visual observation.

- Distribution panel DP5 is rated at 225 amperes, 277/480-volt, 3 phase and is also fed from the stand-by Motor Control Center MCC-7E. Panelboard RP8A is rated at 100 ampere, 120/208 volts, 3 phase and is fed from panel DP5 and is on stand-by power.

It appears that this facility has not been completely operated for a long time due to the elimination of the composting operations.

The full electrical memo can be found in **Appendix E**. A summary of recommendations is included in the next section.

6.2.2.10 Electrical Distribution Equipment

6.2.2.10.1 Normal Utility Power

The existing normal utility electrical service is fed from a primary electrical service which extends overhead from Walker Street along the entrance roadway to a primary service riser pole located adjacent to the Sludge Handing and Maintenance Building. The primary electrical service is fed underground to utility owned, 500 KVA, pad-mounted transformer located outside of the sludge handling and Maintenance Building. The secondary electrical service from the pad-mounted transformer is fed underground at 277/480 volts, 3 phase, 4 wire, 60 HZ to an outdoor switchboard SWBD-1 located adjacent to the pad-mounted transformer. In addition, the utility secondary metering is located outside in this general area on a wall. The outdoor switchboard SWBD-1 is rated at 2,000 ampere, 277/480 bolts, 3 phase, 4 wire, 60 HZ and is a series AV line as manufacturer by General Electric Company. The primary side of the pad-mounted transformer also extends primary electrical service to the Water Pump House. The primary electrical service extends underground to a second pad-mounted transformer and separate service and utility meter located for this location. Our understanding is that this location served the power plant which is no longer operational and therefore the pump house is no longer operational.

The outdoor switchboard SWBD-1 provides normal utility power to the following locations and equipment with electrical capacity as noted in **Table 6-31**.

TABLE 6-31

EXISTING ELECTRICAL CAPACITIES

Equipment		Location
1	800 Ampere Motor Control Center MCC-1	Sludge Handling and Maintenance Building
2	1,000 Ampere Motor Control Center MCC-4	Operations Building
3	400 Ampere Motor Control Center MCC-5	Preliminary Treatment Building
4	800 Ampere Motor Control Center MCC-7	Biofilter Building

6.2.2.10.2 Existing Stand-by Power

The existing stand-by electrical service for the water pollution control facility is generated via existing diesel fueled stand-by generators located at the following site locations, as noted in **Table 6-32**.

TABLE 6-32

EXISTING GENERATORS

Generator	Location
Generator No. 1 (GEN-1)	Outside of the Sludge Handling and Maintenance Building
Generator No. 2 (GEN-2)	Outside between the Biofilter Control Room and Compost Curing Facility
Generator No. 3 (GEN-3)	Generator Room at the Operations Building
Generator No. 4 (GEN-4)	Generator Room at the Preliminary Treatment Building

Notes

1. The existing stand-by generators have been identified and noted by generator tag numbers (i.e. – GEN-1) for the purposes of this memorandum.
2. The existing automatic transfer switches have been identified and noted by tag for that location (i.e. – ATS-1) for the purposes of this memorandum.
3. The existing motor control center sections which have been split-bussed for stand-by operation have been noted by tag numbers (i.e. – MCC-4E) where the E denotes (emergency) for the purposes of this memorandum.

Each of the stand-by generators is furnished with a separate automatic transfer switch at the respective location. When there is a loss of normal utility power at the facility each of the generators and associated automatic transfer switches will respond to provide stand-by power locally for the equipment to which it is connected. **Table 6-33** provides the location and rating of the existing automatic transfer switches.

TABLE 6-33

AUTOMATIC TRANSFER SWITCHES

Location	Automatic Transfer Switch (ATS)	Rating
Outdoors outside of Sludge Handling and Maintenance Building	Automatic Transfer Switch No. 1 (ATS-1)	400 Ampere, 3 Pole
Biofilter Building	Automatic Transfer Switch No. 2 (ATS-2)	400 Ampere, 3 Pole
Generator Room at the Operations Building	Automatic Transfer Switch No. 3 (ATS-3)	225 Ampere, 3 Pole
Generator Room at the Preliminary Treatment Building within MCC-5E-7E	Automatic Transfer Switch No. 4 (ATS-4)	225 Ampere, 3 Pole

Notes:

1. ATS-1 is a Cummins/Onan manufactured automatic transfer switch.
2. ATS-2 is a Cummins/Onan manufactured automatic transfer switch.
3. ATS-3 is a Caterpillar supplied automatic transfer switch.
4. ATS-4 is a Caterpillar supplied automatic transfer switch.
5. Additional information regarding model numbers and specific manufacturers was not available due to not being able to access and open these enclosures due to arc flash liability issues.

The following **Table 6-34** provides a summary and information regarding the stand-by generators and sizing for the facility.

TABLE 6-34

STAND-BY GENERATORS

Tag	Location	Capacity
GEN-1	Outside of the Sludge Handling and Maintenance Building	Model DFEH-594784 Cummins unit 400 kW, 500 KVA, 277/480 volts, 3 phase 4 wire, 60 HZ with an oversized alternator rated 600 kW, 750 KVA continuous duty. Serial No. 5221648-02
GEN-2	Outside between the Biofilter Control Room and Compost Curing Facility	Model DQDAA-7169116 Cummins Unit 250 kW, 312.5 KVA, 277/480 volts, 3 phase 4 wire, 60 HZ Serial No. F080192483
GEN-3	Generator Room at the Operations Building	Model 3306B Caterpillar Unit 180 kW, 225 KVA, 277/480 volts, 3 phase, 4 wire, 60 HZ Serial No. 85Z03852
GEN-4	Generator Room at the Preliminary Building	Model 3306B Caterpillar unit 180 kW, 225 KVA, 277/480 volts, 3 phase, 4 wire, 60 HZ Serial No. 85Z03852

Notes:

1. The capacity of the total stand-by power which is available at the treatment facility is equal to 1,010 kW, 1,262.5 KVA. The issue is that these are all separately, dedicated units with output capacities which do not necessary match the dedicated loads they serve. This creates an inefficient use of the stand-by power availability for the facility.

6.2.3 Hydraulic and Loading Conditions

Wastewater influent flows and loads to the treatment facility were developed using operations and reporting data collected from January 2013 to August 2018 as presented in **Table 6-35**.

TABLE 6-35
CURRENT INFLUENT FLOWS AND LOADS
2013-2018

PARAMETER	FLOW		BOD_5		TSS	
	mgd	P.F.	mg/L	lb./day	mg/L	lb./day
Annual Average	3.33	—	127	3,544	146	4,078
Max Month -Winter (BOD_5 Based)[1]	4.1	1.23	148	5,060	161	5,515
Max Month - Summer (BOD_5 Based)[1]	2.58	0.77	238	5,115	293	6,297
Peak Day – (99.9 Percentile)	10.32	3.1	116	9,967	90	7,730

Notes:

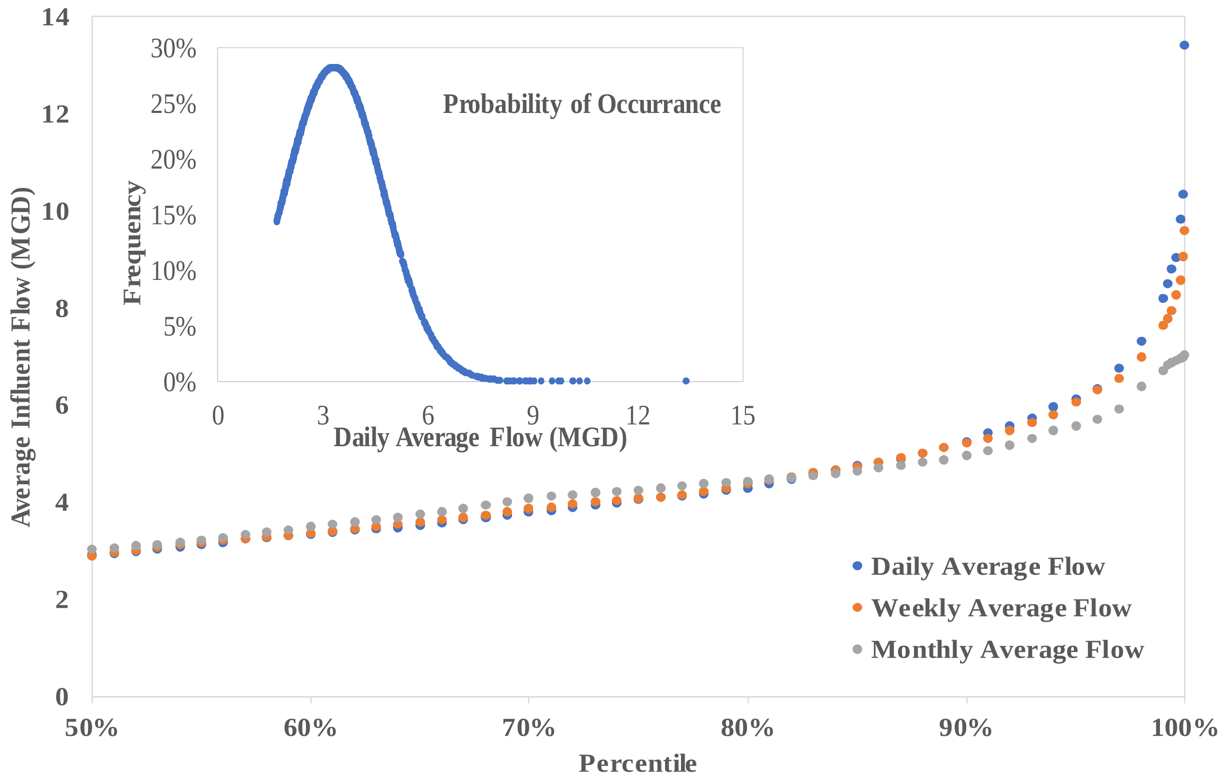
1. The maximum month BOD_5 loading condition represents the maximum 30-day BOD_5 loading received at the WPCF. The associated flow rate, and TSS loading are the actual influent loads of each parameter that occurred concurrently with the historical 30-day maximum BOD_5 load. Thus, the values presented above for all parameters (except BOD_5) may or may not be the historical maximum 30-day influent loading condition for each parameter.

2. P.F. = Peaking Factor

Statistical analysis of the influent wastewater data was done to determine the flow distributions and their probability of occurrence. The peak flow selected for the performance analysis of the WPCF corresponds to an eight-hour event per year. This flow occurs at a 99.9-percentile or frequency of 99.9 percent [364.66/365 x 100] and has a probability of occurrence of approximately 0.1 percent. Percentile is the value that corresponds to the percentage of observations that are equal or less than the indicated value. **Figure 6-3** shows the percentile of influent flows and probability of occurrence of the daily average flows from 2013 to 2018.

FIGURE 6-3

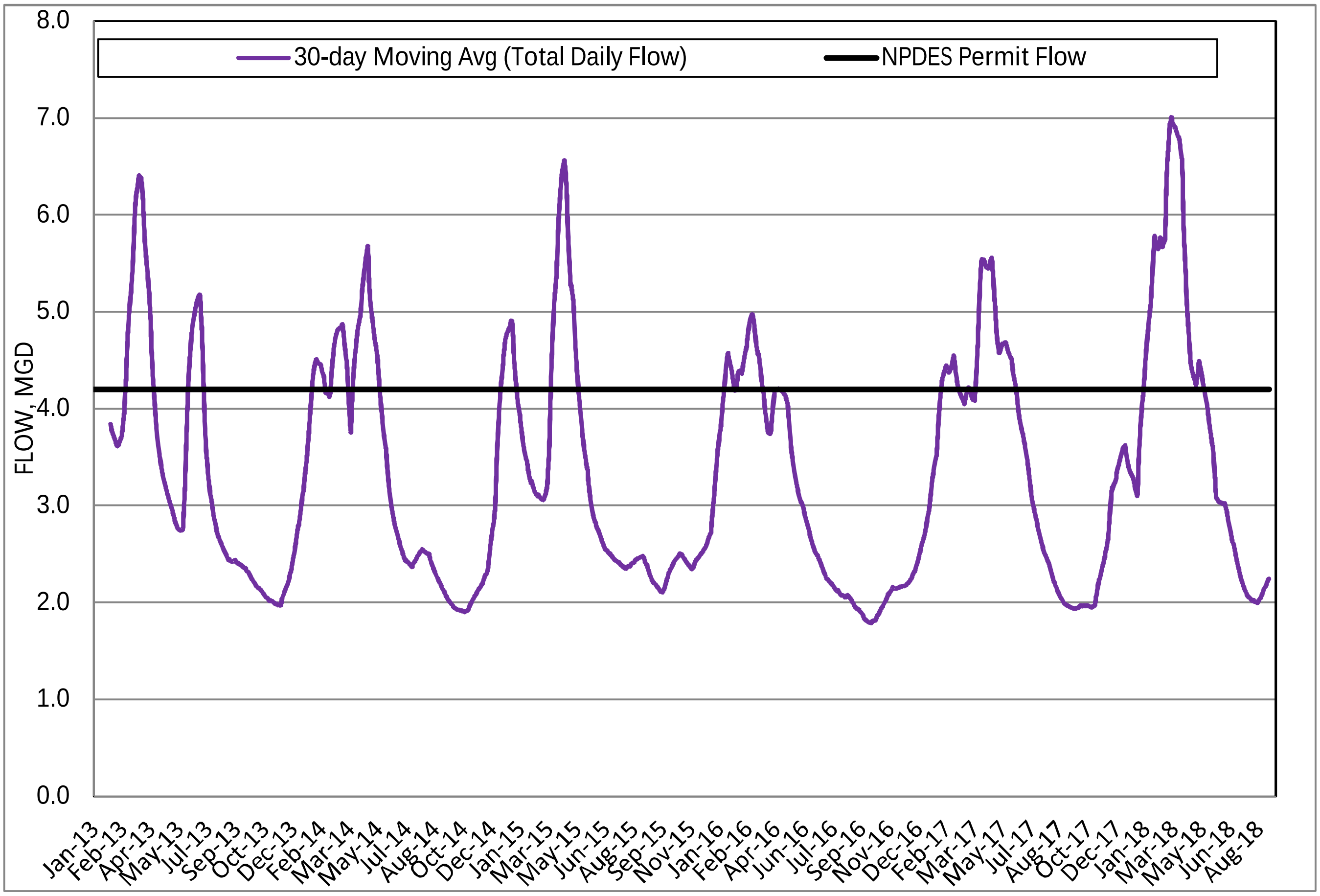
PERCENTILE OF INFLUENT FLOWS AND PROBABILITY OF OCCURRENCE OF DAILY AVERAGE FLOWS (2013-2018)



The Somerset WPCF currently treats an average daily flow of 3.33 MGD, or approximately 80 percent of the facility's permitted capacity (4.2 MGD). In addition, as shown in **Figure 6-4**, the average daily influent flow has increased from 2016 to 2018.

FIGURE 6-4

WPCF AVERAGE MONTHLY FLOW (MGD) (2016-2018)



6.2.4 WPCF Performance

The Somerset WPCF is currently permitted to discharge an average daily flow of 4.2 MGD of flow to the Taunton River. **Table 6-36** summarizes the current permit limits for the Somerset WPCF. A complete copy of the NPDES permit is included in **Appendix F**. The permit is up for renewal and a draft permit is expected to be issued to the Town in 2019. The Town anticipates a numerical total nitrogen limit to be included as part of the new permit.

TABLE 6-36

NPDES PERMIT LIMITS (EXISTING, 2004)

Effluent Characteristic	Units	Discharge Limitation		
		Average Monthly	**Average Weekly**	**Maximum Daily**
Influent Flow	MGD	4.2	-	Report
Effluent Flow	MGD	Report	-	-
BOD_5	mg/L lbs/day	30 1,051	45 1,576	Report Report
TSS	mg/L lbs/day	30 1,051	45 1,576	Report Report
pH	S.U.	Not less than 6.5 mg/L nor greater than 8.3	Not less than 6.5 mg/L nor greater than 8.3	Not less than 6.5 mg/L nor greater than 8.3
Fecal Coliform	cfu/100 mL	200	-	400
Settleable Solids	mL/L	0.1	0.1	0.3
Total Ammonia – Nitrogen	mg/L	-	`-	Report
Total Kjeldahl Nitrogen	mg/L	-	-	Report
Total Residual Chlorine	Mg/L	0.2	-	0.3
LC_{50}	%	100%		

The most recent WPCF data (2013 through 2018) was used in this CWMP for the evaluation of flows and loads in respect to the performance of the WPCF. Monthly data for the WPCF is presented in **Appendix G**. A summary of the 2016-2018 influent data is presented in **Table 6-35** above. A summary of the 2016-2018 effluent data is presented in **Table 6-37**.

TABLE 6-37

CURRENT EFFLUENT FLOWS AND LOADS

2016-2018

PARAMETER	FLOW	BOD_5		TSS	
	mgd	mg/L	lb./day	mg/L	lb./day
Annual Average	3.3	15.6	429	7.84	216
Average Winter	4.1	15.2	520	7.1	243
Average Summer	2.58	16.1	346	8.1	174

From 2013 through 2018, the influent BOD concentration at the WPCF has averaged 127 mg/l (3,544 lbs/day), while the effluent concentration averaged 15.6 mg/l (429 lbs/day). This equates to an 87.8 percent treatment efficiency for BOD removal.

Influent TSS concentrations have averaged 146 mg/l (4,078 lbs/day), while the effluent concentration averaged 7.84 mg/l (216 lbs/day). This equates to greater than 94.5 treatment efficiency for TSS removal.

The Town has been operating the facility under their 2004 NPDES permit, which is shown in Table 6-36.

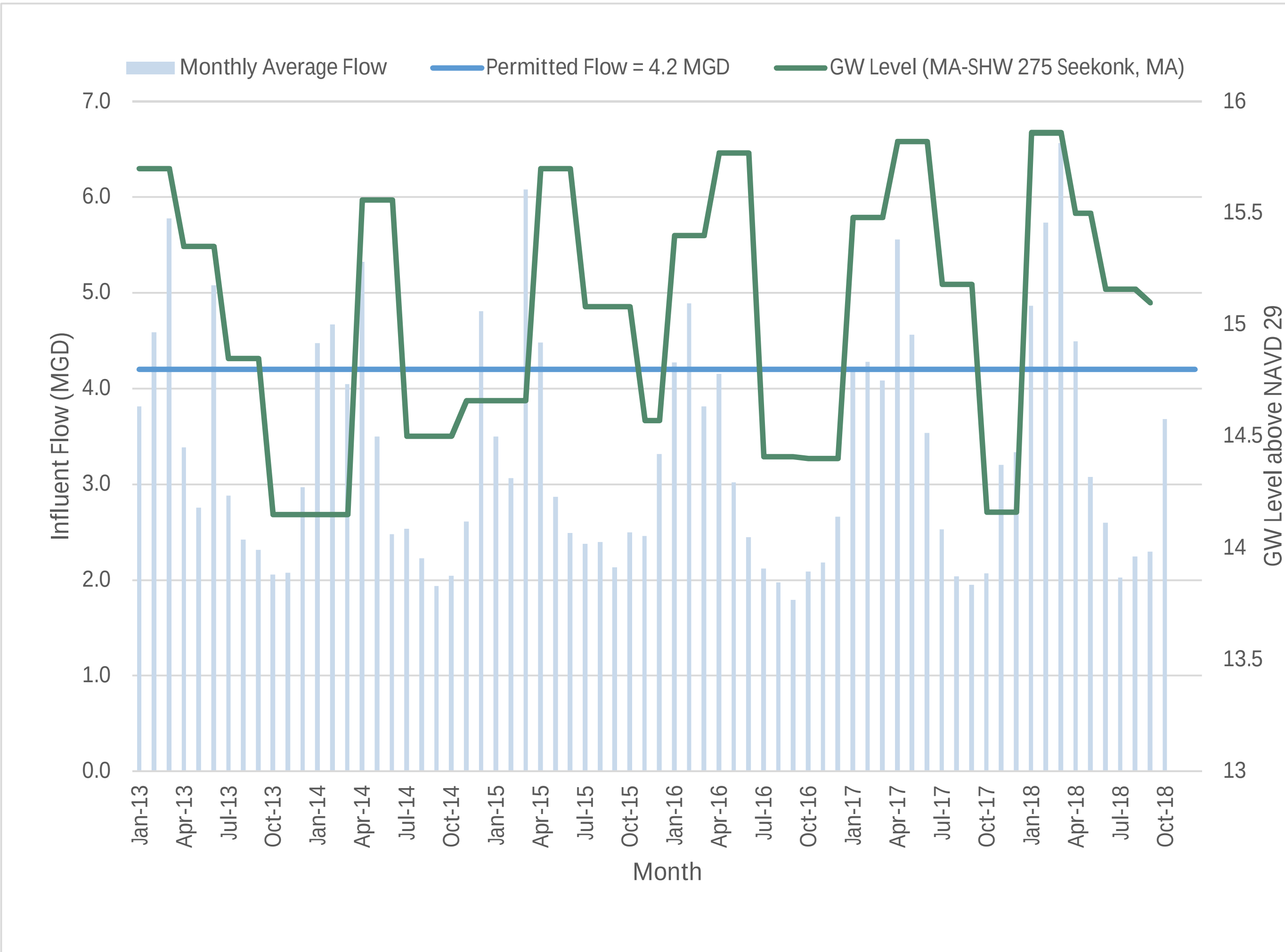
The Town is currently required to treat to a Biochemical Oxygen Demand (BOD) limit of 30 mg/L. The Town is also required to treat Total Suspended Solids to a limit of 30 mg/L. The Town currently has no nutrient limits in their permit, but are required to report Ammonia, Nitrate, and TKN. The Town is expecting that a mass limit of 105 lbs/day for Total Nitrogen (TN) will be included in their upcoming permit. This mass limit is equivalent to a TN concentration limit of 3.8 mg/l and 3.0 mg/l at average daily flow of 3.33 MGD, and permitted capacity of 4.2 MGD, respectively. This mass limit is also equivalent to a TN concentration limit of 3.1 mg/l and 4.9 mg/l at average winter flow of 4.1 MGD and summer flow of 2.58 MGD, respectively.

6.2.4.1 Secondary Treatment

Historical permit compliance was evaluated through a review of the WPCF's DMR reports from 2016-2018. Values highlighted in red indicate that the reported level was in exceedance of the permitted amount. From 2016-2018 there has been one BOD mass loading exceedance, and a total of 18 permitted flow exceedances. The BOD exceedance of 1,120 lbs/day occurred in March 2013 during a period of high influent flows with a high BOD loading. The BOD limit has not been in exceedance since this time and does not appear to be a recurring problem.

From 2013-2018 every year has had at least two months with exceedances of the permitted flow. The exceedances typically occur during months with high precipitation in late winter or early spring when groundwater levels are at their highest. **Figure 6-4** shows the monthly average flows from 2016-2018 and periods when the 30-day average flow was in exceedance of the permitted 4.2 MGD. Wastewater flow is influenced by rainfall and groundwater infiltration based on the seasonal variation. To evaluate the potential groundwater influence, the reported average monthly flows were compared to the groundwater level from a nearby USGS monitoring well in Seekonk, MA (MA-SHW 275) in **Figure 6-5**. The figure shows that during low groundwater periods, flows are typically lower, and when levels increase so does the flow. Recommendations to further investigate infiltration causes and solutions are presented in Section 4. It should be noted that during the completion of the 2018 I/I plan, the MA-SHW 275 monitoring well was used to compare collected groundwater readings in Somerset to the monitoring well. The comparison from the monitoring well and the collected data showed similar results and responses, so it is believed that the response seen in this well is similar to that in Somerset.

FIGURE 6-5
WPCF AVERAGE MONTHLY FLOW (MGD) AND GROUNDWATER INFLUENCE (2016-2018)



6.3 NEEDS ASSESSMENT

The first part of this section discusses the existing conditions at the Somerset WPCF. Within that part, deficiencies were identified for the various treatment processes, equipment, structures, and buildings. The deficiencies are grouped by equipment and infrastructure age, code-related deficiencies (architectural, structural, mechanical, electrical and instrumentation), and treatment process ability to meet current and future NPDES permit limits.

This section of the report focuses on the needs assessment and short-list of alternatives for the WPCF. The needs assessment involves an analysis of equipment replacement needs based on age and treatment deficiency and building and structural needs based on age and code compliance requirements. The short-listed alternatives are identified in this section and further analyzed in the next section.

6.3.1 Equipment and Process Systems

The needs assessment for the WPCF identifies a replacement schedule for equipment, buildings, and structures, groups them into different project phases in 5-year intervals and identifies which items can be replaced in-kind versus requiring a short-list of alternatives for further evaluation.

The following criteria was used to group the items in the 0 to 5-year interval, or those that are an "immediate need":

- Age of item is past useful service life or will be in the next 5 years
- Condition of item requires replacement before failure occurs (very poor to poor)
- Code-compliance is triggered by doing work in a building/room
- Item is not designed to meet pending draft NPDES permit limits

Because the last major upgrade at the facility was in 1990 and the upgrade touched almost every piece of equipment, building, and structure, much of the facility falls into the 0-5-year replacement category.

The following criteria was used to group the items in the 5-10-year interval, or those that are a "moderate need":

- Age of item is approaching useful service life in the next 5-10 years or can be maintained/rebuilt to extend service life
- Condition of item is fair
- Item is not tied to another item by area or process that is being replaced in the 0-5-year category
- Item is not integral to meeting draft NPDES permit limits

The 10-15-year, 15-20-year, and 20+ year categories are all based on age and expected service life and the items are in good to very good condition and not related to NPDES permit compliance.

6.3.1.1 0-5 Year Replacement

The following equipment is identified as having a need to be replaced in the next 0-5 years. If the equipment is not identified as requiring an alternatives analysis, it is recommended that it be replaced in-kind:

Preliminary Treatment

- Influent sampler – flow paced
- Parshall flume and ultrasonic meters
- Gas Detection
- Grit Removal & Dewatering Screw

Flow Equalization

- Flow Equalization Pumps
- Tank Aerators/Mixers

Septage Receiving

- Evaluate location and use

Primary Treatment

- Clarifier Mechanisms
- Primary Sludge Pumps
- Primary Scum Pumps
- Primary Scum Grinders
- Consider adding Sludge Pump Grinders

Secondary Treatment

Aeration Tanks[1]

- Fine-bubble Diffusers
- Slide Gates

- DO Probes
- Blowers

1. Aeration tanks are identified as process requiring alternatives analysis, see below

Secondary Clarifiers

- Clarifier Mechanisms
- Secondary Scum Pumps
- WAS Pumps
- RAS Pumps

Solids Processing[1]

- Gravity Belt Thickeners
- Belt Filter Presses
- Sludge Transfer Pumps
- BFP Feed Pumps
- Polymer System

1. The solids processing system and building are identified as a system requiring an alternatives analysis.

Composting/Biofilter[1]

- Composting Blowers
- Sludge Feed Unit
- Bulking Agent Feed Unit
- Mixers
- OCS Fan
- OCS Fan
- OCS Vessel
- Biofilter Fan
- Biofilter

1. The composting and related odor control is identified as a process requiring an alternatives analysis

The estimated project costs for these equipment replacements are discussed in the following section.

6.3.1.2 5-10 Year Replacement

No equipment during the 5-10-year period would need to be replaced.

6.3.1.3 10-15 Year Replacement

The 10-15-year interval, or approximately 2030 to 2035, is sixty years after the 1970 construction and forty years after the 1990 upgrade. This is important because concrete tanks typically have a useful life expectancy of sixty years and buildings typically have a useful life expectancy of forty years. As such, concrete tanks that are still in place and original to the 1970 facility construction, and any buildings that were constructed during the 1990 upgrade would be recommended for replacement. This includes the flow equalization tanks that were converted from the old aeration tanks and primary clarifiers, the original chlorine contact tanks, and the Preliminary Treatment, Operations, Chemical, Administration, Composting, and Biofilter Buildings. Some of these structures and buildings are discussed as part of the alternatives analyses below and would no longer be in this category if replaced in the near-term. The hypochlorite and bisulfite pumps are expected to have reached or past their useful lives. The sodium bisulfite storage tank would also be expected to be past its useful life.

6.3.1.4 15-20 Year Replacement

Equipment in the 15-20-year category fall under recently replaced equipment. This includes the mechanical screens, screenings wash presses, and influent standby pump. This equipment could be replaced earlier if the Preliminary Treatment Building were to undergo an overhaul in the 10-15-year range.

6.3.1.5 20+ Year Replacement

The 20+ year equipment replacement items are primarily concrete structures that were added to the facility during the 1990 upgrade. Much of these would be considered past their useful life in 2050. The influent screw pumps, expected useful life of forty years, would be at their end of useful life between 2055 and 2060. Some of these structures are discussed in the alternatives analyses below.

6.3.2 Building and Structures

The following are the recommendations from building discipline engineers. Much of these recommendations apply and can be addressed when work is being completed in a building or structure. The general electrical and instrumentation recommendations are at the end of this subsection.

6.3.2.1 Preliminary Treatment

6.3.2.1.1 Architectural

Exterior: clean brickwork. Repoint bricks at window sills. Clean, scrape and repaint grate stairs.

Windows: replace windows with new aluminum thermally broken insulated windows.

Doors: replace doors, frames and hardware.

Interior: clean and repaint all wall surfaces and piping

6.3.2.1.2 Structural

Repair all cracks by epoxy injection. Resurface degraded concrete sections with cementitious repair material after applying epoxy bonding agent to exposed reinforcing steel. Replace expansion joint sealants. Modify the guard at the top of the stairs at the screw pumps to conform to OSHA regulations. Install the missing handrail on the stairs to the steel platform on the Operating Deck. Install toe plate on the guard. Remove and replace the exterior lifting assembly at the Loading Platform. Indicate the capacity of all lifting assemblies.

6.3.2.1.3 Mechanical

Grit Screening Room

Remove and replace existing hydronic unit heaters with new units. Provide new units with corrosion resistant epoxy coating and explosion-proof motors. Repair or replace existing PVC jacketing on hydronic heating piping. Replace corroded exposed piping and ensure new piping is insulated and jacketed to unit. Sandblast and repaint or remove and replace existing vertical rain leader piping. Replace mesh screens at exhaust duct inlets over the screening equipment with screens or air devices with larger openings to reduce collection of debris. Remove and replace existing motor operated dampers and associated actuators. Provide dampers with stainless steel construction and NEMA 7 actuators.

Scum Room

Evaluate the necessity of the existing sidewall centrifugal exhaust fan serving the Scum Concentrator & Pump Room. Remove existing fan and infill opening if not required or replace with new if necessary.

Odor Control

The emergency shower/eyewash unit is code required to be provided with tepid water. Any significant upgrade will require an emergency thermostatic mixing valve and a new domestic water heater, sized to supply a minimum of 15 minutes of tepid water at a flow rate of 20.4 gallons per minute.

6.3.2.2 Flow Equalization

6.3.2.2.1 Structural

Old Aeration Tanks

Drain and clean tanks 1, 2 and 3 to inspect the concrete surfaces below the waterline. Concrete resurfacing is recommended where exposed aggregate was observed. Repair all cracks by epoxy injection. Apply epoxy bonding adhesive and cementitious repair material to all spalled concrete areas. Resurface all exposed reinforcing steel after applying epoxy bonding agent. Remove and replace expansion joint backer rod and sealant. Fill the guard post holes with cementitious repair mortar. Grease and exercise the pressure relief valves regularly.

Old Primary Clarifiers

Drain and clean the east Flow Equalization Tank to inspect the concrete surfaces below the waterline. Replace the corroded components of the mechanism. Repair all cracks by epoxy injection. Resurface all exposed reinforcing steel after applying epoxy bonding agent. Concrete resurfacing is recommended where exposed aggregate was observed.

6.3.2.3 Primary Treatment

6.3.2.3.1 Structural

Drain and clean Tank 1 for further inspection of interior concrete surfaces. Repair all cracks by epoxy injection. Resurface the launder wall, launder slab and weir wall surfaces with cementitious repair material. Realign all misplaced neoprene pads at odor control pipe supports.

6.3.2.4 Secondary Treatment

6.3.2.4.1 Architectural

<u>Operations Building</u>

Exterior: clean and evaluate brick veneer. Replace spalled bricks and repoint joints as required. Remove and reseal expansion joints.

Windows: Remove and replace sloped windows at control room with a water-tight assembly. This may involve a design change to the sloped windows.

Doors: replace lower level exterior door, frame and hardware. Replace some interior door hardware that is failing.

Interiors: Replace flooring in laboratory with ACT. Consult with staff regarding any potential cosmetic changes or reconfiguration of spaces.

Bathrooms: not required to update to current ADA codes unless other renovations within the building fall under Alteration level 2 or greater which would trigger updates.

6.3.2.4.2 Structural

Operations Building

Repair all cracks by epoxy injection. Determine all lift hook capacities and label appropriately. Remove and replace the gravel borrow and 2-inch insulation below the extended slab in the northeast corner of the building. Replace the concrete entrance pad expansion joint sealant where the step has settled, and the sealant is no longer protecting the gap. If the hatch is to remain open, a safety grate should be installed.

Aeration Tanks

Drain and clean all the Aeration Tanks to inspect the concrete surfaces below the waterline. Repair all cracks by epoxy injection. Remove all loose and degraded concrete and resurface all wall surfaces with cementitious repair material. Fill the guard post holes with cementitious repair mortar. Replace all joint sealant.

Secondary Clarifier Tanks

It can be assumed that the west tank conditions are similar to the observed east tank conditions. Monitor the condition of the tank walls. It is likely the tank walls will need resurfacing within 10 years. Repair all cracks by epoxy injection. Grease and exercise the pressure relief valves regularly. Replace the joint sealant. Prepare and cold-galvanize the corroding steel guard posts. Fill the guard post holes with cementitious repair mortar and consider modifying the guard system to have top-mounted brackets.

6.3.2.4.3 Mechanical

Operations Building

Laboratory

Demolish existing roof-mounted air handling units, condensing units, and all associated ductwork and appurtenances. Provide an additional ductless split system air conditioning unit to provide cooling to the Specimen Room. Provide two fan coil units and associated ductwork to provide heating and ventilation air. Provide a roof-mounted intake ventilator and associated ductwork to supply outdoor air to the unit mixing boxes. Modify existing hydronic heating piping as necessary to accommodate new units. Replace the four utility set type fans serving the compensating lab hoods. Provide tepid water to the emergency shower/eyewash unit (the unit currently utilizes cold water only).

Control and Break Area

Demolish existing roof-mounted air handling units, condensing units, and all associated ductwork and appurtenances. Provide ductless split system air conditioning units to provide cooling to the Break Room and Control Room. Provide fan coil unit and associated ductwork to provide heating and ventilation air. Provide a roof-mounted intake ventilator and associated ductwork to supply outdoor air to the unit mixing box. Modify existing hydronic heating piping as necessary to accommodate new unit.

Locker Room

Replace existing centrifugal roof-mounted exhaust fan in-kind. Remove existing window air conditioning unit. Provide ductless split system air conditioning unit to provide cooling to the locker rooms.

MCC Room

Remove existing hydronic unit heater. Cut back associated piping to outside space and cap. Remove/demolish existing roof-mounted exhaust fan cap seal and insulate existing roof opening. Provide ductless split system heat pump to supply heating and cooling to the space.

Pump Room Lower Level

Remove and replace existing inline supply and exhaust fans sized to supply 6 ACH. Provide with EC motors and associated controls to allow fan speed to be reduced to 50 percent when the outdoor air temperature falls below 50°F and the space in unoccupied. Remove supply duct insulation and replace with new. Provide new hydronic heating coil and associated controls; provide new control valve and extend piping to reconnect.

Blower Room - Lower Level

Evaluate airflow required to remove heat from space and replace fan and ductwork as necessary. Additional measures may be investigated to reduce the heat rejected to the space; for example, providing insulation on the blower outlet piping could potentially reduce the heat rejection significantly. Remove and replace the existing inline exhaust fan. Provide with EC motor or variable frequency drive and thermostatic control to allow the fan speed to decrease to meet the cooling load instead of cycling.

Boiler Room – Lower Level

Remove and replace existing oil-fired boiler, flue, piping, and associated appurtenances. Investigate feasibility and consider extending natural gas service to supply boiler allowing for less expensive fuel in addition to higher efficiency and lower maintenance, direct vent gas-fired equipment. Remove and replace existing hydronic circulating pumps and piping in boiler room. To decrease the likelihood of excessive corrosion and premature failure of the boiler, provide an inline ventilation fan to reduce the humidity and provide fresh air to the space.

6.3.2.5 Chlorine Contact Tanks and Chemical Building

6.3.2.5.1 Structural

Drain and clean Tanks 1 and 2 to inspect the concrete surfaces below the waterline. Verify that there is a guard at all locations where the wall is not 3 feet 6 inches above finished grade. Install missing toe plates. Repair all cracks by epoxy injection. Replace joint sealant. Remove all loose and degraded concrete and resurface all wall surfaces with cementitious repair material. Fill the guard post holes with cementitious repair mortar. Grease and exercise the pressure relief valves regularly. Replace the wood steps.

6.3.2.6 Solids Processing

Currently, much of the solids processing at the WPCF is located in the Administration Building. This building and the solids processing in general are one of the alternatives analyses items summarized below. Some of the recommendations listed below would no longer apply if rooms are repurposed and equipment is removed.

6.3.2.6.1 Architectural

Exterior: The existing building code does not require it to comply with current energy code requirements. However, if substantial renovations within the building are being considered that would create an opportunity to improve the thermal envelope by adding rigid insulation to the interior face of exterior walls and covering with a new layer of gypsum wall board.

Windows: replace all windows with new aluminum thermally broken insulated windows.

Doors: replace hardware as needed.

Interior: none, unless Town has specific request for cosmetic changes or reconfiguration of spaces.

Bathrooms: not required to update to current ADA codes unless other renovations within the building fall under Alteration level 2 or greater, which would trigger updates.

6.3.2.6.2 Structural

Exterior

Repair all cracked concrete by epoxy injection. Replace the corroding pipe supports underneath the balcony. Prepare and cold galvanize the corroding steel guard posts. Install galvanized toe plate on the galvanized guard. Replace broken aluminum nosing. Install the stop plate on the galvanized guard so the swing gate conforms to OSHA regulations.

Sludge Handling Room

Modify the sludge chute support legs to bear on a grout pad to elevate the steel above the wet floor. Repair the concrete curb beneath the sludge chute. Repair all cracked concrete with epoxy injection. Install aluminum toe plate on the aluminum guard. Install guard on stair stringers to protect a fall into the sludge chute.

Influent Well

Repair all cracks by epoxy injection. Resurface degraded concrete sections with cementitious repair material after applying epoxy bonding agent to exposed reinforcing steel. Replace the corroding pipe supports. Replace the chain at the guard opening at the ladder with a safety gate. Replace the Influent Well ladder and modify the opening in the guard at the ladder to conform to OSHA regulations.

Mixing Room

Label the monorail with its rated load capacity.

Sludge Loading Area

Replace the roll-off plates in the Sludge Loading Area. Confirm that the wooden bumper can stop the sludge container. Determine and install means for stopping the other roll-off sludge container. Repair all cracks by epoxy injection. Resurface degraded concrete sections with cementitious repair material.

Pump Rooms

Repair all cracked concrete by epoxy injection. Install toeplate on guard on intermediate stair landing.

Electric Room

Verify that the roof is properly flashed and sealed. Infill the conduit slab openings in the Electric Room.

6.3.2.6.3 Mechanical

Administrative Area

Remove the dated self-contained air conditioning units; replace with cabinet unit heaters with fresh air connection and damper. Alternatively, replace the units with convectors in lieu of cabinet unit heaters; provide inline supply fan with filter rack and hot water heating coil, ducted to each office space to provide tempered ventilation air continuously in the occupied mode.

Provide exhaust fan and associated ductwork to ventilate toilet rooms. Remove and replace toilet room faucets and trim. Repair or replace Women's Room water closet.

Remove and replace water bubbler located in the corridor.

Sludge Handling Area

Evaluate air flows required to de-classify the spaces by ventilation per the requirements of NFPA 820. Consider separating ventilation for the individual spaces to allow the ventilation rate to be reduced in each space when the outdoor air temperature falls below 50°F and the space is unoccupied. Provide inline supply and exhaust fans, filter racks, and hydronic heating coils as appropriate; modify ductwork and rebalance odor control fan as necessary to provide 6 ACH to spaces served.

Investigate potential strategies to reduce total raw outside air introduced to the building to conserve energy. Due to the damage, corrosion, and proposed modifications to the ventilation system, it is recommended to replace the majority of the existing ductwork; sections may be re-used where the condition and configuration allows. Remove and replace existing unit heaters with new. Provide units with corrosion resistant epoxy coating in Sludge Handling Room and Sludge Garage. Remove existing pipe insulation; evaluate piping, replace sections with significant corrosion, reinsulate with new fiberglass insulation and PVC jacketing.

Boiler Room

Remove and replace existing oil-fired boiler, flue, piping, and associated appurtenances. Investigate feasibility and consider extending natural gas service to supply boiler allowing for less expensive fuel in addition to higher efficiency and lower maintenance, direct vent gas-fired equipment. Remove and replace existing hydronic circulating pumps and piping in boiler room.

Maintenance Area

Provide exhaust fan with thermostatic control to provide cooling to the space. Provide intake louver and associated motor operated damper.

Other

Provide ductless split system air conditioning with twinning kit to allow a single outdoor unit to serve two separate indoor units for cooling in the Maintenance Office and Operators Room.

Remove existing window and portable air conditioning units and associated appurtenances. Replace existing Maintenance Office exhaust fan in-kind. Provide ventilation fan to serve Operators Room.

6.3.2.7 Composting/Biofilter

6.3.2.7.1 Architectural

Exterior: replace rusting metal panels. Replace exterior doors and frames and hardware.

6.3.2.7.2 Structural

Apply epoxy bonding adhesive and cementitious repair material to the few spalled concrete areas. Sand blast and paint the corroded roof purlins. Modify the bottom of corroded steel columns by welding on angles and having the legs of the angles bear on dry pack grout.

6.3.2.7.3 Mechanical

Electrical Room: Remove through-the-wall air conditioning unit and replace with a new ductless split system air conditioning unit or in-kind unit.

6.3.2.8 General Electrical Equipment

The major overall electrical issue at this facility is the fact that systems and equipment are old and in need of upgrade or replacement. The following is a summary of the areas in need of electrical system upgrades/replacements:

- Facility lighting efficiency and lighting levels need to be upgraded throughout the entire facility, including site lighting.
- The need for legally required emergency lighting, exit signage and fire alarm systems for life safety and personnel protection need to be installed.
- Personnel protection in the area of process related equipment via emergency e-stop pushbutton control stations needs to be updated and standardized to compliant-type devices. Some of the present devices are momentary lock-out only which is not code compliant. Therefore, the

maintained push-off and pull-on type e-stops are required for this protection. The facility needs all process equipment installations to have these types of e-stop personnel protection.

- Update and supplement local disconnect switches at electrical equipment for local tag-out/lock-out.
- Total replacement (in-kind) of existing site structures and treatment electrical equipment and devices which are located outdoors or within enclosed, dome-type structures. This would include stainless-steel or aluminum-type mounting structures and hardware. with local stainless-steel junction boxes, pull boxes, control stations, and devices with aluminum-type conduit (which would withstand the environmental conditions at these locations).

Electrical Distribution Equipment

The overall electrical distribution equipment is beyond its useful operational life.

This equipment replacement should occur within each of the major buildings noted. The challenge of renovation projects lies in the ability to sequence the work while maintaining facility operation. The following items are recommended for upgrade and sequencing of the electrical distribution system:

- Furnish and install a new pre-cast or traditional stick-built main electrical building, along with a new service pad-mounted transformer just outside of the Composting Building and opposite the existing electrical service and transformer. As another alternative, the new proposed electrical distribution equipment could also be built within a re-vamped area of the Composting Building. This would allow the existing electrical service and equipment to remain in service at the same time.
- In order to sequence the construction of the project, the existing electrical rooms for each of the major buildings will need to be maintained during the sequence of construction. Most of these existing buildings have limited available space to re-allocate as a new electrical room. Therefore, it will be required to find an available space or create an extension for that building location which will allow for the new electrical distribution equipment to be installed while maintaining the existing electrical room and keeping equipment operational until the new equipment is installed, tested, and ready for service.

Stand-by System and Equipment

The existing stand-by power system consists of the four diesel-driven generators located around the facility. The electrical distribution system is split-bussed which consists of fixed equipment loads being connected only to the stand-by generator source for that facility building location. The issue with this arrangement is that the specific loads connected to this system are the only loads allowed to operate on stand-by power.

Secondly, the capacity and size of each generator does not efficiently match the loads that they operate thus providing for a limited and inefficient emergency operating system for the facility. The following is a description of the recommendation for the proposed stand-by generator system for the facility:

- Furnish and install two appropriately-sized stand-by diesel-driven generators, next to one another in separate outdoor, weather-protected, stand-by generators. These two units could also be installed within a portion of the existing Composting Building as was proposed for the electrical system incoming service distribution equipment. The two generators would be paralleled together over an ethernet cable for on-board paralleling. The capacity of the two units would operate the entire facility and all equipment would be selectable to operate on the generators through a SCADA generator load selection program to provide for an efficient and flexible equipment selection.
- Another option to consider is the possible use of two of the existing outdoor Cummins generators, GEN-1 and GEN-2, with a control scheme that would allow paralleling or transfer at the front-end of the electrical system.
- The electrical upgrade would include all requirements for HVAC and SCADA/Instrumentation system upgrades proposed for the facility as recommended for that portion of the facility upgrade.
- A system study would be performed to determine the Harmonic Mitigation equipment required for the facility upgrade based upon the VFD equipment to be supplied as part of the facility upgrade.

6.3.2.9 General Instrumentation Items

Existing PLCs at the WPCF are Allen-Bradley CompactLogix for the WPCF process controls. Programmable Logic Controllers must be of the same manufacturer and be compatible with existing control equipment. Controllers must have a viable lifespan and not be slated for obsolescence. The PLC manufacturer for any replacement or new PLCs will be Allen-Bradley with Ethernet/IP communication for installation at WPCF, and Ethernet/IP and RS-232 communication ports for remote locations.

All Control Panels should:

- be 304 stainless steel if located outdoors or in corrosive and wet areas.
- be +24vdc for discrete inputs, relay for discrete outputs.
- have UPS with a minimum of 15-minute power ride-through under full-load, 30 minutes under half-load. UPSs shall have output card for status and alarm contacts to PLC/SCADA.
- have +24vdc power supplies provided with 20 percent spare power capacity
- have dead-front panels for the mounting of OITs, pilot lights, selector switches, and/or pushbuttons in outdoor panels.
- have heat calculation study submitted by panel providers to confirm temperature range within UL508A requirements. Each outdoor panel will be sized to dissipate heat, be provided with sun-shielding and AC/fan cooling if necessary. The AC/fan kit shall meet the environmental NEMA rating of the enclosure. Heaters with integral thermostats will be provided to maintain temperatures above UL508A low limit and drive off condensation.
- have fuses provided for discrete I/O in logical groups of eight.
- have fuses provided for all analog I/O loops.
- surge suppression will be provided for 120vac power and I/O signals where signal originates or transitions to/from outdoor locations.
- will have locking hasps to accept lock and 6-point latching system. Integrated keylock will not be acceptable.
- Division 11 Manufacturers and Division 13 System Integrators will program in RSLogix 500/5000 standard edition and develop code in ladder logic with no function blocks.
- Control panel lights will use the following colors as a standard:

- Control Power – White
- On UPS Power – Blue
- On, Running, Open – Green
- Off, Stopped, Closed – Red
- General Alarm – Red
- Blue – Remote
- Any alarms that are hardwire interlocked in the panel - Amber

Addition of a redundant fiber optic ring network be installed within the WPCF to replace the existing radio network currently installed at the facility. Included on the fiber optic ring will be the panels directly communicating on the radio network per recent upgrade: headworks control panel, hypochlorite control panel, process control panel, composting control panel, control building control panel. Remaining PLC based panels can be connected in a star-configuration as part of an overall hybrid network. This will provide far more reliable and faster (10/100/1000MBPs) communications as compared to the 900 MHz spread-spectrum unlicensed radio communications. The radios and associated ancillary equipment can potentially be used for possible telemetry between remote pumping stations to consolidate communication sites with VHF licensed frequency radios (TBD) between WPCF and select remote stations.

Dual methods of alarm reporting from WIN 911; text messages of alarms through one USB Cellular Modem, and voice messaging of alarms through voice or TAPI modems and dedicated analog phone lines. This will provide a redundant means of alarm delivery to avoid potential compliance issues that may occur with unreported alarming.

6.3.3 Wastewater Treatment Process Alternative Analyses

The treatment process of the Town of Somerset's WPCF consists of a conventional activated-sludge process for BOD and TSS removal. Currently the facility treats an annual average influent flow of 3.33 MGD using the following treatment processes: pretreatment (screening and grit removal), flow equalization, primary clarifiers, activated sludge, secondary clarifiers, disinfection, and solids handling through gravity belt thickeners and belt filter presses. The Town currently has no nutrient limits in their permit but is expecting a new permit including a total nitrogen (TN) discharge limit of approximately 105 lbs./day. As a result, the WPCF will need to upgrade their existing activated-sludge treatment system to implement nitrogen removal processes and optimize solids handling. This section will discuss biological process alternatives to meet the expected nitrogen discharge limit, sludge processing alternatives to optimize solids handling, flow equalization, and odor control alternatives.

6.3.3.1 Evaluation of Biological Nitrogen Removal

The activated sludge treatment process of the Town of Somerset's WPCF consists of two bioreactor trains (aeration basins), each one with two aeration tanks for carbon oxidation and nitrification followed by a secondary clarifier for solids separation. The Town is expecting a new seasonal permit for a TN discharge limit of approximately 105 lbs./day from May 1st to October 31st and report TN concentrations from November 1st to April 30th. This type of permit will require the Town to meet a TN concentration of approximately 4.9 mg/l during summer at an average flow of 2.58 MGD. This section will discuss the process configurations and alternatives analysis to implement biological nitrogen removal at the Somerset WPCF.

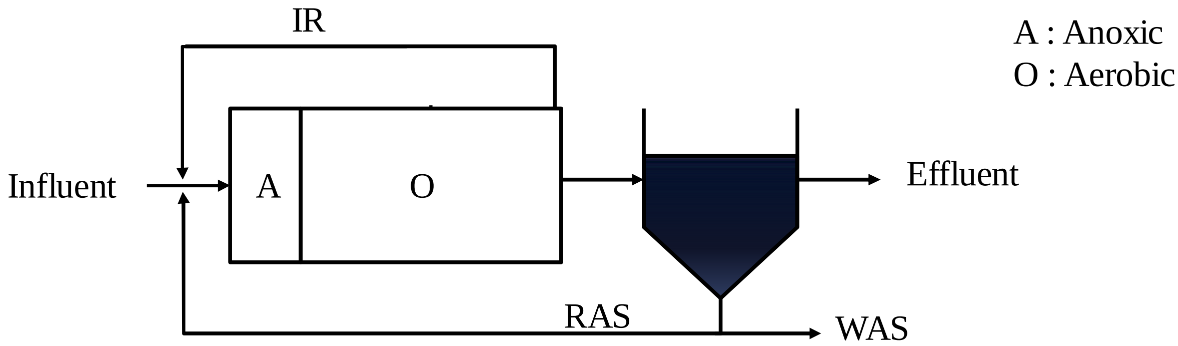
6.3.3.1.1 ***Biological Nitrogen Removal Process Configurations***

Several activated-sludge process configurations can be implemented to achieve low TN effluents. The section below discusses the biological nitrogen removal capability of each process configuration.

Modified Ludzack-Ettinger (MLE)

This activated sludge process is one of the most common configurations used for biological nitrogen removal in municipal wastewater treatment. The MLE configuration is shown in **Figure 6-6** below.

FIGURE 6-6
MODIFIED LUDZACK-ETTINGER (MLE) PROCESS FOR BIOLOGICAL NITROGEN REMOVAL



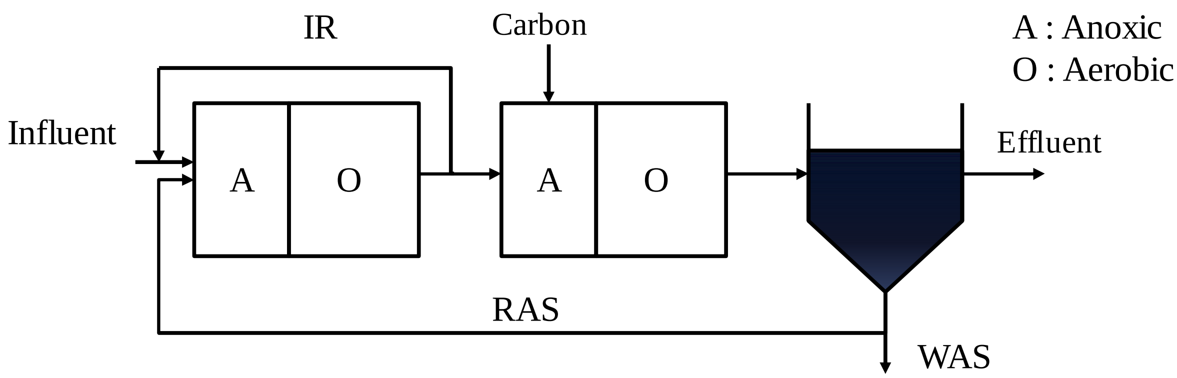
(IR = internal reccycle; RAS = return activated sludge; WAS = waste activated sludge)

In this configuration, nitrified mixed liquor from the aerobic zone is recycled to the anoxic zone where influent BOD is used as a carbon source for denitrification. This configuration can be easily implemented at the Somerset WPCF and used to achieve effluent TN between 6 - 12 mg/L.

Four-Stage Bardenpho

This activated sludge process consists of four zones, two anoxic and two aerobic, with internal recycling of nitrified mixed liquor from the first aerobic zone to the first anoxic zone. In this configuration, denitrification occurs in the first anoxic zone using influent BOD as the carbon source and in the second anoxic zone with supplemental carbon (if required). The final aerobic zone is used to strip residual nitrogen gas from the wastewater and minimize phosphorus release in the secondary clarifiers. This process can be used to maintain an effluent TN less than 4.9 mg/L during summer. This configuration can be added to the MLE configuration by adding wall baffling for the second anoxic and aerobic zones. The Four-Stage Bardenpho configuration is shown in **Figure 6-7** below.

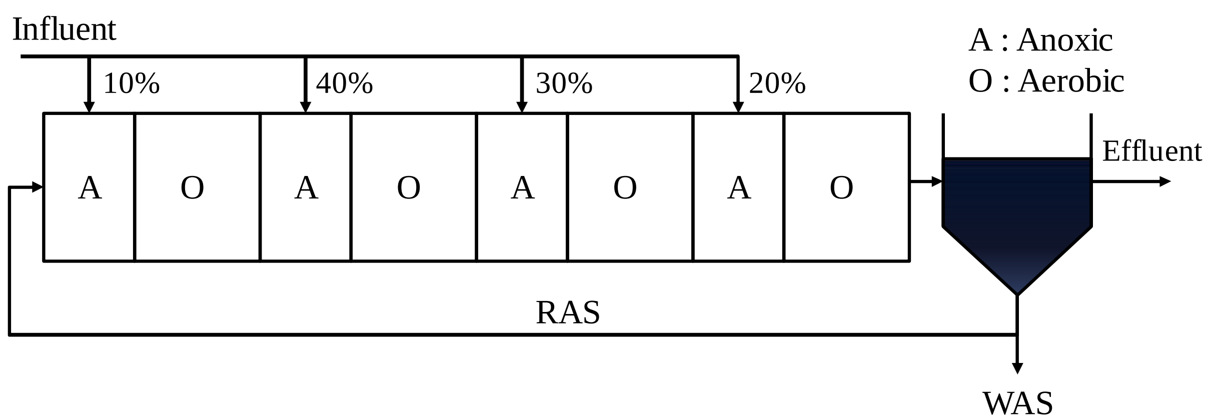
FIGURE 6-7
FOUR-STAGE BARDENPHO PROCESS FOR BIOLOGICAL NITROGEN REMOVAL



Step Feed

This step feed activated-sludge process consists of a series of anoxic zones followed by aerobic zones, where portions of the influent are fed to the anoxic zones for denitrification. This process can also be used to achieve an effluent TN less than 4.9 mg/L. However, it requires more DO control in the upstream aerobic zones to optimize influent BOD use as a carbon source. This configuration is more difficult to implement at the WPCF as it requires more wall baffling for zone separations and piping for influent distribution. The Step Feed configuration is shown in **Figure 6-8** below.

FIGURE 6-8
STEP FEED PROCESS FOR BIOLOGICAL NITROGEN REMOVAL



6.3.3.1.2 *Biological Nitrogen Removal Process Alternatives*

Three secondary treatment alternatives for biological nitrogen removal were evaluated. The three alternatives were selected to cover a range of secondary treatment options to ensure that a representative number of treatment processes and costs were evaluated. Based on the expected seasonal TN permit limit, it is recommended to upgrade the WPCF to a Four-Stage Bardenpho process with swing zones that allow the conversion to an MLE process in the off-season. This flexible approach will meet the seasonal low TN limit during summer and produce a low TN effluent during winter.

Alternative No. 1 – Alternate Four-Stage Bardenpho and MLE Processes for Seasonal Nitrogen Removal

The first alternative considered to upgrade the secondary treatment process is to implement Four-Stage Bardenpho and MLE processes at the WPCF. These two processes can be alternated for summer and winter conditions, respectively. The process analysis for the implementation of Four-Stage Bardenpho and MLE configurations were modeled with BioWin® using the existing two bioreactor trains (two aeration tanks per train) and secondary clarifiers. Historically, Somerset has experienced high winter loading conditions in January and April and high loadings in summer from June to August. As a result, the maximum capacity for these two processes were analyzed at the maximum month load conditions listed in **Table 6-37**.

The maximum treatment capacity of the Four-Stage Bardenpho and MLE processes is defined as the maximum influent load that can be successfully treated over the course of 30 days without the resulting MLSS levels exceeding 3,500 mg/l (i.e., the maximum MLSS level defined in the secondary clarifier analysis). Historical influent data including annual average and monthly average flows with maximum monthly load for $CBOD_5$ and TSS were used to evaluate the process capacities. **Table 6-38** below summarizes the maximum month and annual average conditions that can be successfully treated by the Four-Stage Bardenpho and MLE process during summer and winter, respectively.

TABLE 6-38
FOUR-STAGE BARDENPHO AND MLE PROCESS CAPACITY ANALYSIS

PARAMETER	MLE	Four-Stage Bardenpho	Existing CAS
	Winter	Summer	Average Condition
Raw Influent Maximum Monthly Loading			
Average Monthly Flow, MGD	4.1	2.58	3.33
Peak Daily Flow, MGD (99.9 percentile)	10.3	10.3	10.3
$CBOD_5$ Loading, lbs./day[1]	5,060	5,115	3,544
TSS Loading, lbs./day	5,515	6,297	4,078
TKN – Nitrogen, lbs./day[2]	686	630	642
Water Temperature, ^oC	10	20	15
Effluent Quality			
$CBOD_5$, mg/l	< 20	< 20	< 20
TSS, mg/l	< 20	< 20	< 20
Total Nitrogen, mg/L	< 8.0	< 4.0	< 12.0
TN, lbs./day	< 273	< 85	< 335

Notes:

1) The maximum month BOD_5 loading condition represents the maximum 30-day BOD_5 loading received at the WPCF. The associated flow rate, and TSS loading are the actual influent loads of each parameter that occurred concurrently with the historical 30-day maximum BOD_5 load. Thus, the values presented above for all parameters (except BOD_5) may or may not be the historical maximum 30-day influent loading condition for each parameter.
2) Nitrogen load was assumed based on ratio to CBOD5 for low strength municipal wastewater in the vicinity.
3) CBOD5: Carbonaceous BOD5; TSS: Total Suspended Solids; TKN: Total Kjeldahl Nitrogen; CAS: Conventional Activated Sludge.

Bioreactor Trains

The existing activated sludge bioreactors can be easily modified into Four-Stage Bardenpho and MLE configurations to meet the seasonal effluent nitrogen limit. During summer, the WPCF can be operated as a Four-Stage Bardenpho process to meet a low effluent TN of less than 4.9 mg/L, and during winter it can be operated as an MLE process reporting the effluent TN. The modifications to implement these two processes include wall baffling for anoxic zone isolation, internal mixed liquor recycling (pumping) for denitrification, higher aeration capacity (blowers) and mixers for the anoxic zones. The bioreactor for both processes consists of the following zones with corresponding volumes listed in **Table 6-39** below.

TABLE 6-39
BIOREACTOR CHARACTERISTICS

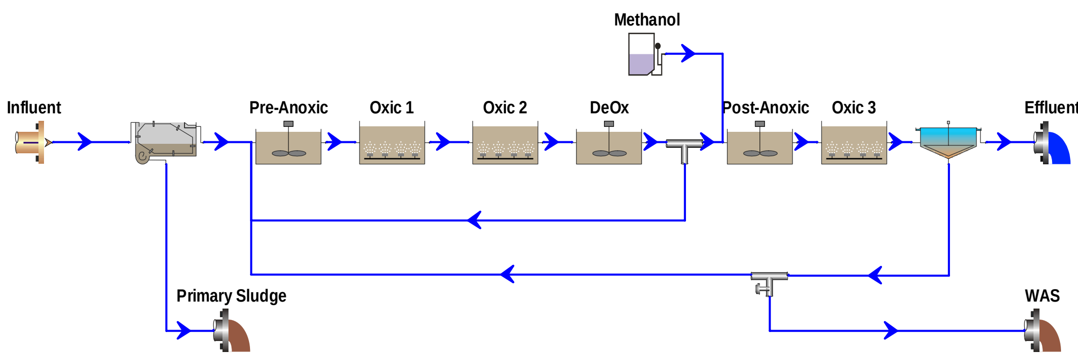
Parameter	MLE	Four-Stage Bardenpho	Existing CAS
Bioreactor Trains	2	2	2
Pre-Anoxic Vol, gal	136,300	136,300	-
Aeration Tank 1 Vol, gal	136,300	136,300	272,650
Aeration Tank 2 Vol, gal	106,000	106,000	272,650
De-Ox Tank Vol, gal	-	30,300	-
Post-Anoxic Vol, gal	-	90,900	-
Aeration Tank 3 Vol, gal	166,650	45,450	-
Total Bioreactor Vol, gal	545,300	545,300	545,300
Methanol, gal/day	-	25	-
Internal Recycle Flow, MGD	8.2	5.16	-
RAS Flow, MGD	2.05	1.3	1.7
Average MLSS, mg/L	2,700	2,700	3,000
Aerobic SRT, day	9	7	9
Waste Sludge, lbs/day	2,150	1,860	2,100
OTR, lbs/day	8,300	8,630	5,700
Air Required, icfm	3,100	3,300	2,400

Notes:

1) The volumes and design calculations provided are preliminary only and may change during final detailed design

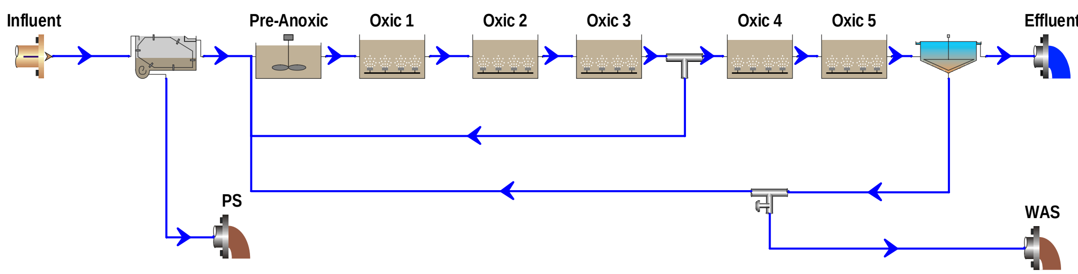
In the implementation of the Four-Stage Bardenpho configuration, the two existing aeration tanks in each bioreactor train will be divided into four zones as shown in **Figure 6-9**. The first aeration tank will be subdivided into a pre-anoxic tank and aerobic tank; the second aeration tank will be subdivided into four tanks, aerobic, de-oxygenation, post-anoxic and final aerobic tank. In the pre-anoxic tank, nitrified mixed liquor from the de-oxygenation tank will mix with influent BOD for denitrification. The mixed liquor will continue to the first aerobic tank where oxygen is supplied for carbon oxidation and nitrification. Upon leaving the aeration tank, the mixed liquor will go through the de-oxygenation tank where oxygen will be removed from it. A portion of the mixed liquor will be recycled to the pre-anoxic tank, the remaining portion will continue to flow into the post-anoxic tank. In the post-anoxic tank methanol will be added (when necessary) as a supplemental carbon source for additional denitrification, reducing the nitrate produced in the previous aerobic zone. The final aerobic tank strips residual nitrogen gas (so it doesn't rise and carry sludge in the clarifiers) from the wastewater and minimizes phosphorus release in the secondary clarifiers. This process can be used to maintain an effluent TN less than 5 mg/L.

FIGURE 6-9
FOUR-STAGE BARDENPHO PROCESS FOR BIOLOGICAL NITROGEN REMOVAL



The MLE configuration requires less modifications than the Four-Stage Bardenpho. This configuration can be easily implemented by switching the aerobic and the post-anoxic zone in the Bardenpho configuration. The MLE configuration will consist of two zones, a pre-anoxic zone, where nitrified mixed liquor from the aerobic zone will mix with influent BOD for denitrification, followed by an aerobic zone where oxygen is supplied for carbon oxidation and nitrification, see **Figure 6-10**. In this process, denitrification only occurs in the pre-anoxic zone, which results in effluent TN between 6 - 12 mg/L.

FIGURE 6-10
MLE PROCESS FOR BIOLOGICAL NITROGEN REMOVAL



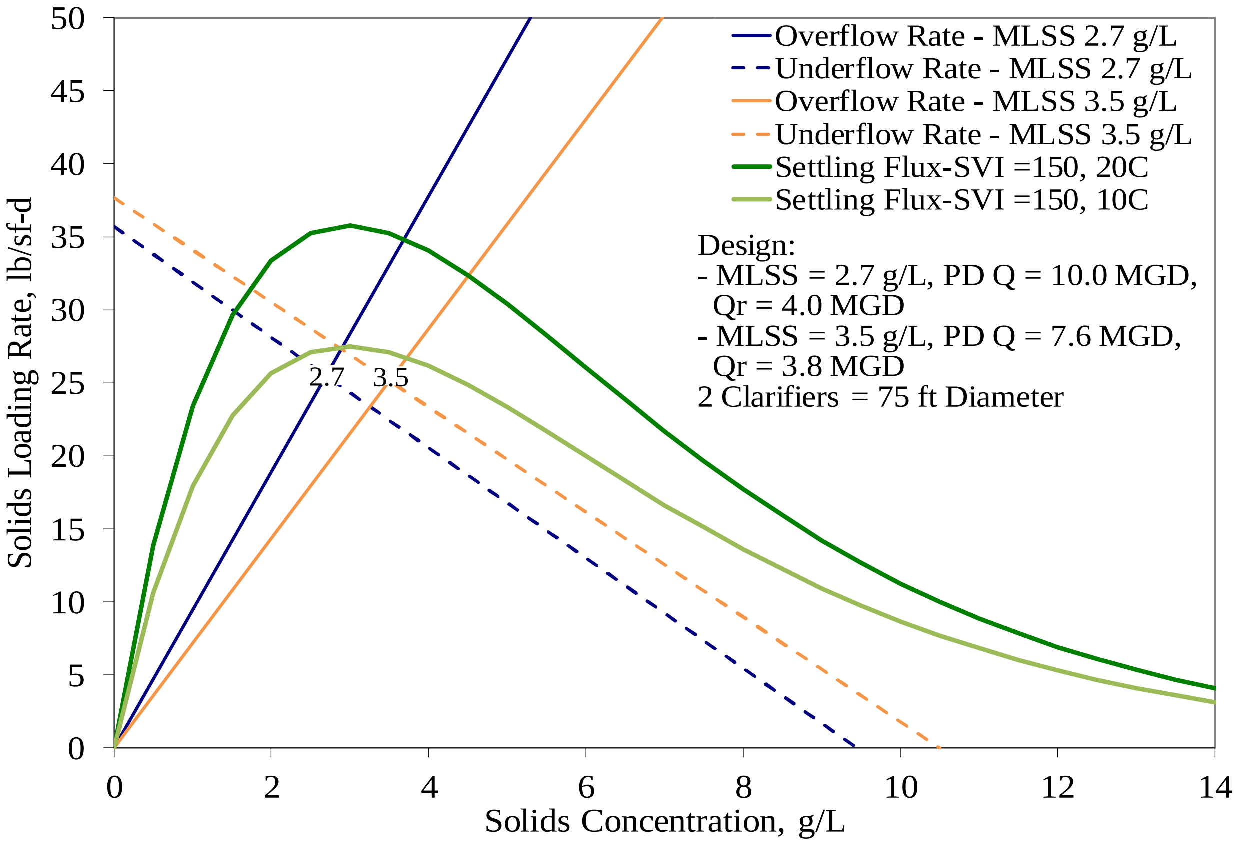
Secondary Clarifier Capacity Analysis

The performance of the secondary clarifiers was analyzed under steady-state conditions to establish their limit capacity. Clarifier capacity was determined via a State Point Analysis (SPA), the graphical technique used for evaluating the performance of secondary clarifiers under peak flow conditions, MLSS concentrations and Sludge Volume Index (SVI, mL/g). SVI is a test used to measure the settleability of the mixed liquor. Sludge with good settleability have SVI values from 75 to 150. The clarifier capacity analysis was developed assuming an SVI value of 150. This value represents sludge with medium settleability properties. However, lower SVI values will be expected once biological nitrogen removal processes are implemented at the WPCF as these processes tend to produce low SVI values.

SPA examines the performance of the secondary clarifier under maximum day (peak) flow conditions and can be used as an operational tool to estimate secondary system capacity for the given process conditions, and the impacts of changes in process parameters, including mixed liquor concentration, sludge settling velocity, return sludge concentration, and return sludge rate. The results of the SPA are graphically illustrated in **Figure 6-11**. The point of intersection of the overflow rate (effluent over the weirs) and underflow rate (sludge withdrawn from clarifier) at the target MLSS concentration is the State Point.

The location of the State Point in relation to the settling flux curve predicts the performance of the secondary clarifier. The State Point of a well operated clarifier should be located below the settling flux curve and the underflow rate line should operate below the descending limb of the settling flux curve. If the State Point is located above the settling flux curve in any condition, the material will not settle in the clarifier, but will flow out of the clarifier via the effluent weir. Similarly, if the underflow rate operating line is shown above the settling flux curve in any condition, the sludge blanket is projected to rise and exit the clarifier via the effluent weir.

FIGURE 6-11
SECONDARY CLARIFIER STATE POINT ANALYSIS



As shown in **Figure 6-11**, at operating MLSS concentrations between 2,700 and 3,500 mg/L, the secondary clarifiers will not be overloaded and therefore have sufficient capacity to settle the MLSS and comply with an effluent TSS limit of 30 mg/L. The performance analysis of the secondary clarifiers indicates that winter conditions are the limiting factor for their capacity. At a water temperature of 10 ^{o}C (Winter), the clarifiers can be operated at a peak daily flow of 7.6 MGD and 10.0 MGD with a MLSS concentration of 3,500, and 2,700 mg/L, respectively. At a water temperature of 20 ^{o}C (Summer), the clarifiers can be operated at much higher flow conditions than winter, up to a peak daily flow of 10.0 MGD with a MLSS concentration of 3,500 mg/L. The clarifier performance analysis was done assuming an average SVI of 150 mL/g. However, Four-Stage Bardenpho and MLE processes should produce SVI values in the 125 range. At this settling condition, significant additional clarification capacity could be achieved.

Equalization Capacity

As noted above, the performance analysis of the secondary clarifiers indicates that winter conditions are the limiting factor for their capacity. At a water temperature of 10 ^{o}C, the clarifiers can be operated at a peak daily flow of 10.0 MGD with a reduced MLSS concentration of 2.7 g/L. Historical data for the WPCF influent flows shows a 99.9-percentile peak daily flow of 10.3 MGD in March. This suggests that the remaining 0.3 MGD will need to be adsorbed by the flow equalization tanks. Somerset has four rectangular tanks of 0.325 MG capacity each. Since the 0.3 MGD peak flow delta can be stored in one flow equalization tank, the two clarifier EQ tanks can be utilized for another purpose and two rectangular EQ tanks can be reserved for future aeration capacity.

Conclusion

Current and future effluent quality requirements could require the facility to upgrade the secondary treatment process. Implementing Four-Stage Bardenpho and MLE processes to meet effluent nitrogen requirements is feasible. The facility currently produces an average effluent TN of 335 lbs./day at yearly average conditions. The implementation of Four-Stage Bardenpho and MLE processes will provide greater nitrogen removal than the existing aeration tanks. These two processes can be alternated to meet seasonal effluent nitrogen requirements. MLE process can produce an average effluent TN of less than 275 lbs./day during winter conditions, and Four-Stage Bardenpho can produce an average effluent TN of less than 85 lbs./day during summer conditions.

Historical data for the WPCF influent flows shows a 99.9-percentile peak daily flow of 10.3 MGD in March. The two existing secondary clarifiers can treat a peak daily flow of 10.0 MGD at a MLSS concentration of 2.7 g/L during winter conditions. Most of the 99.9-percentile peak flow can be treated by the existing two secondary clarifiers; however, any flow greater than 10.0 MGD will need to be absorbed by the flow equalization tanks (four tanks with a total capacity of 1.3 MG, if circular tanks are repurposed).

A proposed modified site layout for this alternative is shown in **Figure 6-12**. and a wastewater process flow diagram in **Figure 6-13**. The major components and improvements needed to provide Four-Stage Bardenpho and MLE process treatment at the WPCF include the following:

- Bioreactor Train Modifications:
  - Divide first Aeration Tank into:
    - Pre-Anoxic Tank (136,300 gallons) with mechanical mixer
    - Aerobic Tank (136,300 gallons) with fine-bubble membrane diffusers and aeration blowers
  - Divide second Aeration Tank into:
    - Aerobic Tank (106,000 gallons) with fine-bubble membrane diffusers and aeration blower
    - De-Oxygenation/Swing Tank (30,300 gallons)
    - Post-Anoxic/Swing Tank (90,900 gallons) with mechanical mixer
    - Aerobic Tank (45,450 gallons) with fine bubble membrane diffusers
  - Add two internal sludge recirculation lines, one per bioreactor train
  - New aeration system consisting of four aeration blowers, aeration manifold and aeration grids for the two bioreactor trains and three equalization tanks
  - New secondary clarifiers influent splitter box

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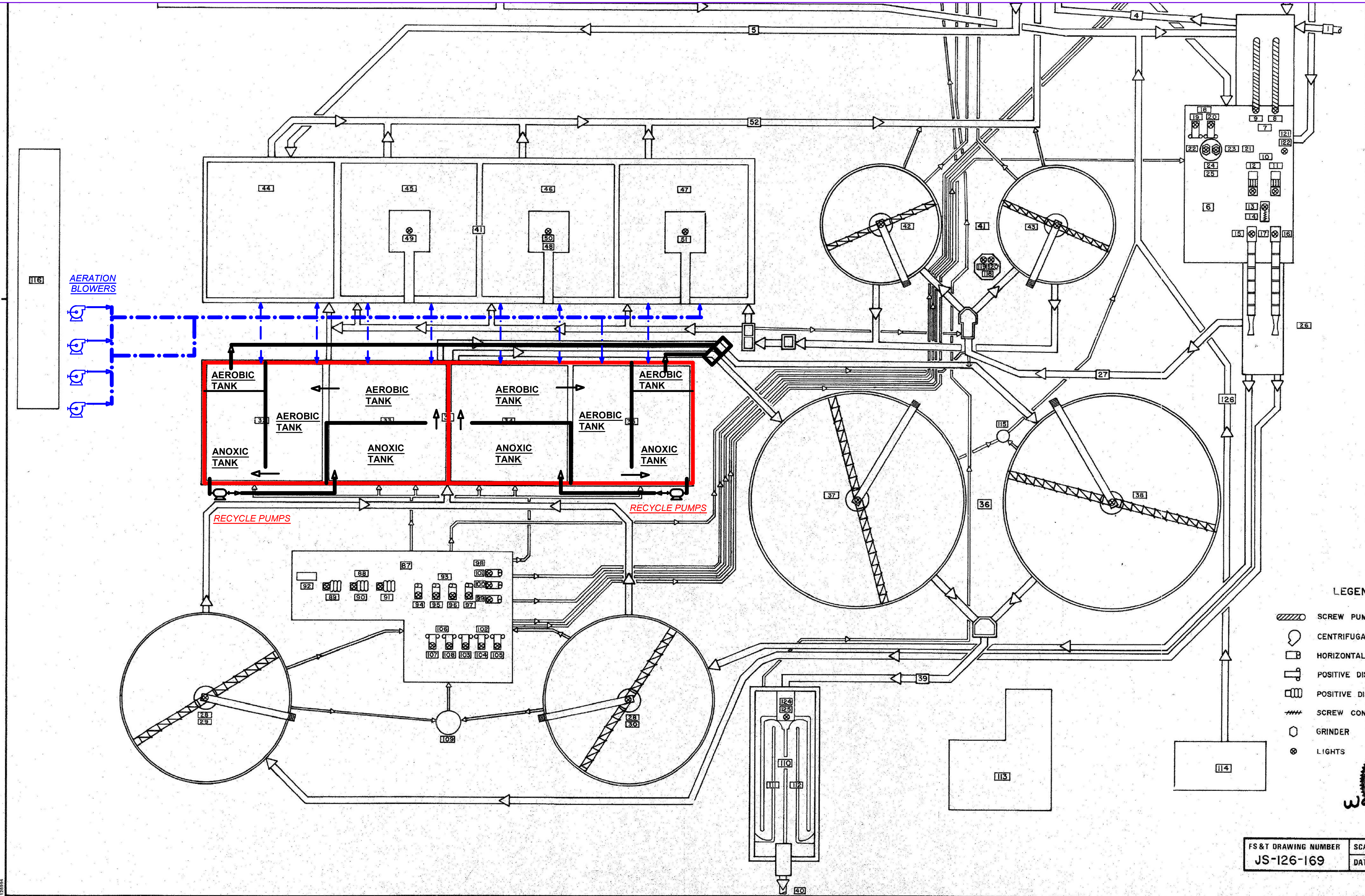

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TOWN OF SOMERSET, MASSACHUSETTS
WATER POLLUTION CONTROL FACILITY
NUTRIENT REMOVAL UPGRADES

PROJ NO: 14110

DATE: JULY 2019

PROPOSED LAYOUT MODIFICATIONS
FOR ALTERNATIVE 1

FIGURE: 6-12

WRIGHT-PIERCE
Engineering a Better Environment

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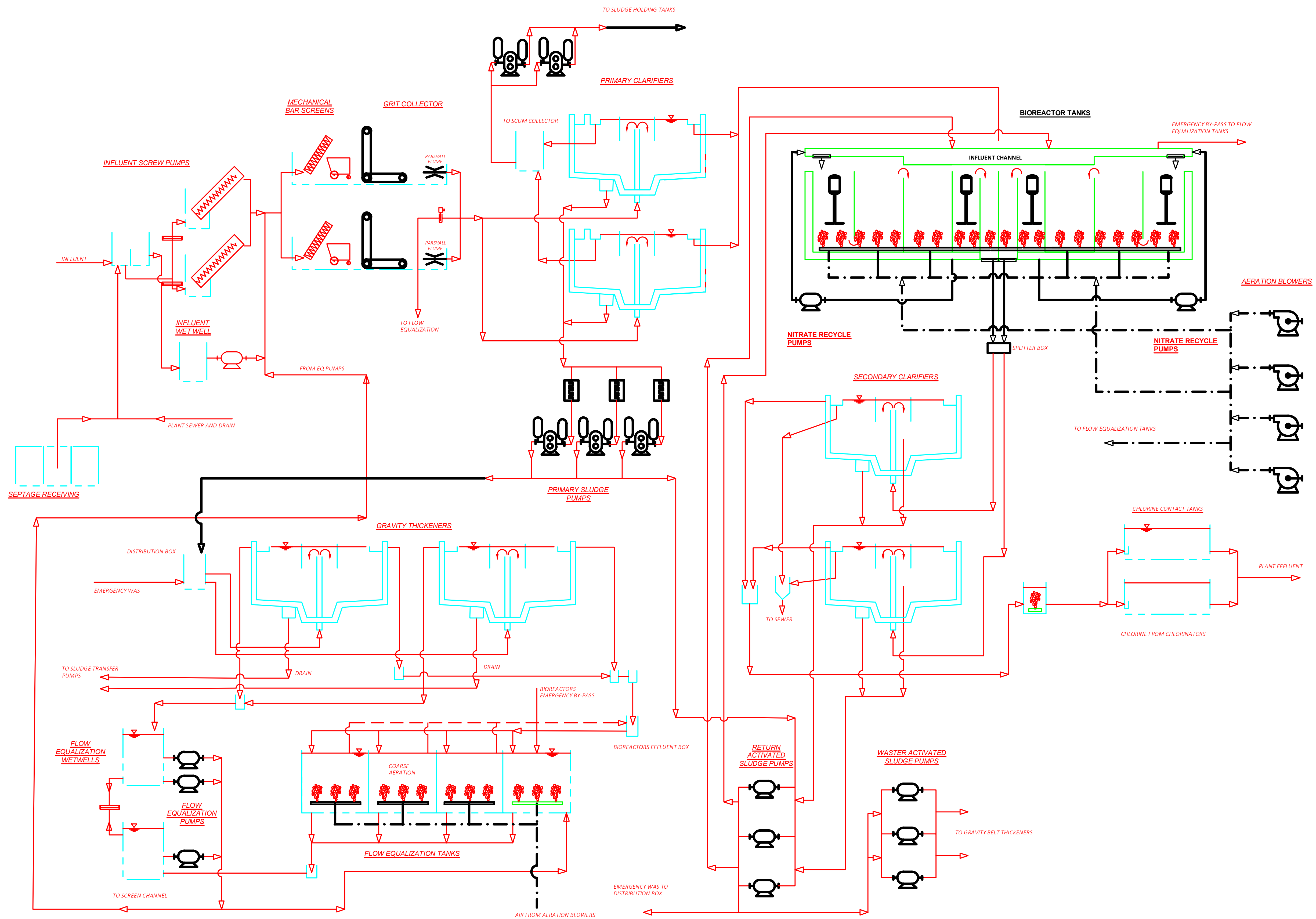

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TOWN OF SOMERSET, MASSACHUSETTS
WATER POLLUTION CONTROL FACILITY
NUTRIENT REMOVAL UPGRADES

PROJ NO: 14110
DATE: JULY 2019

WRIGHT-PIERCE
Engineering a Better Environment

PROPOSED WASTEWATER PROCESS FLOW DIAGRAM - NUTRIENT REMOVAL

FIGURE: 6-13

Alternative No. 2 – Alternate Four-Stage Bardenpho and MLE Processes for Seasonal Nitrogen with Addition of New Secondary Clarifier

This alternative will include the same bioreactors as described in Alternative 1 and one new secondary clarifier and similar equalization capacity.

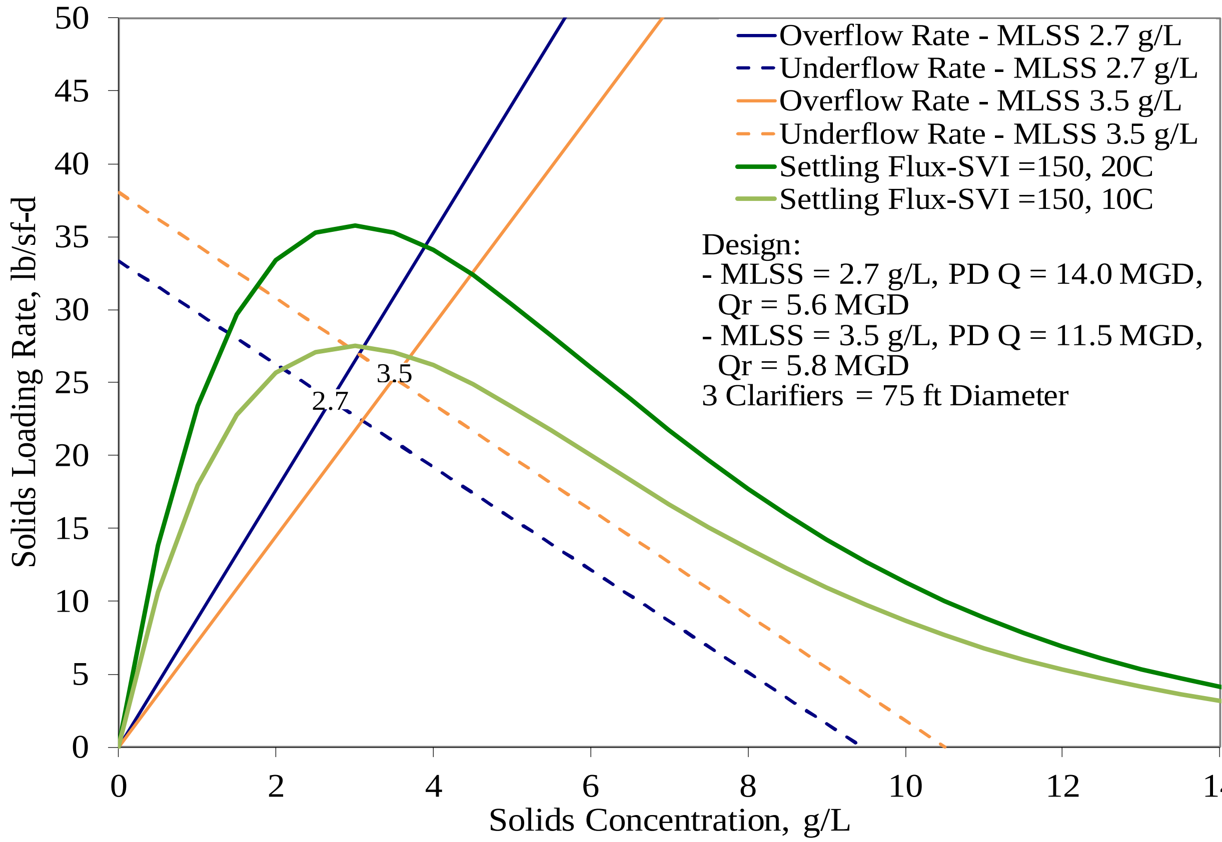
Bioreactor Trains

Same as Alternative 1, see Section 6.3.3.1.2.

Secondary Clarifiers Capacity Analysis

One new secondary clarifier with the same characteristics as the two existing ones will be added to increase the WPCF treatment capacity. The implementation of the new clarifier will require a new influent junction box with flow control to provide an even distribution to all three clarifiers. The performance of the three secondary clarifiers was analyzed under steady-state conditions to establish their limit capacity. The results of the SPA are graphically illustrated in **Figure 6-14**. The point of intersection of the overflow rate and underflow rate operating level at the target MLSS concentration is the State Point.

FIGURE 6-14
THREE SECONDARY CLARIFIERS-STATE POINT ANALYSIS



As shown in **Figure 6-14**, at operating MLSS concentrations between 2,700 and 3,500 mg/L, the secondary clarifiers will not be overloaded and therefore have sufficient capacity to settle the MLSS and comply with an effluent TSS limit of 30 mg/L. The clarifier performance analysis was done at water temperatures of 20 ^{o}C and 10 ^{o}C, and assuming an average Sludge Volume Index of 150 mL/g. The performance analysis of the secondary clarifiers indicates that winter conditions are the limiting factor for their capacity. At a water temperature of 10 ^{o}C, the clarifiers can be operated at a peak daily flow of 11.5 MGD and 14.0 MGD with a MLSS concentration of 3,500, and 2,700 mg/L, respectively. At a water temperature of 20 ^{o}C, the clarifiers can be operated up to a peak daily flow of 14.0 MGD with a MLSS concentration of 3,500 mg/L.

<u>Equalization Capacity</u>

The performance analysis of the secondary clarifiers indicates that winter conditions are the limiting factor for their capacity. At a water temperature of 10 ^{o}C, the three secondary clarifiers can be operated at a peak daily flow of up to 14.0 MGD with a reduced MLSS concentration of 2,700 mg/L. Historical data for the WPCF influent flows shows a 100-percentile peak daily flow of 13.4 MGD in March. This indicates that the three secondary clarifiers can provide enough capacity to treat the maximum peak daily flow of 13.4 MGD. As a result, there is no need to increase the facility flow equalization capacity.

Conclusion

Current and future effluent quality requirements require the facility to upgrade the secondary treatment process implementing Four-Stage Bardenpho and MLE processes to meet effluent nitrogen requirements. The facility currently produces an average effluent TN of 335 lbs/day at yearly average conditions. The implementation of Four-Stage Bardenpho and MLE processes will provide greater nitrogen removal than the existing aeration tanks. These two processes can be alternated to meet seasonal effluent nitrogen requirements. MLE process can produce an average effluent TN of less than 275 lbs./day during winter conditions, and Four-Stage Bardenpho an average effluent TN of less than 85 lbs./day during summer conditions.

Historical data for the WPCF influent flows shows a 100-percentile peak daily flow of 13.4 MGD in March. The three secondary clarifiers can treat a peak daily flow of up to 14.0 MGD at a MLSS concentration of 2,700 mg/L during winter conditions. This suggests the three secondary clarifiers can provide enough capacity to treat the maximum peak daily flow of 13.4 MGD. As a result, there is no need to increase the facility flow equalization capacity.

A proposed site layout modification for this alternative is shown in **Figure 6-15**. The major components and improvements needed to provide Four-Stage Bardenpho and MLE process treatment at the WPCF include the following:

- Bioreactor Train Modifications:
  - Divide first Aeration Tank into:
    - Pre-Anoxic Tank (136,300 gallons) with mechanical mixer
    - Aerobic Tank (136,300 gallons) with fine-bubble membrane diffusers and aeration blowers
  - Divide second Aeration Tank into:

        - Aerobic Tank (106,000 gallons) with fine-bubble membrane diffusers and aeration blowers
        - De-Oxygenation/Swing Tank (30,300 gallons)
        - Post-Anoxic/Swing Tank (90,900 gallons) with mechanical mixer
        - Aerobic Tank (45,450 gallons) with fine bubble membrane diffusers
    - 4 RAS pumps in two RAS lines
    - 4 Aeration Blowers for one main aeration line
- New Secondary Clarifier – 75-foot Diameter
    - Influent Junction Box to feed all three secondary clarifiers

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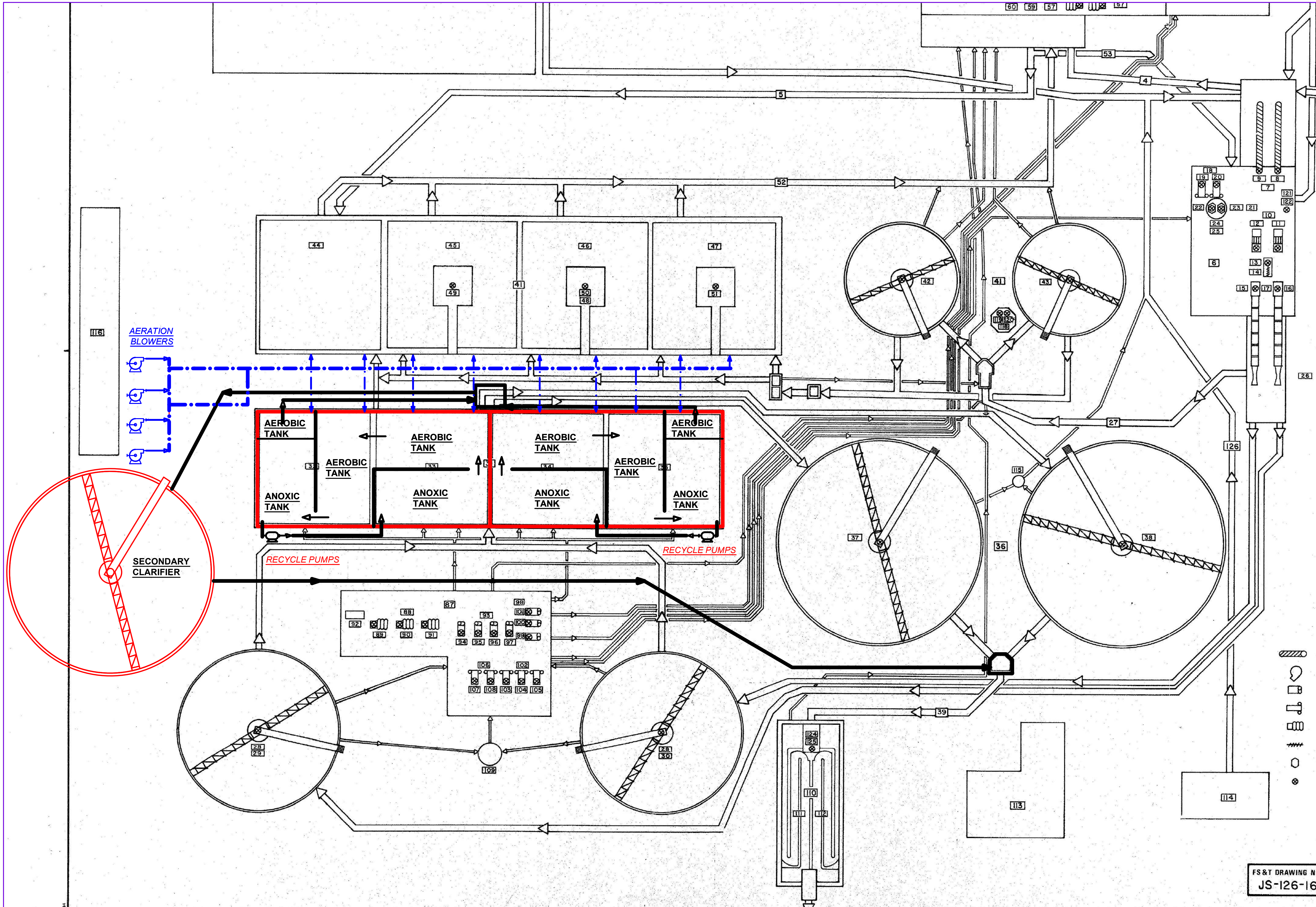

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TOWN OF SOMERSET, MASSACHUSETTS
WATER POLLUTION CONTROL FACILITY
NUTRIENT REMOVAL UPGRADES

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DATE: JUL 2019

PROPOSED LAYOUT MODIFICATIONS FOR ALTERNATIVE 2

FIGURE: 6-15

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Alternative No. 3 – Three Trains of Four-Stage Bardenpho Process for Year-Round Nitrogen Removal

This alternative will include the same modifications described in Alternative 2 for the existing bioreactors, with one additional bioreactor train converted from the upgrade of two rectangular equalization tanks, three secondary clarifiers (one new) and reduced equalization capacity.

Bioreactor Trains

This alternative will include three bioreactor trains, two from the upgrade of the existing aeration tanks as described in Alternative 1, and one new bioreactor train by retrofitting two of the four existing rectangular equalization tanks. The new bioreactor train will use a Four-Stage Bardenpho configuration, which will be constructed in two of the four existing equalization tanks. The tanks will be divided into four zones as described in Alternative 1. With the addition of a third Four-Stage Bardenpho bioreactor train, the WPCF will be able to maintain an effluent TN less than 4.9 mg/L year-round.

The modifications to implement the Four-Stage Bardenpho process include wall baffling for anoxic zone isolation, internal mixed liquor recycling for denitrification, higher aeration capacity, mixers for anoxic zones, and an influent splitter box for flow distribution. The new bioreactor train will consist of the zones with corresponding volumes as listed in **Table 6-39**.

Secondary Clarifiers Capacity Analysis

The performance of the three secondary clarifiers was analyzed and described in Alternative 2. The implementation of a new, third, clarifier will require a new influent junction box with flow control to provide an even distribution to all three clarifiers.

Equalization Capacity

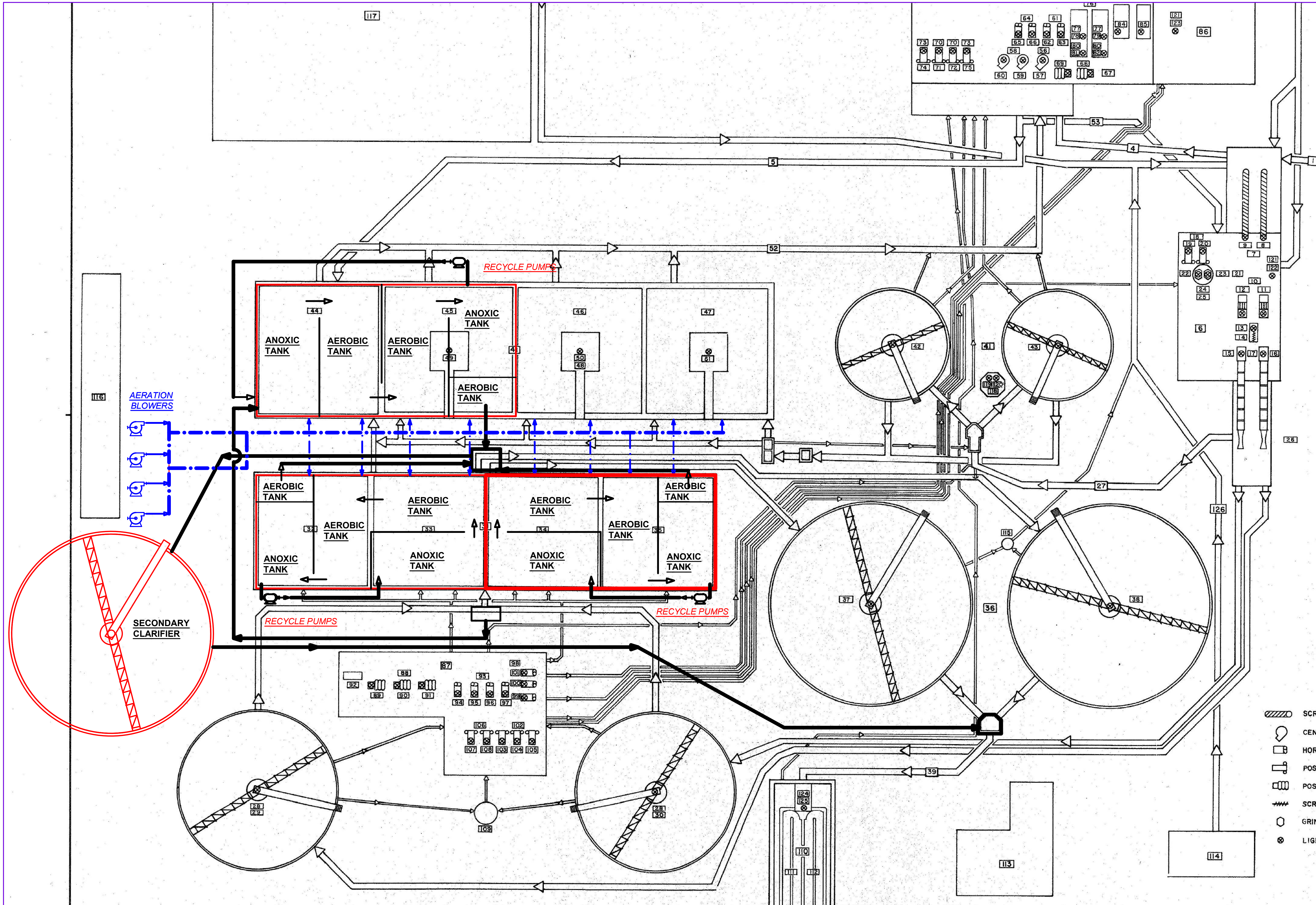
The WPCF will have a flow equalization capacity of 0.85 MGD after retrofitting two equalization tanks into a third bioreactor. The performance analysis of the three secondary clarifiers at a water temperature of 10 ^{o}C indicates that the clarifiers can be operated up to a peak daily flow of 14.0 MGD with a reduced MLSS concentration of 2,700 mg/L. This operational condition will be enough to absorb the 100th-percentile peak daily flow of 13.4 MGD in March.

Conclusion

Current and future effluent quality requirements may require the facility to upgrade the secondary treatment process, implementing Four-Stage Bardenpho and MLE processes to meet effluent nitrogen requirements. The facility currently produces an average effluent TN of 335 lbs/day at yearly average conditions. If a year-round TN discharge limit of 105 lbs/day is required, Four-Stage Bardenpho can be implemented permanently to produce effluent TN of less than 105 lbs./day. Historical data for the WPCF influent flows shows a 100th-percentile peak daily flow of 13.4 MGD in March. The three secondary clarifiers can treat a peak daily flow of up to 14.0 MGD at a MLSS concentration of 2,700 mg/L during winter conditions. The three secondary clarifiers can provide enough capacity to treat the maximum peak daily flow of 13.4 MGD. As a result, there is no need to increase the facility's flow equalization capacity.

A proposed modified site layout for this alternative is shown in **Figure 6-16**. The major components and improvements needed to provide Four-Stage Bardenpho process treatment at the WPCF include the following:

- Bioreactor Train Modifications:
  - Influent splitter box for feed distribution
  - Divide first Aeration/Equalization Tank into:
    - Pre-Anoxic Tank (136,300 gallons) with mechanical mixer
    - Aerobic Tank (136,300 gallons) with fine-bubble membrane diffusers and blowers
  - Divide second Aeration/Equalization Tank into:
    - Aerobic Tank (106,000 gallons) with fine bubble membrane diffusers and aeration blowers
    - De-Oxygenation/Swing Tank (30,300 gallons)
    - Post-Anoxic/Swing Tank (90,900 gallons) with mechanical mixer
    - Aerobic Tank (45,450 gallons) with fine bubble membrane diffusers
  - 4 RAS pumps in two RAS lines
  - 4 Aeration Blowers for one main aeration line
- New Secondary Clarifier – 75-foot Diameter
  - Influent Junction Box to feed all three secondary clarifiers



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TOWN OF SOMERSET, MASSACHUSETTS
WATER POLLUTION CONTROL FACILITY
NUTRIENT REMOVAL UPGRADES

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PROPOSED LAYOUT MODIFICATIONS FOR ALTERNATIVE 3

FIGURE: 6-16

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6.3.3.2 Evaluation of Solids Handling Process

The solids handling processes at the Somerset WPCF consist of sludge holding, sludge thickening, sludge dewatering, and sludge stabilization via composting to treat primary sludge (PS) from the primary clarifiers and waste activated sludge (WAS) from the secondary clarifiers. The facility has reduced the use of composting due to maintenance issues and lack of end-users in the area. As a result, the facility has become more dependent on solids disposal through a contract with Synagro in Woonsocket, RI.

The WAS from the secondary clarifiers is currently thickened on two gravity belt thickeners (GBTs). The thickened sludge is blended with primary sludge in a holding tank and then pumped to two belt filter presses (BFPs) for dewatering to a solids content of approximately 17 percent. The solids handling processes at the facility needs several improvements; as a result, several alternatives to upgrade solids handling processes and equipment are presented in this section. This section will discuss the technologies for sludge dewatering, alternatives available to upgrade solids handling, and disposal options for the WPCF.

6.3.3.2.1 Sludge Dewatering

The Somerset WPCF uses two belt filter presses (BFP) to dewater its sludge to a solids content of approximately 17 percent. The belt filter presses were installed during the 1990 upgrade. They have performed well but have reached the end of their useful life. In addition, staff have reported some operational and maintenance issues. The section below discusses the dewatering technologies considered at the WPCF.

Belt Filter Presses

Belt filter presses (BFP) have been a dewatering technology for many years for municipal sludge. This technology has dominated the municipal sludge dewatering market for many years and is still a cost-effective means of dewatering. Filtration occurs by passing a pair of filtering cloths and belts through a system of rollers. The system takes sludge and separates it into a filtrate and a solid cake. Some of its disadvantages include corrosion due to the high moisture content of air resulting from the wash water mist and continuous spray of wash water on both belts (fines and polymer are continually pushed through the belts); large footprint; increased odor control requirements due to its open design; lower average cake solids; and a higher-level handling of materials.

Screw Presses

Screw Presses have traditionally not been used in municipal sludge dewatering due to higher cost and lower throughputs, however, screw presses have proven cost-effective on a life-cycle cost basis due to the potential for higher cake solids (less transportation) with many recent New England installations in the municipal market. There are primarily two technologies that have proven successful (although there are others now available in the market); the horizontal rotary screw press (FKC) and the inclined rotary screw press (Huber).

The screw press consists of a screw with a conical shaft and flights that can vary in pitch and taper. The solids are fed into the space between the screw and a screw basket. Clarified liquid (filtrate) is discharged through the screen. The conditioned sludge can be fed either by gravity or under pressure. The screw moves the solids down the shaft and gradually increases the pressure. The discharge pressure can be controlled to help produce the desired cake solids. This technology typically outperforms belt filter presses with sludge of the same characteristics and performs very well with high concentrations of waste sludge. However, some of its disadvantages include high pressure loss in the feed to operate at the polymer and sludge mixer, overloading can cause pressure build up in the inlet chamber shutting down the screw press.

Centrifuges

Centrifuges also have a strong presence in the municipal sludge dewatering market. Centrifugal sludge dewatering uses the centrifugal force developed by the rotation of a cylindrical drum or bowl to separate the sludge solids from the liquid. Centrifuges have been favored whenever sludge disposal costs are significantly reduced by having a high solids content. The centrifuge market is very competitive, with several manufacturers offering units with significant ranges in price, size, capacity, and features.

The solid bowl centrifuge is horizontally mounted and tapered at one end. Thickened sludge is fed into the cylindrical bowl assembly, which rotates between 2,500 and 4,000 revolutions per minute. The high centrifugal force drives the solids against the bowl's interior walls. Difference in densities between the sludge solids and the liquid causes the formation of two distinct layers; sludge cake and liquid centrate. The dewatered sludge cake is discharged at the tapered end, while the centrate is discharged at the opposite end of the unit. This technology typically provides the highest dewatering cake thickness and capacity available. Based on typical performance for primary/secondary mixtures, a high solids centrifuge can be expected to achieve a final dewatered cake of 24 to 30 percent solids. Other advantages of this technology include small footprint; ability to provide redundancy in available footprint; odor control system size is minimized because the process is totally enclosed. However, some of its disadvantages include high energy consumption and maintenance costs.

6.3.3.2.2 Solids Handling Alternatives

Solids handling alternatives for sludge storage, thickening, dewatering and disposal were evaluated. The alternatives were selected to cover a range of solids handling treatment options to ensure that a representative number of treatment processes and costs were evaluated.

Alternative No. 1 – Increase Sludge Storage Capacity and Upgrade Sludge Thickening and Dewatering Equipment

The first alternative considered to upgrade the sludge handling process at the WPCF is to increase the sludge storage capacity and upgrade the thickening and dewatering treatment processes.

Sludge Storage Capacity

The sludge storage capacity at the WPCF can be increased by using the existing circular equalization tanks (previous primary clarifiers) not only to thicken primary sludge, but also to store it; and by adding a new sludge tank (30,000 gallons). This new sludge tank can be installed underground, outside the dewatering building, next to the sludge transfer pumps and can be used to store thickened waste activated sludge from the gravity belt thickeners. The new sludge tank can also be used to batch thickened blended sludge, which can be fed directly to the new dewatering equipment during periods of high loading. These two modifications can be easily implemented at the WPCF and increase storage capacity up to three days during maximum month conditions.

Sludge Thickening and Dewatering

A key factor in sizing sludge processing equipment is the number of hours per day and the number of days per week that the equipment system will be operated. The Somerset WPCF is fully staffed approximately eight hours per day, five days per week. The existing thickening system is only operated during these hours (with an hour for startup/shutdown operations). Newer sludge processing equipment systems include a higher level of control automation and can be designed to be operated with little to no operational oversight. The solids processing system should be designed with sufficient capacity to process the maximum sludge loadings during regularly staffed periods. As such, it will be assumed that solids processing will occur 5 days per week for 7 hours a day, totaling 35 hours per week of processing time. This will eliminate some technologies from consideration, especially slow-speed equipment for dewatering, as the size of the equipment must be increased, and the cost will not be economically feasible.

The sludge quantities estimate for summer and winter conditions at the WPCF are summarized below in Table 6-31. These design parameters, along with current operations, were used to develop the basis of design for thickening and dewatering alternatives below.

TABLE 6-40

SLUDGE QUANTITIES

PARAMETER	Influent		Primary Sludge		WAS	
	Summer	Winter	Summer	Winter	Summer	Winter
Average Monthly Flow, MGD	2.3	4.6	0.022	0.019	0.034	0.041
TSS MM Loading, lbs./day	5,855	5,532	4,380	3,707	2,047	2,150
$CBOD_5$ MM Loading, lbs./day	5,118	5,058	2,543	2,124	701	814
TN – MM Loading, lbs./day	632[1]	690[1]	144	106	136	147

Notes:

1) Nitrogen load was assumed based on $CBOD_5$ for low strength municipal wastewater in the vicinity.
2) MM: Maximum Monthly; $CBOD_5$: Carbonaceous BOD_5; TSS: Total Suspended Solids; TN: Total Nitrogen; WAS: Waste Activated Sludge.

Gravity Belt Thickener

The Somerset WPCF currently utilizes two GBTs to thicken their WAS to approximately 4 percent. The technology has not changed significantly since the units were installed and are still a reliable way to thicken sludge. A new feature of GBTs is the ability to completely enclose them for odor control purposes. WAS can be thickened using one GBT unit operating for less than 7 hours a day with another unit in standby. **Table 6-41** below shows the design data of the recommended GBTs.

TABLE 6-41

GRAVITY BELT THICKENER DESIGN DATA

PARAMETER	Summer	Average	Winter
WAS TSS Loading, lbs/day	2,047	1,900	2,150
Gravity Belt Thickener Design Data			
Target Solids Capture, %	92	92	92
Target Thicken Solids, %	5	5	5
Number of Units	2	2	2
Number of Units in Service	1	1	1
Unit Hydraulic Loading, gpm	180	180	180
Operating Time, hrs./day	5.5	5.1	5.7
Thickened Sludge lbs./day	1,890	1,750	1,980
Thickened Sludge gal/day	4,520	4,200	4,750

Centrifuge

The Somerset WPCF currently utilizes two belt filter presses (BFPs) to dewater their thickened sludge to a solids content of approximately 25 percent. The units are at the end of their useful life and need to be replaced with a reliable and more robust technology, able to handle higher solids throughputs. This eliminates some technologies from consideration, especially slow-speed equipment, making centrifuge technology the most attractive option as the new units need to fit in the same space as the BFPs and provide higher solid dewatering capacity.

Centrifuges have a strong presence in the municipal sludge dewatering market, especially for facilities that have sludges more difficult to dewater and relatively limited space. Centrifuges can run unattended for extended periods, as the centrifuge can self-compensate for changes in sludge feed concentrations. This reduces the need for oversight during operation of the centrifuge, resulting in lower operating labor requirements. Startup and shutdown can also be completely automated, with adjustments to the timing made by PLC process programming. Centrifuges can be used to dewater the blended sludge from the primary clarifier or gravity thickeners and thickened WAS from the GBTs. The sludge dewatering needs in the WPCF can be met using one centrifuge unit operating for less than 7 hours a day with another unit in standby. **Table 6-42** below shows the design data of the recommended centrifuges.

TABLE 6-42

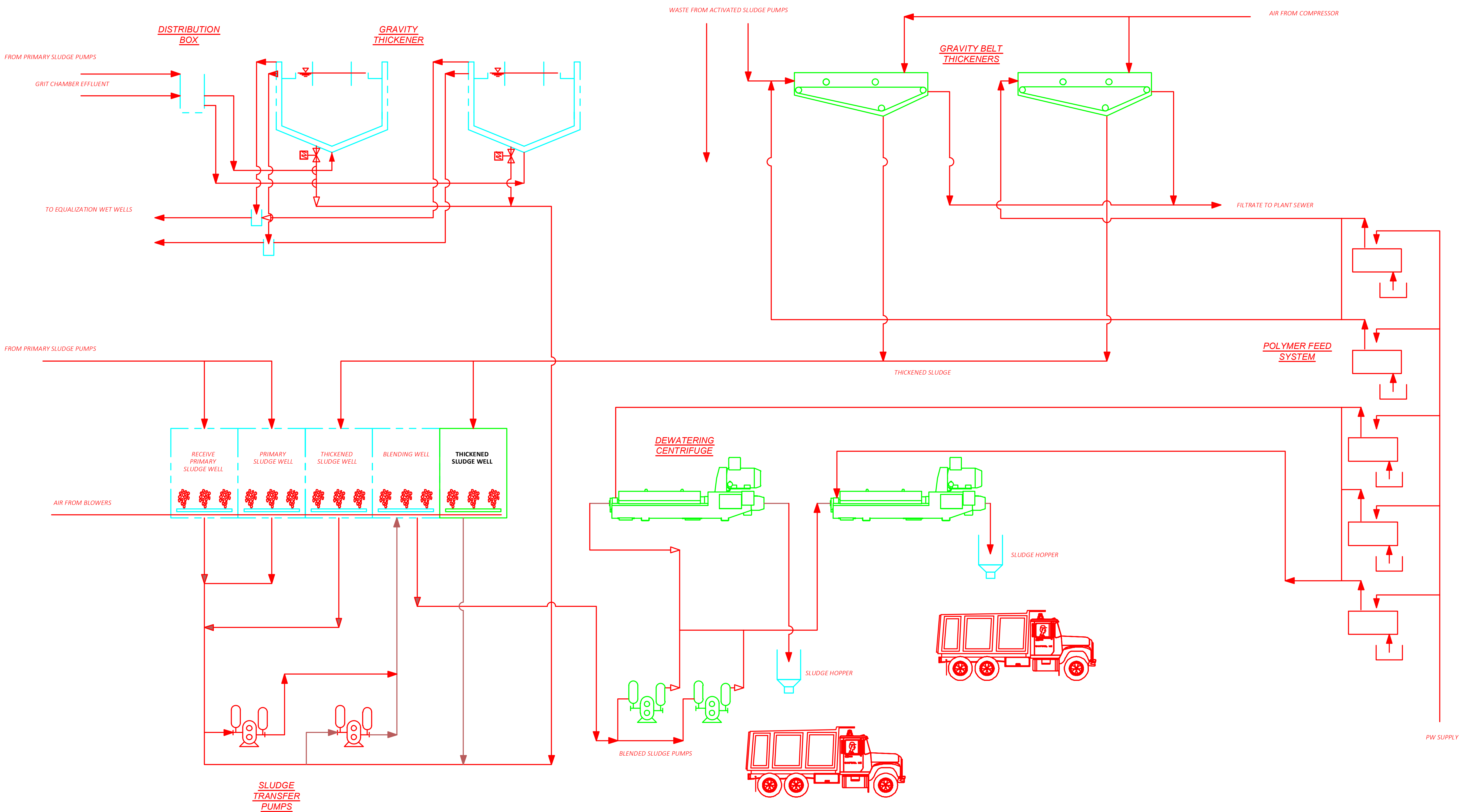
CENTRIFUGE DESIGN DATA

PARAMETER	Summer	Average	Winter
Primary Sludge Loading, lbs./day	4,380	3,200	3,707
Thickened Sludge (GBT) Loading, lbs/day	1,890	1,750	1,980
Centrifuge Design Data			
Number of Units	2	2	2
Number of Units in Service	1	1	1
Unit Capacity Loading, lbs./hr.	1,500	1,500	1,500
Hydraulic Loading, gpm	120	95	110
Operating Time, hrs./day	5.9	4.7	5.3
Cake Solids, %	25	25	25
Cake Density, lbs./cubic feet	65	65	65
Cake Volume, cubic feet/hr.	46.5	46.5	46.5

This alternative will consist of increasing the sludge storage capacity, upgrading the sludge thickening process, and adding a new dewatering process. This alternative will include the components listed below:

- Upgrading the existing circular sludge thickener tanks
- One new sludge holding tank
- Two gravity belt thickeners with space left for a future unit
- Two centrifuge units sized assuming thickened sludge at 4 percent solids
- Polymer dilution systems (2 for thickening and 2 for dewatering)
- Two blended sludge feed pumps and associated grinder
- 1-bay sludge off-loading garage (attached to Sludge Dewatering Building)
- Sludge transport conveyor (from dewatering units to sludge off-loading bay)
- Sludge loading conveyor (from transport conveyor to sludge container)

A proposed solids process flow diagram is shown in **Figure 6-17** and mass balance flow diagram in **Figure 6-18**.



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PROPOSED SOLID PROCESS FLOW DIAGRAM

FIGURE: 6-17

TOWN OF SOMERSET, MASSACHUSETTS
WTP AND WPCF CHLORINE CONVERSION
TO SODIUM HYPOCHLORITE

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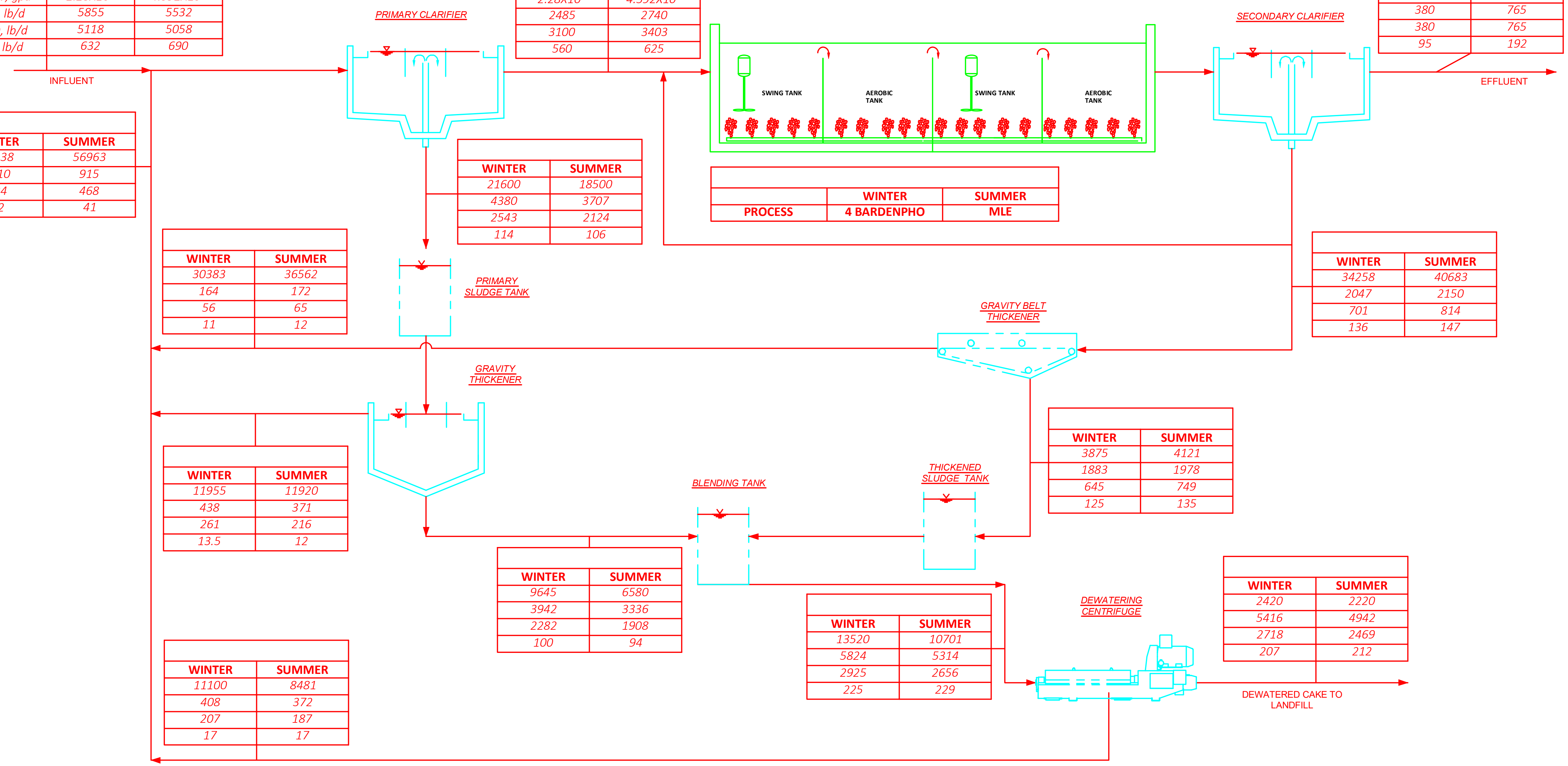

	WINTER	SUMMER
FLOW, gpd	$2.28X10^6$	$4.592X10^6$
TSS, lb/d	5855	5532
BOD, lb/d	5118	5058
TN, lb/d	632	690

WINTER	SUMMER
$2.28X10^6$	$4.592X10^6$
2485	2740
3100	3403
560	625

WINTER	SUMMER
$2.277x10^6$	$4.589x10^6$
380	765
380	765
95	192

WINTER	SUMMER
53438	56963
1010	915
524	468
42	41

WINTER	SUMMER
21600	18500
4380	3707
2543	2124
114	106

	WINTER	SUMMER
PROCESS	4 BARDENPHO	MLE

WINTER	SUMMER
30383	36562
164	172
56	65
11	12

WINTER	SUMMER
34258	40683
2047	2150
701	814
136	147

WINTER	SUMMER
11955	11920
438	371
261	216
13.5	12

WINTER	SUMMER
3875	4121
1883	1978
645	749
125	135

WINTER	SUMMER
9645	6580
3942	3336
2282	1908
100	94

WINTER	SUMMER
13520	10701
5824	5314
2925	2656
225	229

WINTER	SUMMER
2420	2220
5416	4942
2718	2469
207	212

WINTER	SUMMER
11100	8481
408	372
207	187
17	17

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TOWN OF SOMERSET, MASSACHUSETTS
WATER POLLUTION CONTROL FACILITY
NUTRIENT REMOVAL UPGRADES

MASS BALANCE FLOW DIAGRAM

FIGURE: 6-18

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__Alternative No. 2 – Biosolids Disposal Alternatives and Sludge Handling Building Upgrade__

This alternative discusses the biosolids (sludge) disposal alternatives and upgrades to the sludge handling building to accommodate for the new thickening and dewatering treatment processes.

Compost Stabilization

The Somerset WPCF has a composting facility where dewatered sludge from the plant is mixed with woodchips and treated for approximately 21 days until the mixture is stable, creating a class A biosolid. The Town decided to minimize the use of composting due to maintenance and odor control issues with the composting facility and a reduction in end-users. As a result, the solids disposal at the WPCF has become more dependent on its solids disposal contract with Synagro in Woonsocket, RI for incineration and final landfill disposal. Due to the lack of end-users and age of the composting facility, it is recommended that the composting facility and associated biofilter be removed during the next WPCF upgrade. This will create significant open space to utilize for future tankage requirements and building modifications.

Thermal Processing

Any feasible thermal alternative to composting as final stabilization or volume reduction for biosolids at the Somerset WPCF will require capital expenditures, operational simplicity and the ability to produce biosolids suitable for land application. Thermal drying involves heating biosolids to evaporate water, producing final solids with reduced mass and volume compared with a mechanical dewatering method. Thermal drying meets the requirements for Class A and Class B biosolids. However, thermal drying processes are more complex and expensive to operate than conventional dewatering methods. Thermal drying alternatives (e.g., mechanical drying, pelletization) that require self-performing Class A or Class B biosolids suitable and desirable for land application are virtually non-existent in Massachusetts. In addition, thermal oxidation or incineration are highly complex operations that may be beyond the scale of the facility. It is recommended to consider alternatives that are less complex and involve reduced process complexity, odor generation, and truck traffic.

Sludge Handling Building Upgrade and New Administration Building

The sludge dewatering facility at the Somerset WPCF is in poor condition and needs upgrades due to age, use, and current code compliance issues. The facility needs more space and requires a loading dock/sludge garage to haul solids off site. In addition, the administration offices/rooms are part of the sludge dewatering building and are constantly exposed to odors from sludge thickening and dewatering operations. Consequently, it is recommended that the administration area be relocated from the sludge dewatering building into a new building during the next upgrade at the WPCF. If the composting and biofilter buildings are removed, the new administration building could be located in that space. This proposed new administration building will have an area of 1,200 square feet and cost approximately $350/sf. Dewatering building modifications include those related to replacing existing sludge thickening and dewatering equipment, addition of new conveyors, garage and loading modifications, mechanical, electrical, and instrumentation upgrades, and new storage tanks.

6.3.3.3 Odor Control

There are several alternatives available to the WPCF for on-site odor control. Currently, the WPCF is in a location surrounded by industrial facilities. Typically, off-site nuisance odors aren't an issue in that type of neighborhood and facilities won't experience odor complaints. However, there is a residential neighborhood within a mile of the facility, and the facility sits directly adjacent to the Taunton River. With the composting facility generating a very high amount of odor, and odor that travels in heavy, humid air well, the facility went through an extensive odor control upgrade in the mid to late 90s. There are several systems treating odorous air at the facility. The biggest odor control system is the biofilter which treats air from the composting operations. The second largest system services both the preliminary treatment building and the sludge dewatering building, including the sludge holding tanks. There is a small system that treats air from the covered primary clarifiers and a very small system that services the septage receiving tank. Much of the systems onsite are chemical wet scrubbers, which were good systems at the time they were installed. However, many new options are available today. There are also new code requirements (NFPA 820) to take into consideration when designing odor control systems. This section discusses some of the options available to the WPCF.

A description of the systems that could be a good fit for the WPCF are summarized below:

- Packed tower wet scrubbers - Wet scrubbing is a common term for liquid absorption. A liquid "scrubs" the air clean by transferring airborne pollutants into the liquid stream. In wastewater treatment, the scrubbant liquid is typically water and the process occurs in an enclosed vessel. These mass transfer vessels are called wet scrubbers. The primary advantage of wet scrubbing is that most odorants can be isolated and removed by selecting the proper scrubbing solution contact time. Packed bed/tower refers to the media that is used to fill the tower to increase surface area and thereby contact time between the liquid and the odorous air.
- Activated carbon adsorbers - Activated carbon adsorption is effective for removing low levels of odorous compounds such as hydrogen sulfide, reduced sulfur compounds, and VOCs from air emissions at municipal wastewater treatment facilities. Granular activated carbon (GAC) is an effective adsorbent because it possesses a high surface area per unit weight, an intricate pore structure, and a primarily hydrophobic surface. Bituminous coal and coconut shell are the most widely used sources for manufacturing GAC, because they create an activated carbon with good physical properties and excellent porosity.
- Biofilters – Similar to dry media scrubbers, biofilters use a porous media bed to absorb/adsorb compounds from an airstream. However, biofilters rely on microbial degradation of the absorbed/adsorbed compounds to renew sorptive capacity rather than on frequent media replacement. The process for air distribution and support of the media can vary from custom engineered systems to packaged proprietary systems or components. Biofilters can be open to the environment, covered, or totally enclosed for a stack discharge. Biofilters are effective in removing the hydrogen sulfide and mercaptan odors most common in wastewater applications as well as a wide range of other contaminants. Media is typically a form of wood, such as wood chips. Pre-engineered systems use a different type of media, typically inorganic, and is typically a stone or plastic. Pre-engineered biofilters have a longer media life and smaller footprint.
- Bio-towers/scrubbers – As a form of biological odor scrubbing, biotrickling filters are similar to biofiltration. Both rely on a wetted porous media to absorb/adsorb compounds from an airstream, and the sorptive capacity is renewed through microbial degradation of the absorbed/adsorbed compounds. Biotrickling filters differ from biofilters primarily in that the

media tends to have a lower moisture-holding capacity and requires a more active moisture control system. Biotrickling filters are typically enclosed packaged systems, although it is possible to custom engineer a system. Biotrickling filters are effective in removing the hydrogen sulfide and mercaptan odors most common in wastewater applications as well as a wide range of other contaminants. Biotrickling filters are considered particularly effective in handling very high concentrations of hydrogen sulfide (up to 400 ppm) that can cause acidification of biofilter media.

The following table, taken from table 10-2 in TR-16, outlines the various options available for odor control and some of the advantages and disadvantages of each type of system. One type of system that has gained popularity in the market that is not on this list is the new-style of high-capacity carbon. High-capacity carbon is more expensive than traditional carbon systems but lasts longer and can treat higher levels of H_2S. Many of the levels seen at the WPCF would be treatable by this type of system.

The WPCF primarily needs to remove H_2S as an odor source. Non-H_2S sources are not as much of a concern because of the location of the facility and the surrounding area. As such, many options exist for the facility to replace the existing chemical wet scrubbers with lower operation and maintenance cost technologies.

Technique	Frequency of Use	Cost Factors	Advantages	Disadvantages
Packed tower wet scrubbers	High	Moderate capital cost, high O&M cost	Effective and reliable; long track record; small footprint	High chemical consumption, high O&M
Activated carbon adsorbers	High	Cost-effectiveness depends on carbon replacement frequency	Simple; few moving parts; effective; several media options	Applicable to relatively dilute air streams in order to ensure long carbon life
In-ground biofilters	High	Low to moderate capital; low O&M costs	Simple; low O&M; effective; no chemicals	Large footprint; design criteria varies; some failures due to short-circuiting, overloading
Pre-engineered biofilters	Medium	Moderate to high capital; low O&M	Low O&M, no chemicals; longer media life and smaller footprint than in-ground systems	Higher capital costs than in-ground biofilters
Bioscrubbers, Biotrickling filters	Medium	Moderate capital; low O&M	Smaller footprint than biofilters, high H_2S loadings possible; little or no chemicals	Reduced performance at low temperatures; not as effective for non-H2S odors.
Thermal oxidizers	Low	Very high capital and O&M (energy) costs	Effective for wide spectrum of odors and VOCs	Only economical for high-strength, difficult to treat air streams
Diffusion into activated sludge basins	Low	Economical if existing blowers or diffusers are used	Simple; low O&M; effective, reliable	Potential for corrosion of blower inlet components; add'l air filtration required
Odor counteractants	High	Operating cost dependent on chemical usage	Low capital cost	Limited odor removal efficiency (<40%); only applicable for dilute air streams

The following is a list of odor sources that could be treated by new odor control systems and their electrical classification:

- Preliminary treatment building (same as existing system), Class 1, Division 1
  - 12 ACH required when occupied, 6 ACH unoccupied. Two-speed fan and adjustable louver on inlet ductwork. For grit and screening room and the scum room, a total of approximately 13,000 cubic feet of space needs to be ventilated. That translates to about 2,000 cfm for the maximum size of the fan and odor control system required.

- Septage receiving, Class 1, Division 1
  - 6 ACH. A total of approximately 25,000 cubic feet of space needs to be ventilated. That translates to about 2,500 cfm for the size of the fan and odor control system required.
- Primary Clarifiers, Class 1, Division 1
  - 6 ACH. A total of approximately 30,000 cubic feet of space needs to be ventilated (each clarifier). That translates to about 6,000 cfm for the size of the fan and odor control system required.
- Flow equalization tanks and wet wells (circular tanks outlined to be repurposed as gravity thickeners), Class 1, Division 1
  - Rectangular - 6 ACH. A total of approximately 43,000 cubic feet of space needs to be ventilated (each tank). That translates to about 17,000 cfm for the size of the fan and odor control system required.
  - Circular - 6 ACH. A total of approximately 12,500 cubic feet of space needs to be ventilated (each tank). That translates to about 2,500 cfm for the size of the fan and odor control system required.
  - Wet wells - 6 ACH. A total of approximately 6,500 cubic feet of space needs to be ventilated (both wells). That translates to about 1,000 cfm for the size of the fan and odor control system required.
- Sludge Holding Tanks, Class 1, Division 1
  - Existing Tanks - 6 ACH. The water level is variable so a fan on VFD would be desirable. A two-speed fan could also be used for the two scenarios of an empty tank and a full tank. A total of approximately 6,500 cubic feet of space needs to be ventilated (all four tanks). That translates to about 500 cfm for the maximum size of the fan and odor control system required.
  - Proposed new tanks – Two new tanks are proposed, 1,500 gallons each. The same scenario described above applies to these tanks. The new tankage would require approximately 300 cfm.
- Sludge Dewatering and Loading area, Class 1, Division 2
  - 12 ACH required when occupied, 6 ACH unoccupied. Two-speed fan and adjustable louver on inlet ductwork. For the dewatering room and sludge loading area, a total of

approximately 60,000 cubic feet of space needs to be ventilated. That translates to about 6,000 cfm for the maximum size of the fan and odor control system required.

- Composting area, Class 1, Division 2
  - Proposed to remove this operation

The alternatives for treating odor at the WPCF include the following:

- Do nothing – run existing systems to failure and address at that time
- Replace in-kind
- Evaluate and replace systems as needed, utilizing newer technologies, and evaluate additional systems to add odor control to

Each of these alternatives are evaluated below and each assumes that the composting facility will be abandoned and/or demolished as part of the next WPCF upgrade.

6.3.3.3.1 Do Nothing Approach

The do-nothing approach for the WPCF is the cheapest option available. The facility would run the existing systems until the equipment fails. Odor generated at the facility is fairly minimal aside from the composting operation. The facility would still need to comply with ventilation requirements and NFPA 820 as building systems are modified.

6.3.3.3.2 Replace In-kind Approach

The existing odor control systems (mostly wet scrubbers) work but are at the end of their useful life. During the next facility upgrade, the systems could be replaced in-kind. For the wet scrubbers, significant capital expenditure could be saved if the vessels are in fair to good condition. The fans, chemical feed and storage system, and media would be replaced. The fans would be sized to comply with NFPA 820 requirements, and the same building systems/process tankage would be odor controlled. This is likely the highest life-cycle cost option as wet scrubbers are O&M cost intensive and the vessels are likely not in good condition, therefore high capital costs can be expected to replace the systems.

6.3.3.3.3 Evaluate and Replace Systems As-Needed

This approach would evaluate new technology choices as well as which systems designated for odor control. For example, the septage receiving station is currently not used and is likely not going to be used in the future as over 90 percent of the Town of Somerset is sewered. Providing odor control to this system is not necessary. Furthermore, providing odor control to the primary clarifiers is also likely not necessary. If odor control is desired for the PCs, a high-capacity carbon system could be a better option than the existing wet scrubber.

The main odor sources to be treated at the facility are from the preliminary treatment building, sludge dewatering and loading area, sludge holding tanks, and the potential new gravity thickeners. The existing wet scrubber that serves the preliminary treatment and sludge building could be further evaluated to see if the vessel is in fair to good condition. If re-usable, significant capital cost savings could be realized. If not, a different system such as a pre-engineered biofilter or bioscrubber could be used. The preliminary treatment building, sludge dewatering room, and sludge loading area would comprise of this system. A second system is likely needed to control odor generated in the sludge holding tanks and the potential gravity thickeners. The same types of systems may be better options than a wet scrubber and could be combined into one system with the sludge dewatering and preliminary treatment system.

Further evaluation of ventilation requirements could change the system size requirements for the new odor control systems as well. For example, utilizing two-speed fans to provide 6 ACH while unoccupied and 12 ACH when occupied for certain rooms.

6.3.4 Energy Evaluation

An energy evaluation was included as part of this CWMP. Energy use at the WPCF consists of electricity and heat consumption. As noted in the architectural and mechanical evaluation memos, there are several improvements that can be made at each building to be more energy efficient in relation to heating and cooling at the WPCF. A summary of the steps that could be taken at each building is summarized in section 6.3.4.2. The second major piece of energy use is electricity demand at the WPCF. The major electricity consumers at the facility are the equipment, and especially the equipment that is used twenty-four hours a day, seven-days per week, 365-days per year and has a large motor. The equipment electrical demand is summarized in 6.3.4.1 and efficiency improvements are discussed in 6.3.4.2. A minor component to electricity demand relates to facility lighting, which is discussed in the electrical memo and summarized below.

6.3.4.1 Base Load

Base load at a facility is defined as the electricity consumption over a one-year period. The electricity consumption is measured in kilowatt-hours and is calculated by an equipment's motor horsepower (Hp) and how long the motor runs for. **Table 6-43** provides the energy consumption and cost for the 2018 calendar year. **Figure 6-19** provides a monthly summary of the electrical demand and peak demand for the WPCF during the 2018 calendar year.

TABLE 6-43

SOMERSET WPCF ENERGY USE SUMMARY

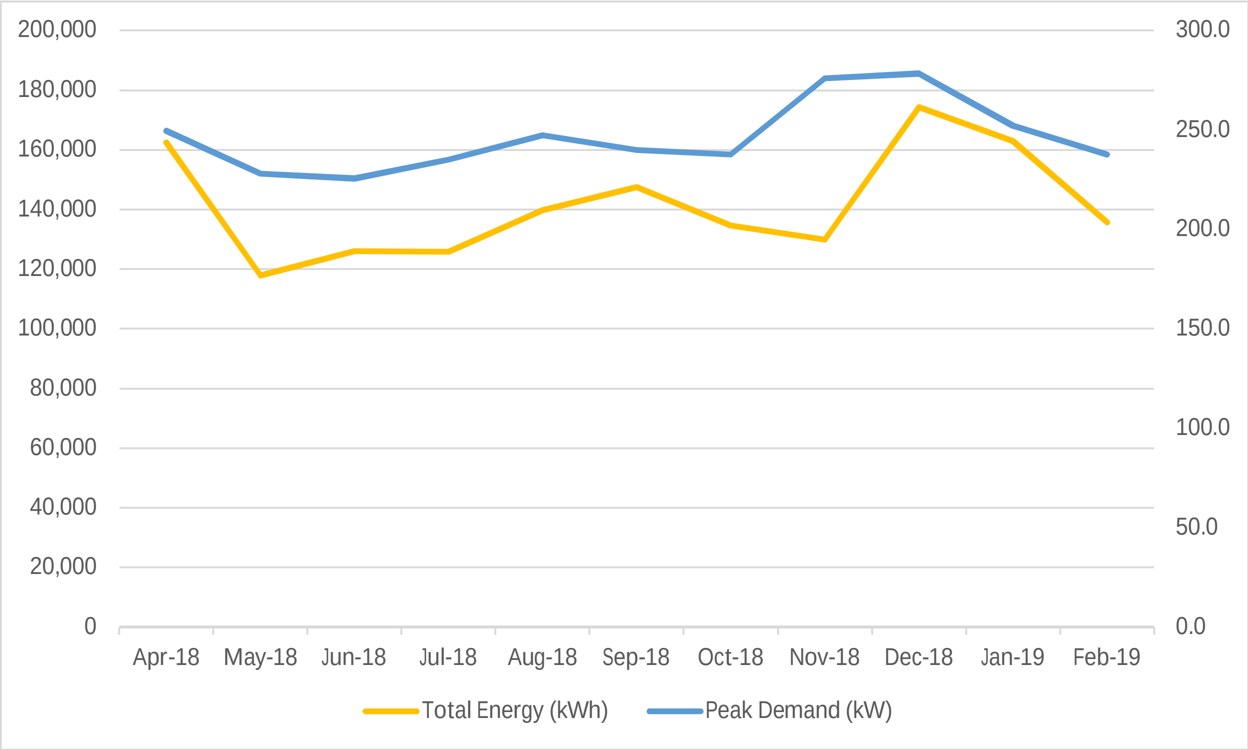
ENERGY SOURCE	ANNUAL ENERGY USE (KWH)[1]	ANNUAL COST	UNIT COST
Electrical use	1,556,830	$210,000	$0.145

1. For the 2018 calendar year

Average monthly electricity cost is approximately $20,000.

FIGURE 6-19

SOMERSET WPCF MONTHLY ENERGY USAGE AND PEAK DEMAND (2018)



An equipment list and estimated usage table is included in **Appendix H**. Based on the equipment at the facility, the aeration blowers have the largest electrical demand and make up approximately 65 percent of the facility's usage. Improving the efficiency of this equipment will result in the most savings at the facility. However, other measures can be taken to improve energy efficiency and electrical use and are discussed in the next section.

6.3.4.2 Improvements

6.3.4.2.1 Building Improvements

Building improvements are taken from the recommendations in the discipline technical memos. They are split into architectural and mechanical. Electrical improvements apply to each building and are summarized as follows:

- Energy efficient lighting (LED) inside buildings and site lighting

- Install motion detectors on normally unoccupied buildings/rooms to turn lights on only when occupied
- Variable frequency drives (VFDs) on applicable equipment (discussed in equipment section)
- Replace old electrical gear

Administration Building

Architectural improvements

- Improve the thermal envelope by adding rigid insulation to interior face of exterior walls and covering with a new layer of gypsum wall board
- Replace all windows with new aluminum thermally broken insulated windows

Mechanical (HVAC) improvements

- Replace air conditioners, fans, and heating units with more efficient equipment
- Provide proper ventilation to comply with NFPA 820, investigate energy saving measures for unoccupied requirements and winter season variations
- Investigate, replace or patch existing ductwork so HVAC systems are more efficient
- Replace boiler with more efficient unit

Preliminary Treatment Building

Architectural improvements

- None

Mechanical (HVAC) improvements

- Provide proper ventilation to comply with NFPA 820, investigate energy saving measures for unoccupied requirements and winter season variations
- Investigate, replace or patch existing ductwork so HVAC systems are more efficient

Operations Building

Architectural improvements

- Replace all windows with new aluminum thermally broken insulated windows

Mechanical (HVAC) improvements

- Replace air conditioners, fans, and heating units with more efficient equipment
- Provide proper ventilation to comply with NFPA 820, investigate energy saving measures for unoccupied requirements and winter season variations
- Investigate, replace or patch existing ductwork so HVAC systems are more efficient
- Replace boiler with more efficient unit

6.3.4.2.2 Equipment Improvements

The following list of equipment could be made more energy efficient by installing a VFD and/or premium efficient motors:

- Flow equalization mixing
- Flow equalization, second pump
- Screw pumps
- Clarifier mechanisms
- Plant water pumps
- Sludge tank blowers
- Odor control fans

Replacing the existing PD blowers with hybrid screw compressors, placed on VFD, and properly sized for maintaining a DO setpoint in the oxic zones of 2.0 will significantly reduce electrical consumption.

6.4 RECOMMENDED PLAN

The recommended plan for the Somerset WPCF consists of phased upgrades for the 20-year planning period. The recommended first phase of these upgrades consists of equipment and processes in immediate need of replacement and/or an upgrade. The primary reasons for replacement are equipment age or building code requirements. The primary reason for upgrading is related to achieving compliance with the impending NPDES permit, which will contain total nitrogen-related effluent discharge limits. The other phases in the recommended plan consist of items that are not in immediate need of replacement, are not part of a building system that will trigger code requirements, and do not relate to achieving compliance with the future NPDES permit.

6.4.1 Base Improvements

The base improvements for the WPCF consist of equipment, processes, and building requirements that do not relate to the alternatives analysis completed above. The primary basis for these improvements is equipment age and building code compliance.

The following list encompasses the systems and equipment in the 0-5-year (first phase) recommended upgrade:

- Preliminary Treatment – building improvements, grit removal upgrade, sampler and flow measurement replacement
- Septage receiving - none
- Primary Treatment – mechanism replacement, sludge and scum pump replacement. Evaluate weirs and baffles, and concrete repair.
- Secondary Treatment – see following section for aeration improvements. Replace secondary clarifier mechanisms, concrete repair and sludge (RAS and WAS) pumps. Evaluate weirs and baffles and addition of perimeter density baffle addition to increase performance. Operations building improvements.
- Disinfection – none
- Solids Processing – see recommendation below
- Flow Equalization – replace flow equalization pump. Install new aeration/mixing system in two equalization tanks. See other recommendations below
- Composting – abandon and demolish composting, see recommendation below under solids processing for land use.
- Odor Control – see recommendations below

- General site – replace electrical service and MCCs. Replace all generators with two new units. SCADA and instrumentation upgrade, including a site-wide fiber-optic network. General paving of the site.

A significant requirement for this upgrade is to bring buildings and processes up to current codes through the upgrade of the HVAC, electrical, and architectural details. A large portion of the project cost will be dedicated to electrical, instrumentation, and mechanical overhauls at the facility. These improvements will also target energy efficiency at the facility.

6.4.2 Secondary Treatment

Current and future effluent quality requirements require the facility to upgrade the secondary treatment process, implementing Four-Stage Bardenpho and MLE processes to meet effluent nitrogen requirements. These two processes can be alternated to meet seasonal and year-round effluent nitrogen requirements.

6.4.2.1 Aeration Tanks

The existing aeration tanks need to be retrofitted into Four-Stage Bardenpho and MLE configurations to meet the seasonal effluent nitrogen limit. During summer, the WPCF can be operated as Four-Stage Bardenpho process to meet a low effluent TN of less than 4.9 mg/L, and during winter it can be operated as MLE process reporting the effluent TN.

A new bioreactor train will be needed if an effluent TN of less than 4.9 mg/L is required all year round. The new bioreactor train can be added by retrofitting two of the existing rectangular equalization tanks into a Four-Stage Bardenpho configuration.

6.4.2.2 Secondary Clarifiers

Historical data for the WPCF influent flows shows a 99.9th-percentile peak daily flow of 10.3 MGD in March. The two existing secondary clarifiers can treat a peak daily flow of 10.0 MGD at a MLSS concentration of 2,700 mg/L during winter conditions. Most of the 99.9th-percentile peak flow can be treated by the existing two secondary clarifiers; however, any flow greater than 10.0 MGD will need to be absorbed by the flow equalization tanks. A third clarifier is not required.

6.4.3 Sludge Handling Processing

The sludge handling process at the WPCF needs to be upgraded to increase the sludge storage capacity, upgrade the thickening equipment, replace the dewatering system, and upgrade the sludge handling building to accommodate for sludge conveyors, and new thickening and dewatering systems.

6.4.3.1 Sludge Storage and Mixing

The facility needs to increase its sludge storage capacity to accumulate sludge during long weekends breaks. The sludge storage capacity can be increased by using the existing circular equalization tanks (previous primary clarifiers) not only to thicken primary sludge, but also to store it; and by adding a new sludge tank (30,000 gallons), next to the existing sludge blending tanks. This new sludge tank can be installed underground, outside the dewatering building, and can be used to store thickened waste activated sludge from the gravity belt thickeners. These two modifications can increase the sludge storage capacity of the facility up to three days during maximum month conditions.

6.4.3.2 Sludge Dewatering

The facility currently uses two GBTs to thicken their WAS to approximately 4 percent. These units were installed as part of a previous upgrade and need to be replaced by two new updated GBTs. The new units can be used to thicken WAS using one GBT operating for less than 7 hours a day with another GBT in standby.

The facility uses two BFPs to dewater its sludge to a solids content of approximately 25 percent. The BFPs are at the end of their useful life and need to be replaced for a faster and more robust technology. It is recommended to replace the BFPs by two centrifuges with sludge conveyors to transport sludge from the units to the off-loading area.

6.4.3.3 Sludge Disposal

The use of the composting facility has been minimized due to maintenance and odor control issues, and lack of end-users. It is recommended that the composting facility and associated biofilter be removed during the next WPCF upgrade. Currently, the facility is more dependent on solids disposal through a contract with Synagro in Woonsocket, RI for incineration and final landfill disposal, and retains a minimum composting ability to provide redundancy to the disposal of solids. As a result, it is recommended to continue with Synagro as a mean to dispose the solids from the facility.

6.4.4 Flow Equalization

The facility has enough flow equalization capacity to handle the 99.9^{th}-percentile peak daily flow in winter. Historical data for the WPCF influent flows shows a 99.9^{th}-percentile peak daily flow of 10.3 MGD in March. The facility has a possible flow equalization capacity of 11.3 MGD from the secondary clarifiers and equalization tanks. The facility currently has two secondary clarifiers able to handle a peak daily flow up to 10.0 MGD with a reduced MLSS concentration of 2,700 mg/L, and four rectangular equalization tanks with a total capacity of 1.3 MG. Consequently, the facility has enough capacity to absorb the 99.9^{th}-percentile peak daily flow of 10.3 MGD and could have an additional capacity of 1.0 MGD that can be used to absorb greater daily flows. It is recommended that two rectangular equalization tanks are outfitted with new coarse bubble aeration/mixing systems and all four tanks be repaired for concrete issues and leaks. A new aeration header will be run to the EQ tanks, to be connected to the aeration blowers.

6.4.5 Odor Control

The recommended plan for the odor control systems at the WPCF is to implement Alternative 3 – evaluate and replace systems as needed. The septage receiving station, primary clarifiers, flow equalization tanks and wet wells, and abandoned composting operation would not be odor controlled. The systems to odor control would be split into two categories: preliminary treatment and sludge dewatering/loading and sludge holding/thickening. Part of the evaluation would be to investigate if one pre-engineered biofiltration system could serve all of the odor sources. The second part of the evaluation would be to investigate which type of odor control system would be the best fit for the two different systems outlined above.

If the systems were combined and treated by one large biofiltration odor control system, the capacity would need to be approximately 12,000 cfm. Each individual component of the system (dewatering room and loading area, sludge holding tanks, preliminary treatment rooms, and gravity thickeners) would have a dedicated fan to draw in odorous air.

If the systems were split such that the preliminary treatment and gravity thickeners were grouped and the sludge holding tanks and the dewatering room and sludge loading area were grouped, the systems would need to be 5,000 cfm and 7,000 cfm, respectively.

6.4.6 Recommended Plan Conceptual Cost Estimate

The recommended list of upgrades is summarized in the following list:

General Site

- New Electrical service
- New generators
- New power feed and duct banks
- Site lighting
- New Fiber-optic network and SCADA upgrade
- Site paving
- Site piping
- Replace Yard Pump Station pumps, piping, and repair concrete

Preliminary Treatment

- Demolish and replace grit removal system
- Demolish and/or abandon primary scum concentrator, scum holding, and transfer scum pumps
- Demolish and replace Parshall flumes
- Demolish and replace influent sampler
- Demolish and replace weir gates
- Replace HVAC system in Preliminary Building
- Replace electrical systems in Preliminary Building, including new power and control stations to replaced equipment
- New Instrumentation and SCADA integration for replaced equipment

- General structural and architectural improvements to Preliminary Building, including window and door replacement.

Flow Equalization

- Demolish equipment and surface aerator piers, clean, and repair concrete for rectangular flow EQ tanks
- Install new aeration header from Operations Building to EQ tanks
- Install new coarse-bubble aeration/mixing system in two EQ tanks
- Tie-in new systems to SCADA and new instrumentation
- New power and conduit to EQ tanks from Sludge Processing Electrical Room
- Convert circular EQ tanks to Gravity Thickeners by replacing mechanisms and repair concrete
- Modify primary sludge piping and GT effluent piping
- New instrumentation and electrical related to GTs

Primary Treatment

- Demolish and replace primary clarifier mechanisms
- Demolish and replace primary sludge pumps; modify piping to discharge to GTs
- Demolish and replace primary sludge grinders
- Demolish and replace scum pumps; modify piping to discharge to SHTs
- General piping and valve replacement in pump rooms
- Lighting at clarifiers
- New conduit and power, local control stations, and emergency stops for replaced equipment
- New Instrumentation and SCADA integration for replaced equipment; new flow meters for sludge pumps

Secondary Treatment

- Modify Bioreactors to setup for 4-stage Bardenpho/MLE process, including demolition of existing equipment and piping within the tanks, repairing concrete, installing baffle walls, new slide gates, new aeration piping and valves, new diffuser grids, new anoxic zone mixers, internal recycle pumping, and new blowers. Associated piping, electrical, and instrumentation for this modification, including a new MCC and Control Panels with SCADA integration.

- Demolish and replace secondary clarifier mechanisms
- Demolish and replace return activated and waste activated sludge pumps; replace piping and valves
- Demolish and replace scum pumps; modify piping to discharge to SHTs
- General piping and valve replacement in pump rooms
- Flow Distribution structure modifications
- Lighting at clarifiers
- New conduit and power, local control stations, and emergency stops for replaced equipment
- New Instrumentation and SCADA integration for replaced equipment; new flow meters for sludge pumps
- Replace HVAC system in Operations Building
- Replace electrical systems in Operations Building, including new power and control stations to replaced equipment
- New Instrumentation and SCADA integration for replaced equipment
- General structural and architectural improvements to Operations Building, including window and door replacement.

Solids Processing

- Demolish and replace belt filter presses with centrifuges
- Install new conveyors
- Demolish and replace gravity belt thickeners in-kind
- Demolish and replace polymer systems
- Demolish and replace spray wash water pumps
- Demolish and replace thickened sludge pumps and centrifuge feed pumps
- Replace piping and valving associated with solids processing
- Demolish and replace SHT blowers and diffusers
- Install a new SHT underground and Sludge Building
- Replace HVAC system in Sludge Building

- Replace electrical systems in Sludge Building, including new power and control stations to replaced equipment. New MCCS and a new Electrical Room on upper floor of sludge building
- New Instrumentation and SCADA integration for replaced equipment, including new control panels
- General structural and architectural improvements to Sludge Building, including window and door replacement.
- New roll-off container room and structural modifications in existing Sludge Bay
- Modifications to Sludge Building to renovate Maintenance offices and remove Administrative offices.

<u>Composting and Administrative Area</u>

- Demolish and/or abandon composting operations; including existing biofilter
- Construct new building to house administrative offices in or next to Composting Building

<u>Odor Control</u>

- Demolish and/or abandon wet scrubbing unit in Preliminary Treatment Building
- Demolish and/or abandon carbon unit in Septage Receiving
- Demolish and/or abandon wet scrubber for Primary Clarifiers
- Demolish and/or abandon biofilter
- Replace equipment and media associated with wet scrubber for preliminary treatment building, repair vessel. New ductwork to GTs, and SHTs.
- New high-capacity carbon unit for Preliminary Building
- New high-capacity carbon unit for Sludge Building
- Associated electrical, instrumentation, SCADA integration, and piping/ducts for all systems

There are no improvements recommended for the septage receiving and disinfection systems at the WPCF. The Plant Water system should be replaced.

Tables 6-44 and **6-45** present a summary of the conceptual level cost estimate for the project. This cost estimate will be updated throughout the design process to reflect any changes to the design. The estimated cost to upgrade the WPCF was developed using standard cost estimating procedures, utilizing conceptual layouts, equipment quotations and unit cost information. Where appropriate, recent construction cost data were incorporated. Allowances were provided for general contractor overhead and profit, project location multiplier for Massachusetts construction, construction phase contingency, and engineering services for design and construction. The total project cost for the recommended improvements is estimated to be approximately $57.6 million.

TABLE 6-44

CONCEPTUAL COST ESTIMATE

ITEM	ESTIMATED COST
Civil	$1,694,000
Architectural	$2,573,000
Structural	$2,282,000
Process Equipment & Piping	$12,139,000
HVAC/Plumbing	$1,621,000
Instrumentation	$1,809,000
Electrical	$4,653,000
Contractor Mobilization (5%)	$1,339,000
Itemized Construction Subtotal	**$28,110,000**
Contractor Overhead and Profit (20%)	$3,666,000
Contractor Mark-up on Subcontractor Work	$733,000
Bonds and Insurances and Unit Price Items (4%)	$1,212,000
Construction Cost Subtotal	**$33,721,000**
Design Contingency (20%)	$6,744,000
Inflation to Mid-point of Construction (12%)	$4,061,000
Total Estimated Construction Cost	**$44,526,000**
Construction Phase Contingency (5%)	$2,230,000
Engineering Services – Design & Construction Administration (20%)	$8,905,000
Materials Testing (1%)	$445,000
Asbestos and Lead Paint Abatement	$10,000
Town Legal/Administration Fees (2%)	$891,000
Financing (1%)	$570,000
Total Project Cost	**$57,577,000**

TABLE 6-45

CONCEPTUAL COST ESTIMATE BY UNIT PROCESS

ITEM	ESTIMATED COST
General Sitework And Paving	$1,555,000
Preliminary Treatment	$2,758,000
Flow Equalization	$1,254,000
Primary Treatment	$2,845,000
Secondary Treatment	$12,363,000
Solids Handling	$17,305,000
Administration Building	$1,579,000
Odor Control	$2,149,000
Plant Water	$173,000
Yard Pump Station Piping, Valving, and Pumps	$130,000
Fiber Optic Network	$156,000
Scada Software and Hardware	$156,000
Generators	$779,000
Power Feed and Associated Duct banks	$1,168,000
Site Lighting	$156,000
Total Estimated Construction Cost	***$44,526,000***
Total Project Cost	**$57,577,000**

The recommended process flow diagram is shown in Figure 6-13 and the recommended solids flow diagram is shown in Figure 6-17. The recommended site plan is shown in **Figure 6-20**.

6.4.7 Recommended Implementation Schedule

The proposed project schedule is shown in **Table 6-46**. The schedule is subject to change based on funding approval by the Town. The preliminary design phase would be initiated within one month after the annual Town Meeting (needed to appropriate design funds).

TABLE 6-46

PROPOSED SCHEDULE

MILESTONE	DATE
Final CWMP	January 2020
CWMP Public Hearing	February 2020
Draft/Final NPDES Permit Issuance	2020/2021
Preliminary Design Begins	July 2021
MassDEP SRF Project Evaluation Form (PEF) Submitted	August 2021
Preliminary Design Report (30%)	December 2021
MassDEP SRF Intended Use Plan (IUP) Notification Draft	By December 31, 2021
Final IUP	January 2022
Final Design & Permitting Begins	January 2022
SRF Application Submission (90% Design)	By October 15, 2022
100% Design & Permitting Complete	By December 31, 2022
Bidding	January through March 2023
Start Construction	By June 30, 2023
Substantial Completion	June 2025
Final Completion	December 2025
One-year Warranty Period	June 2026

6.4.8 Design Considerations

During design of the WPCF, TR-16 and other engineering design guidelines will be followed. Part of the guidelines include measures for reducing impacts of flooding/storm surge on equipment at the WPCF. To address this, all structures and equipment will be raised (where possible) to be 3-feet above the 100-year flood elevation. For structures and equipment that cannot be raised, the operation and maintenance manual update will include standard operating procedures to control flood waters, including placing berms, sand bags, etc.

DRAWING
FIG 6-20

SOMERSET, MASSACHUSETTS
SOMERSET WPCF

Recommended Site Plan

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Section 7
Wastewater Management Systems Recommendations

SECTION 7

WASTEWATER MANAGEMENT SYSTEMS RECOMMENDATIONS

7.1 UNSEWERED AREAS

As previously presented in this report, approximately ninety-nine percent of Somerset residents rely on the Town's municipal sewer system to collect, transport, treat and dispose of its wastewater. Somerset is unique in that they have regulations in place where a resident or other property owner must connect to the Town sewer system if they sell their property/building, or their existing septic system "fails".

A Town-wide needs assessment was conducted for the non-sewered areas to evaluate whether conventional, on-site septic systems can provide adequate treatment for sanitation and environmental protection now and through the 20-year planning period. To complete the needs assessment, the non-sewered areas were divided into seven study areas based on geographical location and various other physical and environmental criteria. The non-sewered areas in Somerset are largely undeveloped areas. Gravity sewer is available on nearly every developed street.

The evaluation of the needs assessment concluded with all 7 study areas being categorized as having "Low Needs" under existing and projected future conditions.

7.1.1 Recommended Plan

This evaluation shows that there is no immediate need for municipal sewer extension, but if new development is to occur this could change. Study areas 3 and 7, which have been targeted for future development will be further analyzed to determine what future wastewater flows could be generated from within the study areas, and possible impacts on the collection system. The study areas that are not targeted for future development were discontinued from further evaluation as it has been determined that these parcels do not show a need to be connected to the collection system, and development of the area is unlikely.

The Town of Somerset does not have any current plans for municipal sewer expansion. The Town has been in communication with the neighboring Town of Swansea to discuss the possibility of a sewer district being formed or an intermunicipal Agreement (IMA) to allow for municipal sewer expansion of several areas in the Route 6 corridor of Swansea. Initial evaluation of Somerset's average wastewater flow to the WPCF suggest that that there may be available average flow capacity available for Swansea (design average flow for the WPCF is 4.2 mgd and the current average daily flow is approximately 3.3 mgd ~ potentially 0.9 mgd of average flow capacity available). One potential scenario includes Somerset utilizing 0.5 mgd of available average flow capacity making up to 0.4 mgd of average flow available for "others" (Swansea, for example).

7.2 GRAVITY COLLECTION SYSTEM AND I/I

The Somerset sewer collection system consists of approximately 500,000 linear feet of gravity sewer, 20,000 linear feet of force main, and 2,345 sanitary sewer manholes. The collection system includes both new and older sewer piping, and no combined sewers are believed to be connected to the collection system. Wastewater collected is comprised mostly of residential flow, with some commercial and industrial wastewater. The Town does not have any intermunicipal agreements for sewer collection in surrounding towns.

If the Town of Swansea were to connect to the Somerset wastewater collection system, it is assumed that the connection would be along Route 6 and consist of an average daily flow of 400,000 gpd.

As part of an evaluation completed by the Town of Swansea in June 2019, it was determined that the most effective approach to connecting Swansea flow to Somerset via the Route 6 corridor is to connect via force main at the existing sewer manhole at the Route 6 and Lees River Avenue intersection. Initial analysis indicates that the downstream Lees River Pump Station has available capacity for some additional flow, but an additional 400,000-500,000 gpd of additional average daily flow may require capacity upgrades to the station (addition of a third pump or replace existing pumps with larger capacity pumps). The 12-inch diameter force main for the Lees River Avenue pump station and downstream gravity sewers (10-inch to 15-inch in diameter) between the force main discharge and the WPCF would need to be evaluated in more detail from a hydraulic capacity standpoint if a Swansea connection were to move forward and when more specific information is available. The June 2019 evaluation makes the assumption that the existing force main for Lees

River Avenue pump station and all gravity sewer to the WPCF would need to be replaced and or rehabilitated as part of receiving wastewater flow from Swansea via the Route 6 corridor.

7.2.1 Recommended Plan

The recommended plan for the collection system is to focus on removing sources of I/I by first locating the sources using sewer system evaluation survey (SSES) field work. Focus will then shift to rehabilitating or replacing sewer pipes and manholes with significant sources of I/I and/or that have structural defects or other condition-related problems. As manhole inspections are performed during SSES phases, the pipe data including materials and inverts should be entered into the Town's GIS database. It is recommended that the Town develop a prioritized plan for cleaning, inspecting, and ultimately rehabilitation of gravity sewer pipes utilizing the municipality's GIS data.

The Town will also continue to repair or replace sewer assets on an as-needed and/or emergency basis (for example, sewer main or service lateral pipe breaks). Based on the results from the flow monitoring and infiltration/inflow (I/I) analysis, preliminary recommendations for sanitary sewer evaluation survey (SSES) work were made for areas of the collection systems (prioritized by flow meter basins).

Using the MassDEP criteria, **Table 7-1** summarizes the recommended collection system SSES investigation work. The following types of SSES tasks are recommended in meter basins, which are identified to have infiltration issues: manhole inspections, night flow isolations, and closed-circuit television (CCTV) inspection. The Town has recently and will continue to perform pipeline CCTV inspections for high priority areas of the collection system. For area with inflow problems, typical types of SSES work include: manhole inspections, smoke testing, dye testing, and building inspections.

TABLE 7-1

PLANNED SSES RECOMMENDATIONS

Meter Basin	Infiltration Priority	Inflow Priority	CCTV Inspection	Night Flow Isolation	Manhole Inspection	Smoke Testing	Dye Testing	Building Inspection	Flow Monitoring
M1	No	No	No	No	No	No	No	No	No
M2	No	Yes	No	No	Yes	No	No	Yes	No
M3	No	No	No	No	No	No	No	No	No
M4	No	Yes	No	No	Yes	Yes	Yes	Yes	No
M5	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
M6	Yes	No	Yes	Yes	Yes	No	No	No	No
M7	No	No	No	No	No	No	No	No	No
M9/M8	No	Yes	No	No	Yes	Yes	Yes	Yes	No
M10	No	No	No	No	No	No	No	No	No
M11	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
M12	No	Yes	No	No	No	No	No	Yes	No
M14	No	Yes	No	No	Yes	No	No	Yes	No
M15	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
M16	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
M19	No	Yes	No	No	Yes	No	No	Yes	No
M20/M13/M17/M18	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
M21	No	Yes	No	No	Yes	Yes	Yes	Yes	No
M22	No	No	No	No	No	No	No	No	No
M23	Yes	No	Yes	Yes	Yes	No	No	No	No
M24	No	Yes	No	No	Yes	No	No	Yes	No
M25	No	No	No	No	No	No	No	No	No
M26	No	No	No	No	No	No	No	No	No
Totals	**7**	**13**	**7**	**7**	**14**	**4**	**4**	**13**	**1**

1. Gray highlights represent "high priority" areas.

7.2.2 Project Costs

The planning level cost estimates for the six SSES phases are shown in **Table 7-2**. These planning-level costs were developed using standard cost estimating procedures consistent with industry standards utilizing unit cost information. The project cost information presented herein is in current dollars and is based on the *Engineering News-Record* (ENR) Index of 11,170 (September 2018) The estimated cost for all six phases is $2,188,700.

TABLE 7-2
PLANNING LEVEL PROJECT COST ESTIMATE FOR RECOMMENDED SSES WORK

SSES Phase	Meter Basin	Total Cost
Phase 1	M4, M16, M21	$318,400
Phase 2	M6, M11. M15	$395,200
Phase 3	M2, M5, M12	$328,300
Phase 4	M9/M8, M14, M24	$327,600
Phase 5	M23, M20/M13/M17/M18[1]	$217,500
Phase 6[2]	M20/M13/M17/M18	$601,700
	TOTAL	**$2,188,700**

1. The work in M20/M13/M16/M18 will only be micro-metering and night flow isolations in this phase.
2. The results of the micro-metering during Phase 5 may reduce the quantity of SSES work for M20/M13/M16/M18 in Phase 6.

7.2.3 Implementation Plan

The implementation schedule shown in **Table 7-3** includes provisions for the recommended SSES tasks over the next 13 years. The first phase of SSES work will be in 2021.

This schedule focuses on finding and quantifying the sources of I/I in the sanitary sewer system. Based on the findings from the SSES tasks, the Town will consider rehabilitation, repair, or replacement of sewer assets to address the problems identified. Also, it is recommended that the

Town perform post-rehabilitation flow monitoring to document the estimated amount of I/I removed from its sewer collection system, when feasible.

TABLE 7-3

IMPLEMENTATION SCHEDULE

Phase	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1													
2													
3													
4													
5													
6													

7.3 WASTEWATER PUMP STATIONS

There are currently 17 pump stations located throughout Somerset's wastewater collection system. Each of the pump stations currently being operated and maintained by the Town's Water Pollution Control Department are listed below:

1. Angus Street
2. Cherry Street
3. Dublin Street
4. Durfee Court
5. Foley Avenue
6. Gay Street
7. Grove Avenue
8. Lake Street
9. Lees River Avenue
10. Luther Avenue
11. Main Street
12. Millers Lane
13. Owen Avenue
14. Pilot Drive
15. Pleasant Street
16. Route 6
17. Wilbur Avenue

The pump stations were evaluated, and ranked, based on several evaluative criteria. The criteria included the following:

1. Condition of Station
2. Age of Station
3. Rated capacity
4. Safety concerns
5. Instrumentation and Communications
6. Standby power
7. Locational Impacts (environmental & residential impacts, odor, aesthetics, etc.)
8. Vulnerability to impact from sea level rise
9. Vulnerability to impact from hurricane surge

Based on the criteria above, recommendations for each pump station were made, cost estimates developed, and a prioritization list created for a Capital Improvement Plan (CIP).

7.3.1 Recommended Plan

A detailed recommended plan for each pump station is included in Section 5.

7.3.2 Project Costs

We have summarized the estimated capital costs for high and normal priority improvements to each station in **Table 7-4** below. The costs were estimated using similar pump station upgrade bid pricing and should be considered planning level costs for Town budgeting purposes. As the Town moves forward with station upgrades (preliminary and design phases), the cost estimates will need to be updated and adjusted to reflect the specific details for the upgrades for the given station.

TABLE 7-4
SUMMARY OF TOTAL PROJECT COST ESTIMATES FOR RECOMMENDED PUMP STATION IMPROVEMENTS

Pump Station	Estimated Costs		
	Normal Priority	High Priority	Total
Angus Street	$384,000	$17,000	$401,000
Cherry Street	$944,000	$0	$944,000
Dublin Street	$447,000	$161,000	$608,000
Durfee Court	$921,000	$0	$921,000
Foley Avenue	$816,000	$373,000	$1,189,000
Gay Street	$0	$913,000	$913,000
Grove Street	$498,000	$297,000	$795,000
Lake Street	$497,000	$0	$497,000
Lee's River Avenue	$517,000	$18,000	$535,000
Luther Avenue	$703,000	$269,000	$972,000
Main Street	$0	$1,983,000	$1,983,000
Millers Lane	$1,069,000	$0	$1,069,000
Owen Avenue	$933,000	$0	$933,000
Pilot Drive	$0	$1,215,000	$1,215,000
Pleasant Street	$0	$1,226,000	$1,226,000
Route 6	$0	$1,578,000	$1,578,000
Wilbur Avenue	$0	$1,712,000	$1,712,000
Overall Total	$7,729,000	$9,762,000	$17,491,000

7.3.3 Recommended Implementation Plan

The recommended improvements implementation schedule is detailed in **Table 7-5**. This table shows the target year to complete the recommended improvements and the total estimated cost for such improvements. The schedule is based on the results of the pump station evaluation and ranking analysis as summarized in Table 5-2. The intent is to spread the improvement costs over a 15-20-year duration and recognize that the Town needs to balance its wastewater pumping station improvements with other infrastructure improvements (WWTF upgrade, water system improvements, stormwater/drainage system improvements, etc.)

TABLE 7-5

RECOMMENDED PUMP STATION IMPROVEMENTS IMPLEMENTATION SCHEDULE

Pump Station	CAPITAL IMPROVEMENTS PLAN YEAR																
	2020	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**
Angus Street																	$401,000
Cherry Street				$944,000													
Dublin Street													$608,000				
Durfee Court		$921,000															
Foley Avenue										$1,189,000							
Gay Street		$913,000															
Grove Street														$795,000			
Lake Street															$497,000		
Lee's River Avenue																$535,000	
Luther Avenue											$972,000						
Main Street			$1,983,000														
Millers Lane				$1,069,000													
Owen Avenue		$933,000															
Pilot Drive					$1,215,000												
Pleasant Street			$1,226,000														
Route 6	$500,000					$1,078,000											
Wilbur Avenue		$1,712,000															
Yearly Total	**$500,000**	**$4,479,000**	**$3,209,000**	**$2,013,000**	**$1,215,000**	**$1,078,000**	**$0**	**$0**	**$0**	**$1,189,000**	**$972,000**	**$0**	**$608,000**	**$795,000**	**$497,000**	**$535,000**	**$401,000**

7.4 WATER POLLUTION CONTROL FACILITY

The Town of Somerset's Water Pollution Control Facility (WPCF) was originally built in the late 1960's and was an extended aeration facility. The original facility included grit removal, three aeration tanks, and two chlorine contact tanks and an Operating Building. In the mid to late 1980's the facility underwent a major upgrade (particulars included below). In 1993 a small upgrade was undertaken to construct an additional chlorine contact tank. In 1997 odor control was installed at the facility. In 2016 the chemical disinfection system was changed from chlorine gas to liquid sodium hypochlorite. SCADA upgrades were also completed a the WPCF over the last few years. Minor equipment replacements have been completed during subsequent years, including two new mechanical screens, screenings wash presses, and two new screw pumps. Most of the equipment and structures are of the 1990 upgrade vintage.

In addition to aging equipment and building systems, the Town of Somerset is expecting to receive a numerical Total Nitrogen (TN) limit in its new NPDES permit. The Town is expecting that a mass limit of 105 lbs/day for TN will be included. This mass limit is equivalent to a TN concentration limit of 3.8 mg/l and 3.0 mg/L at average daily flows of 3.33 MGD and permitted capacity of 4.2 MGD, respectively. The Town cannot meet this limit with their existing treatment facility processes.

The recommended upgrade targets the immediate equipment replacement needs, building upgrades required, and a plan to address pending numerical permit limits for Total Nitrogen. The equipment and building upgrades will also target energy deficiencies at the facility.

7.4.1 Recommended Plan

The recommended plan for the Somerset WPCF consists of phased upgrades for the 20-year planning period. The recommended first phase of these upgrades consists of equipment and processes in immediate need of replacement or upgrade. The primary reasons for replacement are equipment age or building code requirements. The primary reason for upgrading is related to achieving compliance with the pending NPDES permit (which will include total nitrogen-related effluent discharge limits). The other phases in the recommended plan consist of items that are not in immediate need of replacement, are not part of a building system that will trigger code requirements, and do not relate to achieving compliance with the pending NPDES permit.

The following list encompasses the systems and equipment in the 0-5-year (first phase) recommended upgrade:

- Preliminary Treatment – building improvements, grit removal upgrade, sampler and flow measurement replacement.
- Septage receiving – none.
- Primary Treatment – mechanism replacement, sludge and scum pump replacement. Evaluate weirs and baffles, and concrete repair.
- Secondary Treatment – see following section for aeration improvements. Replace secondary clarifier mechanisms, concrete repair and sludge (RAS and WAS) pumps. Evaluate weirs and baffles and addition of perimeter density baffle addition to increase performance. Operations building improvements.
- Disinfection – none.
- Solids Processing – see recommendation below.
- Flow Equalization – replace flow equalization pump. Install new aeration/mixing system in two rectangular equalization tanks. See other recommendations below.
- Composting – abandon and demolish composting, see recommendation below under solids processing for land use.
- Odor Control – see recommendations below
- General site – replace electrical service and MCCs. Replace all generators with two new units. SCADA and instrumentation upgrade, including a site-wide fiber-optic network. General paving of the site.

Current and pending effluent quality limits require the facility to upgrade the secondary treatment process, implementing a Four-Stage Bardenpho and MLE processes to meet effluent nitrogen requirements. These two processes can be alternated to meet seasonal and year-round effluent nitrogen requirements. The existing aeration tanks need to be retrofitted into Four-Stage Bardenpho and MLE configurations to meet a seasonal effluent total nitrogen limit. During summer (growing season), the WPCF can be operated as Four-Stage Bardenpho process to meet an effluent TN of 4.9 mg/L, or less. During the winter season (non-growing season) the WPCF can be operated as an MLE process only having to “report” the effluent TN data.

A new bioreactor train will be needed if an effluent TN of less than 4.9 mg/L is required year-round. The new bioreactor train can be added by retrofitting two of the existing rectangular equalization tanks into a Four-Stage Bardenpho configuration. The following is a list of improvements that will be required for the secondary system to meet the new TN limits.

- Modify Bioreactors to set-up for 4-stage Bardenpho/MLE process, including demolition of existing equipment and piping within the tanks, repairing concrete, installing baffle walls, new slide gates, new aeration piping and valves, new diffuser grids, new anoxic zone mixers, internal recycle pumping, and new blowers. Associated piping, electrical, and instrumentation for this modification, including a new MCC and Control Panels with SCADA integration.
- Demolish and replace secondary clarifier mechanisms.
- Demolish and replace return-activated and waste-activated sludge pumps; replace piping and valves.
- Demolish and replace scum pumps; modify piping to discharge to SHTs.
- General piping and valve replacement in pump rooms.
- Flow distribution structure modifications.
- Lighting at clarifiers.
- New conduit and power, local control stations, and emergency stops for replaced equipment.
- New Instrumentation and SCADA integration for replaced equipment; new flow meters for sludge pumps.
- Replace HVAC system in Operations Building.
- Replace electrical systems in Operations Building, including new power and control stations to replaced equipment.
- New Instrumentation and SCADA integration for replaced equipment.
- General structural and architectural improvements to Operations Building, including window and door replacement.

The solids processing equipment requires significant improvements to meet the needs of the facility going forward. Below is a list of recommended improvements.

- Demolish and replace belt filter presses with centrifuges.
- Install new conveyors.
- Demolish and replace gravity belt thickeners, in-kind.
- Demolish and replace polymer systems.
- Demolish and replace spray-wash water pumps.
- Demolish and replace thickened sludge pumps and centrifuge feed pumps.
- Replace piping and valving associated with solids processing.
- Demolish and replace sludge holding tank (SHT) blowers and diffusers.
- Install a new sludge holding tank underground and Sludge Building.
- Replace HVAC system in Sludge Building.
- Replace electrical systems in Sludge Building, including new power and control stations to replaced equipment. New MCCS and a new Electrical Room on upper floor of sludge building.
- New Instrumentation and SCADA integration for replaced equipment, including new control panels.
- General structural and architectural improvements to Sludge Building, including window and door replacement.
- New roll-off container room and structural modifications in existing sludge bay.
- Modifications to Sludge Building to renovate maintenance offices and remove administrative offices.
- Demolish and/or abandon composting operations; including existing biofilter.
- Construct new building to house administrative offices in or next to Composting Building

The odor control systems at the facility also need to be replaced and re-evaluated for what is necessary at the facility. Below is a list of needs for these systems.

- Demolish and/or abandon wet scrubbing unit in Preliminary Treatment Building.
- Demolish and/or abandon carbon unit in Septage Receiving.
- Demolish and/or abandon wet scrubber for Primary Clarifiers.
- Demolish and/or abandon biofilter.
- Replace equipment and media associated with wet scrubber for preliminary treatment building, repair vessel. New ductwork to GTs, and SHTs.

- New high-capacity carbon unit for Preliminary Building.
- New high-capacity carbon unit for Sludge Building.
- Associated electrical, instrumentation, SCADA integration, and piping/ducts for all systems.

There are no improvements recommended for the septage receiving and disinfection systems at the WPCF. The plant water system should be replaced.

7.4.2 Project Cost Estimates

Table 7-6 and **7-7** present a summary of the conceptual level cost estimates for upgrades/improvements to the WPCF. This cost estimate will be updated throughout the design process to reflect any changes to the preliminary and final design. The estimated cost to upgrade the WPCF was developed using standard cost estimating procedures, utilizing conceptual layouts, equipment quotations and unit cost information. Where appropriate, recent construction cost data were incorporated. Allowances were provided for general contractor overhead and profit, project location multiplier for Massachusetts construction, construction phase contingency, and engineering services for design, bidding, construction and other services. The total project cost estimate for the recommended upgrades/improvements is estimated to be approximately $57.6 million.

TABLE 7-6

CONCEPTUAL COST ESTIMATE FOR WPCF UPGRADES/IMPROVEMENTS

ITEM	ESTIMATED COST
Civil	$1,694,000
Architectural	$2,573,000
Structural	$2,282,000
Process Equipment & Piping	$12,139,000
HVAC/Plumbing	$1,621,000
Instrumentation	$1,809,000
Electrical	$4,653,000
Contractor Mobilization (5%)	$1,339,000
Itemized Construction Subtotal	**$28,110,000**
Contractor Overhead and Profit (20%)	$3,666,000
Contractor Mark-up on Subcontractor Work	$733,000
Bonds and Insurances and Unit Price Items (4%)	$1,212,000
Construction Cost Subtotal	**$33,721,000**
Design Contingency (20%)	$6,744,000
Inflation to Mid-point of Construction (12%)	$4,061,000
Total Estimated Construction Cost	**$44,526,000**
Construction Phase Contingency (5%)	$2,230,000
Engineering Services – Design & Construction Administration (20%)	$8,905,000
Materials Testing (1%)	$445,000
Asbestos and Lead Paint Abatement	$10,000
Town Legal/Administration Fees (2%)	$891,000
Financing (1%)	$570,000
Total Project Cost Estimate	**$57,577,000**

TABLE 7-7

CONCEPTUAL COST ESTIMATE BY UNIT PROCESS FOR WPCF UPGRADES/IMPROVMENTS

ITEM	ESTIMATED COST
General Sitework And Paving	$1,555,000
Preliminary Treatment	$2,758,000
Flow Equalization	$1,254,000
Primary Treatment	$2,845,000
Secondary Treatment	$12,363,000
Solids Handling	$17,305,000
Administration Building	$1,579,000
Odor Control	$2,149,000
Plant Water	$173,000
Yard Pump Station Piping, Valving, and Pumps	$130,000
Fiber Optic Network	$156,000
Scada Software and Hardware	$156,000
Generators	$779,000
Power Feed and Associated Duct banks	$1,168,000
Site Lighting	$156,000
Total Estimated Construction Cost	***$44,526,000***
Total Project Cost Estimate	**$57,577,000**

7.4.3 Implementation Schedule

The estimated project schedule for WPCF upgrades/improvements is shown in **Table 7-8**. The schedule is subject to change based on when the Town received the new final NPDES permit (Town still has not received the new draft NPDES permit) and project funding/budgeting approvals. It is anticipated that the Town will receive preliminary design phase for the WPCF upgrades/improvements would be initiated within one month after the annual Town Meeting (needed to appropriate design funds).

TABLE 7-8

PROPOSED SCHEDULE

MILESTONE	DATE
Final CWMP	January 2020
CWMP Public Hearing	February 2020
Draft/Final NPDES Permit Issuance	2020/2021
Preliminary Design Begins	July 2021
DEP SRF Loan Project Evaluation Form (PEF) Submitted	August 2021
Preliminary Design Report (30% design completion)	December 2021
MassDEP SRF Intended Use Plan (IUP) Notification-Draft	by December 31, 2021
Final IUP	January 2022
Final Design and Permitting Begins	January 2022
SRF Application Submission (90% Design completion)	by October 15, 2022
100% Design and Permitting Complete	by December 31, 2022
DEP Issues Project Approval Certificate (PAC)	by December 31, 2022
Bidding	January through March 2023
Start Construction	By June 30, 2023
Substantial Completion of Construction	June 2025
Final Completion of Construction	December 2025
One-year Warranty Period	June 2026

Section 8
Public Participation

SECTION 8

PUBLIC PARTICIPATION

8.1 INTRODUCTION

Public outreach strategies and activities included meetings with municipal officials and representatives of regulatory agencies, and other appropriate stakeholders. All relevant Town Boards and Departments were interviewed to identify:

- The current wastewater management status with the Town;
- The short and long-term goals regarding the Town's wastewater management systems;
- The issues, concerns and inputs specific to the CWMP;

The public outreach efforts are also utilized to gauge the level of knowledge and interest about the wastewater issues within the Town.

This process gives interested parties in the Town of Somerset a chance to understand the issues, the CWMP process, and the opportunity to "have a voice" in the decision-making process. Communication between Town officials, interested stakeholders, and state agencies is important during the CWMP process and beyond.

Implementation of an effective public participation process results in a plan that can be "approved" by Town officials and the citizens of the community.

8.2 SUMMARY OF PUBLIC PARTICIPATION

Wright-Pierce has worked closely with the Town's Board of Water and Sewer Commissioners, Department of Public Works, Board of Health, Planning Department, Assessor's Department, and relevant state agencies to develop the CWMP. The intent of the CWMP is to ultimately build consensus for the recommended wastewater management plan.

The Town will establish a depository for project information to be viewed by the public. This depository is to be located at Town Hall. This depository site is for displaying information generated during the CWMP process and may include:

- Draft and final versions of CWMP reports;
- Any advertisements and press releases published;
- Newspaper articles;
- Any relevant project meeting schedules

One public meeting will be held for gathering and reporting information for the residents of Somerset. The public meeting will be held at a location in Somerset to present the overall approach, goals and progress to date.

The draft CWMP will be made available to the Town, DEP, and the public via the depositories for review prior to the public meeting. After the public meeting, Wright-Pierce will summarize the comments, the questions, and the answers presented at the public meeting.

Section A
Scope of Services

Scope of Services

Wright-Pierce will complete all tasks as required by the Town's RFP. As requested by the Town, we have elaborated on several items in the scope of services. At the end of each task and/or subtask as appropriate, any scope of services additions and/or clarifications have been added using **bold text**.

TASK 1: ASSESSMENT OF EXISTING CONDITIONS

Discuss and describe what kind of information, data, planning documents (federal. state, local and regional), mapping and other tools that will be used to conduct assessments and provide an outline to analyze and evaluate each of the following:

A. *Description of Man-Made Environment*

B. *Description of Natural Environment* - Development of maps using existing federal, state and local GIS data to present overview of existing conditions and environmental features.

   Review and document water quality data available from the Town and state resources. Review census data, geographical land use information and zoning regulations to describe population growth and development patterns within the town. Review assessor data and mapping. Coordinate with the Southeast Regional Planning and Economic Development District. Coordinate with planning staff to update the information and refine estimates with specific focus on potential redevelopment opportunities that could impact water resources. Review existing environmental databases to identify existing or potentially contaminated sites (e.g., Chapter 21E oil and hazardous material sites with MassDEP AUL's, underground storage tanks). Identify locations and character of undeveloped land and any conservation efforts to preserve open space using the most recent master plan or open space and recreation plan.

C. *Description of anticipated growth* – Project anticipated population and economic growth through the 20-year planning period. Data from the Massachusetts Institute for Social and Economic Research (MISER), regional planning agencies, and other data sources can be used to develop economic and population projections. Any master plans or open space plans done by the community will be considered in developing growth projections.

D. *Conformance with other town planning documents* - Identify important components of recent planning documents that may impact the IWRMP. Findings, recommendations, or conclusions will be referenced from recent planning studies conducted by or for the Town of Somerset.

   At the outset of Task 1, Wright-Pierce will collect all relevant water, wastewater, stormwater and other information/data/reports necessary to assess existing conditions and properly develop the Town's IWRMP. This will include careful coordination with SRPEDD and Town departments to make sure all relevant information is collected, reviewed and utilized for this effort.

TASK 2: ASSESSMENT OF EXISTING WASTEWATER MANAGEMENT SYSTEMS

Identify and discuss information, data and other resources that will be used to conduct assessments and provide an outline to analyze and evaluate each of the following:

A. *Description of on-site systems* - review and analyze septic system data and evaluate performance.

Water Pollution Control facility - Evaluate buildings, structures, equipment electrical systems, controls piping and treatment processes, and identify facility deficiencies. Provide a condition and performance evaluation, which will include a review of the existing system with respect to design points.

- Provide an energy evaluation, which will review the facilities for opportunities to improve energy efficiency.
- Assess existing flows andloads through a 4-month sampling program.
- Identify potential alternative uses and /or elimination of the current tankage/processes, and assess the impact of potential future permit changes for nitrogen and other conventional pollutants.
- Identify alternative equipment and process improvements and/or replacements.
- Determine the most cost-effective improvements based on a total life cycle cost. Develop non-monetary screening criteria to evaluate alternatives. Apply criteria and rank advantageous alternatives to establish preferred alternatives for evaluation.

Perform a comprehensive site investigation of the WPCF with its building disciplines. Evaluate all buildings and structures, processes/systems, operations, and other components as needed. Each discipline will develop a technical memo of their site visit.

B. ***Wastewater collection system*** - Condition assessment of the ***pump stations*** located within the collection system, which will include an assessment of each station, including process, mechanical, electrical and structural elements. Provide capacity assessment to focus on empirical evidence of capacity deficiencies, such as historic backups or overflows. Review current operation and maintenance practices in the context of industry standards and best management practices.

Wright-Pierce will also assess architectural (as appropriate), instrumentation and control, and code related items at each pumping station. Perform pump draw-down testing at stations, as necessary to fully evaluate station capacity.

C. *Residuals treatment, handling and disposal.*

Perform a thorough assessment of the Town's current screenings, grit and biosolids systems.

D. *Operation and maintenance of existing treatment works* - Identify and rate deficiencies based on a level of severity, or threat of failure or regulatory violation.

E. *Identification of future needs* - Evaluate the need or potential to expand the existing sewer collection system. Review potential for inter-municipal connections and agreements. Estimate future pollutant loadings (BOD, TSS, N, and P) for the current and future sewer system.

Perform a town-wide "Needs Assessment" by dividing the Town into study areas; developing wastewater assessment criteria; evaluating, scoring and ranking each area; and ultimately determining what areas (if any) are "needs areas" and require further evaluation to develop an off-site solution (onsite treatment and disposal systems are not sustainable long-term).

TASK 3: ASSESSMENT OF EXISTING DRINKING WATER SUPPLY SYSTEM AND FUTURE NEEDS

A. Description of treatment facilities

B. Description of distribution and storage system

C. Description of residuals treatment and disposal practices

D. Description of emergency procedures

E. *Description of water use patterns* - Analyze existing water usage and patterns, including overview of water balance. Summarize existing water quality concerns.

F. *Identification of future needs*- Project future demands over a 20- year planning period. Discuss water conservation and demand management.

Perform a complete assessment of the Town's existing water system infrastructure. Identify and evaluate future water system needs.

TASK 4: ASSESSMENT OF STORMWATER SYSTEM AND IDENTIFICATION OF FUTURE NEEDS

A. *Identify priority stormwater problems* - Collect existing information on the waters that receive stormwater discharges. Review and document surface water quality data available from the Town and state resources. Identify areas in the community with the potential to generate stormwater with higher than average pollutant loads. Identify critical areas that may be impacted by stormwater discharges, such as outstanding resource waters, bathing beaches, cold water fisheries and recharge areas for public water supplies. Identify water bodies that have been classified by the Water Resource Commission (WRC) as being under high or medium stress or that have localized low flow or flooding problems.

B. *Assessment of public education and outreach*

C. *Assessment of public participation program*

D. *Assessment of Illicit Discharge Detection and Elimination (IDDE) Program* - Assess existing efforts toward meeting IDDE program requirements, including review of existing information and mapping for NPDES compliance.

Develop inventory of stormwater assets based on available information, including NPDES MS4 outfall and system maps, GIS databases, technical reports, video and/or anecdotal information provided by the town staff. Review existing outfall inspection data.

Complete IDDE dry weather inspections for up to ten days in the field. No sample collection is required under this scope of work.

Review/update existing IDDF Program; Review/draft legal authority; Review/update written protocol for IDDE responsibilities.

Develop systematic procedures for locating and removing illicit connections. Develop illicit discharge prevention procedures. Define indicators of IDDE program progress.

Prepare written IDDE Program document.

E. *Assessment of construction runoff program*

F. *Assessment of post construction run-off program*

G. *Assessment of good housekeeping/pollution prevention practices for municipal facilities* - Review existing operations and maintenance procedures. Inventory town- owned parcels and evaluate parcels for use as potential mitigation offsets, BMP retrofit sites, or resources otherwise applicable to stormwater management practices.

H. *Identification of Future Needs* - Estimate level of effort and associated costs to meet EPA's future stormwater requirements under the MS4 General permit, including public education, public involvement, IDDE, construction and post construction stormwater runoff, good housekeeping, and water quality issues. This task should include understanding how to manage future development and redevelopment projects and identifying needed modifications to the stormwater management program, including staffing and funding.

Below are listed more specific tasks that will be completed as part of this task:

<u>Mapping and Data Collection</u>

Research and compile available mapping information, which will form the basis of documenting the current situation and identifying areas of critical concern using the latest Town, Mass GIS, and EPA information. Information will include:

<u>Mapping information</u>

a. ***Urban areas established by 2010 census***
b. ***Topography***
c. ***Drainage system information and outfalls, and identified by ownership***
d. ***Sewer system***
e. ***NHESP mapped endangered and rare species habitat areas***
f. ***Historic properties and structures***
g. ***Aquifer and watershed protection zones***
h. ***Waters of the United States (wetlands)***
i. ***Waters with TMDLs***
j. ***Water quality limited waters***
k. ***FEMA mapped flood zones***
l. ***Town owned properties***
m. ***Land use***
n. ***NRCS soils data with hydrologic group ratings***

Existing reports

Research and compile available reports and previously generated documents relative to permit compliance. These documents include (if available):

- a. ***2003 Stormwater Management Program***
- b. ***MS4 Annual Reports (last 3 years)***
- c. ***Town SWPPP information***
- d. ***All Town Bylaws and Regulations***
- e. ***List of Town-owned Properties with Addresses***
- f. ***Operations and Maintenance Plans for Town Facilities***
- g. ***Stormwater Pollution Prevention Plans (SWPPP) for Town Facilities***
- h. ***Available Watershed Association information***
- i. ***Street Sweeping and catch basin cleaning Information***
- j. ***Illicit connection and outfall sampling information***
- k. ***Title 5 Information***

MS4 Component Assessment and Future Needs

Assess each of the components of the MS4 program both for the past and to look at the future. Develop an MS4 Permit Status and Compliance Strategy Matrix - which will be used as an outline for the new stormwater management plan (SWMP).

1. ***Current status of all required tasks including the six minimum control measures will be assessed:***
   1) ***Public Education and Outreach***
   2) ***Public Involvement and Participation***
   3) ***Illicit Discharge Detection and Elimination Program***
   4) ***Construction Site Stormwater Runoff Control***
   5) ***Post Construction Stormwater Management (New & Re Developments)***
   6) ***Good Housekeeping including inventorying Town-owned parcels***
2. ***Identify areas with potential to generate higher than average pollutant loads***
3. ***Identify critical areas impacted by stormwater discharge***
4. ***Identify future needs***
5. ***Develop a plan for compliance with the new permit***
   - a. ***Responsible party***
   - b. ***Schedule***
   - c. ***Budget (planned/available)***
   - d. ***Funding sources – if applicable***

Illicit Discharge Detection and Elimination (IDDE) Program

Assess the current status of the Town's IDDE program. Meet with Town staff to review the program and obtain insights about the Town and stormwater system and overall

drainage patterns and pollutions sources. Take the information collected above to further develop a complete understanding of the issues.

Provide outfall screening. As noted in the RFP, we will perform up to 10 days of Dry Weather outfall screening. Coordinate with Town to visit outfalls during wet weather events in accordance with EPA guidelines. Screening will include:

- ***a. Using existing GIS mapping***
- ***b. Data will be collected using our standard tablet and data collection menus***
- ***c. Missing outfalls, if found, will be located manually using existing orthophotography***

Review and update (as necessary) IDDE related documents.

TASK 5: DEVELOP AND SCREEN ALTERNATIVES

A. ***Wastewater*** - Describe and outline process for assessment of alternatives to address identified needs.

1. Baseline conditions
2. Wastewater alternatives
3. Regulatory standards and water quality goals
4. Facilities requiring groundwater discharge permits
5. Evaluate wastewater collection system alternatives
6. Evaluate residuals management alternatives
7. Evaluate regional solutions

B. ***Water*** - Describe and outline process for assessment of alternatives to address identified needs.

1. Evaluate need for additional withdrawal volumes
2. Evaluate source management
3. Evaluate sources outside basin
4. Evaluate proposal to create new public water system

C. ***Stormwater*** - Describe and outline process for assessment of stormwater alternatives to address the following needs.

1. Additional actions to control groundwater

Typical groundwater control strategies to accomplish these goals include:

- ***Promotion of Infiltration/groundwater recharge where feasible***
- ***Disconnection of impervious areas***
- ***Reuse of stormwater on-site***
- ***Stormwater management on a watershed scale***
- ***Stormwater regulations***
- ***LID/BMP implementation for both public and private parties***

Alternatives will be developed with the Town and each alternative will be screened against the factors outlined in the RFP.

At a minimum, assessments should address evaluation of "no-action alternative" and "fix-it-first" alternative. The screening and evaluation of alternatives should use the following factors:

a. environmental benefits and impacts of selected alternatives

b. impacts on sensitive environmental receptors

c. cost-effectiveness evaluation

d. institutional arrangements

Identify, evaluate and screen alternatives for the Town's water, wastewater and stormwater infrastructure systems. The result will be a short-list of alternatives to further develop and rank in order of priority.

TASK 6: EVALUATE AND RANK PREFERRED ALTERNATIVES

Describe and outline process for ranking and evaluating recommended preferred alternatives for ***water, wastewater and stormwater***, addressing the following considerations:

- public participation
- recommended plan
- necessary institutional arrangements
- preliminary design and scheduling for implementation
- financial arrangements for implementing plan

Perform a detailed evaluation of the preferred (short-listed) alternatives for water, wastewater and stormwater system upgrades/improvements. Address all the items noted above and present a prioritized recommended plan for each discipline.

TASK 7: PUBLIC PARTICIPATION AND OUTREACH PROGRAM

Describe and outline a public participation program to focused on keeping interested stakeholders informed at key project planning milestone dates and events to solicit input for the public include briefings, public meetings, workshops, media release/public information coordinated with the IWRMP project schedule.

The development of a public outreach program is to keep interested stakeholders informed at key project planning milestone dates and events, and to rely on knowledgeable residents and business owners to contribute to the planning process through structured forums and solicit input. A schedule of public meetings, project updates and anticipated media releases/public information coordinated with the IWRMP project schedule should be developed. The program should include the following:

A. Develop a work plan that describes the public participation program, its schedule and budget, initial communication, and how communication of public information meetings will take place.

B. Develop information on posting on the Town's web site and update with project and meeting announcements.

C. Prepare and disseminate information to the public for public information meetings and hearings. Communication methods appropriate lo the purpose will be developed and may include project brochures, meeting notices, agendas, flyers, advertisements, informational fact sheets, press releases and bulletins.

D. Provide six (6) briefings to the Board of Water and sewer Commissioners throughout the assumed twenty (20) month process.

E. Conduct four (4) workshops and provide graphic support for these meetings in the way of handouts, and PowerPoint presentations. Coordinate the recording and distribution of meeting minutes. These workshops will be scheduled at the appropriate project milestones and will be coordinated with the Town.

F. Conduct one (1) public hearing (meeting) at the conclusion of the "draft" IWRMP and provide graphic support for this meeting and coordinate the recording and distribution of meeting minutes.

Work closely with the Town to develop a thoughtful, interactive and effective public outreach program.

TASK 8: COMPREHENSIVE WASTEWATER MANAGEMENT PLAN (CWMP) REPORT

A. Summarize in written document

B. Meet with Town representatives

C. Conduct a meeting to summarize <u>draft</u> report

D. Issue <u>final</u> CWMP report (concurrent with the IWRMP)

Develop a <u>draft</u> CWMP report and transmit to Town for review. Meet with the Town to review and discuss comments regarding the <u>draft</u> report. Incorporate comments on the draft report and issue a <u>final</u> report. Solicit and incorporate draft report comments from SRPEDD and DEP.

TASK 9: COMPREHENSIVE STORMWATER MANAGEMENT SYSTEM PLAN (CSWMP)

A. Review and update stormwater management plan for compliance with NPDES MS4 Program

B. Meet with Town and other stakeholders to review

C. Develop program updates to meet goals of improving water quality and meeting the requirements of the NPDES MS4

D. Develop/update written Comprehensive Stormwater Management Plan (CSWMP)

Develop/update the CSWMP first as a draft for review and comment, then finalize based on Town and stakeholders review.

Meet with Town staff to review and update the existing stormwater management plan (SWMP), to determine current status, schedule, responsible party, methodology for compliance and budget requirements for each task in the MS4 permit and IWRMP. Information gathered in related tasks will be compiled and summarized and reviewed against the existing SWMP.

In reviewing the existing SWMP, the following specific information will be assessed in detail:

1. ***Required documentation:***
    a. ***Identification of people responsible for implementation of program***
    b. ***Compliance regarding endangered species***
    c. ***Compliance regarding historic properties***
    d. ***Authorization of new or increased discharges***
    e. ***Annual program evaluation***
2. ***Inventory of the following:***
    a. ***Listing of all discharges to waters with TMDLs***
    b. ***Listing of all discharges to water quality limited waters***
    c. ***Sanitary sewer overflows (SSOs)***
3. ***Written procedures or description for the following:***
    a. ***Practices for achieving reduction in pollutants to the maximum extent practicable (MEP) through the six minimum control measures***
    b. ***Illicit discharge detection and elimination (IDDE) program***
    c. ***Site inspection procedures and enforcement of sediment and erosion control***
    d. ***Minimizing impacts to drinking water supply sources***
    e. ***Measurers to avoid impacts to surface drinking water supplies and their tributaries***

Developing the CSWMP will be a key element in the final integrated plan. The integration of competing needs within the system will be balanced in the final integration.

TASK 10: INTEGRATED CAPITAL IMPROVEMENT PLAN

A. Develop prioritized capital improvement plan

B. Compile the recommended alternatives

C. Adjust the preliminary list of capital improvement projects based on timeliness, coordination with other project, regulatory or political concerns, environmental and public health concerns, community impacts, and budgetary constraints.

Integrate the water, wastewater and stormwater recommendations into one complete and holistic capital improvements plan (CIP).

One of the major goals of the integrated capital improvement plan is to develop an economically feasible Capital Improvements Plan (CIP) to address known water, wastewater and stormwater deficiencies. The total capital cost of all identified projects will be established and presented in a flexible strategy over a period of time deemed affordable through close analysis with the Town.

A financial capability evaluation will be performed. The integrated CIP will identify potential grants and other funds (for implementation of the recommended plan) available to the Town. Once the funding/financing options are fully vetted, a rate of spending will be established using a combination of project priorities, costs, and potential funding sources.

TASK 11: IWRMP REPORT

A. Document and summarize all work conducted under the forgoing tasks into a draft integrated water resources management plan report

B. Submit draft report to the Town of Somerset and the Massachusetts Department of Environmental Protection for review and comment

C. Conduct a public meeting to discuss report findings.

D. Submit final report to the Town and MassDEP

Similar to the CWMP and CSWMP, submit a draft report, review comments with the Town, DEP, SRPEDD (and others) and then complete and submit final IWRMP report.

TASK 12: FILE ENVIRONMENTAL NOTIFICATION FORM (ENF)

A. Prepare and file an Environmental Notification Form with MEPA

B. Conduct a public hearing on the IWRMP report and notification form

C. Address MEPA comments and update IWRMP

Below is an added task for project administration and additional project related meetings.

TASK 13: PROJECT ADMINISTRATION AND ADDITIONAL MEETINGS

A. Provide project administration services for the entire duration of this project. This will include project management, coordination with the Town, SRPEDD, DEP and other entities as needed.

B. For all meetings noted above in Tasks 1 through 12, Wright-Pierce will prepare agenda's and other meeting information as appropriate. We will attend in person all meetings and document such with written minutes of each meeting.

C. We recommend additional meetings as detailed below:

   a. Project kick-off meeting with the Town and SRPEDD.

   b. Four (4) meetings with the Town to be scheduled as needed during Tasks 1 through 6.

   c. It is assumed all project meetings will be held in Somerset.

The following water system tasks have been added to the IWRMP based on MassDEP ACO requirements:

1. Review current operations with regard to target tank water levels, set-points for booster pumps and other operating conditions that might be influencing water age.

2. Perform a water age analysis using the Town's computerized hydraulic model to test operational changes that could reduce water age. The following simulations are envisioned:
   a. Changes in operating level setpoint for the Hot and Cold Lane tanks
   b. Changes in pump operation and flow rate at the treatment facility
   c. Benefits of reducing tank volume during summer months when TTHMs are highest
   d. Changes in control for booster pumps for high zone

3. Summarize asset management findings regarding proper future sizing of infrastructure in the south end of the water distribution system. Analysis will include:
   a. Developing a pipe replacement plan for the system consistent with reduction of DBPs in the system
   b. Identifying piping that is too large for the reduced demands in the system
   c. Reconfiguring piping and services to reduce water age
   d. Possible abandonment of certain pipelines no longer of value.

Section B
Private Wells

List of Known Private Wells in Somerset as of 8/2002
Somerset BOH

Street Adress	Use
1080 Grand Army of the Republic Highway	Drinking Water
1723 Brayton Avenue	Drinking Water
294 Grand Army of the Republic Highway	Drinking Water
164 Forest Avenue	Irrigation
468 Fairway Drive	Irrigation
108 Warren Street	Drinking Water
26 Gertrude Street	Drinking Water
199 Lynch Avenue	Irrigation
2 O'Neil Road	Drinking Water
3 O'Neil Road	Drinking Water
5 O'Neil Road	Drinking Water
977 Lee's River Avenue	Drinking Water
80 Olympic Road	Drinking Water
179 Alberta Avenue	Drinking Water
105 Mayes Avenue	Irrigation
86 Carol Street	Irrigation

Section C
Sewer Opt Out

OFFICE OF
THE BOARD OF
Water & Sewer Commissioners

3249 COUNTY STREET
P.O. BOX 35
SOMERSET, MASSACHUSETTS 02726
OFFICE (508) 679-2731
PLANT (508) 674-4215

Town of Somerset Water Pollution Control Sewer Service Opt- Out Agreement

Date: 4-10-18

For Property at: 352 Chatterton Ave.
Water Service #: 000100261600

The undersigned residential property owner(s) whose property is not currently connected to the Town of Somerset Sewerage Collection System hereby state that they wish not to connect their property to the current municipal sewerage system and elects to not pay any charges due to the Town of Somerset Water and Sewer Departments for sewerage service, at this time.

The undersigned residential property owner(s) understand and agree that if they elect to connect their property to the Town of Somerset Sewer Collection System at any time after this date that they or ~~their~~ successors or assigns will have to pay in full any and all required connection fees and application fees in place at that time in order to connect to the system and allow discharge of their residential waste into the Town of Somerset Sewerage Collection System.

Signed by: ____________ Signed by: ____________

Printed name: Candice DeStefano Printed name: ____________

Notary Block:

COMMONWEALTH OF MASSACHUSETTS
Candice Destefano
personally appeared before me, the undersigned notary public, and proved to me his/her identity through satisfactory evidence, which were Massachusetts Drivers License and acknowledged he/she signed the foregoing instrument voluntarily for its stated purpose on this 10th day of April, 2018

PATRICIA CARREIRO, Notary Public
My Commission Expires July 17, 2020

Approved by the Board of Water and Sewer Commissioners: ____________

Dated: ____________

OFFICE OF
THE BOARD OF
Water & Sewer Commissioners

3249 COUNTY STREET
P.O. BOX 35
SOMERSET, MASSACHUSETTS 02726
OFFICE (508) 679-2731
PLANT (508) 674-4215

Town of Somerset Water Pollution Control Sewer Service Opt- Out Agreement

Date: 7-31-2017

For Property at: 205 EAStView AVE.
Water Service #: 000100475800

The undersigned residential property owner(s) whose property is not currently connected to the Town of Somerset Sewerage Collection System hereby state that they wish not to connect their property to the current municipal sewerage system and elects to not pay any charges due to the Town of Somerset Water and Sewer Departments for sewerage service, at this time.

The undersigned residential property owner(s) understand and agree that if they elect to connect their property to the Town of Somerset Sewer Collection System at any time after this date that they or their successors or assigns will have to pay in full any and all required connection fees and application fees in place at that time in order to connect to the system and allow discharge of their residential waste into the Town of Somerset Sewerage Collection System.

Signed by: X Richard A Baker Signed by: ______

Printed name: Richard A Baker Printed name: ______

Notary Block: **Then personally appeared before me,**
Richard A. Baker
this 31st **day of** July **20**17
Notary: [illegible signature]
My Commission expires: 3-4-2022

Approved by the Board of Water and Sewer Commissioners: [signatures]

Dated: ______

OFFICE OF
THE BOARD OF
Water & Sewer Commissioners

3249 COUNTY STREET
P.O. BOX 35
SOMERSET, MASSACHUSETTS 02726
OFFICE (508) 679-2731
PLANT (508) 674-4215

Town of Somerset Water Pollution Control Sewer Service Opt- Out Agreement

Date: 7/21/2017

For Property at: 191 Mohawk Road
Water Service #: 10028120

The undersigned residential property owner(s) whose property is not currently connected to the Town of Somerset Sewerage Collection System hereby state that they wish not to connect their property to the current municipal sewerage system and elects to not pay any charges due to the Town of Somerset Water and Sewer Departments for sewerage service, at this time.

The undersigned residential property owner(s) understand and agree that if they elect to connect their property to the Town of Somerset Sewer Collection System at any time after this date that they or their successors or assigns will have to pay in full any and all required connection fees and application fees in place at that time in order to connect to the system and allow discharge of their residential waste into the Town of Somerset Sewerage Collection System.

Signed by: Irving W. Bieler Signed by: ____________

Printed name: Irving W. Bieler Printed name: ____________

Notary Block: COMMONWEALTH OF MASSACHUSETTS
Irving W. Bieler
personally appeared before me, the undersigned notary public, and proved to me his/her identity through satisfactory evidence, which were Massachusetts drivers license and acknowledged he/she signed the foregoing instrument voluntarily for its stated purpose on this 21st day of July, 2017
Patricia Carreiro
PATRICIA CARREIRO, Notary Public
My Commission Expires July 17, 2020

Approved by the Board of Water and Sewer Commissioners: ____________

Dated: ____________

OFFICE OF
THE BOARD OF

Water & Sewer Commissioners

3249 COUNTY STREET
P.O. BOX 35
SOMERSET, MASSACHUSETTS 02726
OFFICE (508) 679-2731
PLANT (508) 674-4215

Town of Somerset Water Pollution Control Sewer Service Opt- Out Agreement

Date: 10-5-2017

For Property at: 182 Centre St.
Water Service #: 100108100

The undersigned residential property owner(s) whose property is not currently connected to the Town of Somerset Sewerage Collection System hereby state that they wish not to connect their property to the current municipal sewerage system and elects to not pay any charges due to the Town of Somerset Water and Sewer Departments for sewerage service, at this time.

The undersigned residential property owner(s) understand and agree that if they elect to connect their property to the Town of Somerset Sewer Collection System at any time after this date that they or their successors or assigns will have to pay in full any and all required connection fees and application fees in place at that time in order to connect to the system and allow discharge of their residential waste into the Town of Somerset Sewerage Collection System.

Signed by: Sue Durand Signed by: Dennis Durand

Printed name: SUE DURAND Printed name: DENNIS DURAND

Notary Block:

PATRICIA CARREIRO
Notary Public
Commonwealth of Massachusetts
My Commission Expires
July 17, 2020

COMMONWEALTH OF MASSACHUSETTS
Sue Durand & Dennis Durand personally appeared before me, the undersigned notary public, and proved to me his/her identity through satisfactory evidence, which were Massachusetts Drivers License and acknowledged he/she signed the foregoing instrument voluntarily for its stated purpose on this 5th day of October 2017
Patricia Carreiro
PATRICIA CARREIRO, Notary Public
My Commission Expires July 17, 2020

Approved by the Board of Water and Sewer Commissioners: ______________________

Dated: ____________

Section D
Improvement Cost Estimates

SOMERSET, MA WPCF
IWRMP RECOMMENDED WWTF UPGRADE
W-P PROJECT NO. 14110A
CWMP
July, 2019 [ENR INDEX = 11300]
PROJECT COST ESTIMATE

PROJECT COMPONENT		COST
CONSTRUCTION		$44,526,000
CONSTRUCTION CONTINGENCY	5.0%	$2,230,000
ENGINEERING SERVICES	20.0%	$8,905,000
MATERIALS TESTING	1.0%	$445,000
ASBESTOS & LEAD PAINT ABATEMENT		$10,000
LEGAL/ ADMINISTRATIVE	2.0%	$891,000
SUBTOTAL		$57,007,000
FINANCING	1.0%	$570,000
ENGINEER'S ESTIMATE OF PROJECT COST		$57,577,000

Notes:
1) Cost estimate is based on ENR CCI 11300 (dated July, 2019).

SOMERSET, MA WPCF
IWRMP RECOMMENDED WWTF UPGRADE
W-P PROJECT NO. 14110A
CWMP
July, 2019 [ENR INDEX = 11300]
CONSTRUCTION COST ESTIMATE

DESCRIPTION	ESTIMATED COST
CIVIL	
GENERAL SITEWORK AND PAVING	$1,000,000
PRE-TREATMENT	$0
FLOW EQUALIZATION	$63,000
PRIMARY TREATMENT	$157,500
SECONDARY TREATMENT	$178,500
SLUDGE BUILDING & DEWATERING	$211,050
SLUDGE THICKENER	$0
ADM BUILDING - 2400 SF	$57,750
ODOR CONTROL	$26,250
ARCHITECTURAL	
PRE-TREATMENT	$378,000
FLOW EQUALIZATION	$0
PRIMARY TREATMENT	$0
SECONDARY TREATMENT	$546,000
SLUDGE BUILDING & DEWATERING	$1,155,000
SLUDGE THICKENER	$52,500
ADM BUILDING - 2400 SF	$441,000
ODOR CONTROL	$0
STRUCTURAL	
PRE-TREATMENT	$141,750
FLOW EQUALIZATION	$231,000
PRIMARY TREATMENT	$52,500
SECONDARY TREATMENT	$951,300
SLUDGE BUILDING & DEWATERING	$695,538
SLUDGE THICKENER	$57,750
ADM BUILDING - 2400 SF	$126,000
ODOR CONTROL	$26,250
PROCESS & DEMO	
PRE-TREATMENT	$517,808
FLOW EQUALIZATION	$412,230
PRIMARY TREATMENT	$1,111,740
SECONDARY TREATMENT	$4,102,155
SLUDGE BUILDING & DEWATERING	$2,834,475
SLUDGE THICKENER	$2,252,506
PLANT WATER	$100,000
Yard Pump Station piping, valving, pumps	$75,000
ODOR CONTROL	$733,320
ADM BUILDING - 2400 SF	$0
HVAC/ PLUMBING	
PRE-TREATMENT	$245,700
FLOW EQUALIZATION	$0
PRIMARY TREATMENT	$0
SECONDARY TREATMENT	$567,000
SLUDGE BUILDING & DEWATERING	$630,000
SLUDGE THICKENER	$0
ADM BUILDING - 2400 SF	$126,000
ODOR CONTROL	$52,500
INSTRUMENTATION	
FIBER OPTIC NETWORK	$100,000
SCADA SOFTWARE & HARDWARE	$100,000
PRE-TREATMENT	$155,943
FLOW EQUALIZATION	$40,343
PRIMARY TREATMENT	$181,086
SECONDARY TREATMENT	$372,901
SLUDGE BUILDING & DEWATERING	$262,080

SOMERSET, MA WPCF
IWRMP RECOMMENDED WWTF UPGRADE
W-P PROJECT NO. 14110A
CWMP
July, 2019 [ENR INDEX = 11300]
CONSTRUCTION COST ESTIMATE

DESCRIPTION		ESTIMATED COST
SLUDGE THICKENER		$221,130
ADM BUILDING - 2400 SF		$0
ODOR CONTROL		$375,375
ELECTRICAL		
GENERATORS		$500,000
POWER FEED AND ASSOCIATED DUCTBANKS		$750,000
SITE LIGHTING		$100,000
PRE-TREATMENT		$312,618
FLOW EQUALIZATION		$30,098
PRIMARY TREATMENT		$293,535
SECONDARY TREATMENT		$1,027,724
SLUDGE BUILDING & DEWATERING		$893,316
SLUDGE THICKENER		$336,670
ADM BUILDING - 2400 SF		$252,000
ODOR CONTROL		$157,500
SPECIALS		
MOB/DEMOB (5%)		$1,338,570
SUBTOTAL, CONSTRUCTION		$18,332,392
GENERAL CONTRACTOR OH&P AND GENERAL CONDITIONS	20.0%	$3,666,000
SUBTOTAL, SUBCONTRACTORS (C/M/P/I/E)		$9,777,569
GENERAL CONTRACTOR MARKUP	7.5%	$733,000
BONDS & INSURANCES	2.0%	$650,000
UNIT PRICE ITEMS	2.0%	$562,000
SUBTOTAL, CONSTRUCTION COSTS		$33,720,961
PROJECT MULTIPLIER, DESIGN CONTINGENCY	20.0%	$6,744,192
PROJECT MULTIPLIER, INFLATION TO MIDPT CONST.	12.0%	$4,060,566
ENGINEERS ESTIMATE OF CONSTRUCTION COST		**$44,526,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

ANGUS STREET

Submersible (2009) 300 GPM Generator

Year Scheduled for Improvements 2036

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority	Total Cost
STRUCTURAL						
Foundation Repairs	LS	1	$ 10,000		$ 10,000	$ 10,000
PROCESS						
Flow Meter	LS	1	$ 6,000		$ 6,000	$ 6,000
Force main inspection	LF	1,900	$ 30		$ 57,000	$ 57,000
MECHANICAL						
Insulate Generator muffler	LS	1	$ 1,000		$ 1,000	$ 1,000
Wrap heat trace wiring tight to piping and insulate	LS	1	$ 1,000		$ 1,000	$ 1,000
INSTRUMENTATION						
Instrumentation/Controls	LS	1	$ 40,000		$ 40,000	$ 40,000
ELECTRICAL						
Emergency lighing, exit signs, fire alarms, security, and gas dete	LS	1	$ 5,000	$ 5,000		$ 5,000
SUBTOTAL MATERIAL COST:				$5,000	$115,000	$ 120,000
				$5,000	$115,000	$120,000
General Contractor OH&P			20%	$ 1,000	$ 23,000	$ 24,000
Bonds and Insurance			2%	$ 100	$ 2,300	$ 2,400
Traffic Control Allowance				$ -	$ 5,000	$ 5,000
Utility Allowance						
ENGINEER'S ESTIMATE OF CONSTRUCTION COST:				**$6,000**	**$145,000**	**$151,000**
Engineering Design and Bidding Services			20%	$ 1,200	$ 29,000	$ 30,200
Engineering Construction Services and Resident Observation			20%	$ 1,200	$ 29,000	$ 30,200
Materials Testing			1%	$ 60	$ 1,450	$ 1,510
Legal/Admin and Easements			2%	$ 120	$ 2,900	$ 3,020
Wetlands & Con.Com			0%	$ -	$ -	$ -
SUBTOTAL OF ENGINEERING COST:				$3,000	$62,000	$65,000
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:				$9,000	$207,000	$216,000
Annual Inflation Rate to Mid-point construction			3%	$5,442	$125,174	$130,617
Project Contingency (Construction & Design)			25%	$ 2,250	$ 51,750	$54,000
TOTAL ESTIMATED PROJECT COST:				**$17,000**	**$384,000**	**$401,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

CHERRY STREET

Submersible Station (1976)	75 GPM	No Generator
Year Scheduled for Improvements	2027	

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority
CIVIL					
Misc. Site Work	LS	1	$ 25,000		$ 25,000
PROCESS					
Install 2 new pumps (75 gpm)	EA	2	$ 10,000		$ 20,000
Precast wetwell	LS	1	$ 50,000		$ 50,000
6-foot diameter valve vault	LS	1	$ 30,000		$ 30,000
Pipe, Valves, and Fittings	LS	1	$ 30,000		$ 30,000
INSTRUMENTATION					
Instrumentation/Controls - Control Panel	LS	1	$ 40,000		$ 40,000
ELECTRICAL					
New Electrical Service	LS	1	$ 10,000		$ 10,000
New Electrical Equipment	LS	1	$ 40,000		$ 40,000
Generator	LS	1	$ 50,000		$ 50,000
Conduit and Wire	LS	1	$ 15,000		$ 15,000
SPECIALS					
Bypass Pumping	LS	1	$ 25,000		$ 25,000
Force Main Inspection	LF	300	$ 30		$ 9,000
			SUBTOTAL MATERIAL COST:		$344,000
					$344,000
			General Contractor OH&P 20%		$ 68,800
			Bonds and Insurance 2%		$ 6,880
			Traffic Control Allowance		$ 5,000
			Utility Allowance		$ 15,000
			ENGINEER'S ESTIMATE OF COSTRUCTION COST:		**$440,000**
			Engineering Design and Bidding Services 20%		$ 88,000
			Engineering Construction Services and Resident Observation 20%		$ 88,000
			Materials Testing 1%		$ 4,400
			Legal/Admin and Easements 2%		$ 8,800
			Wetlands & Con.Com 2%		$ 8,800
			SUBTOTAL OF ENGINEERING COST:		$198,000
			SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:		$638,000
			Annual Inflation Rate to Mid-point construction 3%		$146,660
			Project Contingency (Construction & Design) 25%		$ 159,500
			TOTAL ESTIMATED PROJECT COST:		**$944,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

DUBLIN STREET

Existing Flooded Suction Station (1967, 2012) 1700 gpm Generator
Year Scheudled for Improvements 2032

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority	Overall Cost
ARCHITECTURAL						
Install new flashing and repoint chimney	LS	1	$ 15,000		$ 15,000	$ 15,000
Replace wetwell entrance door and hardware	LS	1	$ 5,000		$ 5,000	$ 5,000
STRUCTURAL						
Replace stair nosings and repair concrete surfaces	LS	1	$ 2,500		$ 2,500	$ 2,500
Install toeplate on guard in wet well	LS	1	$ 1,000	$ 1,000		$ 1,000
Replace sunp cover	LS	1	$ 1,000		$ 1,000	$ 1,000
Replace clip angles anchoring the bottom of the stairs to the concrete slab in wetwell	LS	1	$ 5,000		$ 5,000	$ 5,000
Indicate capacity of lifting assemblies	LS	1	$ 1,000	$ 1,000		$ 1,000
Replace the chains at all openings with safety gates that conform to OSHA regulation	LS	1	$ 5,000	$ 5,000		$ 5,000
Install rigging points to aid in removal of pumps	LS	1	$ 10,000		$ 10,000	$ 10,000
PROCESS						
Spot repair on pump coating	LS	1	$ 5,000		$ 5,000	$ 5,000
Repair pump No. 1 to run in sequence	LS	1	$ 5,000		$ 5,000	$ 5,000
Inspect force main	LF	1300	$ 30		$ 39,000	$ 39,000
MECHANICAL						
Insulate domestic water piping	LS	1	$ 2,500		$ 2,500	$ 2,500
Replace electric heater in wetwell	LS	1	$ 15,000		$ 15,000	$ 15,000
Replace Exhaust Fan; Derate the space	LS	1	$ 15,000	$ 15,000		$ 15,000
INSTRUMENTATION						
Instrumentation/Controls	LS	1	$ 40,000		$ 40,000	$ 40,000
ELECTRICAL						
Provide Emergency lighting, exit signs, fire alarms, security, gas detection	LS	1	$ 30,000	$ 30,000		$ 30,000
			SUBTOTAL MATERIAL COST:	$52,000	$145,000	$197,000

		High Priority	Normal Priority	Overall Cost
		$52,000	$145,000	$ 197,000
General Contractor OH&P	20%	$ 10,400	$ 29,000	$ 39,400
Bonds and Insurance	2%	$ 1,040	$ 2,900	$ 3,940
Traffic Control Allowance		$ -	$ 5,000	$ 5,000
Utility Allowance		$ 5,000	$ 5,000	$ 10,000
ENGINEER'S ESTIMATE OF CONSTRUCTION COST:		**$68,000**	**$187,000**	**$255,000**
Engineering Design and Bidding Services	20%	$ 13,600	$ 37,400	$ 51,000
Engineering Construction Services and Resident Observation	20%	$ 13,600	$ 37,400	$ 51,000
Materials Testing	1%	$ 680	$ 1,870	$ 2,550
Legal/Admin and Easements	2%	$ -	$ 3,740	$ 3,740
Wetlands & Con.Com	0%	$ -	$ -	$ -
SUBTOTAL OF ENGINEERING COST:		$28,000	$80,000	$108,000
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:		$96,000	$267,000	$363,000
Annual Inflation Rate to Mid-point construction	3%	$40,873	$113,678	$154,551
Project Contingency (Construction & Design)	25%	$ 24,000	$ 66,750	$ 90,750
TOTAL ESTIMATED PROJECT COST:		**$161,000**	**$447,000**	**$608,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

DURFEE COURT

Submersible 100 gpm no generator

Year Scheduled for Improvements 2026

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority	Overall Cost
CIVIL						
Misc. Site Work	LS	1	$ 25,000		$ 25,000	$ 25,000
PROCESS						
Install 2 new pumps (75 gpm)	EA	2	$ 10,000		$ 20,000	$ 20,000
Precast wetwell	LS	1	$ 50,000		$ 50,000	$ 50,000
6-foot diameter valve vault	LS	1	$ 30,000		$ 30,000	$ 30,000
Pipe, Valves, and Fittings	LS	1	$ 30,000		$ 30,000	$ 30,000
INSTRUMENTATION						
Instrumentation/Controls - Control Panel	LS	1	$ 40,000		$ 40,000	$ 40,000
ELECTRICAL						
New Electrical Service	LS	1	$ 10,000		$ 10,000	$ 10,000
New Electrical Equipment	LS	1	$ 40,000		$ 40,000	$ 40,000
Generator	LS	1	$ 50,000		$ 50,000	$ 50,000
Conduit and Wire	LS	1	$ 15,000		$ 15,000	$ 15,000
SPECIALS						
Bypass Pumping	LS	1	$ 25,000		$ 25,000	$ 25,000
Force Main Inspection	LF	300	$ 30		$ 9,000	$ 9,000
SUBTOTAL MATERIAL COST:					$344,000	$ 344,000
						$ -
				$0	$344,000	$ 344,000
General Contractor OH&P			20%	$ -	$ 68,800	$ 68,800
Bonds and Insurance			2%	$ -	$ 6,880	$ 6,880
Traffic Control Allowance				$ -	$ 5,000	$ 5,000
Utility Allowance				$ -	$ 15,000	$ 15,000
ENGINEER'S ESTIMATE OF CONSTRUCTION COST:					**$440,000**	$ 440,000
						$ -
Engineering Design and Bidding Services			20%	$ -	$ 88,000	$ 88,000
Engineering Construction Services and Resident Observation			20%	$ -	$ 88,000	$ 88,000
Materials Testing			1%	$ -	$ 4,400	$ 4,400
Legal/Admin and Easements			2%	$ -	$ 8,800	$ 8,800
Wetlands & Con.Com			2%	$ -	$ 8,800	$ 8,800
SUBTOTAL OF ENGINEERING COST:				$0	$198,000	$198,000
						$0
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:				$0	$638,000	$638,000
Annual Inflation Rate to Mid-point construction			3%		123,805	123,805
Project Contingency (Construction & Design)			25%	$ -	$ 159,500	$159,500
TOTAL ESTIMATED PROJECT COST:				**$0**	**$921,000**	**$921,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

FOLEY AVENUE

Existing Flooded Suction Station (1995)	2600 gpm	w/ generator
Year Scheduled for Improvements	2029	

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority
ARCHITECTURAL					
Replace Asphalt shingle roof	LS	1	$ 10,000		$ 10,000
Replace wood shingle siding	LS	1	$ 20,000		$ 20,000
Install gutter to one side of roof	LS	1	$ 2,500		$ 2,500
Replace flashing and repoint chimney	LS	1	$ 1,500		$ 1,500
STRUCTURAL					
Repair stair nosings and concrete surfaces	LS	1	$ 2,500		$ 2,500
Replace clip angels to anchor the bottom of the stairs to the wet well slab	LS	1	$ 3,000	$ 3,000	
Safety - Indicate capacity of all lifting assemblies	LS	1	$ 1,000	$ 1,000	
Safety - Replace chains at all openings with safety gates that conform to OSHA regulation	LS	1	$ 5,000	$ 5,000	
Install toe plate on guard in wet well	LS	1	$ 1,000		$ 1,000
PROCESS					
Replace slide gates in wet well	EA	3	$ 20,000	$ 60,000	
Spot coat on pumps and valves	LS	1	$ 10,000		$ 10,000
Investigate clogging issues, evaluate if grinder needed in wet well	LS	1	$ 10,000		$ 10,000
Investigate pumping capacity, at times three pumps operate	LS	1	$ 5,000		$ 5,000
Install by-pass connection	LS	1	$ 20,000		$ 20,000
Inspect force main	LF	1000	$ 30		$ 30,000
MECHANICAL					
Replace Exhaust Fan and motor; Derate the space	LS	1	$ 20,000	$ 20,000	
Insulate Domestic Hot water piping	LS	1	$ 2,500		$ 2,500
Replace electric hot water heater in wet well	LS	1	$ 10,000		$ 10,000
INSTRUMENTATION					
Instrumentation/Controls	LS	1	$ 40,000		$ 40,000
ELECTRICAL					
Provide emergency lighting, fire alarms, & gas detection	LS	1	$ 30,000	$ 30,000	
Replace receptacles and equipment for code compliance	LS	1	$ 20,000	$ 20,000	
Replace/ update pump room and wet well lighting	LS	1	$ 20,000		$ 20,000
Replace outdated VFDs	EA	3	$ 15,000		$ 45,000
Install new electrical service & distribution equipment	LS	1	$ 50,000		$ 50,000
			SUBTOTAL MATERIAL COST:	$139,000	$280,000

		High Priority	Normal Priority
		$139,000	$280,000
General Contractor OH&P	20%	$ 27,800	$ 56,000
Bonds and Insurance	2%	$ 2,780	$ 5,600
Traffic Control Allowance		$ -	$ 5,000
Utility Allowance		$ -	$ 15,000
ENGINEER'S ESTIMATE OF COSTRUCTION COST:		**$170,000**	**$362,000**
Engineering Design and Bidding Services	20%	$ 34,000	$ 72,400
Engineering Construction Services and Resident Observation	20%	$ 34,000	$ 72,400
Materials Testing	1%	$ 1,700	$ 3,620
Legal/Admin and Easements	2%	$ -	$ 7,240
Wetlands & Con.Com	2%	$ -	$ 7,240
SUBTOTAL OF ENGINEERING COST:		$70,000	$163,000
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:		$240,000	$525,000
Annual Inflation Rate to Mid-point construction	3%	$73,146	$160,006
Project Contingency (Construction & Design)	25%	$ 60,000	$ 131,250
TOTAL ESTIMATED PROJECT COST:		**$373,000**	**$816,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

GAY STREET
Submersible Station (1990s) 100 gpm No generator
Year Scheduled for Improvements 2025

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority	Overall Cost
CIVIL						
Misc. Site Improvements	LS	1	$ 25,000	$ 25,000		**$ 25,000**
PROCESS						
Install 2 new pumps (75 gpm)	EA	2	$ 10,000	$ 20,000		**$ 20,000**
6-foot diameter precast wetwell	LS	1	$ 50,000	$ 50,000		**$ 50,000**
6-foot diameter valve vault	LS	1	$ 30,000	$ 30,000		**$ 30,000**
Pipe, Valves, and Fittings	LS	1	$ 30,000	$ 30,000		**$ 30,000**
Force Main Replacement	LF	350	$ 125	$ 43,750		**$ 43,750**
INSTRUMENTATION						
Instrumenetation/Controls	LS	1	$ 40,000	$ 40,000		**$ 40,000**
ELECTRICAL						
New Electrical Service	LS	1	$ 10,000	$ 10,000		**$ 10,000**
New Electrical Equipment	LS	1	$ 40,000	$ 40,000		**$ 40,000**
Generator	LS	1	$ 50,000	$ 50,000		**$ 50,000**
Conduit and Wire	LS	1	$ 15,000	$ 15,000		**$ 15,000**
SPECIALS						
Bypass Pumping	LS	1	$ 25,000	$ 25,000		**$ 25,000**
SUBTOTAL MATERIAL COST:				$378,750		**$ 378,750**

		High Priority	Normal Priority	Overall Cost
		$353,750		**$ 353,750**
General Contractor OH&P	20%	$ 70,750		**$ 70,750**
Bonds and Insurance	2%	$ 7,075		**$ 7,075**
Traffic Control Allowance				
Utility Allowance		$ 15,000		**$ 15,000**
ENGINEER'S ESTIMATE OF CONSTRUCTION COST:		**$447,000**	**$0**	**$447,000**
Engineering Design and Bidding Services	20%	$ 89,400	$ -	**$ 89,400**
Engineering Construction Services and Resident Observation	20%	$ 89,400	$ -	**$ 89,400**
Materials Testing	1%	$ 4,470	$ -	**$ 4,470**
Legal/Admin and Easements	2%	$ 8,940	$ -	**$ 8,940**
Wetlands & Con.Com	2%	$ 8,940	$ -	**$ 8,940**
SUBTOTAL OF ENGINEERING COST:		$201,150	$0	$201,000
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:		$648,150	$0	$648,150
Annual Inflation Rate to Mid-point construction	3%	$103,233	$0	$103,233
Project Contingency (Construction & Design)	25%	$ 162,038	$ -	$ 162,038
TOTAL ESTIMATED PROJECT COST:		**$913,000**	**$0**	**$913,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

GROVE AVENUE

Flooded Suction (2008) 1900 gpm w/ generator
Year Scheduled for Improvements 2033

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority
ARCHITECTURAL					
Chimney - repair leak, install new flashing, and repoint	LS	1	$ 15,000	$ 15,000	
STRUCTURAL					
Sandblast and repaint gate base plates in wetwell	LS	1	$ 10,000		$ 10,000
Install toe plate on guard in wetwell	LS	1	$ 1,000	$ 1,000	
Replace chains with safety gates that conform to OSHA	LS	1	$ 10,000	$ 10,000	
Indicate capacity of all lifting assemblies	LS	1	$ 1,000	$ 1,000	
Install grout pads for pipe support legs to elevate off wet floor	LS	1	$ 3,000		$ 3,000
Install rigging point for pump removal	LS	1	$ 20,000		$ 20,000
PROCESS					
Inspect force main	LF	300	$ 30		$ 9,000
MECHANICAL					
Replace Exhaust Fan and motor; Derate the space	LS	1	$ 20,000	$ 20,000	
Install RPZ backflow preventer on utility sink	LS	1	$ 2,500	$ 2,500	
Insulate domestic water piping	LS	1	$ 2,500		$ 2,500
INSTRUMENTATION & CONTROLS					
Instrumentation/ Controls	LS	1	$ 40,000		$ 40,000
ELECTRICAL					
Provide emergency lighting, exit signs, fire alarms, gas detecti	LS	1	$ 30,000	$ 30,000	
Replace receptacles and equipment for code compliance	LS	1	$ 20,000	$ 20,000	
Replace pump room and wetwell lighting	LS	1	$ 20,000		$ 20,000
Install new electrical service & distribution equipment	LS	1	$ 50,000		$ 50,000
			SUBTOTAL MATERIAL COST:	$99,500	$154,500

		High Priority	Normal Priority
		$ 99,500	$ 154,500
General Contractor OH&P	20%	$ 19,900	$ 30,900
Bonds and Insurance	2%	$ 1,990	$ 3,090
Traffic Control Allowance		$ -	$ -
Utility Allowance		$ -	$ 15,000
ENGINEER'S ESTIMATE OF COSTRUCTION COST:		**$121,000**	**$203,000**
Engineering Design and Bidding Services	20%	$ 24,200	$ 40,600
Engineering Construction Services and Resident Observation	20%	$ 24,200	$ 40,600
Materials Testing	1%	$ 1,210	$ 2,030
Legal/Admin and Easements	2%	$ 2,420	$ 4,060
Wetlands & Con.Com		$ -	$ -
SUBTOTAL OF ENGINEERING COST:		$52,000	$87,000
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:		$173,000	$290,000
Annual Inflation Rate to Mid-point construction	3%	$81,056	$135,875
Project Contingency (Construction & Design)	25%	$ 43,250	$ 72,500
TOTAL ESTIMATED PROJECT COST:		**$297,000**	**$498,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

LAKE STREET
Submersible Station (1990) 160gpm w/ generator
Year Scheduled for Improvements 2034

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority	Overall Cost
ARCHITECTURAL						
Replace exterior siding, door and frame	LS	1	$ 15,000		$ 15,000	$ 15,000
Install exterior insulation	LS	1	$ 5,000		$ 5,000	$ 5,000
Repaint interior	LS	1	$ 2,500		$ 2,500	$ 2,500
STRUCTURAL						
Repair crack on interior wall	LS	1	$ 3,000		$ 3,000	$ 3,000
Resurface hole in valve pit concrete slab	LS	1	$ 1,000		$ 1,000	$ 1,000
Replace corroded pipe supports	LS	1	$ 2,500		$ 2,500	$ 2,500
PROCESS						
Replace corroded check valve and isolation gate valves in valve vault	EA	4	$ 1,000		$ 4,000	$ 4,000
Replace float level sensor with pressure transducer level sensors	LS	1	$ 2,500		$ 2,500	$ 2,500
Inspect Force main	LF	350	$ 30		$ 10,500	$ 10,500
MECHANICAL						
Replace existing electric unit heater	LS	1	$ 1,000		$ 1,000	$ 1,000
INSTRUMENTATION						
Instrumentation/Controls	LS	1	$ 40,000		$ 40,000	$ 40,000
ELECTRICAL						
Update all lighting (interior/ exterior)	LS	1	$ 5,000		$ 5,000	$ 5,000
Install new generator and ATS	LS	1	$ 35,000		$ 35,000	$ 35,000
Install emergency lighting and exit signage, fire alarm, and sec	LS	1	$ 10,000		$ 10,000	$ 10,000
Install new VFD equipment	LS	1	$ 10,000		$ 10,000	$ 10,000
Install new electrical service and distribution equipment	LS	1	$ 10,000		$ 10,000	$ 10,000
SUBTOTAL MATERIAL COST:				$ -	$ 157,000	$ 157,000

		High Priority	Normal Priority	Overall Cost
		$ -	$ 157,000	$ 157,000
General Contractor OH&P	20%	$ -	$ 31,400	$ 31,400
Bonds and Insurance	2%	$ -	$ 3,140	$ 3,140
Traffic Control Allowance			$ 5,000	$ 5,000
Utility Allowance			$ 15,000	$ 15,000
ENGINEER'S ESTIMATE OF COSTRUCTION COST:		**$ -**	**$ 212,000**	**$ 212,000**
Engineering Design and Bidding Services	20%	$ -	$ 42,400	$ 42,400
Engineering Construction Services and Resident Observation	10%	$ -	$ 21,200	$ 21,200
Materials Testing	1%	$ -	$ 2,120	$ 2,120
Legal/Admin and Easements	2%	$ -	$ 4,240	$ 4,240
Wetlands & Con.Com		$ -	$ -	$ -
SUBTOTAL OF ENGINEERING COST:		$ -	$ 70,000	$ 70,000
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:		$ -	$ 282,000	$ 282,000
Annual Inflation Rate to Mid-point construction	3%		$144,550	$144,550
Project Contingency (Construction & Design)	25%	$ -	$ 70,500	$ 70,500
TOTAL ESTIMATED PROJECT COST:		**$ -**	**$ 497,000**	**$497,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

Lees River Avenue
Flooded Suction Station (2016) 1200 gpm w/ generator
Year Scheduled for Imrpovements 2035

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority	Overall Cost
STRUCTURAL						
Replace chains with safety gates to confrom to OSHA Regulatio	LS	1	$ 5,000	$ 5,000		$ 5,000
Label monorail and all lifting assemblies with rated load capacit	LS	1	$ 1,000	$ 1,000		$ 1,000
Replace expansion joint sealant	LS	1	$ 1,000		$ 1,000	$ 1,000
Rapir cracked concrete	LS	1	$ 1,000		$ 1,000	$ 1,000
Resurface exposed reinforcing steel with cementitious repair m	LS	1	$ 5,000		$ 5,000	$ 5,000
Replace corroding pipe supports in wetwell	LS	1	$ 5,000		$ 5,000	$ 5,000
PROCESS						
Evaluate and Inspect the FM condition	LF	4000	$ 30		$ 120,000	$ 120,000
MECHANICAL						
Repair Hydronic Heating System & replace damaged insulation	LS	1	$ 15,000		$ 15,000	$ 15,000
Test and balance exhaust fan airflow	LS	1	$ 15,000		$ 15,000	$ 15,000
Insulate cold water piping in service room	LS	1	$ 2,000		$ 2,000	$ 2,000
SUBTOTAL MATERIAL COST:				$ 6,000	$ 164,000	$ 170,000
				$ 6,000	$ 164,000	$ 170,000
General Contractor OH&P			20%	$ 1,200	$ 32,800	$ 34,000
Bonds and Insurance			2%	$ 120	$ 3,280	$ 3,400
Traffic Control Allowance				$ -	$ -	$ -
Utility Allowance				$ -	$ -	$ -
ENGINEER'S ESTIMATE OF COSTRUCTION COST:				**$ 7,000**	**$ 200,000**	**$ 207,000**
Engineering Design and Bidding Services			20%	$ 1,400	$ 40,000	$ 41,400
Engineering Construction Services and Resident Observation			20%	$ 1,400	$ 40,000	$ 41,400
Materials Testing			1%	$ 70	$ 2,000	$ 2,070
Legal/Admin and Easements			2%	$ 140	$ 4,000	$ 4,140
Wetlands & Con.Com				$ -	$ -	$ -
SUBTOTAL OF ENGINEERING COST:				$ 3,000	$ 86,000	$ 89,000
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:				$ 10,000	$ 286,000	$ 296,000
Annual Inflation Rate to Mid-point construction			3%	$5,580	$159,579	$165,158
Project Contingency (Construction & Design)			25%	$ 2,500	$ 71,500	$ 74,000
TOTAL ESTIMATED PROJECT COST:				**$ 18,000**	**$ 517,000**	**$ 535,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

LUTHER AVENUE

Existing Flooded Suction Station (1990)	2200 gpm	w/ generator
Year Schedule for Improvements	2030	

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority
ARCHITECTURAL					
Replace wet well door hardware	LS	1	$ 1,000		$ 1,000
Replace ashpalt shingle roof	LS	1	$ 10,000		$ 10,000
Replace flashing and repoint chimney	LS	1	$ 5,000		$ 5,000
STRUCTURAL					
Replace the chains at all openings with saftey gates that confo	LS	1	$ 1,000	$ 1,000	
Indicate capcaity of lifting assemblies	LS	1	$ 1,000	$ 1,000	
Install rigging points for pump removal	LS	1	$ 5,000		$ 5,000
Repair cracked concrete	LS	1	$ 2,500		$ 2,500
Install cover over sump	LS	1	$ 500		$ 500
Install grout pads to elevate pipe support legs above wet floor	LS	1	$ 2,500		$ 2,500
Repaint stair noses in wet well	LS	1	$ 1,000		$ 1,000
Install toe on guard in wet well	LS	1	$ 1,000		$ 1,000
PROCESS					
Inspect FM	LF	2400	$ 30		$ 72,000
Replace sluice gates in wetwell	EA	3	$ 20,000		$ 60,000
Replace pumps and motors	EA	3	$ 40,000		$ 120,000
Spot repair pipe coatings	LS	1	$ 10,000		$ 10,000
Replace/rehab check and gate valves	EA	6	$ 5,000		$ 30,000
Install bypass connection	LS	1	$ 20,000		$ 20,000
MECHANICAL					
Install RPZ	EA	1	$ 2,500	$ 2,500	
Replace wet well exhaust fan and ductwork	LS	1	$ 15,000	$ 15,000	
Replace exhaust fan and motor	LS	1	$ 20,000	$ 20,000	
INSTRUMENTATION				$ -	
Instrumentation/Controls	LS	1	$ 40,000		$ 40,000
ELECTRICAL					
Install emergency lighting, exit signs, fire alarms, and gas dete	LS	1	$ 30,000	$ 30,000	
Replace outdated receptacles and equipment for code compli	EA	1	$ 20,000	$ 20,000	
Replace outdated VFDs	EA	3	$ 20,000		$ 60,000
SUBTOTAL MATERIAL COST:				$89,500	$440,500

		High Priority	Normal Priority
		$89,500	$440,500
General Contractor OH&P	20%	$ 17,900	$ -
Bonds and Insurance	2%	$ 1,790	$ -
Traffic Control Allowance		$ 5,000	$ -
Utility Allowance		$ 15,000	$ -
ENGINEER'S ESTIMATE OF COSTRUCTION COST:		**$129,000**	**$441,000**
Engineering Design and Bidding Services	20%	$ 17,900	$ -
Engineering Construction Services and Resident Observation	20%	$ 17,900	$ -
Materials Testing	1%	$ 895	$ -
Legal/Admin and Easements	2%	$ 1,790	$ -
Wetlands & Con.Com	2%	$ 1,790	$ -
SUBTOTAL OF ENGINEERING COST:		$40,000	$0
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:		$169,000	$441,000
Annual Inflation Rate to Mid-point construction	3%	$58,122	$151,667
Project Contingency (Construction & Design)	25%	$ 42,250	$ 110,250
TOTAL ESTIMATED PROJECT COST:		**$269,000**	**$703,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

MAIN STREET

Existing Flooded Suction Station (1967)	700 gpm	w/ generator
Year Scheduled for Improvements	2020	

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority
CIVIL					
MISC. SITE IMPROVEMENTS	LS	1	$ 75,000	$ 75,000	
ARCHITECTURAL					
New CMU Building	LS	1	$ 250,000	$ 250,000	
STRUCTURAL					
Wet Well Modifications	LS	1	$ 100,000	$ 100,000	
PROCESS					
Pumps	EA	2	$ 30,000	$ 60,000	
Piping, Valves, and Fittings	LS	1	$ 90,000	$ 90,000	
Install valve vault	LS	1	$ 30,000	$ 30,000	
MECHANICAL					
HVAC Systems	LS	1	$ 25,000	$ 25,000	
INSTRUMENTATION					
Instrumentation/Controls	LS	1	$ 40,000	$ 40,000	
ELECTRICAL					
New Generator and ATS	LS	1	$ 80,000	$ 80,000	
Provide emergency lighting, fire alarms, & gas detection	LS	1	$ 30,000	$ 30,000	
New electrical service and distribution equipment	LS	1	$ 50,000	$ 50,000	
SPECIALS					
Bypass Pumping	LS	1	$ 20,000	$ 20,000	
Inspect FM	LF	1000	$ 30	$ 30,000	
			SUBTOTAL MATERIAL COST:	$880,000	$0

		$880,000	$0
General Contractor OH&P	20%	$ 176,000	$ -
Bonds and Insurance	2%	$ 17,600	$ -
Traffic Control Allowance		$ 5,000	$ -
Utility Allowance		$ 15,000	$ -
ENGINEER'S ESTIMATE OF COSTRUCTION COST:		**$1,094,000**	**$0**
Engineering Design and Bidding Services	20%	$ 218,800	$ -
Engineering Construction Services and Resident Observation	20%	$ 218,800	$ -
Materials Testing	1%	$ 10,940	$ -
Legal/Admin and Easements	2%	$ 21,880	$ -
Wetlands & Con.Com	2%	$ 21,880	$ -
SUBTOTAL OF ENGINEERING COST:		$492,000	$0
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:		$1,586,000	$0
Annual Inflation Rate to Mid-point construction	3%	$0	$0
Project Contingency (Construction & Design)	25%	$ 396,500	$ -
TOTAL ESTIMATED PROJECT COST:		**$1,983,000**	**$0**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

MILLERS LANE
Existing Flooded Suction Station (1986) 100gpm no generator
Year Scheduled for Improvements 2031

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority	Overall Cost
CIVIL						
Misc. Site Work	LS	1	$ 25,000		$ 25,000	$ 25,000
PROCESS						
Install 2 new pumps (75 gpm)	EA	2	$ 10,000		$ 20,000	$ 20,000
Precast wetwell	LS	1	$ 50,000		$ 50,000	$ 50,000
6-foot diameter valve vault	LS	1	$ 30,000		$ 30,000	$ 30,000
Pipe, Valves, and Fittings	LS	1	$ 30,000		$ 30,000	$ 30,000
INSTRUMENTATION						
Instrumentation/Controls - Control Panel	LS	1	$ 40,000		$ 40,000	$ 40,000
ELECTRICAL						
New Electrical Service	LS	1	$ 10,000		$ 10,000	$ 10,000
New Electrical Equipment	LS	1	$ 40,000		$ 40,000	$ 40,000
Generator	LS	1	$ 50,000		$ 50,000	$ 50,000
Conduit and Wire	LS	1	$ 15,000		$ 15,000	$ 15,000
SPECIALS						
Bypass Pumping	LS	1	$ 20,000		$ 20,000	$ 20,000
Force Main Inspection	LF	800	$ 30		$ 24,000	$ 24,000
SUBTOTAL MATERIAL COST:				$0	$354,000	$ 354,000

		High Priority	Normal Priority	Overall Cost
		$0	$354,000	$ 354,000
General Contractor OH&P	20%	$ -	$ 70,800	$ 70,800
Bonds and Insurance	2%	$ -	$ 7,080	$ 7,080
Traffic Control Allowance			$ 10,000	$ 10,000
Utility Allowance			$ 15,000	$ 15,000
ENGINEER'S ESTIMATE OF COSTRUCTION COST:		**$0**	**$457,000**	**$457,000**
Engineering Design and Bidding Services	20%	$ -	$ 91,400	$ 91,400
Engineering Construction Services and Resident Observation	20%	$ -	$ 91,400	$ 91,400
Materials Testing	1%	$ -	$ 4,570	$ 4,570
Legal/Admin and Easements	2%	$ -	$ 9,140	$ 9,140
Wetlands & Con.Com		$ -	$ -	$ -
SUBTOTAL OF ENGINEERING COST:		$0	$197,000	$197,000
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:		$0	$654,000	$654,000
Annual Inflation Rate to Mid-point construction	3%	$0	$251,289	$251,289
Project Contingency (Construction & Design)	25%	$ -	$ 163,500	$ 163,500
TOTAL ESTIMATED PROJECT COST:		**$0**	**$1,069,000**	**$1,069,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

OWEN AVENUE

Suction Lift Station (2000) 125gpm w/ generator
Year Scheduled for Improvments 2028

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority	Overall Cost
CIVIL						
Misc. Site Work	LS	1	$ 25,000		$ 25,000	$ 25,000
PROCESS						
Install 2 new pumps (75 gpm)	EA	2	$ 10,000		$ 20,000	$ 20,000
Precast wetwell	LS	1	$ 50,000		$ 50,000	$ 50,000
6-foot diameter valve vault	LS	1	$ 30,000		$ 30,000	$ 30,000
Pipe, Valves, and Fittings	LS	1	$ 30,000		$ 30,000	$ 30,000
INSTRUMENTATION						
Instrumentation/Controls - Control Panel	LS	1	$ 40,000		$ 40,000	$ 40,000
ELECTRICAL						
New Electrical Service	LS	1	$ 10,000		$ 10,000	$ 10,000
New Electrical Equipment	LS	1	$ 40,000		$ 40,000	$ 40,000
Generator	LS	1	$ 50,000		$ 50,000	$ 50,000
Conduit and Wire	LS	1	$ 15,000		$ 15,000	$ 15,000
SPECIALS						
Bypass Pumping	LS	1	$ 20,000		$ 20,000	$ 20,000
Force Main Inspection	LF	30	$ 30		$ 900	$ 900
SUBTOTAL MATERIAL COST:				$0	$330,900	$330,900

		High Priority	Normal Priority	Overall Cost
		$0	$330,900	$ 330,900
General Contractor OH&P	20%	$ -	$ 66,180	$ 66,180
Bonds and Insurance	2%	$ -	$ 6,618	$ 6,618
Traffic Control Allowance			$ 5,000	$ 5,000
Utility Allowance			$ 15,000	$ 15,000
ENGINEER'S ESTIMATE OF COSTRUCTION COST:		**$0**	**$424,000**	**$424,000**
Engineering Design and Bidding Services	20%	$ -	$ 84,800	$ 84,800
Engineering Construction Services and Resident Observation	20%	$ -	$ 84,800	$ 84,800
Materials Testing	1%	$ -	$ 4,240	$ 4,240
Legal/Admin and Easements	2%	$ -	$ 8,480	$ 8,480
Wetlands & Con.Com	2%	$ -	$ 8,480	$ 8,480
SUBTOTAL OF ENGINEERING COST:		$0	$191,000	$191,000
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:		$0	$615,000	$615,000
Annual Inflation Rate to Mid-point construction	3%		164,064	164,064
Project Contingency (Construction & Design)	25%	$ -	$ 153,750	$ 153,750
TOTAL ESTIMATED PROJECT COST:		**$0**	**$933,000**	**$933,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

PILOT DRIVE
Flooded Suction Station (1976) 250gpm w/ generator
Year Scheduled for Improvements 2024

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority	Overall Cost
ARCHITECTURAL						
Replace siding & trim	LS	1	$ 30,000	$ 30,000	$ -	$ 30,000
Install Exterior Insulaion	LS	1	$ 10,000	$ 10,000		$ 10,000
Replace windows	LS	1	$ 15,000	$ 15,000		$ 15,000
Repoint chimney	LS	1	$ 5,000	$ 5,000		$ 5,000
Replace all exterior doors, frames, and hardware	LS	1	$ 5,000	$ 5,000	$ -	$ 5,000
Repaint interior walls and ceiling	LS	1	$ 6,000	$ 6,000		$ 6,000
SAFETY						
Indicate capacity of all lifting assemblies	LS	1	-			
Replace chains at wetwell grating hach with fall protection that	LS	1	$ 10,000	$ 10,000		$ 10,000
Install Rigging Points for pump removal	LS	1	$ 20,000	$ 20,000		$ 20,000
STRUCTURAL						
Repair crack in porch slab	LS	1	$ 1,000	$ 1,000		$ 1,000
Repiar stair landing	LS	1	$ 7,000	$ 7,000		$ 7,000
Replace pipe penetration sealant	LS	1	$ 500	$ 500		$ 500
Replace pipe support	LS	1	$ 1,000	$ 1,000		$ 1,000
Replace bent guard on stair landing	LS	1	$ 1,000	$ 1,000		$ 1,000
Replace sump cover	LS	1	$ 500	$ 500		$ 500
PROCESS						
Replace pump no. 2 and suction piping	LS	1	$ 20,000	$ 20,000		$ 20,000
Replace all check and gate valves	LS	4	$ 5,000	$ 20,000		$ 20,000
Install a bypass connection	LS	1	$ 20,000	$ 20,000		$ 20,000
Inspect FM	LF	1700	$ 30	$ 51,000		$ 51,000
MECHANICAL						
Replace exhaust fan and motor	LS	1	$ 10,000	$ 10,000		$ 10,000
Replace fuel storage tank or connect to natural gas	LS	1	$ 15,000	$ 15,000		$ 15,000
Replace electric unit heaters	LS	1	$ 10,000	$ 10,000		$ 10,000
Replace hot water heater with new tankless electric water heat	LS	1	$ 10,000	$ 10,000		$ 10,000
Provide RPZ for utility sink	LS	1	$ 2,500	$ 2,500		$ 2,500
Replace wetwell exhaust fan and ductwork	LS	1	$ 15,000	$ 15,000		$ 15,000
Replace wetwell damper actuator	LS	1	$ 2,000	$ 2,000		$ 2,000
Replace electric heater in wetwell	LS	1	$ 7,000	$ 7,000		$ 7,000
INSTRUMENTATION						
Instrumentation/Controls	LS	1	$ 40,000	$ 40,000		$ 40,000
ELECTRICAL						
Emergency Lighting, exit signs, fire alarms, and gas detection	LS	1	$ 30,000	$ 30,000		$ 30,000
Replace/update pump room and wet well lighting	LS	1	$ 5,000	$ 5,000		$ 5,000
New electrical service and distribution equipment	LS	1	$ 50,000	$ 50,000		$ 50,000
Replace generator and locate on exterior	LS	1	$ 90,000	$ 90,000		$ 90,000
			SUBTOTAL MATERIAL COST:	$509,500	$0	$509,500

		High Priority	Normal Priority	Overall Cost
		$509,500	$0	$ 509,500
General Contractor OH&P	20%	$ 101,900	$ -	$ 101,900
Bonds and Insurance	2%	$ 10,190	$ -	$ 10,190
Traffic Control Allowance		$ -	$ -	$ -
Utility Allowance		$ -	$ -	$ -
ENGINEER'S ESTIMATE OF COSTRUCTION COST:		**$622,000**	**$0**	**$622,000**
Engineering Design and Bidding Services	20%	$ 124,400	$ -	$ 124,400
Engineering Construction Services and Resident Observation	20%	$ 124,400	$ -	$ 124,400
Materials Testing	2%	$ 12,440	$ -	$ 12,440
Legal/Admin and Easements	0%	$ -	$ -	$ -
Wetlands & Con.Com	0%	$ -	$ -	$ -
SUBTOTAL OF ENGINEERING COST:		$261,000	$0	$261,000
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:		$883,000	$0	$883,000
Annual Inflation Rate to Mid-point construction	3%	$110,824	$0	$110,824
Project Contingency (Construction & Design)	25%	$ 220,750	$ -	$ 220,750
TOTAL ESTIMATED PROJECT COST:		**$1,215,000**	**$0**	**$1,215,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

PLEASANT STREET

Exisinting Flooded Suction Station (1987) 350 gpm w/ generator
Year Scheduled for improvements 2022

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority	Overall Cost
ARCHITECTURAL						
Replace siding & trim	LS	1	$ 30,000	$ 30,000		$ 30,000
Install Exterior Insulaion	LS	1	$ 10,000	$ 10,000		$ 10,000
Replace windows	LS	1	$ 15,000	$ 15,000		$ 15,000
Repoint chimney	LS	1	$ 5,000	$ 5,000		$ 5,000
Replace all exterior doors, frames, and hardware	LS	1	$ 5,000	$ 5,000		$ 5,000
Repaint interior walls and ceiling	LS	1	$ 6,000	$ 6,000		$ 6,000
SAFETY						
Indicate capacity of all lifting assemblies	LS	1	-	-		
Replace chains at wetwell grating hach with fall protection tha	LS	1	$ 10,000	$ 10,000		$ 10,000
Install Rigging Points for pump removal	LS	1	$ 20,000	$ 20,000		$ 20,000
STRUCTURAL						
Repair crack in porch slab	LS	1	$ 1,000	$ 1,000		$ 1,000
Repiar stair landing	LS	1	$ 2,000	$ 2,000		$ 2,000
Replace pipe penetration sealant	LS	1	$ 500	$ 500		$ 500
Replace pipe support	LS	1	$ 500	$ 500		$ 500
Replace bent guard on stair landing	LS	1	$ 500	$ 500		$ 500
Replace sump cover	LS	1	$ 500	$ 500		$ 500
PROCESS						
Replace pump no. 2 and suction piping	LS	1	$ 50,000	$ 50,000		$ 50,000
Replace all check and gate valves	EA	4	$ 5,000	$ 20,000		$ 20,000
Install a bypass connection	LS	1	$ 20,000	$ 20,000		$ 20,000
Inspect FM	LF	1000	$ 30	$ 30,000		$ 30,000
MECHANICAL						
Replace exhaust fan and motor	LS	1	$ 10,000	$ 10,000		$ 10,000
Replace fuel storage tank or connect to natural gas	LS	1	$ 15,000	$ 15,000		$ 15,000
Replace electric unit heaters	LS	1	$ 10,000	$ 10,000		$ 10,000
Replace hot water heater with new tankless electric water hea	LS	1	$ 10,000	$ 10,000		$ 10,000
Provide RPZ for utility sink	LS	1	$ 2,500	$ 2,500		$ 2,500
Replace wetwell exhaust fan and ductwork	LS	1	$ 15,000	$ 15,000		$ 15,000
Replace wetwell damper actuator	LS	1	$ 2,000	$ 2,000		$ 2,000
Replace electric heater in wetwell	LS	1	$ 7,000	$ 7,000		$ 7,000
INSTRUMENTATION						$ -
Instrumentation/ Controls	LS	1	$ 40,000	$ 40,000		$ 40,000
ELECTRICAL						
Emergency Lighting, exit signs, fire alarms, and gas detection	LS	1	$ 30,000	$ 30,000	$ -	$ 30,000
Replace/update pump room and wet well lighting	LS	1	$ 5,000	$ 5,000		$ 5,000
New electrical service and distribution equipment	LS	1	$ 50,000	$ 50,000		$ 50,000
Replace generator and locate on exterior concrete pad	LS	1	$ 90,000	$ 90,000		$ 90,000
			SUBTOTAL MATERIAL COST:	$512,500	$0	$512,500
				$512,500	$0	$ 512,500
General Contractor OH&P			20%	$ 102,500	$ -	$ 102,500
Bonds and Insurance			2%	$ 10,250	$ -	$ 10,250
Traffic Control Allowance				$ 5,000	$ -	$ 5,000
Utility Allowance				$ 15,000	$ -	$ 15,000
ENGINEER'S ESTIMATE OF COSTRUCTION COST:				**$645,000**	**$0**	**$645,000**
Engineering Design and Bidding Services			20%	$ 129,000	$ -	$ 129,000
Engineering Construction Services and Resident Observation			20%	$ 129,000	$ -	$ 129,000
Materials Testing			1%	$ 6,450	$ -	$ 6,450
Legal/Admin and Easements			2%	$ 12,900	$ -	$ 12,900
Wetlands & Con.Com			2%	$ 12,900	$ -	$ 12,900
SUBTOTAL OF ENGINEERING COST:				$290,000	$0	$290,000
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:				$935,000	$0	$935,000
Annual Inflation Rate to Mid-point construction			3%	$56,942	$0	$56,942
Project Contingency (Construction & Design)			25%	$ 233,750	$ -	$ 233,750
TOTAL ESTIMATED PROJECT COST:				**$1,226,000**	**$0**	**$1,226,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

ROUTE 6
Exisinting Flooded Suction Station (1976) 200 gpm w/ generator
Year scheduled for improvements 2021

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority	Overall Cost
CIVIL						
MISC. SITE IMPROVEMENTS	LS	1	$ 50,000	$ 50,000		$ 50,000
ARCHITECTURAL						
New CMU Building	LS	1	$ 250,000	$ 250,000		$ 250,000
PROCESS						
New Pumps	EA	2	$ 10,000	$ 20,000		$ 20,000
Precast wetwell	LS	1	$ 50,000	$ 50,000		$ 50,000
6-foot diameter valve vault	LS	1	$ 30,000	$ 30,000		$ 30,000
Pipe, Valves, and Fittings	LS	1	$ 30,000	$ 30,000		$ 30,000
MECHANICAL						
HVAC Systems	LS	1	$ 25,000	$ 25,000		$ 25,000
INSTRUMENTATION						
Instrumentation/Controls	LS	1	$ 40,000	$ 40,000		$ 40,000
ELECTRICAL						
New Generator and ATS	LS	1	$ 80,000	$ 80,000		$ 80,000
Provide emergency lighting, fire alarms, & gas detection	LS	1	$ 30,000	$ 30,000		$ 30,000
New electrical service and distribution equipment	LS	1	$ 50,000	$ 50,000		$ 50,000
SPECIALS						
Bypass Pumping	LS	1	$ 25,000	$ 25,000		$ 25,000
Inspect FM	LF	1000	$ 30	$ 30,000		$ 30,000
SUBTOTAL MATERIAL COST:				$680,000	$0	$680,000

		High Priority	Normal Priority	Overall Cost
		$680,000	$0	$ 680,000
General Contractor OH&P	20%	$ 136,000	$ -	$ 136,000
Bonds and Insurance	2%	$ 13,600	$ -	$ 13,600
Traffic Control Allowance		$ 5,000	$ -	$ 5,000
Utility Allowance		$ 15,000	$ -	$ 15,000
ENGINEER'S ESTIMATE OF COSTRUCTION COST:		**$850,000**	**$0**	**$850,000**
Engineering Design and Bidding Services	20%	$ 170,000	$ -	$ 170,000
Engineering Construction Services and Resident Observation	20%	$ 170,000	$ -	$ 170,000
Materials Testing	1%	$ 8,500	$ -	$ 8,500
Legal/Admin and Easements	2%	$ 17,000	$ -	$ 17,000
Wetlands & Con.Com	2%	$ 17,000	$ -	$ 17,000
SUBTOTAL OF ENGINEERING COST:		$383,000	$0	$383,000
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:		$1,233,000	$0	$1,233,000
Annual Inflation Rate to Mid-point construction	3%	$36,990	$0	$36,990
Project Contingency (Construction & Design)	25%	$ 308,250	$ -	$ 308,250
TOTAL ESTIMATED PROJECT COST:		**$1,578,000**	**$0**	**$1,578,000**

TOWN OF SOMERSET, MASSACHUSETTS
INTEGRATED WATER RESOURCE MANGEMENT PLAN
W-P PROJECT 14110

WILBUR AVENUE
Exisinting Flooded Suction Station (1976) 200 gpm w/ generator
Year scheduled for improvements 2023

ITEM	UNIT	QUAN.	UNIT PRICE	High Priority	Normal Priority	Overall Cost
CIVIL						
MISC. SITE IMPROVEMENTS	LS	1	$ 50,000	$ 50,000		$ 50,000
ARCHITECTURAL						
New CMU Building	LS	1	$ 250,000	$ 250,000		$ 250,000
PROCESS						
New Pumps	EA	2	$ 10,000	$ 20,000		$ 20,000
Precast wetwell	LS	1	$ 50,000	$ 50,000		$ 50,000
6-foot diameter valve vault	LS	1	$ 30,000	$ 30,000		$ 30,000
Pipe, Valves, and Fittings	LS	1	$ 30,000	$ 30,000		$ 30,000
MECHANICAL						
HVAC Systems	LS	1	$ 25,000	$ 25,000		$ 25,000
INSTRUMENTATION						
Instrumentation/Controls	LS	1	$ 40,000	$ 40,000		$ 40,000
ELECTRICAL						
New Generator and ATS	LS	1	$ 80,000	$ 80,000		$ 80,000
Provide emergency lighting, fire alarms, & gas detection	LS	1	$ 30,000	$ 30,000		$ 30,000
New electrical service and distribution equipment	LS	1	$ 50,000	$ 50,000		$ 50,000
SPECIALS						
Bypass Pumping	LS	1	$ 25,000	$ 25,000		$ 25,000
Inspect FM	LF	800	$ 30	$ 24,000		$ 24,000
SUBTOTAL MATERIAL COST:				$704,000	$0	$704,000
				$704,000	$0	$ 704,000
General Contractor OH&P			20%	$ 140,800	$ -	$ 140,800
Bonds and Insurance			2%	$ 14,080	$ -	$ 14,080
Traffic Control Allowance				$ 5,000	$ -	$ 5,000
Utility Allowance				$ 15,000	$ -	$ 15,000
ENGINEER'S ESTIMATE OF COSTRUCTION COST:				**$879,000**	**$0**	**$879,000**
Engineering Design and Bidding Services			20%	$ 175,800	$ -	$ 175,800
Engineering Construction Services and Resident Observation			20%	$ 175,800	$ -	$ 175,800
Materials Testing			1%	$ 8,790	$ -	$ 8,790
Legal/Admin and Easements			2%	$ 17,580	$ -	$ 17,580
Wetlands & Con.Com			2%	$ 17,580	$ -	$ 17,580
SUBTOTAL OF ENGINEERING COST:				$396,000	$0	$396,000
SUBTOTAL ESTIMATED CONSTRUCTION & ENGINEERING COST:				$1,275,000	$0	$1,275,000
Annual Inflation Rate to Mid-point construction			3%	$118,227	$0	$118,227
Project Contingency (Construction & Design)			25%	$ 318,750	$ -	$ 318,750
TOTAL ESTIMATED PROJECT COST:				**$1,712,000**	**$0**	**$1,712,000**

Section E
Building Services Memos

WRIGHT-PIERCE
Engineering a Better Environment™

MEMORANDUM

TO:	Jacob Ducharme, Kevin Olson	**DATE:**	10/2/2018
FROM:	Andrew Munsey, Architect	**PROJECT NO.:**	14110A
SUBJECT:	Somerset MA Water Pollution Control Facility – Pump Stations Evaluation		

Project Background

The Somerset Water Pollution Control Facility is composed of multiple buildings originally designed in 1968 and upgraded several times in 1985 and 1995. The original treatment facilities were completed in 1972 and located at the present site on Walker Street. Wright-Pierce conducted a site visit on September 24, 2018 to evaluate twelve out of the total 17 pump stations – those with buildings. The findings as they relate to the Architectural features and components are summarized below.

Applicable Building Codes

The following codes are currently in effect in the State of Massachusetts and applicable to this project:

1. Ninth Edition of the MA State Building Code 780 which adopts:
    a. International Building Code (IBC) 2015 as amended
    b. International Existing Building Code (IEBC) 2015 as amended
    c. International Mechanical Code (IMC) 2015 as amended
    d. International Energy Conservation Code (IECC) 2015 as amended
    e. International Fire Code 2015 as amended
    f. CMR 521 – Massachusetts Accessibility Regulations

Angus Street Pump Station

1. General: The Angus street pump station is a masonry block structure 13’-6” x 15’-6” with a brick veneer. It was renovated in 2009 (design by Fay, Spofford & Thorndike, LLC), adding a pitched roof and insulation and new siding, among other improvements. The new siding is a vinyl shingle in very good condition. The roof is asphalt shingles in very good

condition. Overall all the components – doors, frame, louvers, trim, etc. - and finishes are in very good condition.

a. Recommendations: none at this time.

Dublin Street Pump Station

1. General: The Dublin Street Pump station was originally built in 1968. It's a CMU structure 17 feet by 29 feet with wood siding and a pitched roof with asphalt shingles. Renovations to the building were designed in 2005 by Fay, Spofford & Thorndike, LLC. The improvements included new vinyl shingle siding, trim, louvers, windows and doors. In general all are in good condition with a few exceptions: The asphalt shingle roof is in poor condition and needs to be replaced. It's unclear whether these were replaced in 2005 with the other renovations but regardless, they need to be replaced. In addition, the door to the wet well shows some corrosion on the interior side, and the hardware is corroding. The building has an original chimney and mechanical has confirmed it is being used for exhaust. It is problematic because the masonry joints and flashing is failing and could create leaks within the building. The concrete stairs at the doors have metal edge guards which are broken and missing in some cases.
   a. Recommendations: At chimney install new flashing over cap and replace step flashing and repoint joints as needed. Reshingle entire roof. Replace wet well door and hardware. Replace stair metal edge guards and repair concrete surfaces as needed.

Foley Avenue Pump Station

1. General: The Foley Avenue Pump Station is a duplicate design of the Dublin Street Station. It is a CMU structure with wood shingle siding and a wood framed gable roof with asphalt shingles. It appears to have had some improvements at some point including new windows and doors, although it's unclear when this took place. The windows are in very good condition. Window trim appears to have been replaced at the same time and may be PVC. The exterior wood wall shingles are in fair condition. There are many, particularly on the water side, that are cupped and the painted finish is flaking off. This may be partially due

to the lack of a gutter on that side. Painted wood trimwork appears to be in good condition. The asphalt shingle roof is in poor condition. The original chimney is in fair condition, although brick joints and flashing show significant weathering. Louvers are in good condition. The concrete stair landings outside the doors have separated from the pavement and ground around them resulting in uneven riser heights which create a tripping hazard. The wetwell door is beginning to corrode and the hardware is already significantly corroded. Interior finishes are in very good condition. It appears to have been painted recently.

   a. Recommendations: Replace asphalt shingle roof. Replace wood shingle siding with vinyl siding. Replace wet well door and hardware. Add gutter to one side. At chimney install new flashing cap and replace step flashing and repoint joints as needed.

Grove Avenue Pump Station

1. General: The Grove Avenue Pump station is very similar in size and appearance as the Foley Avenue and Dublin Street stations. It appears to have been renovated recently with new siding, trim, windows, doors and louvers and roof shingles. Overall it is in very good condition. The only areas of concern are the original chimney which shows signs of weathering. Also there appears to be two stains on interior ceiling in the area of the chimney. This might be evidence of a leak. Further investigation is needed. Otherwise interior finishes are in very good condition, and appear to have been painted recently.
   a. Recommendations: Investigate possible leak around chimney. At chimney install new flashing on cap and replace step flashing and repoint joints as needed.

Lake Street Pump Station

1. General: The Lake Street pump station is a very small building approximately 8 feet by 12 feet. It’s a precast concrete building, built in 1990, that was subsequently covered with vinyl siding and gable roof with asphalt shingles. It houses only a generator and limited

electrical equipment. The exterior of the building is very poorly constructed, missing rake trim and possibly exposing edge of wood roof sheathing to the weather. Siding appears to be significantly faded. The steel double door is significantly rusted. The asphalt shingle roof is in fair to poor condition. One of the few exterior building mounted light fixtures is a cheap residential style light mounted poorly. Overall the exterior of the building is fair to poor condition.

   a. Recommendations: Upgrade exterior with new siding, trim, asphalt shingle roof, new door and frame, new light fixtures. If this building is to be heated it must comply with the current energy code. This will require adding insulation to the walls and roof. Mostly likely it will need to be added to the exterior.

Lees River Pump Station

1. General: The Lees River Pump station is a CMU structure similar in size and appearance to the Foley Ave and Dublin Street stations. It has vinyl shingle siding, gable roof with asphalt shingles, PVC trim and metal doors. It was completely renovated in 2014, design done by Wright-Pierce (job #12726B). All exterior and interior components are in excellent condition.
   a. Recommendations: None at this time.

Luther Avenue Pump Station

1. General: The Luther Avenue Pump Station is a CMU structure similar in size and appearance to the Foley Avenue and Dublin Street stations. It's 31 feet by 17 feet, with gable roof and chimney. The exterior siding is painted wood clapboards in good condition. The trim is painted wood in good condition. The exterior doors are emobossed hollow metal in good condition. However the wet well door hardware is corroding in the interior side. The chimney is the other area of concern on the exterior. It shows signs of weathering, the mortar joints and flashing are failing. If not corrected it could cause leaks. Mechanical has confirmed the chimney is being used for exhaust. The interior finishes are in good condition. It appears to have been painted recently.

a. Recommendations: Replace asphalt shingle roof. At chimney, install new flashing over cap, replace step flashing and repoint joints as needed.

Main Street Pump Station

1. General: The Main Street pump station is a CMU structure approximately 13'-6" by 15'-6", originally built in 1968. The exterior has been painted (yellow). It has a limited amount of spalling and several joint cracks (consult with structural). Otherwise the CMU is in fair condition considering its age. The roof is flat concrete with aluminum flashing perimeter. The roof was not accessed at the time of evaluation, its condition is unknown. The exterior door and frame is hollow metal. It shows signs of rusting, and the hardware is in poor condition. Louvers are in good condition. The interior walls are in good condition considering its age. It appears to have been painted recently. The floor is painted concrete showing significant wear. Exterior stairs are painted concrete with metal edge strips. Concrete is damaged and metal strips are loose.
    a. Recommendations: If building is to be heated it needs to comply with current energy code. Walls and roof would need to be insulated accordingly. If structure is to remain in current form then add an exterior skin assembly consisting of rigid insulation and vinyl siding and trim. Add insulation at roof deck and re-roof with EPDM membrane and new flashing. Replace door and frame and hardware. Remove paint from concrete floor and repaint. Replace exterior stairs.

Pilot Drive Pump Station

1. General: The Pilot Drive pump station is a CMU structure approximately 19 feet by 35 feet, in a saltbox shape. It features an unusual porch style roof overhang on the front. The exterior is clad in wood siding which is in the process of being replaced by the Town with wood shingles. The trim is being replaced with painted wood. Existing shingles on the back side have significant peeling paint. The roof is asphalt shingles in very good condition. Age is unknown. The windows are aluminum in fair condition considering their age. It's unknown whether the town will be replacing these as part of their upgrades.

Louvers are in good condition. The town is installing insect screen over the outside of the louvers as it installs new trim. Exterior doors are hollow metal in fair condition. Hardware is in poor condition. Interior doors are hollow metal in good condition. Interior CMU walls have been painted and are in good condition. The floor is painted concrete in good condition.

   a. Recommendations: Replace exterior doors, frames and hardware. Replace windows with new vinyl ones.

Pleasant Street Pump Station

1. General: The Pleasant street pump station is a CMU structure approximately 14 feet by 25 feet with a wood framed gable roof. It features deep eave and rake overhangs and a brick chimney. The exterior siding is wood shingles in fair condition. There are signs of flaking paint and cupping. The gable roof is asphalt shingles, in good condition. Age is unknown. The brick chimney shows signs of weathering, failing mortar joints and flashing. The windows appear to be site fabricated from glass panels. Trim, including decorative crown moulding on rakes and eave, is rotting and has flaking paint. Exterior doors are hollow metal with some rust spots. Hardware is in fair condition. Interior CMU walls are painted but are dirty.
   a. Recommendations: Replace wood shingle siding with new vinyl. If the building is to be heated it needs to comply with current energy code. This may involve adding rigid insulation to the wall exterior. Replace all wood trim with PVC. Replace windows with new vinyl ones. Confirm chimney is still in use. If not consider removing top portion to below roof deck and sheathing over it to eliminate possibility of leaks. If chimney is being used then repoint joints as needed. Replace step flashing. Replace exterior doors and frames and hardware. Repaint interior walls and ceiling.

Route 6 Ejector Station

1. General: The Route 6 Ejector station is a very small structure, built in 1976, approximately 7’4” square housing a spiral staircase accessing below grade structures. It’s a CMU bearing

wall with 1" rigid insulation in the cavity and a CMU veneer, painted. The roof is cast in place concrete, flat, with an unknown roofing material. The roof was not accessed as part of the evaluation. The exterior is generally in very good condition. It has one hollow metal door that is in good condition, including hardware (perhaps recently replaced). The frame does have some rust on the lower edges near the floor. The aluminum threshold is well worn. The surrounding chain link fence has one post that has been hit by a car and is severly bent.

   a. Recommendations: If the structure is to remain in its current form and is to be heated it will be required to comply with current energy code. This will involve adding insulation to the walls and roof. There's likely not enough space inside the structure to add insulation so it will need to be applied to the exterior. Add insulation at roof and provide new EPDM roofing membrane. Replace door threshold, Repair chain link fence posts.

Wilbur Avenue Ejector Station

1. General: the Wilbur Avenue Pump Station is very similar in size and appearance to the Route 6 Ejector station. It was built in 1976. It's a CMU structure about 7'-4" square housing a spiral staircase to access below grade structures. It has a split face CMU veneer and one inch of rigid insulation in the cavity. It features a flat concrete roof. The roof was not accessed at the time of evaluation. Age and condition are unknown. The exterior door and frame are in good condition, including hardware.
   a. Recommendations: If the structure is to remain in its current form and is to be heated it will be required to comply with current energy code. This will involve adding insulation to the walls and roof. There's likely not enough space inside the structure to add insulation so it will need to be applied to the exterior. Add insulation at roof and provide new EPDM roofing membrane.

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MEMORANDUM

TO:	Project Team	DATE:	December 21, 2018
FROM:	Tony D'Amelio	PROJECT NO.:	14110A
SUBJECT:	Somerset MA Pump Station Evaluations – Electrical System Observations and Recommendations		

Project Background

On 9/24/2018, a site visit was conducted to the 17 pump stations serving the Somerset, MA WWTP. The purpose of the site visit was to perform an electrical system observation for each of the pump stations. Based upon these observations a summary of the existing condition findings and recommendations for each of the pump stations was collected and determine. The information and findings have been included in this memorandum. Below is a summary and evaluation of the electrical system for each of the pump stations.

Applicable Building Codes

The following codes as they apply to each of the pump stations are currently in effect in the State of Massachusetts and applicable to this project:

1. Massachusetts Electrical Code
2. NFPA 70, 2017 Edition
3. Ninth Edition of the MA State Building Code and Applicable References
4. International Fire Code as amended
5. Massachusetts State Energy Code and Applicable References
6. All Other Local City and Town Applicable Code References

General

The project scope determined that of the 17 pump stations there were basically two (2) types of designs of the stations that would summarize all of the locations which were visited and observed. The first type of pump station **(Type 1)** consisted of an above grade building structure. The structure consisted of a dry side and wet side. The dry side housed the electrical distribution equipment, controls, and instrumentation. In addition, there was a below grade pump room which housed the pumps. This area however was open to the upper electrical/control room. Based upon this configuration unless continuously ventilated to the required air changes it would be classified per NFPA 820 requirements.

There was also a separate wet side which consists of the influent sewage flow with wet wells, level controls, and instrumentation. This side is considered classified per NFPA 820 and separate.

The second type of pump station **(Type 2)** consisted of a below grade submersible structure. There was a wet well and either one or two submersible pumps, level controls and alarms. There was also an above grade, pump control panel and incoming service main disconnect means as well as the utility company metering. In the description write-up for each pump station a more detailed information of the finding has been noted for each location.

Pump Stations

1. **Angus Street Pump Station**

- The Angus St Pump Station is powered by a 277/480V 3phase, 4 wire, 60HZ underground electrical service from utility pole #4-30. The main circuit breaker is rated at 225 ampere and is manufactured by ITE Company which is no longer in service. This pump station was recently upgraded, however the main circuit breaker, which is located within the pump station, was never updated or replaced.
- The emergency (stand-by) power to the pump station is furnished via a 43 KW, 54 KVA, natural gas generator located within the pump station.
- This emergency (stand-by) power is provided by a 43kW/54kVA 277/480V, 3-phase, 60HZ GENERAC natural gas generator with a GENERAC automatic transfer switch. The incoming electric service is equipped with a 225A MCB, while the generator is equipped with an 80A MCB.
- The pump station contains two (2)-15 HP submersible pumps, served via the pump control panel located within the pump station.
- Each of the pumps are started and stopped and operated by a solid state reduced voltage starter located within the pump control panel.

- Lighting inside the station consists of open style, industrial fluorescent lighting fixtures. The pump station does not have emergency lighting or exit signs and is not equipped with a fire alarm system, security system, or gas detection system. The station has receptacles and light switches where necessary, and GFCI outlets where appropriate. All NEMA ratings appear to be appropriate for the spaces. Conduit systems are rigid metallic conduit RMC. The heat trace system is not installed properly. Alarm silence is improperly located on the bottom level of the control panel. There is no space for new equipment.
- There is limit clearance around the electrical equipment within the pump station but appears to have been approved during construction.
- The pump station is a submersible type of pump station and was recently upgraded. The station is in good overall condition.
- There presently is a mission control SCADA System telemetry/alarm control panel which transmits via a cellular phone network located at the pump station.

2. Wilbur Avenue Pump Station

- The Wilbur Ave PS is powered by a 120/208V 3phase, 4 wire, 60HZ underground electrical service from utility pole #53/33. The main circuit breaker rated at 100 ampere and is manufactured by Siemens Corporation. This is located on the exterior of the building along with the incoming power and kilowatt – hour meter.
- The emergency (stand-by) power to the pump station is furnished via a 35 KW/44 KVA, 120/208 volt, 3-phase, 60HZ Kohler natural gas generator located outside of the pump station within a weather protected enclosure.
- Backup power is provided by an outdoor 35kW/44kVA older model Kohler natural gas generator with 100A, Kohler automatic transfer switch. The primary electric service is

equipped with a 100A, 18kAIC MCB. The station contains two (2) -7.5hp submersible pumps with start/stop operation on across-the-line motor starters. The NEMA 12 control panel is located in the basement of the station and is corroded.

- The pump station is not equipped with emergency lighting, exit signs, fire alarms, security systems, or gas detection. The conduit system is not compliant for the space. Lighting fixtures inside the station are not consistent. The station has adequate receptacles and switches with GFCI outlets where appropriate. There is a space classification issue in the station; the pump room is open to the upper floor area, classifying the spiral staircase and parts of the upper level as Class 1 Div. 2. None of the equipment is appropriately rated for this classification. The controls and telemetry are located in the basement and not compliant. This is a 40-foot deep station with a separate wet well and dry well area. There are a number of NEC clearance issues in the upper level limiting the equipment that can be installed. The pump station was converted from an ejector station to a submersible pump station, similar to the Route 6 PS.

3. Lee's River Avenue Pump Station

- The Lee's River Ave PS is powered by a 277/480V 3-phase, 4 wire, 60Hz underground electrical service from the utility pole-mounted transformer. Emergency (stand-by) backup power is provided by a 180kW/225kVA Kohler 180REZXB natural gas generator with an 800A, ASCO automatic transfer switch. The incoming electrical service is supplied to a 400A MCB located outside of the entrance to the pump station. The pump station has two (2) - 75hp pumps operated by individual Eaton CRX9000 VFDs.
- The pump station is equipped with LED lighting fixtures, emergency lighting, and exit signs. The station has adequate receptacles and switches with GFCI outlets where appropriate. The conduit system is aluminum/RGS, and there are no NEMA classification issues. There is space for new equipment and any future equipment to be installed at this

pump station location. This pump station was renovated in 2014 by Wright-Pierce (project number 12726) and received a complete electrical upgrade as part of the project.

4. **Route 6 Pump Station**

- The Route 6 PS is powered by a 120/208V 3phase, 4 wire, 60Hz underground electrical service from the utility pole-mounted transformer. The incoming electric service is equipped with a 100A MCB located outside of the building. The station has two (2) - 7.5hp submersible pumps with start/stop operation on across-the-line, motor starters. The NEMA 12 control panel is located in the basement of the station and is corroded.
- Backup power is provided by an outdoor 35kW/44kVA older model Kohler natural gas generator with an indoor mounted, 100A automatic transfer switch.
- The pump station is not equipped with emergency lighting, exit signs, fire alarms, security systems, or gas detection. The conduit system is not compliant for the space. Lighting fixtures inside the station are not consistent. The station does not have adequate receptacles, switches, and GFCI outlets. There is a space classification issue in the station; the pump room is open, classifying the staircase and parts of the upper level as Class 1 Div. 2. None of the equipment is appropriately rated for this classification. The controls and telemetry are located in the basement and not compliant. There are a number of NEC clearance issues in the upper level limiting the equipment that can be installed. The pump station was converted from and ejector station to a submersible pump station, similar to the Wilbur Ave PS.

5. Foley Avenue Pump Station

- The Foley Ave PS is powered by a 277/480V 3phase, 4 wire, 60Hz overhead electrical service from the utility pole-mounted transformer. The incoming electric service is equipped with a 400A MCB located outside of the building along with the utility company metering cabinet and service meter. The station has three (3) -75hp pumps driven by Cutler-Hammer AF 5000+ VFDs. The VFDs are mounted in a GE 7700 series motor control center MCC.
- Backup power is provided by a 175kW/219kVA Waukesha natural gas generator with 400A ASCO automatic transfer switch. Both are located within the pump station building.
- The pump station is not equipped with emergency lighting, exit signs, fire alarms, security, or gas detection systems. The pump station has adequate receptacles where appropriate, but are not compliant for the Class 1 Div. 2 space. There is a space classification issue in the station; the pump room is open to the upper floor area, classifying the spiral staircase and parts of the upper level as Class 1 Div. 2. None of the equipment is appropriately rated for this classification The conduit system is rigid galvanized steel, RGS. The equipment is not properly rated for the Class 1 Div. 2 space. The VFDs are outdated. There is room for new equipment. This pump station is identical to the Lee’s River PS before the upgrade as well as the Luther Ave PS.
- The existing lighting consists of open type, fluorescent, industrial fixtures throughout the station.

6. Luther Avenue Pump Station

- The Luther Ave PS is powered by a 277/480V 3phase, 4 wire, 60Hz underground electrical service from utility pole #98-30. The incoming electric service is equipped with a 400A MCB located outside of the building along with the utility company meter. The station has three (3) -75hp pumps driven by Cutler-Hammer AF 5000+ VFDs. The VFDs are mounted in a Square D motor control center MCC.
- Backup power is provided by a 175kW/219kVA Waukesha natural gas generator with 400A ASCO automatic transfer switch. Both are located within the pump station building.
- The pump station is not equipped with emergency lighting, exit signs, fire alarms, security, or gas detection systems. The pump station has adequate receptacles where appropriate, but are not compliant for the Class 1 Div. 2 space. There is a space classification issue in the station; the pump room is open to the upper floor area, classifying the spiral staircase and parts of the upper level as Class 1 Div. 2. None of the equipment is appropriately rated for this classification. The conduit system is rigid galvanized steel, RGS. The equipment is not properly rated for the Class 1 Div. 2 space. The VFDs are outdated. There is room for new equipment. This pump station is identical to the Lee's River PS before the upgrade as well as the Foley Ave PS.
- The existing lighting consists of open type, fluorescent, industrial fixtures throughout the station.

7. Grove Avenue Pump Station

- The Grove Ave PS is powered by a 277/480V 3phase, 4 wire, 60Hz underground electrical service from utility pole #1-30. The main circuit breaker is rated 225 ampere and is located within the motor control center MCC. The utility company meter is located outside of the building. The MCC is a Cutler-Hammer Freedom Series 2100 and the main bus rating is 600 ampere.
- Backup power is provided by a 75kW/93.75kVA continuous duty rated Cummins natural gas generator with 100 ampere, 42kAIC Eaton ATC-300 automatic transfer switch. The generator model number is GGHE-713361. Both are located within the pump station building.
- The station has three (3) - 25hp pumps driven by VFDs built into a Cutler-Hammer Freedom Series 2100 motor control center MCC.
- The pump station is not equipped with emergency lighting, exit signs, fire alarms, security, or gas detection systems. The lighting in the wet well and pump room is high-pressure sodium, the warm-up time of which has been a problem for the station operators. The pump station has adequate receptacles where appropriate, but are not compliant for the Class 1 Div. 2 space. There is a space classification issue in the station; the pump room is open to the upper floor area, classifying the spiral staircase and parts of the upper level as Class 1 Div. 2. None of the equipment is appropriately rated for this classification. The conduit system is rigid galvanized steel, RGS. The equipment is not properly rated for the Class 1 Div. 2 space. The VFDs are outdated. There is room for new equipment. This pump station

is similar to the Lee's River PS before the upgrade as well as the Foley Ave PS, but only has 2 levels.

- Lighting at this station has been a problem in the scheduling and maintenance operation of this pump station.

8. Dublin Street Pump Station

- The Dublin St PS is powered by a 480V 3phase, 3 wire, 60Hz closed delta, underground electrical service from utility pole #10-30. There is a 200A Siemens main service disconnect located outside and an Eaton 150 ampere MCB which feeds an Eaton 250 ampere main lug only main distribution panel located inside of the building. The utility meter is located outside of the building.
- Backup power is provided by a 60kW/75kVA Kohler 60RZG natural gas generator with MPAC 1500 Kohler automatic transfer switch. Both are located within the pump station building.
- The station has three (3) - 25hp pumps driven by Square D Power-R-Flex VFDs.
- The dry well upper level side lighting consist of open type, industrial fluorescent fixtures.
- The pump station is not equipped with emergency lighting, exit signs, fire alarms, security, or gas detection systems. The first level has open industrial lighting, while the wet well and pump room have delayed start lighting. The pump station has adequate receptacles where appropriate, but are not compliant for the Class 1 Div. 2 space. There is a space classification issue in the station where the pump room is open to the upper floor area, classifying the spiral staircase and parts of the upper level as Class 1 Div. 2. None of the equipment is appropriately rated for this classification. The conduit system is rigid galvanized steel, RGS. The equipment is not properly rated for the Class 1 Div. 2 space. The VFDs are outdated. There is room for new equipment. This pump station is similar to the Lee's River PS before the upgrade as well as the Foley Ave PS, but only has 2 levels.

9. Main Street Pump Station

- The Main Street PS is powered by a 277/480V 3phase, 4 wire, 60Hz underground electrical service from the utility pole-mounted transformer. The incoming electric service is connected to a Westinghouse Company 225A MCB located within the building.
- Backup power is provided by a 45kW/56.25kVA Onan 45DEF diesel generator with ASCO Model 940, 125 ampere, automatic transfer switch. Both the generator and transfer switch are older equipment models.
- The station has two (2) - 20hp pumps that are operated start/stop via an across the line motor starter by a pump control panel.
- The pump station is not equipped with emergency lighting, exit signs, fire alarms, security, or gas detection systems. The lighting fixtures are open type industrial fluorescent. The pump station has adequate receptacles where appropriate, but are not compliant for the Class 1 Div. 2 space. The pump station area in the below grade canned station is rated as Class 1, Div. 2. There is a space classification issue in the station. The upper area of the station is open to the below grade steel canned pump station vis the hatch access and therefore parts of the upper level as Class 1 Div. 2. None of the equipment is appropriately rated for this classification either in the lower level canned station or the upper level. The conduit system is rigid galvanized steel, RGS. The equipment is not properly rated for the Class 1 Div. 2 space. There is no room for new equipment. The controls and telemetry are located in the lower level canned pump station, which is non-compliant.

10. Pilot Drive Pump Station

- The Pilot Drive PS is powered by a 277/480V, 3phase, 4 wire, 60Hz underground electrical service from the utility pole #49-10. The incoming electric service is connected to a 200A main circuit breaker MCB located within the Sylvania Company motor control center inside of the pump station. This existing motor control center is no longer manufactured and the company is no longer in business. The utility company service meter is located on the outside of the building.
- Backup power is provided by a 50kW/62.5kVA Fermont 60DH continuous-duty rated generator with automatic transfer switch. There also is a fuel day tank located within the building for the generator. The generator, automatic transfer switch, and day tank are located within the building.
- The station has two (2) - 25hp pumps that are operated start/stop via across the line motor starters that are located within the Sylvania Company motor control center MCC. There is also a Healy-Ruff pump control panel which provides operation of the pumps at the pump station. There is a level control system and devices as part of this system control at the pump station.
- The pump station is not equipped with emergency lighting, exit signs, fire alarms, security, or gas detection systems. The lighting fixtures are open type, industrial fluorescent. The pump station has adequate receptacles where appropriate, but are not compliant for the Class 1 Div. 2 space. . There is a space classification issue in the station. The pump room is open to the upper floor area, classifying the spiral staircase and parts of the upper level as Class 1 Div. 2. None of the equipment is appropriately rated for this classification. The conduit system is rigid galvanized steel, RGS. The equipment is not properly rated for the Class 1 Div. 2 space. There is no room for new equipment.

11. Pleasant Street Pump Station

- The Pleasant Street PS is powered by a 120/208VV 3phase, 4 wire, 60Hz electrical service from the utility pole #50. The incoming electric service is connected to a 200 ampere main circuit breaker MCB located within the Sylvania Company motor control center inside of the pump station. This existing motor control center is no longer manufactured and the company is no longer in business. The utility company service meter is located on the outside of the building. This station is similar to the Pilot Drive Pump Station.
- Backup power is provided by a 45kW/56.25kVA Fermont 45DH generator with automatic transfer switch. There also is a fuel day tank located within the building for the generator. The generator, automatic transfer switch, and day tank are located within the building.
- The station has two (2) - 5hp pumps that are operated start/stop via across the line motor starters that are located within the Sylvania Company motor control center MCC. There is also a Healy-Ruff pump control panel which provides operation of the pumps at the pump station. There is a level control system and devices as part of this system control at the pump station.
- The pump station is not equipped with emergency lighting, exit signs, fire alarms, security, or gas detection systems. The lighting fixtures are open fluorescent, except for the wet well lighting, which is incandescent. The pump station has adequate receptacles where appropriate, but are not compliant for the Class 1 Div. 2 space. There is a space classification issue in the station. The pump room is open to the upper floor area, classifying the spiral staircase and parts of the upper level as Class 1 Div. 2. None of the

equipment is appropriately rated for this classification. The conduit system is rigid galvanized steel, RGS. The equipment is not properly rated for the Class 1 Div. 2 space. There is no room for new equipment.

12. Lake Street Pump Station

- The Lake Street PS is powered by a 120/240V 1phase, 3 wire, 60Hz overhead electrical service from utility pole #4. The incoming electric service is connected to a 60A 2 pole, main circuit breaker MCB located inside of the building. The utility company meter is located outside of the building.
- The pump station has two (2) submersible pumps connected to a pull box inside the wet well with float controls. The ladder into the wet well is not accessible. The pumps are connected and controlled via a Boydco Corporation Pump Control Panel.
- Backup power is provided by a GENERAC Model 70965 natural gas generator with a GENERAC Model 90A03141-W GTS System, automatic transfer switch. The generator is furnished with an 80 ampere, 2 pole main circuit breaker. Both the generator and the automatic transfer switch are located inside of the building.
- The pump station is not equipped with emergency lighting, exit signs, fire alarms, security, or gas detection systems. The lighting fixtures are gasketed fluorescent. The pump station has adequate receptacles where appropriate. The conduit system is rigid galvanized steel RGS. There is no room for new equipment.

13. Miller's Lane Pump Station

- The Miller's Lane PS is powered by a 120/240V 1phase, 3 wire, 60Hz underground electrical service from the utility pole #21. Backup power is provided by a portable generator and switched with the main breaker and a back-feed plug. The arrangement of this portable generator connection is not code compliant or a safe installation. The aboveground enclosure contains the main circuit breaker MCB, across-the-line starters, and generator plug, making the panel quite messy. The internal wiring of the panel is not clearly identified and live parts exist making this not a safe installation. The cabinet and wet well are appropriately rated and contain equipment appropriate for the classification of the space. This pump station has two (2) submersible pumps. This station is similar to the other outdoor pump stations which the Town presently operates.

14. Gay Street Pump Station

- The Gay Street PS is powered by a 120/240V 1phase, 3 wire, 60Hz underground electrical service from utility pole #147/4. Backup power is provided by a portable generator and switched with the main breaker and a back-feed plug. The arrangement of this portable generator connection is not code compliant or a safe installation. The aboveground enclosure contains the main circuit breaker MCB, across-the-line starters, and generator plug, making the panel quite messy. The internal wiring of the panel is not clearly identified and live parts exist making this not a safe installation. The cabinet and wet well are appropriately rated and contain equipment appropriate for the classification of the space. This pump station is a converted ejector station, and has only 1 submersible pump. This station only services approximately 12 homes in the area. This station is similar to the other outdoor pump stations which the Town presently operates.

15. Owen Avenue Pump Station

- The Owen Avenue PS is powered by a 120/240V 1phase, 3 wire, 60Hz underground electrical service from utility pole #3. Backup power is provided by a portable generator and switched with the main breaker and a back-feed plug. The arrangement of this portable generator connection is not code compliant or a safe installation. The aboveground enclosure contains the 200 ampere main circuit breaker MCB, across-the-line starters, and generator plug, making the panel quite messy. The internal wiring of the panel is not clearly identified and live parts exist making this not a safe installation. The cabinet and wet well are appropriately rated and contain equipment appropriate for the classification of the space. This pump station is a converted ejector station, and has 2 submersible pumps. This station is similar to the other outdoor pump stations which the Town presently operates.

16. Durfee Court Pump Station

- The Durfee Court PS is powered by a 120/240V 1phase, 3 wire, 60Hz underground electrical service from utility pole #2. Backup power is provided by a portable generator and switched with the main breaker and a back-feed plug. The arrangement of this portable generator connection is not code compliant or a safe installation. The aboveground enclosure contains the 200 ampere main circuit breaker MCB, across-the-line starters, and generator plug, making the panel quite messy. The level control system for this station is a multi-trode level control system as provided by Flygt Corporation. The internal wiring of the panel is not clearly identified and live parts exist making this not a safe installation. The cabinet and wet well are appropriately rated and contain equipment appropriate for the classification of the space. In addition, there are no classified, explosion proof seal off fittings installed at the station making it a non-compliant installation. This pump station is a converted ejector station, and has 2 submersible pumps. This station is similar to the other outdoor pump stations which the Town presently operates.

17. Cherry Street Pump Station

- The Cherry Street PS is powered by a 120/240V 1phase, 3 wire, 60Hz underground electrical service from utility pole #152/7. The wet well vent for the pump station is located at the utility pole #152/7 which appears to be in conflict with the utility owned pole. Backup power is provided by a portable generator and switched with the main breaker and a back-feed plug. The arrangement of this portable generator connection is not code compliant or a safe installation. The aboveground enclosure contains the main circuit breaker MCB, across-the-line starter, and generator plug, making the panel quite messy. The internal wiring of the panel is not clearly identified and live parts exist making this not a safe installation. The cabinet and wet well are appropriately rated and contain equipment appropriate for the classification of the space. This pump station has 1 submersible pump. This station is similar to the other outdoor pump stations which the Town presently operates.

Recommendations and Findings

General

The facility staff has done a good job maintaining the overall operation of these seventeen (17) remote pumping stations. These pump stations are located throughout the general area of the Town and cover a large area. There are many facets of the make-up of these stations which require regular maintenance and servicing. The ability to visit, check, maintain and monitor all of these site locations and equipment on a regular basis is a huge task for the Town.

The site visit and observations noted that there were two (2) general types of pump stations that comprised the make-up of the 17 pump stations that the Town operates for this system. Therefore, in the write-up for this section of the memorandum the recommendations and findings will be denoted as such in order to simplify and provide for a more concise description presented. The major overall electrical issue for the pump stations is the fact that systems and equipment are old and in need of upgrade and replacement. In addition, there is limited space clearance issues as well as NFPA 820 Classification issues which need to be addressed and corrected.

The following is a summary of the areas in need of electrical system upgrades as observed and noted and the recommendations necessary to correct these issues:

Type 1 Pump Stations

The Type 1 pump station consisted of an above grade building structure. The structure consisted of a dry side and wet side. The dry side housed the electrical distribution equipment, controls, and instrumentation. In some cases also included the emergency power equipment such as the generator, automatic transfer switch and ancillary equipment which was also located indoors. Some sites the generator was outdoors for this application. In addition, there was a below grade pump room which housed the pumps. This area however was open to the upper electrical/control room. Based upon this configuration unless continuously ventilated to the required air changes it would be classified per NFPA 820 requirements.

There was also a separate wet side which consists of the influent sewage flow with wet wells, level controls, and instrumentation. This side is considered classified per NFPA 820 and separate. There were a total of twelve (12) of the pump stations which were of this Type 1 style of pump station. Based upon this type of station and the set-up noted the following is a summary of the findings and recommendations:

- Update all lighting inside and outside of the pump station including all dry side and wet side locations with energy efficient LED type fixtures and bring all lighting levels to IES standards for this type of facility and locations.
- Furnish and installation of new emergency stand-by generator and equipment including automatic transfer switch. Locate generator outdoors in a weather-protected enclosure to allow sequence of construction of the station as well as additional space within the building for equipment installations and clearances per NEC requirements.
- Furnish and installation of legally required emergency lighting and exit signage.
- Furnish and install new VFD equipment with proper harmonic mitigation equipment.
- Furnish and install fire alarm and security systems as required and tie into SCADA telemetry system new equipment.
- Furnish and install new instrumentation and SCADA telemetry equipment. This shall include new pump control panel/RTU and level controls.
- Separation of spaces between upper and lower level area of station. Alternative continuous ventilation in order to un-classify this space to meet NFPA 820 requirements.
- Complete new electrical distribution equipment for the station.
- New incoming electrical service upgrade to the pump station.

In summary, the recommendations would be to provide a complete station upgrade similar that was recently completed at the Lees River Pump Station. This would apply to all pump station Type 1 locations noted herein.

Type 2 Pump Stations

The Type 2 pump station consisted of a below grade submersible structure. This would include a wet well and two submersible pumps, level controls and alarms. There would also be an above grade, pump control panel, SCADA telemetry and incoming service main disconnect means as well as the utility company metering. All of the above equipment would be installed within an above grade, electrical equipment enclosure except for the utility metering which would be located on the side of the enclosure. We would recommend a stainless steel enclosure for longevity and to withstand the harsh outdoor elements and conditions. The following is a summary of the findings and recommendations:

- New manual transfer switch and portable generator circuit breaker and plug for proper and protected manual transfer and portable generator connection and operation.
- New level controls and instrumentation.
- New SCADA telemetry control and pump control panel.
- New incoming electrical service and connections.
- New submersible pump station.
- New electrical equipment enclosure mounted on a concrete pad.
- New electrical distribution equipment.

Summary

The electrical system upgrade for the existing pump stations will require a very detailed Sequence of Construction in order for each of the stations to be maintained operational throughout the entire construction upgrade for each of the pump station site locations. There are many alternative options to allow for the new electrical equipment and device to be installed, tested, and connected to the overall system for a final and acceptable system while still maintaining a cost-effective overall project as each of the stations are upgraded.

The recommendations presented have been developed for an entire upgrade to each of the pump station site locations. There are some other considerations which can be looked at and determined should a reduced scope and cost consideration be desired. The information presented herein was developed in order to present the finding in a manner to provide a complete system upgrade as required for the pump stations.

TOWN OF SOMERSET, MA

INTEGRATED WATER RESOURCE MANAGMENT PLAN (IWRMP)

PROJECT NO.: 14110A

I&C EVALUATION MEMORANDUM

SUBJECT: Instrumentation & Controls Evaluation Memo – IWRMP

Prepared by: James Papadimitriou, PE

Reviewed by: Paul J. Denis, PE

Date: 10-12-18

Revised on:

CONTENTS

1.0 INTRODUCTION

On September 24, 2018, members of Wright-Pierce's (W-P) Process and Design Team staff met with the Town of Somerset Water Pollution Control Facility's (WPCF) Collection System Supervisor, Jack Bowden. Mr. Bowden escorted W-P staff to all the Town's wastewater pumping facilities providing a brief overview of each facility, its equipment and processes, and existing conditions. Existing conditions relating to the existing instrumentation and control systems, local alarming, cellular alarm dial-out systems, as well as client preferences were discussed.

This memo includes a brief description of existing wastewater pumping facilities, client preferences, and recommendations on potential improvement projects. This memo should not be considered a basis of design and as such does not include constructability, and opinion of probable construction cost.

2.0 DESCRIPTION OF EXISTING FACILITIES

Remote Wastewater Pumping Facilities

General

The Town of Somerset, Massachusetts owns, operates, and maintains seventeen (17) remote wastewater pumping facilities. Although many of the facilities vary in age, they vary little in functionality and are all very similar in nature. Specific instruments, controls, and alarm information for each facility is indicated in Appendix B – Pumping Station, I&C Data Sheets.

Pump Station Control Panels

Pump Station Control Panels were NEMA 12/4 painted steel and were in reasonably good condition. MultiSmart (by Multitrode) or Mercoid dedicated level controllers provided pump station level controls. A submersible level transmitter or ultrasonic level transmitter provided Wetwell level measurement and the MultiSmart (or Mercoid) started/stopped pumps based on water level. Low-level and high-level alarms are also issued through the MultiSmart. Level floats are provided as a backup means of generating low-level and high-level alarms in the event the level transmitter fails. Most pumps were VFD (variable frequency drive) driven where the pump controller modulated the speed of the VFD to maintain water level.

The newest pump station, Lee's River Avenue, utilized a PLC (programmable logic controller) for level controls instead of a dedicated pump controller. The PLC is an Allen-Bradley CompactLogix with a PanelView Plus 1000 graphical OIT (operator interface terminal) that provides monitoring, pump controls, and alarming. The PLC does not communicate alarms directly with the WPCF. Alarm transmission is accomplished via the Mission Controls cellular alarm dialer.

Station Alarms

A cellular alarm dialer by Mission Controls provides the following typical station status and/or alarms: Pump status, low and high alarm, gen run, gen fault, 2-spare inputs. The system dials out the alarms to operators on call and provides voice annunciation of the alarm. Once received, the operator can acknowledge the alarm directly from the cell phone. A status and record of alarm is indicated on a website.

Standby Generator

Each wastewater pumping facility had a standby generator unless otherwise noted in Appendix B. The generator was either diesel fuel or natural gas fired with an automatic transfer switch. A generator fault is issued to the Mission dialer for remote alarming.

3.0 CLIENT PREFERENCES

The following items were directly communicated as preferences by the Town's Operations staff:

1. They would prefer not to utilize the Multitrode pump controller for any controls upgrades.
2. They prefer an easier way to control the VFDs in "Hand" mode, both in terms of start/stopping of the pumps as well as controlling the VFD speed without going into the VFD keypad's menu structure.

4.0 RECOMMENDED UPGRADES

Wastewater Pumping Facilities

The following are possible project recommendations that would provide enhancements and reliability to the wastewater pumping facilities.

Pump Controllers

W-P suggests the addition of an up to date and modern pump controller or programmable logic controller and operator interface terminal to provide monitoring, controls, and alarming. The PLC can provide pump sequencing, pump faults, manual and automatic level control, level alarming, and monitoring of station faults. PLC based controls can provide flexibility whereas dedicated pump controls are limited in functionality.

Remote Communications

A communication study can be provided to determine if radio communications or cellular communications is feasible between remote pumping stations and the WPCF. The local cellular provider would be contracted through the Town to take cellular field measurements at all remote pumping station locations and provide the associated signal strength and anticipated cost vs. data transfer rates. The radio study would include a computerized path provide, RF link analysis (signal strength, anticipated equipment & frequencies), field measurements to confirm the computer study, and a cost benefit analysis to determine the best method(s) of communication over a 20-year life-cycle.

Radio

The radio would be connected to a PLC. The PLC would be connected to the IO at the pump station. Monitoring, control, and alarming would be provided and information would be gathered and processed in the PLC, then transmitted through the radio with an ethernet connection or serial connection.

Pros:

1. Require less space and can be installed in the PLC control panel
2. Less expensive than an RTU
3. Can be serviced by many qualified system integrators

4. May be used utilized as a repeater
5. Can be configured to report on exception

Cons:

1. Most are required to be used in combination with a PLC to collect and transmit data.

<u>Cellular</u>

Cellular machine to machine (M2M) communication between locations may be used. M2M cellular options have come a long way in development and are a viable option in today's marketplace. Cellular may be used with a PLC and use a communication cable. Two considerations if planning to use cellular is if there is sufficient cellular signal, and the amount of data transferred. A M2M phone plan is much like a phone plan in respect to your bill is directly related to the amount of data transferred. Optimization during the setup of the device to minimize data usage, but the usage of cellular at high data locations can become cost prohibitive.

Pros:

1. Can be installed anywhere there is cell coverage
2. Some more expensive models may be used without a PLC to collect data through attached I/O
3. Uses reliable outside infrastructure for communication
4. Minimal capital cost

Cons:

1. Shorter lifecycle than radio communication methods
2. Recurring monthly costs
3. Utilize infrastructure not controlled by user
4. Billed by amount of data used

SCADA Communication and Alarm Reporting WIN911

The MTU at the WPCF would communicate directly to the SCADA Server located in the Control Building which has an alarm notification software called WIN911 Interactive by Specter Software installed. WIN911 provides both local and remote alarm notification to operators via hardware/software alarm dialers. The operator can configure multiple shifts, with multiple people on-call. If the first person on the call list is not reached or does not acknowledge, WIN911 automatically redials a predetermined number of times. If the first operator does not pick up within a predetermined number of re-tries, WIN911 continues to dial the next operator on the call list.

The local plant alarms are issued in Factory Talk and indicated on the Alarm Banner on the SCADA Server. Factory Talk passes the alarms to WIN911. Once the alarm is passed to WIN911, WIN911 issues the alarm and dials out via a TAPI/voice modem (or cellular modem) per the predetermined call-list and schedule, and voice annunciates (or issues text or email) the alarms via cell phone or land-line.

New Control Panels

As of this memo, there are no new panels scheduled for installation. However, as part of a process related upgrade, Division 11 and 13 control panels are suggested to be manufactured in accordance with the following suggested requirements.

Each Control Panel (CP) will be built or modified to UL508A standards and will include the following equipment or requirements where applicable:

- Surge suppression devices for main power, loop power, outdoor signals
- Allen-Bradley based PLC units for all Division 13 Control Panels
- Allen-Bradley PanelView Plus 600 or 1000, Panel-Mounted Color OIT
- 30mm LED Push to Test Indicator Lights as required. Pilot lights will be provided in accordance with Town’s agreed upon standard.
- 30mm Hand Switches and Push Buttons as required
- N-Tron (per install base) un-managed Ethernet Switch for Ethernet CAT6 in panels
- Control Relays and Timers as required
- Single-Tier Field Terminal blocks/strips
- Control Hierarchy including LOR(valves), HOA, MA, OCA, etc.
- Low/High Temperature Switch (internal CP temp alarms)
- Environmental Temperature Controls
- +24vdc for discrete inputs, relay for discrete outputs.

- UPS with at minimum a 15-minute power ride-through under full-load, 30 minutes under half-load. UPSs shall have output card for status and alarm contacts to PLC/SCADA.
- +24vdc power supplies provided with 20% spare power capacity
- heat calculation study submitted by panel providers to confirm temperature range within UL508A requirements. Each outdoor panel will be sized to dissipate heat, be provided with sun-shielding and AC/fan cooling if necessary. The AC/fan kit shall meet the environmental NEMA rating of the enclosure. Heaters with integral thermostats will be provided maintain temperatures above UL508A low limit and drive off condensation.
- fuses provided for discrete I/O in logical groups of eight
- fuses provided for all analog I/O loops
- surge suppression will be provided for 120vac power and I/O signals where signal originates or transitions to/from outdoor locations
- have locking hasps to accept lock and 3-point latching system. Integrated keylock will not be acceptable.

Color Standards

The following color standards have been indicated as being the Town's current color standard. Wright-Pierce will coordinate with the Town as part of any design workshop and finalize on a color standard for SCADA and Control Panels/MCCs.

Control panel lights will use the following colors as a standard:

- Control Power - White
- On UPS Power – Blue
- On, Running, Open – Green
- Off, Stopped, Closed - Red
- General Alarm – Red
- Blue - Remote
- Any alarms that are hardwire interlocked in the panel - Amber

SCADA is currently using the following colors as a standard and needs to be discussed at our Client Workshop:

- Off, Closed – Red
- Running, Open - Green
- General Alarm – Yellow flashing, acknowledged solid yellow
- Trouble – TBD
- Transitioning - TBD

PLC Requirements

Each PLC will meet the following requirements:

- All plant PLCs will be of the same manufacturer Allen-Bradley. Models shall vary (MicroLogix (1100/1400, or CompactLogix,) by complexity and size of the process.
- All PLCs will be provided with both battery backup and flash drive memory
- Each PLC will contain all control logic for all local equipment that is directly wired to it as well as any equipment or systems coordinated over the Town's existing communication network.
- Signals that are required for control in different control panels (i.e. intrusion, fire) will be communicated across the network.
- All discrete outputs (including spares) will include interposing relays to isolate the PLC from the control circuit.
- All inputs will be designed to use +24VDC as applicable. All outputs will be design to utilize "dry" relay contacts to energize interposing control relays.
- All spare inputs and outputs will be wired to terminals.
- All analog inputs and outputs will be provided with loop fuses and surge suppression as previously discussed.
- Control outputs and critical inputs to devices will be hardwired (i.e. VFD start command, VFD run status)
- Non-critical monitoring information can be communicated over the network, if available (i.e. VFD amp draw, Voltage)
- Hardwired backup of critical control loops will be provided in the event of PLC or I/O failures.

Loop Numbering, Equipment, and Instrument Tagging

Control Panels will correspond to the building or associated process that the panel controls. RTUs will correspond to available RTU numbers. If there is more than one panel required with the same prefix, a suffix will be added per the generic examples below.

- RTU-7

Loops numbers and instruments will follow the standard 3-digit XXX convention and match the RTU series number. Equipment will be tagged with a 3-digit XXX convention in sequential order per the generic examples below for RTU-7:

- Level Transmitter LIT-700
- Pumps – Loops 701, 702

Record Documentation

The system integrator will provide the following record documentation:

- 11" x 17" control panel drawings, schematics, bill-of-material, and network diagram in hardcopy and AutoCAD *.DWG format on USB DRIVE.
- Fully documented electronic copies of all As-Built PLC programs on USB DRIVE
- Fully documented electronic copies of all As-Built OIT programs on USB DRIVE
- A restore file for all SCADA programming on USB DRIVE
- Communications configurations, setups, and network address for all networked equipment including but not limited to: PLCs, OITs, Radio Equipment, Network Switches, etc. on USB DRIVE.
- Final Data Tag Spreadsheet on USB DRIVE.
- Final O&M documentation and control strategies on USB DRIVE.

Local Control

Each piece of new equipment will be equipped with a Local Control Station (LCS) adjacent to the equipment. Each LCS will include:

- Hand/Off/Auto Selector Switch – In Hand, the equipment will be capable of being controlled locally and start immediately, or via stop/start pushbuttons. In Off, the equipment will stop and cannot be started at any location. In Auto, control will be transferred to the PLC from a remote location. The PLC will monitor the "Auto" status of the switch.
- Emergency Stop - When pushed, the emergency stop will immediately shut down the equipment via hard-wired interlock. A second contact on the emergency stop switch will be monitored by the PLC.
- Speed Potentiometers – will be provided for VFD driven equipment on the MCCs where the VFDs are installed.
- Open/Stop/Close Selector Switch - will be provided for all duty valves. In open, the valve will open. In stop, the valve will stop. In close, the valve will close.
- Local/Remote Selector Switch - will be provided for all valves. For a duty valve in local, the OSC pushbuttons shall work as previously described. For a modulating valve in local, a positioner pot shall be provided to position the valve. In remote, either type of valve will be controlled by the associated PLC.

<u>Instrumentation</u>

An instrument list is included below. A more comprehensive and complete list will be compiled in the final design phase as part of the Division 13 system integrator specifications.

<u>Instrument List (TBD):</u>

- KPSI submersible level transmitter
- Siemens or Pulsar ultrasonic level transmitter
- H2S/LEL gas detection
- Level floats
- Low Building Temperature Switch

5.0 CONSTRUCTABILITY

Not included at this time.

6.0 OPINION OF PROBABLE CONSTRUCTION COSTS

Not included at this time.

APPENDICES

A. **Construction Cost Estimate – Not provided at this time.**
B. **Pumping Stations, I&C Data Sheets**

APPENDIX B

Pumping Stations, I&C Data Sheets

WRIGHT-PIERCE
Engineering a Better Environment

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Dedicated Controller
Manufacturer:	Flyght Controller - Not preferred by client
Model No.:	Multitrode
Division 13 System Integrator:	
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	NEMA 12
Condition:	Good
Location:	Indoor
Panel Voltage	480/3/60
Level Controls	
Instruments and Types:	Conductive stick probe
Primary Level Controls:	Multitrode
Backup Level Controls:	Floats - low and high
Level Controls Strategy:	
Alarms	
Level	High, low
Flow	NONE
General	Beacon and horn
Generator	Gen fault
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	NONE
Gas Detection	NA
Generator	GENERAC, natural gas
ATS	Generac ATS
Chemicals	NA
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular: Pump 1&2 status, low and high alarm, gen run, gen fault, 2-spare
Cell Strength	2 bars
Dial-UP	
Leased Line	
Dialer	

Angus St.

WRIGHT-PIERCE
Engineering a Better Environment

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Pump controller
Manufacturer:	Mercoid
Model No.:	
Division 13 System Integrator:	
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	NEMA 12/4 painted
Condition:	Corroded
Location:	Lowest level
Panel Voltage:	120vac
Level Controls	
Instruments and Types:	
Primary Level Controls:	Transducer
Backup Level Controls:	Floats: high/low
Level Controls Strategy:	
Alarms	
Level	Transducer floats
Flow	NONE
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	NONE
Gas Detection	NONE
Generator	Kohler
ATS	Kohler ATS
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission cellular: Pump 1&2 status, dry we'll float, wet we'll float, gen transfer, high low float alarms.
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Wilbur Ave

WRIGHT-PIERCE
Engineering a Better Environment

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	PLC, OIT
Manufacturer:	Allen-Bradley CompactLogix, Panelview Plus 1000
Model No.:	
Division 13 System Integrator:	Harbour Controls
	Sump Pump with integral Floats, flood switches
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	NEMA 12/4
Condition:	Excellent
Location:	Electrical Room
Panel Voltage:	120vac With APC BACKUP UPS Pro 1000
Level Controls	
Instruments and Types:	Transducer
Primary Level Controls:	Transducer
Backup Level Controls:	Floats
Level Controls Strategy:	
Alarms	
Level	Transducer, floats with ISB
Flow	Siemens Magmeter
	Low and High Alarm,
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	Magmeter
Gas Detection	NONE
Generator	Kohler Natural Gas, Run, Fault
ATS	ASCO 400Amps, ATS Status
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular: Pump 1&2 Status, low and high level alarms
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Lee's River Ave.

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Pump Controller
Manufacturer:	Mercoid
Model No.:	
Division 13 System Integrator:	
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	12/4 painted
Condition:	Corroded
Location:	Lowest level
Panel Voltage:	120vac
Level Controls	
Instruments and Types:	Transducer, floats
Primary Level Controls:	Tanducer
Backup Level Controls:	Floats
Level Controls Strategy:	
Alarms	
Level	Transducer Floats
Flow	NONE
Gen	
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	NONE
Gas Detection	NONE
Generator	Kohler, Natural gas
ATS	Kohler
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	MISSION Cellular: Pump 1&2 Status, high/low alarms, Gen Transfer, Drywell, 1-spare
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

RT 6 Ejector

WRIGHT-PIERCE
Engineering a Better Environment

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Pump Controller
Manufacturer:	Flyght Controller - Not preferred by client
Model No.:	
Division 13 System Integrator:	Multitrode
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	NEMA 12/4
Condition:	Corroded, open holes.
Location:	2nd level
Panel Voltage:	120vac
Level Controls	
Instruments and Types:	
Primary Level Controls:	Conductive Probe
Backup Level Controls:	Floats
Level Controls Strategy:	
Alarms	
Level	Multitrode conductive probe
Flow	ABB Magmeter
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	Magmeter
Gas Detection	NONE
Generator	Wake Shaw, Natural gas
ATS	ASCO ATS
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular: Pump 1&2 status, low/high level, dry well float, wet well float, Gen transfer
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Foley Ave.

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Pump controller
Manufacturer:	VariMAC
Model No.:	3300
Division 13 System Integrator:	
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	NEMA 12/4
Condition:	Corroded
Location:	2nd level
Panel Voltage:	120vac
Level Controls	
Instruments and Types:	
Primary Level Controls:	Compressed air bubbler
Backup Level Controls:	Pressure switches
Level Controls Strategy:	
Alarms	
Level	Bubbler compressed air
Flow	ABB Magneter
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	ABB Magmeter
Gas Detection	NONE
Generator	Wacashaw, Natural gas
ATS	ASCO ATS
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular: Pump 1,2,&3 status, low/high level, dry well, wet well, gen transfer
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Luther Ave

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Pump controller
Manufacturer:	Flyght Controller - Not preferred by client
Model No.:	Multitrode
Division 13 System Integrator:	
	Sump Pump with float rod
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	NEMA 12/4
Condition:	Adequate
Location:	1st floor
Panel Voltage:	120vac
Level Controls	
Instruments and Types:	
Primary Level Controls:	Pulsar Ultrasonic
Backup Level Controls:	Floats
Level Controls Strategy:	
Alarms	
Level	Pulsar Ultrasonic
Flow	Krohne Magmeter
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	Krohne Magmeter
Gas Detection	NONE
Generator	Cummings, Natural gas
ATS	Eaton ATS
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular: Pump 1,2&3 status, low/high level Alarm, gen transfer, dry well, wet well float
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Grove Ave.

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Pump Controller
Manufacturer:	Flyght Controller - Not preferred by client
Model No.:	Multitrode
Division 13 System Integrator:	
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	NEMA 12/4 Painted
Condition:	Adequate condition, but small
Location:	1st floor
Panel Voltage:	120vac
Level Controls	
Instruments and Types:	
Primary Level Controls:	Pulsar Ultrasonic
Backup Level Controls:	Floats
Level Controls Strategy:	
Alarms	
Level	Pulsar Ultrasonic
Flow	Krohne Magmeter
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	Krohne Magmeter
Gas Detection	NONE
Generator	Kohler, Natural gas
ATS	Kohler
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular Pump 1, 2,&3 status, low/high level, dry well float, wet well float, gen transfer
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Dublin St.

WRIGHT-PIERCE
Engineering a Better Environment

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Pump Controller
Manufacturer:	Flyght Controller - Not preferred by client
Model No.:	Mercoid
Division 13 System Integrator:	
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	NEMA 3R
Condition:	Poor
Location:	Outdoor
Panel Voltage:	
Level Controls	
Instruments and Types:	
Primary Level Controls:	Transducer
Backup Level Controls:	Floats
Level Controls Strategy:	
Alarms	
Level	Transducer
Flow	NONE
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	NONE
Gas Detection	NONE
Generator	Portable
ATS	MTS
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	RLL
Manufacturer:	Boydco
Model No.:	
Division 13 System Integrator:	
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	NEMA 4X
Condition:	Good
Location:	Main floor
Panel Voltage:	120vac
Level Controls	
Instruments and Types:	
Primary Level Controls:	Floats
Backup Level Controls:	
Level Controls Strategy:	
Alarms	
Level	Floats. Problems with grease
Flow	NONE
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	NONE
Gas Detection	NONE
Generator	GENERAC Natural Gas
ATS	Generac
Chemicals	NONE
Intrusion	NONE
Fire	NO
Telemetry	
Communications Type:	
Radio	
Cellular	Mission M800
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Pump Controller
Manufacturer:	Flyght Controller - Not preferred by client
Model No.:	Multitrode
Division 13 System Integrator:	
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	MCC bubbler
Condition:	Adequate
Location:	1st floor
Panel Voltage:	120vac
Level Controls	
Instruments and Types:	
Primary Level Controls:	Transducer
Backup Level Controls:	Floats
Level Controls Strategy:	
Alarms	
Level	Transducer
Flow	ABB Magmeter with Fischer-Porter flow tube
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	ABB Magmeter with Fischer-Porter flow tube
Gas Detection	NONE
Generator	See Electrical
ATS	See Electrical
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular: Pump 1&2 status, low/high level, gen transfer, dry well float, wet well, float
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Pleasant Street

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Pump Controller
Manufacturer:	Mercoid
Model No.:	
Division 13 System Integrator:	
	Sump pump with floats
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	MCC NEMA 1
Condition:	Adequate but obsolete
Location:	1st floor
Panel Voltage:	120vac
Level Controls	
Instruments and Types:	
Primary Level Controls:	Transducer
Backup Level Controls:	Floats
Level Controls Strategy:	
Alarms	
Level	Transducer
Flow	ABB with Fischer-Porter flow tube
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	ABB with Fischer-Porter flow tube
Gas Detection	
Generator	See Electrical
ATS	See Electrical
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular: Pump 1&2 status, low/high level, gen transfer, dry well float, wet well float
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Pilot Drive

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Bubbler controls
Manufacturer:	
Model No.:	
Division 13 System Integrator:	
Davco Can Pump Station	Sump pump
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	
Condition:	
Location:	
Panel Voltage:	
Level Controls	
Instruments and Types:	
Primary Level Controls:	Bubbler
Backup Level Controls:	Pressure switches
Level Controls Strategy:	
Alarms	
Level	Bubbler
Flow	
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	NONE
Gas Detection	NONE
Generator	Onan
ATS	ASCO old school
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular:Pump 1&2 status, low/high level Alarm, gen transfer, dry Well float, wet well float
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Main St.

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Pump Controller
Manufacturer:	Flyght Controller - Not preferred by client
Model No.:	Mercoid
Division 13 System Integrator:	
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	NEMA 3R
Condition:	Poor
Location:	Outdoor
Panel Voltage:	
Level Controls	
Instruments and Types:	
Primary Level Controls:	Transducer
Backup Level Controls:	Floats
Level Controls Strategy:	
Alarms	
Level	Transducer
Flow	NONE
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	NONE
Gas Detection	NONE
Generator	Portable
ATS	MTS
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Gay St.

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Pump Controller
Manufacturer:	Flyght Controller - Not preferred by client
Model No.:	Mercoid
Division 13 System Integrator:	
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	NEMA 3R
Condition:	Poor
Location:	Outdoor
Panel Voltage:	
Level Controls	
Instruments and Types:	
Primary Level Controls:	Transducer
Backup Level Controls:	Floats
Level Controls Strategy:	
Alarms	
Level	Transducer
Flow	NONE
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	NONE
Gas Detection	NONE
Generator	Portable
ATS	MTS
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Owen Ave

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Pump Controller
Manufacturer:	Flyght Controller - Not preferred by client
Model No.:	Mercoid
Division 13 System Integrator:	
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	NEMA 3R
Condition:	Poor
Location:	Outdoor
Panel Voltage:	
Level Controls	
Instruments and Types:	
Primary Level Controls:	Transducer
Backup Level Controls:	Floats
Level Controls Strategy:	
Alarms	
Level	Transducer
Flow	NONE
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	NONE
Gas Detection	NONE
Generator	Portable
ATS	MTS
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Cherry Lane

WRIGHT-PIERCE
Engineering a Better Environment

Site Name: See bottom of page	
Controls Information:	
Pump Controls	
Type: (PLC-OIT/RLL/Control)	Pump Controller
Manufacturer:	Flyght Controller - Not preferred by client
Model No.:	Mercoid
Division 13 System Integrator:	
Pump Control Panel	
Enclosure: (Size/NEMA/Material)	NEMA 3R
Condition:	Poor
Location:	Outdoor
Panel Voltage:	
Level Controls	
Instruments and Types:	
Primary Level Controls:	Transducer
Backup Level Controls:	Floats
Level Controls Strategy:	
Alarms	
Level	Transducer
Flow	NONE
Misc Monitoring and Controls	
Instruments and Types:	
Flow Meter	NONE
Gas Detection	NONE
Generator	Portable
ATS	MTS
Chemicals	NONE
Intrusion	NONE
Fire	NONE
Telemetry	
Communications Type:	
Radio	
Cellular	Mission Cellular
Cell Strength	
Dial-UP	
Leased Line	
Dialer	

Durfee CT

WRIGHT-PIERCE
Engineering a Better Environment

MEMORANDUM

TO:	FILE	DATE:	October 12, 2018
FROM:	Rodney Greene	PROJECT NO.:	14110A
SUBJECT:	Somerset MA Pump Station Evaluations – Mechanical		

APPLICABLE CODES

- 2015 International Energy Conservation Code as amended by 780 CMR 13.00
- ASHRAE Ventilation for Acceptable Indoor Air Quality
- 2015 International Mechanical Code as amended by 780 CMR 28.00
- 2016 NFPA 820 Standard for Fire Protection in Wastewater Treatment and Collection Facilities
- 2015 NFPA 37 Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines
- 248 CMR 10.00 Massachusetts Plumbing Code

1. ANGUS STREET PUMP STATION

Site Visit Review

- A pair of louvers with motor operated dampers provide cooling air intake and exhaust for the generator during operation.
- A natural gas line, meter, regulator, and associated appurtenances supply fuel for the generator and gas fired unit heater.
- The generator exhaust is piped through the wall with an unventilated thimble. The exhaust pipe is insulated; the muffler is uninsulated.
- Heating is provided by a separated combustion gas fired unit heater (natural gas). Exhaust air is vented through the roof, combustion air is drawn from the space. The unit appears to be relatively new and in good condition.
- A propeller sidewall exhaust fan provides ventilation air for the space. The fan appears to be controlled with the space light switch and in good condition.
- An intake louver with motor operated damper is provided for ventilation air. The louver, damper, and ductwork appear to be in good condition.
- The water service entrance piping to the meter, RPZ backflow preventer, and hose bibb is uninsulated; plug-in heat trace wiring has been loosely secured to the piping. The piping and equipment appear to be in good condition.

Code Discussion and Recommendations

- Ventilation is not required by NFPA 820 for an above grade wastewater pumping station if the space is physically separated from the wet well. The IMC ventilation requirements for occupant health allow for mechanical or natural ventilation to be used to provide the required ventilation air. The existing arrangement is acceptable.
- General Recommendations:
  - Insulate the generator exhaust muffler.

  - Wrap heat trace wiring tight to piping and insulate piping.

2. Wilbur Avenue Ejector Station

<u>Site Visit Review</u>

- A natural gas line, meter, regulator, and associated appurtenances supply fuel for the generator and gas fired unit heater. The exterior piping, meter, and regulator show some signs of corrosion and the paint is peeling.
- Heating is provided by a gas fired unit heater (30 MBH, natural gas) located on the platform level. Exhaust air is vented up through the roof, combustion air is drawn from the space. The unit appears to be in fairly good condition.
- An inline utility set type exhaust fan, located on the platform level, provides ventilation air for the space. The fan is ducted down to the lower level ejector floor and up to a louver in the first floor sidewall. The fan is controlled by a switch on the first floor and is not set to run continuously. The ductwork appears to be in relatively good condition.
- An intake louver with motor operated damper is provided for ventilation air. The louver and damper appear to be in fair condition. The actuator appears to not be functional and the cover has been removed.
- A dehumidifier located on the platform level once provided dehumidification to the space; the unit is in fair physical condition but was not functional at the time of observation.
- A simplex sump pump with integral float control is located in the lower level ejector floor. The discharge piping is routed to the wet well. The piping shows some signs of corrosion and appears to be in fair condition. The pump appears to be in fair condition.
- The water service entrance piping to the meter, backflow preventer, and hose bibb has not been insulated. The piping shows some minor signs of corrosion but appears to be in generally good condition.

<u>Code Discussion and Recommendations</u>

- NFPA 820 requires the space to be ventilated continuously at 6 ACH to declassify the space; the existing controls are not set up for the fan to run continuously. NFPA 820 allows for the airflow rate to be reduced by 50% if the space is unoccupied and the outside air temperature is below 50°F.
  - Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature.
- General Recommendations:
  - Scrape and repaint existing natural gas piping and appurtenances.
  - Replace existing gas fired unit heater.
  - Replace intake damper actuator.
  - Replace existing dehumidifier.
  - Insulate domestic water piping.

3. Lees River Pump Station

Site Visit Review

General

- A natural gas line, meter, regulator, and associated appurtenances supply fuel for the generator and gas fired boiler.

Dry Well

- Heating is provided by three hydronic unit heaters, one located on each level. The units were installed in 2015 and appear to be in good condition. The piping to the air vent above the unit in the Pump Access Room is leaking and has damaged the adjacent fiberglass insulation.
- An inline supply fan and associated hydronic heating coil, located in the Motor Room, supplies tempered makeup air. The fan is ducted up to a louver in the sidewall above. The piping associated with the coil has leaked and is showing signs of corrosion; a section of the duct insulation in the vicinity of the coil has been damaged by the leaking water. The equipment appears to be in good condition.
- An inline exhaust fan located in the Pump Access Room is ducted down to each level. The fan and associated ductwork appears to be in good condition but the fan does not seem to be providing the required airflow.
- A simplex sump pump with integral float control is located in the lower level ejector floor. The discharge piping is routed to the wet well. The pump and associated piping appears to be in good condition.

Electrical & Service Room

- Heating and cooling is provided by a ductless split system heat pump. The indoor and associated outdoor unit both appear to be in good condition.
- A sidewall propeller fan exhausts air from the Service Room when occupied. The fan appears to be in good condition.
- The boiler and associated pumps and accessories serving the building are located in the Service Room. The equipment appears to be in good condition.
- The water service entrance piping to the meter, backflow preventer, and fixtures is located in the Service Room. The piping appears to be in good condition but some sections of piping are uninsulated.
- A utility sink and toilet located in the space appear to be in fairly good condition.

Wet Well

- Heating is provided by a hydronic unit heater with corrosion resistant coating located in the Wet Well Entry space.
- An inline exhaust fan ducted down to the Wet Well and associated intake louver with motor operated damper provide ventilation air to the space. The equipment appears to be in good condition.

Code Discussion and Recommendations

- Drain and flush the hydronic heating system, clean existing piping of corrosion and repair leaking joints as necessary. Refill hot water heating system and charge with inhibited propylene glycol solution to a concentration of 30%. Replace damaged and removed fiberglass piping insulation.

- Replace water damaged fiberglass duct insulated in vicinity of hydronic heating coil.
- Engage a testing and balancing company to verify the exhaust fan airflow and make adjustments as necessary to achieve the design requirements.
- Insulate cold water piping in Service Room.

4. Route 6 Ejector Station

- A natural gas line, meter, regulator, and associated appurtenances supply fuel for the generator and gas fired unit heater.
- Heating is provided by a gas fired unit heater (30 MBH, natural gas) located on the lower level ejector floor. Exhaust air is vented up through the roof, combustion air is drawn from the space. The unit appears to be in fair condition.
- An inline utility set type exhaust fan, located on the platform level, provides ventilation air for the space. The fan is ducted down to the lower level ejector floor and up to a louver in the first floor sidewall. The fan is controlled by a switch on the first floor and is not set to run continuously. The ductwork shows some signs of corrosion and appears to be in fair condition.
- An intake louver with motor operated damper is provided for ventilation air. The louver and damper appear to be in fair condition. The actuator appears to not be functional and the cover has been removed.
- A dehumidifier located on the platform level once provided dehumidification to the space but is in poor physical condition and was not functional at the time of observation.
- A simplex sump pump with integral float control is located in the lower level ejector floor. The discharge piping is routed to the wet well. The piping shows some signs of corrosion and appears to be in fair condition. The pump appears to be in fair condition.
- The water service entrance piping to the meter, backflow preventer, and hose bibb has not been insulated. The piping shows some signs of corrosion and appears to be in generally fair condition, however, some sections appear to be significantly corroded.

<u>Code Discussion and Recommendations</u>

- NFPA 820 requires the space to be ventilated continuously at 6 ACH to declassify the space; the existing controls are not set up for the fan to run continuously. NFPA 820 allows for the airflow rate to be reduced by 50% if the space is unoccupied and the outside air temperature is below 50°F.
  - Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature.
- General Recommendations:
  - Scrape and repaint existing natural gas piping and appurtenances.
  - Replace existing gas fired unit heater.
  - Replace intake damper actuator.
  - Replace existing dehumidifier.
  - Replace sections of domestic water piping showing signs of significant corrosion and insulate all domestic water piping.

5. Foley Avenue Pump Station

Site Visit Review

Dry Well

- A natural gas line, meter, regulator, and associated appurtenances supply fuel for the generator and gas fired unit heaters.
- Ventilation air is circulated by a sidewall propeller exhaust fan located in the generator room, ducted down to the pump room below, and to a louver with gravity backdraft damper high in the wall. The louver appears to in good condition. The fan is controlled by the light switch located adjacent to the door. The air is introduced to the space by an intake louver with motor operated damper; the louver and damper appear to be in good condition. The ductwork appears to be in fairly good condition but the exhaust grille is significantly corroded.
- The generator cooling air is vented through a sidewall louver and introduced by two intake louvers with motor operated dampers. The damper actuators show signs of corrosion and one intake actuator linkage has failed.
- The generator exhaust is piped through the wall with an unventilated thimble. The exhaust pipe and muffler are uninsulated.
- Heating is provided by two gas fired unit heaters located in the Generator Room and Pump Room. Exhaust air is vented up through the roof, combustion air is drawn from the space. The units appear to be in fairly good condition.
- A utility sink supplied with cold water only is located in the Generator Room. The fixture appears to be in good condition.
- The water service entrance piping to the meter, backflow preventer, and fixtures has not been insulated. The piping and equipment appears to be in generally good condition. The potable water piping routed to the utility sink is not protected from potential contamination of the piping from the process water and hose bibbs.
- A simplex sump pump with integral float control is located in the Pump Room. The discharge piping is routed to the wet well. The piping appears to be in good condition. The pump appears to be in fair condition.

Wet Well

- Heating is provided by an explosion proof electric convector unit located on the upper level. The unit appears to be in relatively good condition.
- Ventilation air is circulated by an inline exhaust fan ducted down to the Wet Well and up to a louver in the side of the brick chimney through the roof. The ductwork on the lower level appears to be in relatively poor condition and the exhaust grille has failed completely; the exhaust fan and the ductwork on the upper level appear to be in fair condition.
- An intake louver and associated motor operated damper provide ventilation air to the space. The louver and damper appear to be in good condition; the actuator shows some signs of corrosion and appeared not to be functional at the time of observation.

Code Discussion and Recommendations

- NFPA 820 requires the space to be ventilated continuously at 6 ACH to declassify the space; the existing fan is likely undersized and the existing controls are not set up for the fan to run continuously. NFPA 820 allows for the airflow rate to be reduced by 50% if the space is unoccupied and the outside air temperature is below 50°F.
    - Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature.
- NFPA 37 requires that the generator engine room be separated from the rest of the building with a 1-hour fire rating. The existing arrangement does not provide separation between the lower level pump room from the generator engine room; any significant upgrade of the station will likely trigger the requirement to rectify this issue.
- General Recommendations:
    - Replace exhaust grille in Pump Room.
    - Replace motor operated damper actuators.
    - Replace existing gas fired unit heaters.
    - Insulate domestic water piping.
    - Provide an additional RPZ backflow preventer, connected to the existing piping upstream of the existing RPZ, and reroute the utility sink supply piping to the new; this will allow the potable water supplied to the utility sink to be appropriately isolated from the process water and hose bibbs.
    - Replace Wet Well exhaust fan and associated ductwork and appurtenances.

6. Luther Avenue Pump Station

Dry Well

- A natural gas line, meter, regulator, and associated appurtenances supply fuel for the generator and gas fired unit heaters.
- Ventilation air is circulated by a sidewall propeller exhaust fan located in the generator room, ducted down to the pump room below, and to a louver with gravity backdraft damper high in the wall. The louver appears to in good condition. The fan is controlled by the light switch located adjacent to the door. The air is introduced to the space by an intake louver with motor operated damper; the louver and damper appear to be in good condition. The ductwork appears to be in fairly good condition but the exhaust grille is significantly corroded.
- The generator cooling air is vented through a sidewall louver and introduced by two intake louvers with motor operated dampers. The damper actuators show signs of corrosion and one intake actuator linkage has failed.
- The generator exhaust is piped through the wall with an unventilated thimble. The exhaust pipe and muffler are uninsulated.
- Heating is provided by two gas fired unit heaters located in the Generator Room and Pump Room. Exhaust air is vented up through the roof, combustion air is drawn from the space. The units appear to be in fairly good condition.

- A utility sink supplied with cold water only is located in the Generator Room. The fixture appears to be in good condition.
- The water service entrance piping to the meter, backflow preventer, and fixtures has not been insulated. The piping and equipment appears to be in generally good condition. The potable water piping routed to the utility sink is not protected from potential contamination of the piping from the process water and hose bibbs.
- A simplex sump pump with integral float control is located in the Pump Room. The discharge piping is routed to the wet well. The piping appears to be in good condition. The pump appears to be in fair condition.

Wet Well

- Heating is provided by an explosion proof electric convector unit located on the upper level. The unit appears to be in poor condition.
- Ventilation air is circulated by an inline exhaust fan ducted down to the Wet Well and up to a louver in the side of the brick chimney through the roof. The ductwork on the lower level appears to be in relatively poor condition and the exhaust grille has failed completely; the exhaust fan and the ductwork on the upper level appear to be in fair condition.
- An intake louver and associated motor operated damper provide ventilation air to the space. The louver and damper appear to be in good condition; the actuator shows some signs of corrosion and appeared not to be functional at the time of observation.

<u>Code Discussion and Recommendations</u>

- NFPA 820 requires the space to be ventilated continuously at 6 ACH to declassify the space; the existing fan is likely undersized and the existing controls are not set up for the fan to run continuously. NFPA 820 allows for the airflow rate to be reduced by 50% if the space is unoccupied and the outside air temperature is below 50°F.
    - Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature.
- NFPA 37 requires that the generator engine room be separated from the rest of the building with a 1-hour fire rating. The existing arrangement does not provide separation between the lower level pump room from the generator engine room; any significant upgrade of the station will likely trigger the requirement to rectify this issue.
- General Recommendations:
    - Replace exhaust grille in Pump Room.
    - Replace motor operated damper actuators.
    - Replace existing gas fired unit heaters.
    - Insulate domestic water piping.
    - Provide an additional RPZ backflow preventer, connected to the existing piping upstream of the existing RPZ, and reroute the utility sink supply piping to the new; this will allow the potable water supplied to the utility sink to be appropriately isolated from the process water and hose bibbs.
    - Replace Wet Well exhaust fan and associated ductwork and appurtenances.

  - Replace electric heater located in Wet Well.

7. Grove Avenue Pump Station

Site Visit Review

- The station was upgraded in approximately 2008 and unless otherwise noted all equipment, ductwork, and piping appears to be in good condition.
- A natural gas line, meter, regulator, and associated appurtenances supply fuel for the generator and gas fired unit heaters.
- Ventilation air is circulated by an inline exhaust fan located in the generator room, ducted down to the pump room below, and to a louver with gravity backdraft damper high in the wall. The fan is controlled by the light switch located adjacent to the door. The air is introduced to the space by an intake louver with motor operated damper.
- The generator cooling air is vented through a sidewall louver and introduced by an intake louver with motor operated damper.
- The generator exhaust is piped through the wall with an unventilated thimble. The exhaust pipe and muffler are insulated.
- Heating is provided by a separated combustion gas fired unit heater located in the Generator Room. Exhaust and combustion air are routed up through the roof with a concentric vent termination.
- A utility sink supplied with cold water only is located in the Generator Room.
- The water service entrance piping to the meter, backflow preventer, and fixtures has not been insulated. The potable water piping routed to the utility sink is not protected from potential contamination of the piping from the process water and hose bibbs.
- A simplex sump pump with integral float control is located in the Pump Room. The discharge piping is routed to the wet well. The piping appears to be in fair condition. The pump shows significant signs of corrosion and appears to be in relatively poor condition.

Wet Well

- Heating is provided by an explosion proof electric convector unit located on the upper level.
- Ventilation air is circulated by an inline exhaust fan ducted down to the Wet Well and up to a louver in the side of the brick chimney through the roof.
- An intake louver and associated motor operated damper provide ventilation air to the space.

Code Discussion and Recommendations

- NFPA 820 requires the space to be ventilated continuously at 6 ACH to declassify the space; the existing fan is likely undersized and the existing controls are not set up for the fan to run continuously. NFPA 820 allows for the airflow rate to be reduced by 50% if the space is unoccupied and the outside air temperature is below 50°F.
  - Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature.

- NFPA 37 requires that the generator engine room be separated from the rest of the building with a 1-hour fire rating. The existing arrangement does not provide separation between the lower level pump room from the generator engine room; any significant upgrade of the station will likely trigger the requirement to rectify this issue.
- General Recommendations:
    - Insulate domestic water piping.
    - Provide an additional RPZ backflow preventer, connected to the existing piping upstream of the existing RPZ, and reroute the utility sink supply piping to the new; this will allow the potable water supplied to the utility sink to be appropriately isolated from the process water and hose bibbs.

8. Dublin Street Pump Station

<u>Site Visit Review</u>

- The station was upgraded in approximately 2012 and unless otherwise noted all equipment, ductwork, and piping appears to be in good condition.
- A natural gas line, meter, regulator, and associated appurtenances supply fuel for the generator and gas fired unit heaters.
- Ventilation air is circulated by an inline exhaust fan located in the generator room, ducted down to the pump room below, and to a louver with gravity backdraft damper high in the wall. The fan is controlled by the light switch located adjacent to the door. The air is introduced to the space by an intake louver with motor operated damper.
- The generator cooling air is vented through a sidewall louver and introduced by an intake louver with motor operated damper.
- The generator exhaust is piped through the wall with an unventilated thimble. The exhaust pipe and muffler are insulated.
- Heating is provided by a separated combustion gas fired unit heater located in the Generator Room. Exhaust and combustion air are routed up through the roof with a concentric vent termination.
- A utility sink supplied with cold water only is located in the Generator Room.
- The water service entrance piping to the meter, backflow preventer, and fixtures has not been insulated.
- A simplex sump pump with integral float control is located in the Pump Room. The discharge piping is routed to the wet well. The piping appears to be in fair condition. The pump shows significant signs of corrosion and appears to be in relatively poor condition.

Wet Well

- Heating is provided by an explosion proof electric convector unit located on the upper level. The unit shows appears to be in fair condition but does not appear to have replaced during the previous upgrade and shows signs of corrosion.
- Ventilation air is circulated by an inline exhaust fan ducted down to the Wet Well and up to a louver in the side of the brick chimney through the roof.
- An intake louver and associated motor operated damper provide ventilation air to the space.

Code Discussion and Recommendations

- NFPA 820 requires the space to be ventilated continuously at 6 ACH to declassify the space; the existing fan is likely undersized and the existing controls are not set up for the fan to run continuously. NFPA 820 allows for the airflow rate to be reduced by 50% if the space is unoccupied and the outside air temperature is below 50°F.
    - Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature.
- NFPA 37 requires that the generator engine room be separated from the rest of the building with a 1-hour fire rating. The existing arrangement does not provide separation between the lower level pump room from the generator engine room; any significant upgrade of the station will likely trigger the requirement to rectify this issue.
- General Recommendations:
    - Insulate domestic water piping.
    - Replace electric heater located in Wet Well.

9. Main Street Pump Station

Site Visit Review

- A single wall fuel oil storage tank, with no means of secondary containment, is located outside adjacent to the building. The tank shows significant signs of corrosion and appears to be in fairly poor condition.
- A fuel oil day tank and is mounted on the wall inside the space. The equipment appears to be in fair condition.
- A pair of louvers with motor operated dampers provide cooling air intake and exhaust for the generator during operation.
- The generator exhaust is piped through the wall with an unventilated thimble. The exhaust pipe and muffler are uninsulated.
- Heating is provided by an electric unit heater, the unit appears to be in relatively good condition.
- A propeller sidewall exhaust fan, ducted down into the below grade canned section of the station provides ventilation air for the space. The fan appears to be controlled with the space light switch and in fair condition.
- An intake louver with motor operated damper is provided for ventilation air. The louver and damper appear to be in good condition; the damper actuator appears to be in fair condition.
- The water service entrance piping to the meter, RPZ backflow preventer, and hose bibb is uninsulated. The RPZ backflow preventer shows signs of corrosion and appears to be in fair condition; the remaining piping and equipment appear to be in good condition.

Code Discussion and Recommendations

The station is similar to the Angus Street Pump Station prior to the most recent upgrade. The following recommendations assume that the station will remain in its current configuration. If the station is upgraded in a similar manner to the Angus Street station, refer to the recommendations above.

- Secondary containment is required for fuel oil storage tanks to prevent environmental contamination in the event of a leak. Replace the existing single wall tank with a new double wall storage tank. Replace associated piping to serve new tank.
- NFPA 820 requires the space to be ventilated continuously at 6 ACH to declassify the space; the existing fan is likely undersized and the existing controls are not set up for the fan to run continuously. NFPA 820 allows for the airflow rate to be reduced by 50% if the space is unoccupied and the outside air temperature is below 50°F.
    - Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature.
- NFPA 37 requires that the generator engine room be separated from the rest of the building with a 1-hour fire rating. The existing arrangement does not provide separation between the lower level pump room from the generator engine room; any significant upgrade of the station will likely trigger the requirement to rectify this issue.
- General Recommendations:
    - Replace exhaust louver bird screen.
    - Insulate generator exhaust piping and muffler.
    - Replace RPZ backflow preventer; insulate domestic water piping.

10. Pilot Drive Pump Station

Site Visit Review

- A single wall fuel oil storage tank, with no means of secondary containment, is located outside adjacent to the building. The tank shows significant signs of corrosion and appears to be in fairly poor condition.
- A fuel oil day tank and is mounted inside the space. The equipment appears to dated but in fair condition.
- Ventilation air is circulated by an inline exhaust fan located in the generator room, ducted down to the pump room below, and to a louver with gravity backdraft damper high in the wall. The louver appears to in good condition. The fan is controlled by the light switch located adjacent to the door. The air is introduced to the space by an intake louver with motor operated damper; the louver and damper appear to be in good condition. The ductwork appears to be in fair condition.
- The generator cooling air is vented through a sidewall louver and introduced by an intake louver with motor operated damper. The louvers and dampers appear to be in fairly good condition.
- The generator exhaust is piped through the wall with an unventilated thimble. The exhaust pipe and muffler are insulated.
- Heating is provided by three electric unit heaters located in the Generator Room, water entrance closet, and Pump Room. The units in the Generator Room and closet appear to

be in fair condition; the unit in the Pump Room appears to be in poor condition and shows significant signs of corrosion.

- A dehumidifier located in the Pump Room once provided dehumidification to the space; the unit is in fair physical condition but was not functional at the time of observation.
- A utility sink supplied with cold water only is located in a closet off the Generator Room. The fixture appears to be in fair condition.
- The water service entrance piping to the meter, backflow preventer, and fixtures has been insulated. The piping appears to be in generally good condition. The potable water piping routed to the utility sink is not protected from potential contamination of the piping from the process water and hose bibbs. The RPZ backflow preventer shows significant signs of corrosion.
- A simplex sump pump with integral float control is located in the Pump Room. The discharge piping is routed to the wet well. The pump and piping appears to be in fair condition.

Wet Well

- Heating is provided by an explosion proof electric convector unit located on the upper level. The unit appears to be in relatively poor condition.
- Ventilation air is circulated by an inline exhaust fan ducted down to the Wet Well and up to a vent atop a false chimney through the roof. The exhaust fan and the ductwork on the upper level appear to be in fair condition; the fan appears to be original and has exceeded its expected useful life.
- An intake louver and associated motor operated damper provide ventilation air to the space. The louver, damper, and actuator appear to be in good condition.

<u>Code Discussion and Recommendations</u>

- NFPA 820 requires the space to be ventilated continuously at 6 ACH to declassify the space; the existing fan is likely undersized and the existing controls are not set up for the fan to run continuously. NFPA 820 allows for the airflow rate to be reduced by 50% if the space is unoccupied and the outside air temperature is below 50°F.
    - Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature.
- NFPA 37 requires that the generator engine room be separated from the rest of the building with a 1-hour fire rating. The existing arrangement does not provide separation between the lower level pump room from the generator engine room; any significant upgrade of the station will likely trigger the requirement to rectify this issue.
- Secondary containment is required for fuel oil storage tanks to prevent environmental contamination in the event of a leak. Replace the existing single wall tank with a new double wall storage tank. Replace associated piping to serve new tank.
- General Recommendations:
    - Replace existing electric unit heaters.
    - Replace existing RPZ backflow preventer.

  - Provide an additional RPZ backflow preventer, connected to the existing piping upstream of the existing RPZ, and reroute the utility sink supply piping to the new; this will allow the potable water supplied to the utility sink to be appropriately isolated from the process water and hose bibbs.
  - Replace Wet Well exhaust fan and associated appurtenances.
  - Replace electric heater located in Wet Well.

11. Pleasant Street Pump Station

Site Visit Review

- A single wall fuel oil storage tank, with no means of secondary containment, is located outside adjacent to the building. The tank shows some signs of corrosion but appears to be in fair condition.
- A fuel oil day tank and is mounted inside the space. The equipment appears to dated but in fair condition.
- Ventilation air is circulated by an inline exhaust fan located in the generator room, ducted down to the pump room below, and to a louver with gravity backdraft damper high in the wall. The louver appears to in good condition. The fan is controlled by the light switch located adjacent to the door. The air is introduced to the space by an intake louver with motor operated damper; the louver and damper appear to be in good condition. The ductwork appears to be in fair condition.
- A sidewall propeller exhaust fan is located in the water entrance closet / toilet room. The fan appears to be in relatively good condition.
- The generator cooling air is vented through a sidewall louver and introduced by an intake louver with motor operated damper. The louvers and dampers appear to be in fairly good condition.
- The generator exhaust is piped through the wall with an unventilated thimble. The exhaust pipe and muffler are insulated.
- Heating is provided by three electric unit heaters located in the Generator Room, water entrance closet, and Pump Room. The units in the Generator Room and closet appear to be in fair condition; the unit in the Pump Room appears to be in poor condition and shows significant signs of corrosion.
- A dehumidifier located in the Pump Room appears to have been recently replaced and in good condition.
- A utility sink supplied is located in a closet off the Generator Room. The fixture appears to be in fair condition. A small tank-type electric water heater mounted above the utility sink provides hot water; the heater appears to be in fairly poor condition and the domestic cold water piping insulation to the heater has been damaged. A toilet located in the space appears to be functional and in fair condition.
- The water service entrance piping to the meter, backflow preventer, and fixtures has been insulated. The piping appears to be in generally good condition. The potable water piping routed to the utility sink is not protected from potential contamination of the piping from the process water and hose bibbs.

- A simplex sump pump with integral float control is located in the Pump Room. The discharge piping is routed to the wet well. The pump and piping appears to be in fair condition.

Wet Well

- Heating is provided by an explosion proof electric convector unit located on the upper level. The unit appears to be in relatively poor condition.
- Ventilation air is circulated by an inline exhaust fan ducted down to the Wet Well and up to a vent atop a false chimney through the roof. The ductwork on the lower level appears to be in relatively poor condition; the exhaust fan and the ductwork on the upper level appear to be in fair condition.
- An intake louver and associated motor operated damper provide ventilation air to the space. The louver and damper appear to be in good condition; the actuator shows some signs of corrosion but appears to be functional.

<u>Code Discussion and Recommendations</u>

- NFPA 820 requires the space to be ventilated continuously at 6 ACH to declassify the space; the existing fan is likely undersized and the existing controls are not set up for the fan to run continuously. NFPA 820 allows for the airflow rate to be reduced by 50% if the space is unoccupied and the outside air temperature is below 50°F.
  - Replace existing fan with new inline exhaust fan sized for 6 ACH. Provide with electronically commutated motor and controls to allow fan speed to be reduced to 50% based on occupancy and outdoor air temperature.
- NFPA 37 requires that the generator engine room be separated from the rest of the building with a 1-hour fire rating. The existing arrangement does not provide separation between the lower level pump room from the generator engine room; any significant upgrade of the station will likely trigger the requirement to rectify this issue.
- Secondary containment is required for fuel oil storage tanks to prevent environmental contamination in the event of a leak. Replace the existing single wall tank with a new double wall storage tank. Replace associated piping to serve new tank.
- General Recommendations:
  - Replace existing electric unit heaters.
  - Replace existing domestic hot water heater with new tankless electric water heater.
  - Provide an additional RPZ backflow preventer, connected to the existing piping upstream of the existing RPZ, and reroute the utility sink supply piping to the new; this will allow the potable water supplied to the utility sink to be appropriately isolated from the process water and hose bibbs.
  - Replace Wet Well exhaust fan and associated ductwork and appurtenances.
  - Replace Wet Well damper actuator.
  - Replace electric heater located in Wet Well.

12. Lake Street Pump Station

<u>Site Visit Review</u>

- All piping and equipment appears to be in fair condition.
- A pair of louvers with motor operated dampers provide cooling air intake and exhaust for the generator during operation.
- A natural gas line, meter, regulator, and associated appurtenances supply fuel for the generator.
- The generator exhaust is piped through the wall with an unventilated thimble. The exhaust pipe and muffler are insulated.
- Heating is provided by an electric unit heater; the unit appears to be original and has exceeded its expected useful life.

Code Discussion and Recommendations

- Ventilation is not required by NFPA 820 for an above grade wastewater pumping station if the space is physically separated from the wet well. The IMC ventilation requirements for occupant health allow for mechanical or natural ventilation to be used to provide the required ventilation air. The existing arrangement is acceptable.
- General Recommendations:
    - Replace existing electric unit heater.

WRIGHT-PIERCE
Engineering a Better Environment

MEMORANDUM

TO:	Jacob Ducharme, Kevin Olson	**DATE:**	October 19, 2018
FROM:	Christine Sexton	**PROJECT NO.:**	14110A
SUBJECT:	Somerset, MA – Pump Stations WPCF Review – September 24, 2018 Structural Observations and Recommendations		

This memorandum serves to summarize structural observations and recommendations of the pump stations in Somerset, MA. Observations were made for twelve out of 17 total pump stations during a site visit on Monday, September 24, 2018.

1) Angus Street Pump Station

Observations

The Angus Street Pump Station was originally constructed in the late 1960s and was replaced in 2009.

Exterior

- The four corners of the building foundation had diagonal cracks, which it appears will eventually shear off the corner completely.
- There was exposed aggregate at one corner of the foundation at grade, which seems to be from poor vibration during the initial concrete pour.
- There was an exposed reinforcing tie wire/nail that was rusted in the concrete foundation.

Interior Drywell

- The concrete slab paint was failing in a few locations.

Interior Wetwell

- The concrete of the wetwell appeared to be in fair condition.

Recommendations

- Repair the four building corners of cracked concrete by epoxy injection.

2) Wilbur Avenue Pump Station

Observations

The Wilbur Avenue Pump Station was originally constructed in 1976 as an ejector station and was converted into a flood suction type station in the 1990s. This pump station is very similar to the Route 6 Pump Station.

Exterior

- Concrete entrance pad has settled, and the expansion joint sealant has failed.
- The stone ballast appears to have settled and moved away from the foundation wall. The stone ballast is higher one side of the building than the other side.
- Concrete is stained rust colored directly below the door opening.
- The underside of the concrete roof appears to have efflorescence staining, which indicated water infiltration.
- There was one cut-off rusted bolt sticking out from the foundation.
- Observed minor cracking in the sealant on the exterior between the door opening and the CMU veneer.

Interior Drywell

- There was a welded L-shape steel frame with a lifting eye placed in the top of the spiral staircase pipe shaft that was not fastened nor secured. The lifting eye also did not have its rated capacity labeled, and it had a 2-ton manual hoist attached to it.
- There were two chains at an opening at the edge of the top stair platform, which does not comply with OSHA regulations.
- The material on the ceiling was failing.
- There was a lift hook missing its rated capacity.
- In a few places at concrete joints the concrete appeared to be slightly abraded with minor exposed aggregate at the joints.
- Lifting eye in the ceiling of the lower area was not labeled with its rated capacity.
- Observed that an existing wall opening around a pipe was patched.

Interior Wetwell

- The visible concrete riser section of the wetwell was coated. The concrete surfaces under the coating were not observed, but there did not appear to be any deficiencies under the coating.
- The springs of the hatch were corroded and rust in color.
- The bottom support plate of the steel pipe that sits directly on the exterior wetwell concrete wall was corroded. Cracks were observed under the plate support and the concrete was stained.

Recommendations

- Remove and replace the welded L-shape frame lifting assembly at the top of the spiral staircase.
- Indicate the capacity of all lifting assemblies.
- Replace the expansion joint sealant at the concrete entrance pad.

- Replace the chains at the stair platform opening with a safety gate that conforms to OSHA regulations.

3) Lees River Avenue Pump Station

Observations

The Lees River Avenue Pump Station was originally constructed in 1976 and was upgraded in 2015.

Exterior

- The corner of one of the entrance pads was missing with minor exposed aggregate.
- The joint filler between the concrete entrance pads and foundation was visible. There was cracking and minor exposed aggregate along the building edge.
- At the slab chamfer, a few corroding reinforcing steel bars were exposed, and there was minor spalling with exposed aggregate.

Interior Drywell

- Monorail beam had no labeled rated capacity.
- There was liquid staining on the concrete below the angle support for the top of the spiral staircase.
- Hairline crack was observed in the wall at the beam pocket.
- There were several locations on the ceiling exhibiting efflorescence, which indicates water infiltration.
- There are several lifting hooks in the slab and beam next to the hatch that did not have their rated capacities labeled.
- There was minor exposed aggregate around several pipe and conduit ceiling penetrations.
- The hatch opening on lower level had liquid staining.
- There was a long crack in the ceiling, extending from the concrete beam at the hatch and continuing through a small pipe penetration to almost the large corner pipe opening, which was exhibiting liquid staining and efflorescence.

Interior Wetwell

- Observed a severely corroded pipe on the main floor that looked to be abandoned.
- There was one exposed reinforcing bar observed in the ceiling of the main floor.
- All the openings in the guards had chains, which do not meet OSHA regulations.
- The wetwell walls had minor exposed aggregate. No observations could be made below the waterline.
- Observed several lifting hooks with no labeled lifting capacities.
- There was exposed reinforcing steel observed in the ceiling slab and beams that appeared to be corroding and staining the concrete.
- The sleeved pipe penetrations were showing signs of minor corrosion.
- There were several corroded embedded bolts on the walls that are no longer used.

- Some of the pipes and pipe supports were exhibiting corrosion.

Recommendations

- Replace the expansion joint sealant at the concrete entrance pads.
- Repair all cracked concrete by epoxy injection.
- Resurface all exposed reinforcing steel after applying epoxy bonding agent with cementitious repair material.
- Replace the corroding pipe supports in the wetwell.
- Replace the chains at the guard openings with safety gates that comply with OSHA regulations.
- Label the monorail and all the lifting assemblies with thier rated load capacities.

4) Route 6 Pump Station

Observations

The Route 6 Pump Station was originally constructed in 1976 as an ejector station and was converted into a flood suction type station in the 1990s. This pump station is very similar to the Wilbur Avenue Pump Station. *Both Wright-Pierce and Jack Bowden, the Somerset Collections System Supervisor, have taken numerous pictures of the Route 6 Pump Station in the past three years. These photos include inside of the wetwell.*

Exterior

- The foundation and building appear to be recently painted.
- The sealant between the concrete entrance pad and foundation has failed. It appears that the entrance pad has slightly settled.

Interior Drywell

- There were chains spanning across openings at the top of the spiral stair landing, which do not comply with OSHA regulations.
- The material on the ceiling was failing.
- A lifting hook did not have its rated capacity labeled. There were conduits running next to and below the lifting hook, and therefore, the lift hook didn't appear accessible.
- There was a lifting eye with a shackle attached in the below grade concrete ceiling slab, which did not have its rated capacity labeled.
- Observed efflorescence on the below grade concrete ceiling slab.

Interior Wetwell

- Liquid staining at the top of the walls right under the hatch was observed, which indicates that water is infiltrating the hatch.
- The hatch had corroded spring arms.
- The bottom support plate of the painted steel pipe that sits directly on the exterior wetwell concrete wall was exhibiting signs of corrosion. The concrete below the plate was stained rust color.
- There was exposed aggregate on the visible wall surfaces of the concrete riser section of the wetwell.

- *Existing pictures and previous WP site visits indicate:*
    - *The concrete surfaces of the wetwell exhibit major exposed aggregate.*
    - *The pipes in the wetwell are severely corroded.*
    - *The ladder is showing signs of corrosion.*

Recommendations

- Replace the expansion joint sealant at the concrete entrance pad.
- Indicate the capacity of all lifting assemblies.
- Replace the chains at the stair platform opening with a safety gate that conforms to OSHA regulations.
- Remove all loose and degraded concrete in the wetwell. Resurface all wall surfaces with cementitious repair material.
- Sandblast and repaint the pipes in the wetwell.

5) Foley Avenue Pump Station

Observations

The Foley Avenue Pump Station was originally constructed in 1967 and was upgraded in 1995. This pump station is very similar to the Luther Avenue, Grove Avenue and Dublin Street Pump Stations.

Exterior

- There was a guard post in the middle of the concrete aluminum stair nosing.
- Stone retaining wall adjacent to the stairs had a crack separating it from the stairs.

Interior Drywell

- There were several lift hooks that did not have their rated capacities labeled.
- The concrete slab coating was failing in some localized areas.
- Observed damage in the ceiling at the top corner of a cabinet.
- Observed some liquid staining on the ceiling at an opening.
- Liquid streak staining on the concrete beams below the hatch.
- Liquid staining and discoloration on the coated concrete slab.
- Liquid staining and efflorescence on the wall coming from the pipe opening.
- Observed a full height hairline crack on a wall extending up from the corner of a concrete equipment pad.
- Observed several cracks on the lowest level in the concrete slab mostly stemming from the sump, trench or concrete equipment pads.
- The concrete slab on the lowest level was overall damp. A lot of the concrete surfaces on the lowest level had liquid staining that came from leaking pipes.
- The steel base supports for the pumps were exhibiting signs of corrosion.
- The concrete pump equipment pads were spalling.
- The steel support legs resting directly on the slab showed signs of corrosion.
- The sump did not have a cover.
- There was liquid staining on the ceiling at abandoned slab openings exhibiting efflorescence.

Interior Wetwell

- Observed several cracks on the wetwell walls.
- The steel gate supports attached to walls were severely corroded. The steel gate supports on the ceiling slab exhibited signs of minor corrosion.
- Pipe and conduit steel supports were exhibiting signs of corrosion.
- Chains spanned the guard openings, which do not meet OSHA regulations.
- All the guard in the wetwell was missing toeplates.
- The steel angle supports anchoring the stairs to the intermediate concrete landing were extremely corroded.
- Observed minor exposed aggregate on the walls near the waterline. No observations were made below the waterline.

Recommendations

- Indicate the capacity of all lifting assemblies.
- Repair all cracked concrete by epoxy injection.
- Sandblast and repaint the base supports of the pumps.
- Resurface degraded concrete sections with cementitious repair material.
- Modify the pipe support legs to bear on grout pads to elevate the steel above the wet floor.
- Install cover over sump.
- Replace the chains at all openings with safety gates that conform to OSHA regulations.
- Install toe plate on the guard in the wetwell.
- Replace the severely corroding gate, pipe and conduit supports in the wetwell.

6) Luther Avenue Pump Station

Observations

The Luther Avenue Pump Station was originally constructed in 1967 and was updated in the 1990s. This pump station is very similar to the Foley Avenue, Grove Avenue and Dublin Street Pump Stations.

Exterior

- The entrance concrete stairs had one corner missing with exposed aggregate up to the stair nosing. The stair above it had minor spalling at the stair corner.

Interior Drywell

- There was a lifting eye with a manual 1.5-ton hoist that did not have its rated capacity labeled.
- There were several lifting hooks that did not have their rated capacity labeled on the concrete slab and beams.
- The coated concrete slab had a lot of liquid staining.
- There was liquid staining on the wall at pipe and conduit penetrations.
- There were several of diagonal cracks in the walls and ceiling, including stemming from corners of a concrete beam, exhibiting efflorescence.
- Observed a few cracks exhibiting efflorescence on the walls of the lowest level.

- The concrete pipe and pump equipment pads on the lowest level were stained, peeling and degraded.
- There was no cover over the sump.
- Liquid staining was observed on the walls at the pipe penetrations.
- The steel pipe support legs sitting directly on the slab were exhibiting signs of corrosion.
- Observed several cracks in the concrete slab.

Interior Wetwell
- The windows were bordered up with plywood.
- The yellow paint on the nosings of the grated stair treads was failing and the nosings were showing signs of corrosion.
- The guard in the wetwell was missing toeplate.
- Chains spanned the guard openings, which do not meet OSHA regulations.
- Observed minor exposed aggregate on the walls near the waterline. No observations were made below the waterline.

Recommendations
- Indicate the capacity of all lifting assemblies.
- Repair all cracked concrete by epoxy injection.
- Resurface degraded concrete surfaces with cementitious repair material.
- Install cover over sump.
- Modify the pipe support legs to bear on grout pads to elevate the steel above the wet floor.
- Sandblast and repaint the stair nosings in the wetwell.
- Install toe plate on the guard in the wetwell.
- Replace the chains at all openings with safety gates that conform to OSHA regulations.

7) Grove Avenue Pump Station

Observations

The Grove Avenue Pump Station was originally constructed in 1967 and was updated in 2008. This pump station is very similar to the Foley Avenue, Luther Avenue and Dublin Street Pump Stations.

Exterior
- Two corners of one of the concrete entrance stairs was missing and exhibiting exposed aggregate.
- Minor exposed aggregate was observed where a concrete stair was up against the concrete foundation. The expansion joint was visible.

Interior Drywell
- Lifting eye did not have its rated capacity labeled.
- It was evident that the concrete had spalled underneath the coating near the drain and pipe penetrations. The concrete should have been repaired properly with cementitious material before the coating was applied.

- Lifting hooks were observed on the slab and beams that were not labeled with their capacities.
- The coated slab overall exhibited signs of abrasion and there were several cracks observed.
- Steel pipe supports exhibited signs of corrosion, especially where the support was bearing directly on the slab that was wet.
- There were a couple of pipes that had plates fastened to the wall around the pipe penetrations. Some had liquid staining on the plate and wall.

Interior Wetwell

- The coating of the concrete slab on the main level was exhibiting signs of failing in many places.
- The toeplate was missing on the wetwell guard.
- Chains were spanning guard openings, which do not meet OSHA regulations.
- The gate base plates fastened to the top of the concrete walkway were showing minor signs of corrosion.
- It appeared most of the concrete surfaces had been coated. The coating on the ceiling had bubbles, indicating the coating was failing in some areas.
- Concrete surfaces were exhibiting exposed aggregate near the waterline. Concrete surfaces below the waterline could not be observed.

Recommendations

- Indicate the capacity of all lifting assemblies.
- Modify the pipe support legs to bear on grout pads to elevate the steel above the wet floor.
- Sandblast and repaint the gate base plates in the wetwell.
- Install toe plate on the guard in the wetwell.
- Replace the chains at all openings with safety gates that conform to OSHA regulations.

8) Dublin Street Pump Station

Observations

The Dublin Street Pump Station was originally constructed in 1968 and was updated in 2012. This pump station is very similar to the Foley Avenue, Luther Avenue and Grove Avenue Pump Stations.

Exterior

- Some of the nosings on the concrete stairs were broken and missing. Others were not fastened down at the corners.
- There were hairline cracks at the door entrance.

Interior Drywell

- Observed a few hairline cracks on the coated concrete slab.
- The concrete coating on the slab is wearing away in some areas.
- Observed lifting hooks on the slab and beam that did not have their rated capacity labeled.
- The sump cover is showing signs of corrosion.

- There were plates fastened to the wall surrounding pipe penetrations.

Interior Wetwell

- The concrete coating of the slab on the main level was exhibiting signs of abrasion.
- The toeplate was missing from the wetwell guard.
- Chains spanned openings in the guard which does not meet OSHA regulations.
- Concrete surfaces could not be observed below the waterline.
- It appeared the wetwell concrete surfaces had been coated. The coating on the ceiling had bubbles, indicating the coating was failing in some areas. Very short stalactites were observed on the ceiling.
- The angles anchoring the bottom of the stairs to the concrete floor slab were corroded.

Recommendations

- Replace the broken or missing concrete stair nosings.
- Indicate the capacity of all lifting assemblies.
- Replace the sump cover.
- Install toe plate on the guard in the wetwell.
- Replace the chains at all openings with safety gates that conform to OSHA regulations.
- Replace the clip angles anchoring the bottom of the stairs to the concrete slab in the wetwell.

9) Lake Street Pump Station

Observations

The Lake Street Pump Station was originally constructed in 1990 by a private developer. The ownership of the station was recently transferred the Town in 2016.

Interior Building

- Observed a diagonal crack in the top corner of the wall.
- There was a crack the width of the coated slab.
- The coating on the ceiling was failing.

Interior Valve Pit

- Concrete liquid staining coming from the horizontal joint in the concrete walls.
- The steel sleeved pipe penetrations were exhibiting signs of corrosion.
- Observed a hole in the concrete slab.

Interior Wetwell

- The concrete of the wetwell appeared to be in good condition.
- There was a severely corroded pipe support anchored into the wall at two locations, but the section loss was so great that the member doesn't connect in the middle. The member is also no longer being used.

Recommendations

- Repair the diagonal crack in the concrete wall by epoxy injection.
- Resurface the hole in the Valve Pit concrete slab with cementitious repair material.
- Remove the severely corroded pipe support that is not in use.

10) Pleasant Street Pump Station

Observations

The Pleasant Street Pump Station was constructed in 1976. This pump station is very similar to the Pilot Street Pump Station.

Exterior

- One corner of the concrete foundation had spalled and was exhibiting minor exposed aggregate.
- Observed a diagonal hairline crack on the concrete entrance pad stemming from the corner of the nosing.
- Observed exposed aggregate at one corner of the concrete entrance pad at grade that seemed to be from poor vibration.
- There was one exposed nail/tie that was rusted in the concrete foundation.

Interior Drywell

- Concrete floor coating was abraded in the Control Room.
- Observed hairline cracks on the coated concrete slab in the Control Room.
- There was one lifting hook on a painted steel beam and a few other lifting hooks in the concrete slab without their rated capacity labeled.
- The ¼” checkered plate intermediate stair landing was exhibiting signs of corrosion.
- The pipe support base on the checkered plate intermediate stair landing was exhibiting signs of corrosion.
- There was liquid staining on the wall at the 8” pipe penetration above the intermediate stair landing. The liquid leaking from this pipe appears to be causing the corrosion on the stair landing.
- An area of the concrete wall had been removed, exposing the wall reinforcement, to feed conduit through a sleeved slab opening.
- Efflorescence was observed on the ceiling slab at the hatch opening.
- Observed an exposed horizontal reinforcing bar in the concrete wall.
- The sump cover was severely corroded.

Interior Wetwell

- The concrete appeared to be in fair condition viewed from the hatch above.

Recommendations

- Indicate the capacity of all lifting hooks.
- Sandblast and repaint the ¼” checkered plate stair landing and the base plate of the pipe support. Replace a section of the ¼” checkered plate near the 8” pipe penetration in the east wall.

- Replace the pipe penetration sealant in the concrete wall where the leaking liquid and causing the intermediate stair landing checkered plate to corrode.
- Repair the concrete wall with cementitious material after applying epoxy bonding agent to the exposed wall reinforcement.
- Resurface the horizontal exposed reinforcing steel bar after applying epoxy bonding agent with cementitious repair material.
- Replace the sump cover.

11) Pilot Drive Pump Station

Observations

The Pilot Drive Pump Station was constructed in 1976. This pump station is very similar to the Pleasant Street Pump Station.

Exterior

- There was some cracking and spalling exhibiting efflorescence observed at the interface of the 6” walkway porch slab and the top of the frost wall foundation running the length of the east side.

Interior Drywell

- There was a lifting hook on a painted steel beam without its rated capacity labeled. It was supporting a 2-ton hoist.
- Observed liquid staining on the slab below the diesel generator.
- The ¼” checkered plate intermediate stair landing and stair treads were exhibiting signs of corrosion.
- There was liquid staining on the wall at the 8” pipe penetration above the intermediate stair landing. The liquid leaking from this pipe appears to be causing the corrosion on the stair landing.
- There was a CMU block being used as a pipe support on the checkered plate intermediate stair landing.
- The guard on the intermediate stair landing was severely bent.
- The sump cover was severely corroded.
- The coating was failing in many areas of the slab in the Pump Room.
- Observed cracks and spalling in the coated concrete slab in the Pump room.

Interior Wetwell

- The concrete of the wetwell appeared to be in fair condition viewing from the hatch above.
- Chains are located at the opening in the guard at the hinged grating hatch to the wetwell, which does not comply with OSHA regulations.

Recommendations

- Repair the crack in the 6” walkway porch slab by epoxy injection and resurface the degraded concrete with cementitious repair material.
- Indicate the capacity of all lifting hooks.

- Sandblast and repaint the ¼” checkered plate stair landing and stair treads. Replace a section of the ¼” checkered plate near the 8” pipe penetration in the east wall.
- Replace the pipe penetration sealant in the concrete wall where the leaking liquid and causing the intermediate stair landing checkered plate to corrode.
- Replace the CMU block with a permanent pipe support.
- Replace the bent guard on the intermediate stair landing.
- Replace the sump cover.
- Replace the chains at the wetwell grating hatch with fall protection that meets OSHA requirements.

12) Main Street Pump Station

Observations

The Main Street Pump Station was constructed in 1967.

Exterior

- The wooden steps to the wetwell top slab do not appear to be fastened to the concrete.
- The concrete stairs have spalling under the nosings that have at one time been repair patched and coated.
- There is one concrete stair corner missing with exposed aggregate that had been coated.

Interior Drywell

- Lifting hook did not have its rated capacity listed. It was supporting a 1-ton manual hoist.
- The slab coating was abraded in some areas and appeared to have been patched.
- Observed some hairline cracks in the Control Room coated slab.
- No observations were made of the Pump Room during this site visit.

Interior Wetwell

- Observed exposed aggregate in the top riser portion of the wetwell.
- The concrete surface areas visible above the waterline appeared to be in fair condition.
- The manhole cover was exhibiting signs of corrosion.

Recommendations

- Indicate the capacity of the lift hook.
- Replace the wooden steps.

Section F

Somerset WPCF 2004 NPDES Permit

MA0100676
AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Clean Water Act as amended, (33 U.S.C. §§1251 et seq.; the "CWA"), and the Massachusetts Clean Waters Act, as amended, (M.G.L. Chap. 21, §§26-53),

Town of Somerset

is authorized to discharge from the facility located at

Town of Somerset Water Pollution Control Facility
116 Walker Street
Somerset, MA 02725

to receiving water named

Taunton River (MA 62-04)

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on the date of signature.

This permit and the authorization to discharge expire at midnight, September 30, 2008.

This permit supersedes the permit issued on April 16, 1999.

This permit consists of 10 pages in Part I including effluent limitations, monitoring requirements, Attachments A, B & C, and 35 pages in Part II including General Conditions and Definitions.

Signed this 14th day of May, 2004

/S/
Signature on file

Linda M. Murphy, Director
Office of Ecosystem Protection
Environmental Protection Agency
Boston, MA

Director
Division of Watershed Management
Department of Environmental Protection
Commonwealth of Massachusetts
Boston, MA

PART I

A.1. During the period beginning the effective date and lasting through expiration, the permittee is authorized to discharge from outfall serial number **001,** treated effluent to the Taunton River. Such discharges shall be limited and monitored as specified below.

EFFLUENT CHARACTERISTIC			EFFLUENT LIMITS			MONITORING REQUIREMENTS	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE[3] TYPE**
FLOW	***	***	4.2 MGD[2]	***	Report MGD	CONTINUOUS	RECORDER
BOD_5 [4]	1051lbs/Day (478 kgs/Day)	1576 lbs/Day (716 kgs/Day)	30 mg/l	45 mg/l	Report mg/l[1]	1/WEEK	24-HOUR COMPOSITE[5]
TSS [4]	1051 lbs/Day (478 kgs/Day)	1576 lbs/Day (716 kgs/Day)	30 mg/l	45 mg/l	Report mg/l[1]	1/WEEK	24-HOUR COMPOSITE[5]
pH RANGE[1]	6.5 - 8.5 SU SEE PERMIT PAGE 4 OF 10, PARAGRAPH I.A.1.b.					DAILY	GRAB
FECAL COLIFORM[1,6]	***	***	200/100 ml	***	400/100 ml	1/WEEK	GRAB
TOTAL RESIDUAL CHLORINE[1,7, 8]	***	***	0.2 MG/L	***	0.3 MG/L	3/DAY	GRAB
SETTLEABLE SOLIDS[1,9]	***	***	0.1 ML/L	0.1 ML/L	0.3 ML/L	1/DAY	GRAB
TOTAL AMMONIA AS NITROGEN	***	***	***	***	Report mg/l	1/MONTH	24-HOUR COMPOSITE[5]
NITRATE	***	***	***	***	Report mg/l	1/MONTH	24-HOUR COMPOSITE[5]
NITRITE							
TOTAL KJELDAHL NITROGEN	***	***	***	***	Report mg/l	1/MONTH	24-HOUR COMPOSITE[5]
WHOLE EFFLUENT TOXICITY SEE FOOTNOTES 10, 11 and 12	Acute $LC_{50} \geq 100\%$					4/YEAR	24-HOUR COMPOSITE[5]

Footnotes:

1. Required for State Certification.

2. For flow, report maximum and minimum daily rates and total flow for each operating date. This is an annual average limit, which shall be reported as a rolling average. The first value will be calculated using the monthly average flow for the first full month ending after the effective date of the permit and the eleven previous monthly average flows. Each subsequent month's DMR will report the annual average flow that is calculated from that month and the previous 11 months.

3. All required effluent samples shall be collected at the point specified in **Permit Attachment A**. Any change in sampling location must be reviewed and approved in writing by EPA and MADEP. All samples shall be tested using the analytical methods found in 40 CFR §136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR §136. All samples shall be 24 hour composites unless specified as a grab sample in 40 CFR §136.

4. Sampling required for influent and effluent.

5. A 24-hour composite sample will consist of at least twenty four (24) grab samples taken during one working day.

6. Fecal coliform discharges shall not exceed a monthly geometric mean of 200 colony forming units per 100 ml, nor shall they exceed 400 cfu per 100 ml as a daily maximum. This monitoring shall be conducted concurrently with the TRC sampling described below.

7. The minimum level (ML) for total residual chlorine is defined as 20 ug/l. This value is the minimum level for chlorine using EPA approved methods found in the most currently approved version of Standard Methods for the Examination of Water and Wastewater, Method 4500 CL-E and G or USEPA Manual of Methods of Analysis of Water and Wastes, Method 330.5. One of these methods must be used to determine total residual chlorine. For effluent limitations less than 20 ug/l, compliance/non-compliance will be determined based on ML. Sample results of 20 ug/l or less shall be reported as zero on the discharge monitoring report.

8. Chlorination and dechlorination systems shall include an alarm system for indicating system interruptions or malfunctions. Any interruption or malfunction of the chlorine dosing system that may have resulted in levels of chlorine that were inadequate for achieving effective disinfection or interruptions or malfunctions of the dechlorination system that may have resulted in excessive levels of chlorine in the final effluent shall be reported with the monthly DMRs. The report shall include the date and time of the interruption or malfunction, the nature of the problem, and the estimated amount of time that the reduced levels of chlorine or dechlorination chemicals occurred.

9. A grab sample for settleable solids shall be taken during times of peak flow. The sample shall be representative of the effluent being discharged to the river during peak flows.

10. The permittee shall conduct acute toxicity tests four times per year using the Inland Silverside (Menidia beryllina). Toxicity test samples shall be collected during the second week of the months

of February, May, August and November. The test results shall be submitted by the last day of the month following the completion of the test. The results are due March 31st, June 30th, September 30th and December 31st, respectively. The tests must be performed in accordance with test procedures and protocols specified in **Attachment B** of this permit.

Test Dates Second Week in	**Submit Results By:**	**Test Species**	**Acute Limit LC_{50}**
February May August November	March 31st June 30th September 30th December 31st	See Attachment A	≥ 100%

After submitting **one year** and a **minimum** of two consecutive sets of WET test results, all of which demonstrate compliance with the WET permit limits, the permittee may request a reduction in the WET testing requirements. The permittee is required to continue testing at the frequency specified in the permit until notice is received by certified mail from the EPA that the WET testing requirement has been changed.

11. The LC_{50} is the concentration of effluent which causes mortality to 50% of the test organisms. Therefore, a 100% limit means that a sample of 100% effluent (no dilution) shall cause no more than a 50% mortality rate.

12. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall follow procedures outlined in **Attachment C Section IV., DILUTION WATER** in order to obtain permission to use an alternate dilution water. In lieu of individual approvals for alternate dilution water required **in Attachment C**, EPA-New England has developed a Self-Implementing Alternative Dilution Water Guidance document (called "Guidance Document") which may be used to obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water. If this Guidance document is revoked, the permittee shall revert to obtaining approval as outlined in **Attachment C**. The "Guidance Document" has been sent to all permittees with their annual set of DMRs and Revised Updated Instructions for Completing EPA's Pre-Printed NPDES Discharge Monitoring Report (DMR) Form 3320-1 and is not intended as a direct attachment to this permit. Any modification or revocation to this "Guidance Document" will be transmitted to the permittees as part of the annual DMR instruction package. However, at any time, the permittee may choose to contact EPA-New England directly using the approach outlined in **Attachment C**.

Part I.A.1. (Continued)

a. The discharge shall not cause a violation of the water quality standards of the receiving waters.

b. The pH of the effluent shall not be less than 6.5 nor greater than 8.5 at any time, unless these values are exceeded as a result of an approved treatment process.

c. The discharge shall not cause objectionable discoloration of the receiving waters.

d. The effluent shall contain neither a visible oil sheen, foam, nor floating solids at any time.

e. The permittee's treatment facility shall maintain a minimum of 85 percent removal of both total suspended solids and biochemical oxygen demand. The percent removal shall be based on monthly average values.

f. When the effluent discharged for a period of 90 consecutive days exceeds 80 percent of the designed flow, the permittee shall submit to the permitting authorities a projection of loadings up to the time when the design capacity of the treatment facility will be reached, and a program for maintaining satisfactory treatment levels consistent with approved water quality management plans.

g. The permittee shall minimize the use of chlorine while maintaining adequate bacterial control.

h. The results of sampling for any parameter above its required frequency must also be reported.

2. All POTWs must provide adequate notice to the Director of the following:

a. Any new introduction of pollutants into that POTW from an indirect discharger in a primary industry category discharging process water; and

b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

c. For purposes of this paragraph, adequate notice shall include information on:

(1) the quantity and quality of effluent introduced into the POTW; and

(2) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

3. Prohibitions Concerning Interference and Pass Through:

a. Pollutants introduced into POTW's by a non-domestic source (user) shall not pass through the POTW or interfere with the operation or performance of the works.

4. Toxics Control

a. The permittee shall not discharge any pollutant or combination of pollutants in toxic amounts.

b. Any toxic components of the effluent shall not result in any demonstrable harm to aquatic life or violate any state or federal water quality standard which has been or may be promulgated. Upon promulgation of any such standard, this permit may be revised or amended in accordance with such standards.

5. Numerical Effluent Limitations for Toxicants

EPA or DEP may use the results of the toxicity tests and chemical analyses conducted pursuant to this permit, as well as national water quality criteria developed pursuant to Section 304(a)(1) of the Clean Water Act (CWA), state water quality criteria, and any other appropriate information or data, to develop numerical effluent limitations for any pollutants, including but not limited to those pollutants listed in Appendix D of 40 CFR Part 122.

C. UNAUTHORIZED DISCHARGES

The permittee is authorized to discharge only in accordance with the terms and conditions of this permit and only from outfalls listed in Part I A.1. of this permit. Discharges of wastewater from any other point sources, including sanitary sewer overflows (SSOs) are not authorized by this permit and shall be reported in accordance with Section D.1.e. (1) of the General Requirements of this permit (Twenty-four hour reporting).

D. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

Operation and maintenance of the sewer system shall be in compliance with the General Requirements of Part II and the following terms and conditions:

1. Maintenance Staff

The permittee shall provide an adequate staff to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit.

2. Preventative Maintenance Program

The permittee shall maintain an ongoing preventative maintenance program to prevent overflows and bypasses caused by malfunctions or failures of the sewer system infrastructure. The program shall include an inspection program designed to identify all potential and actual unauthorized discharges.

3. Infiltration/Inflow Control Plan:

The permittee shall develop and implement a plan to control infiltration and inflow (I/I) to the separate sewer system. The plan shall be submitted to EPA and MA DEP within **six (6) months of the effective date** of this permit (see page 1 of this permit for the effective date) and shall describe the permittee's program for preventing infiltration/inflow related effluent limit violations, and all unauthorized discharges of wastewater, including overflows and by-passes due to excessive infiltration/inflow.

The plan shall include:

- An ongoing program to identify and remove sources of infiltration and inflow. The program shall include the necessary funding level and the source(s) of funding.

- An inflow identification and control program that focuses on the disconnection and redirection of illegal sump pumps and roof down spouts. Priority should be given to removal of public and private inflow sources that are upstream from, and potentially contribute to, known areas of sewer system backups and/or overflows.

- Identification and prioritization of areas that will provide increased aquifer recharge as the result of reduction/elimination of infiltration and inflow to the system.

- An educational public outreach program for all aspects of I/I control, particularly private inflow.

Reporting Requirements:

A summary report of all actions taken to minimize I/I during the previous calendar year shall be submitted to EPA and the MA DEP annually, by the **anniversary of the effective date** of this permit. The summary report shall, at a minimum, include:

- A map and a description of inspection and maintenance activities conducted and corrective actions taken during the previous year.

- Expenditures for any infiltration/inflow related maintenance activities and corrective actions taken during the previous year.

- A map with areas identified for I/I-related investigation/action in the coming year.

- A calculation of the annual average I/I, the maximum month I/I for the reporting year.

- A report of any infiltration/inflow related corrective actions taken as a result of unauthorized discharges reported pursuant to 314 CMR 3.19(20) and reported pursuant to the <u>Unauthorized Discharges</u> section of this permit.

4. Alternate Power Source

In order to maintain compliance with the terms and conditions of this permit, the permittee shall continue to provide an alternative power source with which to sufficiently operate its treatment works (as defined at 40 CFR §122.2).

E. SLUDGE CONDITIONS

1. The permittee shall comply with all existing federal and state laws and regulations that apply to sewage sludge use and disposal practices and with the CWA Section 405(d) technical standards.

2. The permittee shall comply with the more stringent of either the state or federal (40 CFR part 503), requirements.

3. The requirements and technical standards of 40 CFR part 503 apply to facilities which perform one or more of the following use or disposal practices.

   a. Land application - the use of sewage sludge to condition or fertilize the soil

   b. Surface disposal - the placement of sewage sludge in a sludge only landfill

   c. Sewage sludge incineration in a sludge only incinerator

4. The 40 CFR part 503 conditions do not apply to facilities which place sludge within a municipal solid waste landfill. These conditions also do not apply to facilities which do not dispose of sewage sludge during the life of the permit but rather treat the sludge (lagoons- reed beds), or are otherwise excluded under 40 CFR 503.6.

5. The permittee shall use and comply with the attached Sludge Compliance Guidance document to determine appropriate conditions. Appropriate conditions contain the following elements.

   - General requirements
   - Pollutant limitations
   - Operational Standards (pathogen reduction requirements and vector attraction reduction requirements)
   - Management practices
   - Record keeping
   - Monitoring
   - Reporting

   Depending upon the quality of material produced by a facility, all conditions may not apply to the facility.

6. The permittee shall monitor the pollutant concentrations, pathogen reduction and vector attraction reduction at the following frequency. This frequency is based upon the volume of sewage sludge generated at the facility in dry metric tons per year

less than 290	1/ year
290 to less than 1500	1 /quarter
1500 to less than 15000	6 /year
15000 +	1 /month

7. The permittee shall sample the sewage sludge using the procedures detailed in 40 CFR 503.8.

8. The permittee shall submit an annual report containing the information specified in the Sludge Compliance Guidance document by **February 19.** Reports shall be submitted to the address contained in the reporting section of the permit. Sludge monitoring is not required by the permittee when the permittee is not responsible for the ultimate sludge disposal. The permittee must be assured that any third party contractor is in compliance with appropriate regulatory requirements. In such case, the permittee is required only to submit an annual report by February 19 containing the following information:

- Name and address of contractor responsible for sludge disposal
- Quantity of sludge in dry metric tons removed from the facility by the sludge contractor

F. MONITORING AND REPORTING

1. Reporting

Monitoring results obtained during each calendar month shall be summarized and reported on Discharge Monitoring Report Form(s) postmarked **no later than the 15th day of the following month**.

Signed and dated originals of these, and all other reports required herein, shall be submitted to the Director and the State at the following addresses:

Environmental Protection Agency
Water Technical Unit (SEW)
P.O. Box 8127
Boston, Massachusetts 02114

The State Agency is:

Massachusetts Department of Environmental Protection
Southeast Regional Office
20 Riverside Drive
Lakeville, MA 02347

Signed and dated Discharge Monitoring Report Forms and toxicity test reports required by this permit shall also be submitted to the State at:

Massachusetts Department of Environmental Protection
Division of Watershed Management
Surface Water Discharge Permit Program
627 Main Street, 2nd Floor
Worcester, Massachusetts 01608

G. STATE PERMIT CONDITIONS

This Discharge Permit is issued jointly by the U. S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP) under Federal and State law, respectively. As such, all the terms and conditions of this permit are hereby incorporated into and constitute a discharge permit issued by the Commissioner of the MA DEP pursuant to M.G.L. Chap.21, §43.

Each Agency shall have the independent right to enforce the terms and conditions of this Permit. Any modification, suspension or revocation of this Permit shall be effective only with respect to the Agency taking such action, and shall not affect the validity or status of this Permit as issued by the other Agency, unless and until each Agency has concurred in writing with such modification, suspension or revocation. In the event any portion of this Permit is declared, invalid, illegal or otherwise issued in violation of State law such permit shall remain in full force and effect under Federal law as an NPDES Permit issued by the U.S. Environmental Protection Agency. In the event this Permit is declared invalid, illegal or otherwise issued in violation of Federal law, this Permit shall remain in full force and effect under State law as a Permit issued by the Commonwealth of Massachusetts.

Section G
WPCF Daily Data
(2013-2018)

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH Influent	pH Effluent
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Hi	Low
				ADF	7-Day	30-Day																										
Jan'13	01/01/13	7.200	3.184	4.592			4.20	4.592	92.7	3550.2				11.1	88.0%	127	4863.755				11	91.3%		360	2172	1852	1.065	9984	0.00	52	7.3	6.8
	01/02/13	8.306	2.761	4.451			4.20	4.451	88.0	3266.7				10.9	87.6%		-						3.5	320			1.029		0.00	51	7.2	6.8
	01/03/13	6.642	2.597	4.283			4.20	4.059		-							-						3.7	330			0.985		0.00	50	7.4	6.7
	01/04/13	7.224	2.530	4.104			4.20	3.980		-							-						4.0	360			1.030		0.00	51	7.5	6.7
	01/05/13	6.483	2.470	4.011			4.20	3.840		-							-							380			1.084		0.00	52	7.2	6.6
	01/06/13	7.013	2.197	4.032			4.20	3.771		-							-							460			1.110		0.00	50	7.2	6.9
	01/07/13	6.621	1.973	3.827	4.186		4.20	3.744		-							-						3.9	430			1.057		0.00	51	7.4	6.9
	01/08/13	7.083	2.263	3.808	4.074		4.20	3.675	94.0	2985.3				6.6	93.0%	110	3493.459				5	95.5%	3.9	400	2424	2052	1.000	9488	0.00	51	7.4	6.8
	01/09/13	7.126	1.927	3.860	3.989		4.20	3.650	104.6	3367.3				6.0	94.3%		-						4.2	410			1.119		0.00	51	7.4	6.8
	01/10/13	7.085	2.086	3.835	3.925		4.20	3.668		-							-						4.3	480			1.200		0.00	51	7.5	6.8
	01/11/13	6.957	1.855	3.782	3.879		4.20	3.782		-							-						4.1	500			1.446		0.21	50	7.7	7.0
	01/12/13	6.573	2.072	3.892	3.862		4.20	3.664		-							-							440			1.218		0.04	53	7.3	6.7
	01/13/13	6.278	2.272	3.929	3.848		4.20	3.929		-							-							450			1.255		0.00	53	7.3	6.8
	01/14/13	7.649	2.356	3.935	3.863		4.20	3.773		-							-						3.8	460			1.243		0.22	51	7.5	6.9
	01/15/13	5.840	2.237	3.814	3.864		4.20	3.542	112.7	3584.8				4.2	96.3%	161	5121.21				3	98.1%	3.7	510	2859	2392	1.601	9576	0.00	51	7.4	6.9
	01/16/13	6.646	1.984	3.978	3.881		4.20	3.813	91.0	3019.1				9.0	90.1%		-						3.6	490			1.706		0.57	49	7.7	7.0
	01/17/13	8.525	2.580	4.139	3.924		4.20	3.975		-							-						3.9	480			1.746		0.00	50	7.4	6.8
	01/18/13	7.606	2.429	4.000	3.955		4.20	3.828		-							-						3.8	500			1.667		0.00	49	7.4	6.8
	01/19/13	6.280	2.520	4.114	3.987		4.20	3.797		-							-							430			1.660		0.00	50	7.3	6.9
	01/20/13	6.222	2.644	4.056	4.005		4.20	4.017		-							-							480			1.636		0.00	51	7.5	7.0
	01/21/13	6.026	2.299	3.807	3.987		4.20	3.619		-							-							510			1.559		0.00	50	7.3	7.1
	01/22/13	6.310	2.373	3.625	3.960		4.20	3.376	141.0	4262.8				8.0	94.3%	211	6379.058				6	97.2%	3.8	460	2924	2441	1.477	9884	0.00	48	7.4	7.0
	01/23/13	6.293	2.130	3.551	3.899		4.20	3.455	128.3	3799.6							-						3.9	470			1.457		0.00	48	7.7	7.0
	01/24/13	5.477	1.995	3.533	3.812		4.20	3.533		-							-						3.8	450			1.448		0.00	47	7.6	7.1
	01/25/13	5.801	1.897	3.447	3.733		4.20	3.137		-							-						4.2	460			1.416		0.00	48	7.6	7.0
	01/26/13	6.487	1.907	3.444	3.638		4.20	3.220		-							-							430			1.414		0.00	50	7.1	6.7
	01/27/13	6.586	1.756	3.354	3.537		4.20	3.192		-							-							440			1.381		0.00	49	7.1	6.9
	01/28/13	5.773	1.687	3.301	3.465		4.20	3.148		-							-						3.8	480			1.360		0.00	48	7.4	7.0
	01/29/13	5.307	1.585	3.250	3.411		4.20	3.173	128.0	3469.4				6.6	94.8%	154	4174.17				1	99.4%	3.8	470	3104	2595	1.343	10580	0.14	48	7.4	7.0
	01/30/13	6.133	1.790	3.429	3.394	3.839	4.20	3.283	127.0	3631.9	3493.7			8.2	93.5%		-	4806.3					3.9	490			1.449		0.00	50	7.6	7.1
	01/31/13	7.035	1.730	3.753	3.425	3.811	4.20	3.604		-	3487.4						-	4792.0					3.9	440			1.565		0.70	48	7.5	7.0
Feb'13	02/01/13	5.647	2.074	3.567	3.443	3.782	4.20	3.456		-	3515.0						-	4792.0					4.2	480			1.476		0.00	48	7.6	7.0
	02/02/13	6.920	1.836	3.605	3.466	3.759	4.20	3.455		-	3515.0						-	4792.0						400			1.475		0.00	49	7.2	6.9
	02/03/13	5.877	1.692	3.654	3.508	3.744	4.20	3.497		-	3515.0						-	4792.0						410			1.491		0.00	50	7.1	6.8
	02/04/13	6.214	2.070	3.540	3.543	3.729	4.20	3.356		-	3515.0						-	4792.0					4.0	470			1.453		0.00	48	8.2	7.0
	02/05/13	5.488	1.780	3.391	3.563	3.707	4.20	3.117	107.0	3026.1	3460.7			7.6	92.9%	129	3648.241	4563.2			3	97.7%	3.9	480	2991	2499	1.396	10408	0.00	47	8.0	7.0
	02/06/13	5.613	1.890	3.370	3.554	3.692	4.20	3.231	91.0	2557.6	3370.4			7.0	92.3%		-	4563.2					4.1	460			1.390		0.00	47	7.4	7.0
	02/07/13	5.958	1.744	3.238	3.481	3.673	4.20	3.152		-	3413.2						-	4830.7					4.5	450			1.336		0.00	47	8.6	6.9
	02/08/13	7.647	1.397	3.476	3.468	3.660	4.20	3.476		-	3418.9						-	4830.7						440			1.368		0.00	47	7.7	7.0
	02/09/13	5.240	0.744	3.148	3.402	3.637	4.20	3.148		-	3418.9						-	4830.7						540			1.302		0.00	47	7.2	6.8
	02/10/13	5.311	1.677	3.291	3.351	3.621	4.20	3.291		-	3418.9						-	4830.7						460			1.359		0.00	48	7.4	6.9
	02/11/13	8.622	1.660	3.688	3.372	3.614	4.20	3.688		-	3418.9						-	4830.7					4.4	490			1.493		0.30	46	7.5	6.9
	02/12/13	6.251	2.027	4.013	3.461	3.617	4.20	4.013	78.3	2620.6	3330.2			17.1	78.2%	90	3012.158	4467.0			7	92.2%	4.5	450	3201	2670	1.635	10604	0.00	48	7.4	6.7
	02/13/13	6.873	2.560	4.151	3.572	3.624	4.20	4.151	76.0	2631.1	3260.3			9.7	87.2%		-	4467.0					4.5	430			1.684		0.00	48	7.4	6.8
	02/14/13	7.643	2.715	4.248	3.716	3.639	4.20	4.140		-	3224.2						-	4303.4					5.1	400			1.711		0.00	48	7.5	6.7
	02/15/13	7.935	2.700	4.403	3.849	3.653	4.20	4.363		-	3249.9						-	4303.4					3.2	420			1.767		0.00	48	7.4	6.8
	02/16/13	7.873	3.083	4.660	4.065	3.670	4.20	4.660		-	3249.9						-	4303.4						430			1.834		0.26	49	7.2	6.8
	02/17/13	9.091	3.190	4.684	4.264	3.693	4.20	4.515		-	3249.9						-	4303.4						460			1.832		0.09	45	7.3	6.8
	02/18/13	7.145	2.795	4.369	4.361	3.702	4.20	4.137		-	3249.9						-	4303.4						490			1.745		0.00	47	7.3	6.7
	02/19/13	8.646	2.590	4.651	4.452	3.721	4.20	4.422	69.3	2688.1	3187.5			12.7	81.7%	100	3878.934	4218.5			8	92.0%	4.7	460	3103	2574	1.787	10052	0.70	48	7.4	6.8
	02/20/13	9.203	3.546	5.645	4.666	3.783	4.20	5.559	63.0	2966.0	3165.3			13.9	77.9%		-	4218.5					4.1	350			1.680		0.00	46	7.3	6.9
	02/21/13	8.370	3.552	5.473	4.841	3.844	4.20	5.463		-	3043.4						-	3678.4					5.1	280			1.248		0.00	46	7.3	6.8
	02/22/13	8.962	3.303	5.103	4.941	3.896	4.20	4.974		-	2948.9						-	3678.4					6.2	330			1.254		0.00	46	7.2	6.8
	02/23/13	8.030	3.217	5.118	5.006	3.949	4.20	4.954		-	2948.9						-	3678.4						310			1.296		0.69	48	7.1	6.9
	02/24/13	12.618	4.061	6.655	5.288	4.056	4.20	6.399		-	2948.9						-	3678.4						280			1.297		0.42	48	7.0	6.6
	02/25/13	10.886	5.027	6.611	5.608	4.161	4.20	6.363		-	2948.9						-	3678.4					4.0	240			1.237		0.00	48	7.1	6.7
	02/26/13	9.849	4.758	6.348	5.850	4.261	4.20	6.153	54.0	2858.9	2938.9			13.0	75.9%	77	4076.559	3758.0			6	92.2%	4.3	250	2128	1784	1.300	11692	0.00	48	7.2	6.6
	02/27/13	10.375	4.852	7.902	6.173	4.414	4.20	7.902	45.5	2998.6	2944.8			19.4	57.4%		-	3758.0					4.5	250			1.346		0.93	47	7.2	6.6
	02/28/13	10.225	6.611	8.463	6.600	4.588	4.20	8.269		-	2886.5						-	3654.0					6.3	210			1.337		0.00	47	7.2	6.6
Mar'13	03/01/13	9.547	6.076	7.682	6.968	4.730	4.20	7.481		-	2793.4						-	3654.0					7.3	210			1.324		0.00	47	7.2	6.7
	03/02/13	9.085	4.920	6.796	7.208	4.831	4.20	6.796		-	2793.4						-	3654.0						240			1.352		0.00	48	6.9	6.5
	03/03/13	8.879	4.605	6.303	7.158	4.923	4.20	6.303		-	2793.4						-	3654.0						250			1.353		0.00	48	7.0	6.6
	03/04/13	9.316	4.045	6.046	7.077	5.004	4.20	6.046		-	2793.4						-	3654.0					5.9	280			1.331		0.00	47	7.6	6.4
	03/05/13	8.480	3.820	5.613	6.972	5.069	4.20	5.613	54.7	2560.6	2767.5			13.3	75.7%	86	4025.868	3728.4			5	94.2%	5.6	310	2538	2114	1.359	10896	0.00	47	7.5	6.4
	03/06/13	8.516	3.530	5.503	6.629	5.135	4.20	5.503	70.0	3212.7	2812.0						-	3728.4					5.7	320			1.399		0.30	47	7.4	6.3
	03/07/13	8.874	3.346	5.411	6.193	5.202	4.20	5.275		-	2788.2						-	3748.4					6.0	330			1.380		0.45	46	7.2	6.2
	03/08/13	8.654	3.855	5.708	5.911	5.280	4.20	5.537		-	2817.1						-	3748.4					6.9	300			1.378		0.41	45	7.2	6.6
	03/09/13	9.833	3.915	5.969	5.793	5.371	4.20	5.762		-	2817.1						-	3748.4						280			1.395		0.00	49	6.9	6.2
	03/10/13	9.913	4.205	6.279	5.790	5.464	4.20	6.279		-	2817.1						-	3748.4						260			1.405		0.00	49	6.9	6.2
	03/11/13	9.983	4.382	6.694	5.882	5.583	4.20	6.509		-	2817.1						-	3748.4					5.0	270			1.400		0.00	47	7.1	6.2
	03/12/13	12.633	5.001	7.782	6.192	5.732	4.20	7.777	44.5	2888.1	2825.0			17.6	60.4%	70	4543.132	3907.3			9	87.1%	7.2	250	2055	1712	1.420	11172	0.93	48	7.1	6.2
	03/13/13	12.441	7.035	8.786	6.661	5.902	4.20	8.528	44.5	3260.7	2868.5			30.6	31.2%		-	3907.3					7.1	130			1.332		0.00	48	7.0	6.5
	03/14/13	11.839	6.020	7.657	6.982	6.024	4.20	7.436		-	2896.1						-	4131.1					7.1	130			1.303		0.00	47	7.0	6.6
	03/15/13	10.352	5.020	7.108	7.182	6.122	4.20	6.734		-	2929.2						-	4131.1					7.5	150			1.309		0.00	46	7.2	6.6
	03/16/13	9.697	4.460	6.259	7.224	6.189	4.20	5.575		-	2929.2						-	4131.1						160			1.342		0.00	49	7.0	6.7
	03/17/13	9.848	4.220	5.753	7.148	6.234	4.20	5.066		-	2929.2						-	4131.1						170			1.343		0.00	47	6.9	6.7

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	03/18/13	8.991	3.830	5.657	7.000	6.268	4.20	5.090		-	2929.2						-	4131.1					6.5	190			1.339		0.00	48	7.2	6.5
	03/19/13	9.550	3.680	6.058	6.754	6.313	4.20	5.595	53.0	2677.8	2901.3			20.8	60.8%	80	4041.898	4113.3			13	83.8%	6.7	190	1657	1380	1.374	7376	0.65	47	7.2	6.5
	03/20/13	9.258	4.249	6.021	6.359	6.368	4.20	5.451	58.0	2912.5	2902.4			23.6	59.3%		-	4113.3					6.1	170			1.471		0.00	48	7.1	6.6
	03/21/13	8.688	4.164	5.705	6.080	6.404	4.20	5.169		-	2926.2						-	4171.9					6.7	160			1.350		0.00	47	7.1	6.5
	03/22/13	8.367	3.900	5.478	5.847	6.398	4.20	4.944		-	2921.2						-	4171.9					5.8	170			1.492		0.00	47	7.3	6.6
	03/23/13	8.824	3.529	5.232	5.701	6.390	4.20	4.822		-	2921.2						-	4171.9						160			1.366		0.00	49	7.0	6.5
	03/24/13	7.455	3.445	5.021	5.596	6.387	4.20	4.688		-	2921.2						-	4171.9						170			1.376		0.00	49	6.9	6.6
	03/25/13	7.270	3.226	4.817	5.476	6.377	4.20	4.580		-	2921.2						-	4171.9					5.6	190			1.456		0.08	48	7.1	6.7
	03/26/13	7.310	2.939	4.615	5.270	6.309	4.20	4.331	62.7	2413.3	2864.8			19.1	69.5%	85	3271.574	3991.8			14	83.5%	7.5	180	1706	1409	1.531	6724	0.00	48	7.2	6.5
	03/27/13	6.246	2.806	4.445	5.045	6.237	4.20	4.241	62.3	2309.5	2809.3			16.6	73.4%		-	3991.8					7.6	170			1.722		0.00	49	7.2	6.4
	03/28/13	6.258	2.773	4.264	4.839	6.168	4.20	4.264		-	2803.8						-	3970.6					7.4	180			1.737		0.00	49	7.3	6.6
	03/29/13	6.092	2.293	4.164	4.651	6.043	4.20	4.164		-	2779.4						-	3970.6						180			1.606		0.00	49	7.1	6.5
	03/30/13	6.136	2.281	4.149	4.496	5.899	4.20	4.149		-	2779.4						-	3970.6						180			1.605		0.00	51	7.2	6.6
	03/31/13	6.402	1.962	4.038	4.356	5.778	4.20	4.038		-	2779.4						-	3970.6						180			1.614		0.30	51	7.1	6.6
Apr'13	04/01/13	6.121	2.637	4.217	4.270	5.692	4.20	4.043		-	2779.4						-	3970.6					4.7	170			1.936		0.04	50	7.2	6.7
	04/02/13	5.723	2.223	3.851	4.161	5.610	4.20	3.644	73.3	2354.2	2732.2			31.7	56.8%	118	3789.846	3934.5			35	70.3%	6.4	175	2072	1710	1.717	6340	0.00	48	7.5	6.6
	04/03/13	6.178	1.980	3.720	4.058	5.532	4.20	3.345	81.7	2534.7	2712.4			31.8	61.1%		-	3934.5					6.9	160			1.425		0.00	49	7.3	6.6
	04/04/13	5.969	1.853	3.654	3.970	5.467	4.20	3.470		-	2729.3						-	3911.6					6.3	155			1.497		0.00	49	7.3	6.5
	04/05/13	5.688	2.029	3.639	3.895	5.405	4.20	3.373		-	2668.9						-	3911.6					5.3	170			1.533		0.00	49	7.4	6.8
	04/06/13	5.800	2.073	3.513	3.805	5.342	4.20	3.222		-	2668.9						-	3911.6						200			1.570		0.00	49	7.1	6.7
	04/07/13	6.400	1.960	3.534	3.733	5.269	4.20	3.190		-	2668.9						-	3911.6						240			1.639		0.00	51	7.1	6.8
	04/08/13	5.932	1.913	3.509	3.631	5.187	4.20	3.285		-	2668.9						-	3911.6					3.4	310			1.638		0.00	51	7.3	6.9
	04/09/13	5.349	1.898	3.361	3.561	5.090	4.20	2.955	95.6	2679.7	2670.1			30.6	68.0%	130	3643.996	3858.1			14	89.2%	3.4	370	2479	2105	1.620	6676	0.25	51	7.3	6.9
	04/10/13	5.797	1.467	3.391	3.514	4.980	4.20	3.266		-	2670.1						-	3858.1					3.8	390			1.664		0.38	52	7.3	6.8
	04/11/13	5.347	1.686	3.348	3.471	4.832	4.20	3.348		-	2642.8						-	3686.8					4.3	580			1.569		0.00	51	7.4	7.0
	04/12/13	6.530	1.570	3.513	3.453	4.656	4.20	3.423		-	2554.5						-	3686.8					4.9	580			1.573		0.55	50	7.4	6.8
	04/13/13	6.858	1.870	3.502	3.451	4.518	4.20	3.502		-	2554.5						-	3686.8						580			1.523		0.00	50	7.2	6.8
	04/14/13	6.018	1.827	3.417	3.434	4.395	4.20	3.417		-	2554.5						-	3686.8						670			1.524		0.02	52	7.0	6.8
	04/15/13	5.220	1.923	3.263	3.399	4.295	4.20	3.127		-	2554.5						-	3686.8						710			1.547		0.00	52	7.1	6.7
	04/16/13	5.356	1.890	3.291	3.389	4.213	4.20	3.105	91.3	2505.9	2548.5			7.6	91.7%	114	3128.951	3575.3			5	95.6%	4.2	720	3386	2820	1.581	9364	0.03	52	7.3	6.8
	04/17/13	5.224	1.677	3.238	3.367	4.132	4.20	2.871	108.9	2940.8	2592.1			7.6	93.0%		-	3575.3					4.6	780			1.574		0.00	52	7.5	6.9
	04/18/13	5.561	1.450	3.224	3.350	4.038	4.20	2.746		-	2581.3						-	3458.6					5.3	760			1.507		0.00	52	7.4	6.9
	04/19/13	5.285	1.717	3.219	3.308	3.944	4.20	2.875		-	2534.0						-	3458.6					4.9	700			1.485		0.57	52	7.4	6.8
	04/20/13	9.987	1.680	3.438	3.299	3.869	4.20	2.962		-	2534.0						-	3458.6						400			1.298		0.14	53	7.1	6.8
	04/21/13	5.386	1.796	3.232	3.272	3.794	4.20	2.882		-	2534.0						-	3458.6						780			1.434		0.00	53	7.0	6.8
	04/22/13	5.393	1.730	3.227	3.267	3.727	4.20	3.059		-	2534.0						-	3458.6						780			1.438		0.00	53	7.4	7.0
	04/23/13	6.184	1.670	3.238	3.259	3.668	4.20	2.974	103.7	2800.4	2567.3			8.4	91.9%	144	3888.708	3544.6			10	93.1%	4.0	780	3373	2816	1.480	9112	0.09	51	7.3	6.9
	04/24/13	5.484	1.786	3.290	3.267	3.617	4.20	3.101	120.3	3300.9	2648.8			6.8	94.3%		-	3544.6					3.9	770			1.507		0.00	52	7.4	6.9
	04/25/13	5.497	1.343	3.208	3.265	3.570	4.20	3.070		-	2678.3						-	3612.9					3.9	770			1.494		0.08	53	7.5	6.9
	04/26/13	5.304	1.604	3.125	3.251	3.526	4.20	3.125		-	2731.0						-	3612.9					4.6	760			1.507		0.00	54	7.5	6.9
	04/27/13	5.360	1.536	3.144	3.209	3.489	4.20	3.003		-	2731.0						-	3612.9						750			1.536		0.00	54	7.1	6.9
	04/28/13	5.517	1.582	3.141	3.196	3.454	4.20	3.141		-	2731.0						-	3612.9						720			1.532		0.00	56	7.1	6.9
	04/29/13	5.404	1.280	3.067	3.173	3.418	4.20	3.034		-	2731.0						-	3612.9					3.7	760			1.549		0.00	55	7.5	6.8
	04/30/13	6.374	1.350	3.057	3.147	3.386	4.20	2.973	107.7	2745.9	2732.8			6.4	94.1%	140	3569.353	3604.2			9	93.6%	3.9	750	3435	2872	1.470	10344	0.00	55.0	7.30	6.8
May'13	05/01/13	6.170	1.106	2.984	3.104	3.345	4.20	2.860	120.7	3003.8	2762.9			6.0	95.0%		-	3604.2					4.4	760			1.460		0.00	55	7.3	6.7
	05/02/13	6.020	1.349	2.922	3.063	3.314	4.20	2.890		-	2814.0						-	3557.8					3.8	750			1.430		0.00	55	7.5	6.8
	05/03/13	5.634	1.377	2.902	3.031	3.286	4.20	2.902		-	2853.9						-	3557.8					4.6	740			1.420		0.00	56	7.3	6.7
	05/04/13	6.090	1.173	2.927	3.000	3.262	4.20	2.927		-	2853.9						-	3557.8						740			1.436		0.00	55	7.1	6.7
	05/05/13	4.931	1.567	2.927	2.969	3.238	4.20	2.927		-	2853.9						-	3557.8						640			1.431		0.00	56	7.0	6.6
	05/06/13	4.743	1.043	2.815	2.933	3.215	4.20	2.815		-	2853.9						-	3557.8					3.8	780			1.386		0.00	56	7.4	6.8
	05/07/13	4.992	0.960	2.797	2.896	3.191	4.20	2.797	120.7	2815.6	2849.1			3.6	97.0%	169	3942.26	3634.7			1	99.4%	4.2	760	3488	2910	1.414	10520	0.00	56	7.4	6.8
	05/08/13	5.043	1.080	2.728	2.860	3.165	4.20	2.728	119.7	2723.4	2835.1			6.7	94.4%		-	3634.7					4.6	760			1.379		0.22	58	7.4	6.8
	05/09/13	4.703	0.830	2.800	2.842	3.146	4.20	2.715		-	2854.6						-	3632.3					4.2	740			1.391		0.12	57	7.5	6.7
	05/10/13	4.779	1.020	2.744	2.820	3.124	4.20	2.731		-	2854.6						-	3632.3					4.4	700			1.366		0.00	58	7.2	6.6
	05/11/13	5.367	1.147	2.894	2.815	3.109	4.20	2.866		-	2854.6						-	3632.3						710			1.422		0.58	58	7.0	6.7
	05/12/13	5.106	1.280	2.844	2.803	3.087	4.20	2.844		-	2854.6						-	3632.3						660			1.397		0.02	57	6.9	6.7
	05/13/13	4.801	1.098	2.755	2.795	3.062	4.20	2.733		-	2854.6						-	3632.3					4.0	750			1.360		0.00	56	7.2	6.8
	05/14/13	4.732	1.090	2.684	2.778	3.038	4.20	2.640	130.0	2910.0	2860.7			11.7	91.0%	159	3559.145	3617.7			5	96.9%	3.8	780	3446	2805	1.323	10628	0.00	56	7.3	6.8
	05/15/13	6.212	0.807	2.744	2.781	3.020	4.20	2.714	129.0	2952.2	2869.9			12.6	90.2%		-	3617.7					4.2	760			1.352		0.00	57	7.3	6.9
	05/16/13	4.861	1.169	2.730	2.771	3.002	4.20	2.697		-	2910.3						-	3739.9					4.3	740			1.342		0.00	57	7.4	6.8
	05/17/13	5.010	0.963	2.648	2.757	2.982	4.20	2.612		-	2906.5						-	3739.9					4.2	750			1.310		0.00	58	7.6	7.0
	05/18/13	4.776	0.793	2.662	2.724	2.963	4.20	2.662		-	2906.5						-	3739.9						760			1.317		0.00	59	7.3	6.9
	05/19/13	5.426	1.004	2.689	2.702	2.945	4.20	2.623		-	2906.5						-	3739.9						740			1.325		0.13	59	7.0	6.8
	05/20/13	4.810	0.993	2.676	2.690	2.920	4.20	2.618		-	2906.5						-	3739.9					4.0	820			1.322		0.00	58	7.3	6.9
	05/21/13	5.340	0.910	2.653	2.686	2.901	4.20	2.619	115.7	2560.0	2868.0			24.4	78.9%	162	3584.415	3708.8			6	96.3%	3.7	760	3501	2940	1.298	10468	0.10	60	7.5	6.8
	05/22/13	6.643	0.710	2.627	2.669	2.881	4.20	2.627	126.7	2775.9	2858.8						-	3708.8					4.2	640			1.300		0.00	58	7.4	6.8
	05/23/13	6.859	0.980	2.134	2.584	2.844	4.20	2.134		-	2865.3						-	3663.8					2.2	720			1.378		1.00	60	7.4	6.8
	05/24/13	5.715	1.521	2.890	2.619	2.831	4.20	2.890		-	2810.8						-	3663.8					4.2	650			1.403		0.15	60	7.4	6.8
	05/25/13	4.840	1.052	2.737	2.629	2.815	4.20	2.737		-	2810.8						-	3663.8						710			1.353		0.11	59	6.9	6.4
	05/26/13	5.156	0.990	2.666	2.626	2.800	4.20	2.622		-	2810.8						-	3663.8						800			1.321		0.00	57	7.0	6.2
	05/27/13	4.940	0.990	2.676	2.626	2.784	4.20	2.676		-	2810.8						-	3663.8						840			1.328		0.00	60	6.9	6.0
	05/28/13	5.148	0.800	2.654	2.626	2.768	4.20	2.654	169.0	3740.7	2914.1			18.6	89.0%	202	4471.141	3825.3			10	95.0%	3.8	740	2601	2176	1.306	10204	0.00	60	7.3	5.9
	05/29/13	5.829	0.823	2.842	2.657	2.760	4.20	2.842	142.5	3377.6	2960.5			16.5	88.4%		-	3825.3					3.5	710			1.386		0.87	59	7.4	6.1
	05/30/13	6.146	1.190	2.950	2.774	2.757	4.20	2.879		-	2984.3						-	3889.2					3.5	620			1.451		0.04	61	7.3	6.0
	05/31/13	7.113	1.127	2.869	2.771	2.753	4.20	2.759		-	2981.9						-	3889.2					3.5	780			1.386		0.00	62	7.3	6.1
Jun'13	06/01/13	5.042	0.742	2.746	2.772	2.747	4.20	2.509		-	2981.9						-	3889.2						760			1.359		0.00	62	7.1	6.7

Somerset WPCF Daily Data
2013-2018

	DATE	Max	Min	Sewage Flows(mgd) Influent Flow			NPDES Permit Flow	Effluent Flow	BOD raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	TSS raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	Aeration Tanks final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Weather Rain	Inf Temp	pH Influent Hi	pH Effluent Low
				ADF	7-Day	30-Day																										
	06/02/13	6.480	0.953	2.782	2.788	2.743	4.20	2.522		-	2981.9						-	3889.2						830			1.363		0.00	62	7.1	6.6
	06/03/13	6.556	1.400	3.131	2.853	2.750	4.20	2.953		-	2981.9						-	3889.2					3.6	750			1.483		1.07	60	7.3	6.7
	06/04/13	5.830	0.990	2.839	2.880	2.747	4.20	2.738	145.0	3433.2	3032.0			30.5	79.0%	180	4261.907	3963.8			17	90.6%	3.4	760	2362	1991	1.364	9268	0.00	60	7.3	6.7
	06/05/13	5.913	1.041	2.854	2.882	2.748	4.20	2.744	135.0	3213.3	3050.2			23.7	82.4%		-	3963.8					3.7	250			0.865		0.00	61	7.3	6.6
	06/06/13	6.834	0.914	2.867	2.870	2.751	4.20	2.520		-	3076.2						-	3969.2					3.4	320			0.703		0.00	62	7.2	6.2
	06/07/13	8.979	1.110	3.818	3.005	2.787	4.20	3.786		-	3120.4						-	3969.2					3.6	330			0.813		4.45	60	7.3	6.5
	06/08/13	10.025	4.866	7.548	3.691	2.945	4.20	7.548		-	3120.4						-	3969.2						220			1.292		0.00	62	7.0	6.4
	06/09/13	8.298	4.556	6.298	4.194	3.064	4.20	6.298		-	3120.4						-	3969.2						340			1.628		0.00	63	6.9	6.2
	06/10/13	9.414	4.190	6.307	4.647	3.177	4.20	6.307		-	3120.4						-	3969.2					3.4	390			1.624		1.63	61	7.0	6.4
	06/11/13	13.402	6.390	8.853	5.506	3.378	4.20	8.853	52.5	3876.3	3204.3			14.4	72.6%	81	5980.556	4371.4			12	85.2%	4.3	290	1527	1294	1.632	8708	0.42	60	7.0	6.5
	06/12/13	11.060	7.390	8.656	6.335	3.574	4.20	8.656	56.5	4078.8	3291.8			15.4	72.7%		-	4371.4					3.7	170			1.614		0.00	61	6.9	6.6
	06/13/13	9.224	5.461	7.906	7.055	3.748	4.20	7.906		-	3334.2						-	4574.5						200			1.606		1.25	60	7.1	6.6
	06/14/13	13.221	6.115	8.967	7.791	3.956	4.20	8.967		-	3382.0						-	4574.5					3.2	150			1.638		0.03	60	7.0	6.7
	06/15/13	10.109	6.137	7.854	7.834	4.127	4.20	7.854		-	3382.0						-	4574.5						180			1.683		0.00	62	7.0	6.6
	06/16/13	8.467	5.196	6.895	7.920	4.268	4.20	6.845		-	3382.0						-	4574.5						210			1.693		0.00	61	6.9	6.5
	06/17/13	8.743	4.680	6.189	7.903	4.386	4.20	6.189		-	3382.0						-	4574.5					3.8	250			1.787		0.02	61	7.0	6.5
	06/18/13	8.229	4.224	5.552	7.431	4.481	4.20	5.474	67.0	3102.3	3350.9			15.7	76.6%	80	3704.294	4400.5			6	92.5%	3.5	340	1869	1575	1.744	7716	0.10	62	7.1	6.4
	06/19/13	7.598	2.743	4.687	6.864	4.548	4.20	4.565	111.7	4366.3	3452.4			16.3	85.4%		-	4400.5					3.5	360			1.586		0.00	61	7.1	6.5
	06/20/13	7.980	3.530	5.078	6.460	4.629	4.20	5.038		-	3551.6						-	4604.5					2.9	400			1.741		0.00	62	7.0	6.5
	06/21/13	7.744	3.180	4.898	5.879	4.705	4.20	4.806		-	3648.6						-	4604.5					3.6	480			1.767		0.00	62	7.1	6.5
	06/22/13	8.187	2.670	4.421	5.389	4.781	4.20	4.281		-	3648.6						-	4604.5						460			1.795		0.00	63	7.2	6.5
	06/23/13	7.977	2.670	4.272	5.014	4.827	4.20	4.141		-	3648.6						-	4604.5						530			1.822		0.00	64	7.0	6.4
	06/24/13	7.856	2.480	4.078	4.712	4.872	4.20	3.854		-	3648.6						-	4604.5					3.3	390			1.853		0.01	64	7.2	6.3
	06/25/13	6.047	1.930	3.870	4.472	4.912	4.20	3.555	98.4	3175.9	3596.1			21.0	78.7%	150	4841.37	4651.9			11	92.7%		590	2418	2025	1.875	7272	0.00	63	7.2	6.3
	06/26/13	7.286	2.120	3.746	4.338	4.948	4.20	2.991	85.8	2680.5	3504.5			8.4	90.2%		-	4651.9					3.3	560			1.873		0.02	64	7.2	6.2
	06/27/13	6.463	2.140	3.647	4.133	4.981	4.20	3.403		-	3478.3						-	4697.0					3.5	700			1.888		0.58	64	7.2	6.3
	06/28/13	7.342	2.480	4.062	4.014	5.021	4.20	3.839		-	3490.8						-	4697.0					3.6	600			1.927		0.63	64	7.2	6.2
	06/29/13	7.607	2.350	3.812	3.927	5.050	4.20	3.182		-	3490.8						-	4697.0						590			2.031		0.01	64	7.1	6.2
	06/30/13	6.612	1.990	3.676	3.842	5.077	4.20	3.108		-	3490.8						-	4697.0						560			2.035		0.24	64	6.8	6.2
Jul'13	07/01/13	5.862	1.960	3.661	3.782	5.107	4.20	3.268		-	3490.8						-	4697.0					3.6	710			2.001		0.35	64	7.0	6.3
	07/02/13	6.497	1.950	3.360	3.709	5.127	4.20	2.770	84.6	2370.7	3366.4					113	3166.531	4390.9			2	98.2%	3.2	760	2893	2428	1.977	7428	0.00	65	6.9	6.1
	07/03/13	7.008	1.800	3.468	3.669	5.138	4.20	2.964		-	3366.4						-	4390.9					2.6	720			1.956		0.00	65	7.1	6.2
	07/04/13	6.774	1.900	3.268	3.615	5.152	4.20	2.618		-	3358.0						-	4423.2						700			1.923		0.00	65	6.8	6.1
	07/05/13	7.102	1.720	3.281	3.504	5.167	4.20	2.432		-	3378.7						-	4423.2					3.1	790			1.944		0.00	66	7.1	6.0
	07/06/13	7.157	1.600	3.163	3.411	5.176	4.20	2.408		-	3378.7						-	4423.2						770			1.938		0.00	70	7.0	6.5
	07/07/13	7.084	1.620	2.932	3.305	5.147	4.20	2.102		-	3378.7						-	4423.2						760			1.791		0.00	69	7.0	6.4
	07/08/13	8.219	1.310	3.086	3.223	4.998	4.20	2.435		-	3378.7						-	4423.2					3.1	840			1.939		0.00	66	7.1	6.5
	07/09/13	6.001	1.222	3.002	3.171	4.888	4.20	2.399	96.7	2421.0	3259.0			23.5	75.7%	136	3404.988	4219.5			6	95.6%	2.8	820	3371	2808	1.958	7684	0.07	64	7.3	6.6
	07/10/13	8.676	1.370	3.127	3.123	4.782	4.20	2.702	126.7	3304.2	3264.0			14.3	88.7%		-	4219.5					3.2	810			1.939		0.46	65	7.1	6.2
	07/11/13	6.542	1.350	3.108	3.100	4.591	4.20	2.637		-	3187.5						-	3779.3					3.0	790			1.893		0.48	64	7.4	6.3
	07/12/13	5.986	1.180	2.966	3.055	4.401	4.20	2.636		-	3060.2						-	3779.3					3.9	820			1.911		0.00	66	7.3	6.4
	07/13/13	6.698	1.250	2.948	3.024	4.236	4.20	2.627		-	3060.2						-	3779.3						760			1.936		0.09	65	7.1	6.5
	07/14/13	6.064	1.290	2.904	3.020	4.034	4.20	2.213		-	3060.2						-	3779.3						810			1.937		0.00	67	7.0	6.3
	07/15/13	6.144	1.340	2.857	2.987	3.867	4.20	2.089		-	3060.2						-	3779.3					3.1	660			1.923		0.00	67	7.2	6.4
	07/16/13	4.815	1.320	2.778	2.955	3.730	4.20	1.935		-	3060.2					146	3382.604	3700.0			7	95.2%	3.1	840	3610	2978	2.096	7972	0.00	67	6.9	6.5
	07/17/13	5.603	1.140	2.745	2.901	3.615	4.20	1.965		-	3060.2						-	3700.0					3.5	820			1.912		0.00	68	7.1	6.5
	07/18/13	4.893	1.280	2.762	2.851	3.522	4.20	1.909		-	3053.1						-	3698.9					3.1	850			1.913		0.00	70	7.0	6.4
	07/19/13	5.760	1.220	2.741	2.819	3.457	4.20	1.860		-	2790.5						-	3698.9					3.2	840			1.927		0.00	69	6.9	6.6
	07/20/13	4.852	1.250	2.698	2.784	3.378	4.20	1.829		-	2790.5						-	3698.9						830			1.965		0.06	71	7.3	6.9
	07/21/13	4.813	1.180	2.698	2.754	3.305	4.20	2.034		-	2790.5						-	3698.9						840			1.982		0.04	69	7.1	6.6
	07/22/13	5.173	0.960	2.740	2.737	3.249	4.20	2.011		-	2790.5						-	3698.9					3.0	830			1.952		0.00	69	7.0	6.4
	07/23/13	6.425	0.910	2.840	2.746	3.201	4.20	2.111	138.3	3275.7	2871.4			21.0	84.8%	169	4002.866	3759.7			8	95.3%	3.3	840	4089	3374	1.950	8204	0.48	68	6.9	6.5
	07/24/13	4.779	1.210	2.657	2.734	3.153	4.20	1.963		-	2871.4						-	3759.7					3.4	850			1.957		0.00	68	7.0	6.4
	07/25/13	4.517	1.070	2.633	2.715	3.112	4.20	2.330		-	2810.4						-	3489.2					2.5	820			1.531		0.32	66	6.9	6.4
	07/26/13	5.647	1.270	2.723	2.713	3.078	4.20	2.365		-	2842.9						-	3489.2					2.7	470			0.966		0.12	68	7.0	6.2
	07/27/13	5.028	1.150	2.624	2.702	3.044	4.20	2.267		-	2842.9						-	3489.2						440			0.684		0.04	67	7.2	6.3
	07/28/13	4.824	1.080	2.599	2.688	2.995	4.20	2.331		-	2842.9						-	3489.2						400			0.659		0.00	68	7.1	6.5
	07/29/13	5.087	1.100	2.684	2.680	2.958	4.20	2.197		-	2842.9						-	3489.2					2.6	470			0.683		0.00	69	6.9	6.5
	07/30/13	5.075	1.030	2.518	2.634	2.919	4.20	1.935		-	2842.9					170	3570.02	3505.4			7	95.9%	2.8	460	2812	2332	0.690	10844	0.00	69	7.0	6.4
	07/31/13	4.663	0.920	2.473	2.608	2.879	4.20	1.936		-	2842.9						-	3505.4					2.5	480			0.656		0.00	70	7.1	6.5
Aug'13	08/01/13	4.647	0.920	2.473	2.585	2.850	4.20	1.929	130.0	2681.2	2920.6			17.6	86.5%		-	3590.1					2.7	440			0.662		0.86	70	7.1	6.3
	08/02/13	5.019	0.960	2.561	2.562	2.820	4.20	2.182		-	2920.6						-	3590.1					2.7	430			0.657		0.00	69	7.1	6.4
	08/03/13	4.741	0.750	2.448	2.537	2.792	4.20	2.448		-	2920.6						-	3590.1						460			0.680		0.00	69	7.1	6.5
	08/04/13	4.531	0.780	2.385	2.506	2.762	4.20	2.385		-	2920.6						-	3590.1						470			0.696		0.04	70	7.1	6.7
	08/05/13	4.539	0.750	2.348	2.458	2.735	4.20	2.348		-	2920.6						-	3590.1					2.9	540			0.692		0.00	69	7.2	6.7
	08/06/13	4.666	0.950	2.332	2.431	2.715	4.20	2.332	185.0	3598.0	3056.1			20.6	88.9%	236	4589.936	3790.1			7	97.0%	2.4	520	3131	2584	0.682	11132	0.00	69	7.1	6.6
	08/07/13	4.690	0.830	2.334	2.412	2.690	4.20	2.334	178.3	3470.7	3125.2			17.0	90.5%		-	3790.1					2.8	520			0.680		0.00	70	7.2	6.7
	08/08/13	4.399	0.800	2.454	2.409	2.672	4.20	2.454		-	3266.0						-	3886.4					2.7	520			0.691		0.00	70	7.2	6.7
	08/09/13	5.748	0.960	3.013	2.473	2.668	4.20	3.013		-	3256.4						-	3886.4					2.3	420			0.663		1.29	71	7.0	6.6
	08/10/13	5.873	0.870	2.467	2.476	2.647	4.20	2.467		-	3256.4						-	3886.4						420			0.694		0.00	69	7.4	6.8
	08/11/13	6.372	0.860	2.460	2.487	2.630	4.20	2.460		-	3256.4						-	3886.4						480			0.680		0.00	69	7.1	6.6
	08/12/13	5.730	0.940	2.482	2.506	2.614	4.20	2.468		-	3256.4						-	3886.4					2.5	480			0.668		0.00	70	7.3	7.0
	08/13/13	5.562	0.700	2.492	2.529	2.601	4.20	2.291	171.0	3553.9	3315.9			23.8	86.1%	244	5071.12	4123.3			6	97.5%	3.0	500	3118	2605	0.625	10912	0.04	68	7.1	6.9
	08/14/13	5.285	0.960	2.458	2.547	2.587	4.20	2.395	207.5	4253.7	3472.2			10.9	94.7%		-	4123.3					3.0	470			0.646		0.00	69	7.2	6.9
	08/15/13	5.393	0.720	2.332	2.529	2.572	4.20	2.231		-	3472.2						-	4308.5					2.7	480			0.640		0.00	70	6.9	6.8
	08/16/13	7.841	0.780	2.428	2.446	2.562	4.20	2.340		-	3472.2						-	4308.5					2.4	460			0.640		0.00	70	6.9	7.0

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		Sewage Flows(mgd)							BOD								TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	08/17/13	5.299	0.830	2.355	2.430	2.548	4.20	2.355		-	3472.2						-	4308.5						480			0.639		0.00	70	7.3	7.0
	08/18/13	4.741	0.940	2.352	2.414	2.535	4.20	2.352		-	3472.2						-	4308.5						550			0.656		0.02	70	7.3	6.9
	08/19/13	8.727	0.723	2.387	2.401	2.525	4.20	2.387		-	3472.2						-	4308.5					2.3	580			0.753		0.00	70	7.0	6.9
	08/20/13	5.080	0.779	2.298	2.373	2.512	4.20	2.293	146.5	2807.7	3377.3			15.4	89.5%	213	4082.213	4263.2			12	94.4%	1.8	610	3741	3224	0.799	12000	0.00	71	7.0	6.6
	08/21/13	7.862	0.617	2.299	2.350	2.497	4.20	2.202	169.3	3246.1	3360.9			31.1	81.6%		-	4263.2					2.2	710			0.771		0.00	71	7.1	6.7
	08/22/13	7.520	0.936	2.492	2.373	2.485	4.20	2.149		-	3373.1						-	4328.3					3.0	640			0.666		0.35	71	7.4	6.7
	08/23/13	5.446	0.723	2.315	2.357	2.474	4.20	2.071		-	3373.1						-	4328.3					2.9	600			0.637		0.00	71	7.3	6.6
	08/24/13	4.802	0.617	2.268	2.344	2.462	4.20	1.853		-	3373.1						-	4328.3						540			0.645		0.00	69	7.2	6.8
	08/25/13	5.007	0.670	2.267	2.332	2.447	4.20	1.947		-	3373.1						-	4328.3						600			0.659		0.00	69	7.2	6.9
	08/26/13	6.240	0.779	2.277	2.317	2.435	4.20	1.725		-	3373.1						-	4328.3					3.7	660			0.687		0.00	69	7.4	6.8
	08/27/13	9.110	0.830	2.906	2.403	2.445	4.20	2.437	196.5	4762.4	3546.7			31.2	84.1%	280	6786.091	4819.9			22	92.1%	3.1	400	2462	2077	0.639	11184	2.11	69	7.1	6.5
	08/28/13	5.882	0.779	2.412	2.420	2.436	4.20	1.986		-	3546.7						-	4819.9					3.7	450			0.660		0.00	70	7.1	6.6
	08/29/13	4.329	0.830	2.344	2.398	2.430	4.20	2.008		-	3546.7						-	5132.3					2.6	480			0.674		0.00	70	7.1	6.6
	08/30/13	6.877	0.882	2.359	2.405	2.427	4.20	2.236		-	3546.7						-	5132.3					2.9	480			0.670		0.00	70	7.2	6.5
	08/31/13	6.175	0.626	2.355	2.417	2.423	4.20	2.355		-	3670.4						-	5132.3						540			0.687		0.42	71	7.1	6.8
Sep'13	09/01/13	6.400	0.723	2.481	2.448	2.420	4.20	2.481		-	3670.4						-	5132.3						500			0.703		0.22	71	7.0	6.8
	09/02/13	6.425	0.883	2.494	2.479	2.422	4.20	2.293		-	3670.4						-	5132.3						540			0.693		0.30	71	7.1	6.7
	09/03/13	8.446	0.830	2.513	2.423	2.426	4.20	2.419	154.7	3242.3	3616.9			34.7	77.6%	193	4044.975	4914.9			19	90.2%	2.6	510	3168	2705	0.675	11152	0.72	71	7.1	6.7
	09/04/13	6.303	1.043	2.444	2.427	2.429	4.20	2.444	144.0	2935.1	3541.1			23.2	83.9%		-	4914.9					3.4	500			0.670		0.00	70	7.2	6.8
	09/05/13	7.803	0.830	2.462	2.444	2.433	4.20	2.462		-	3534.0						-	4996.1					3.6	530			0.669		0.01	68	7.3	6.8
	09/06/13	6.597	0.882	2.416	2.452	2.436	4.20	2.416		-	3543.0						-	4996.1					2.8	470			0.651		0.00	69	7.2	6.5
	09/07/13	5.246	1.043	2.427	2.462	2.435	4.20	2.365		-	3543.0						-	4996.1						530			0.672		0.00	69	7.2	6.7
	09/08/13	8.603	0.883	2.464	2.460	2.417	4.20	2.464		-	3543.0						-	4996.1						540			0.693		0.00	70	7.1	6.7
	09/09/13	5.890	0.830	2.368	2.442	2.414	4.20	2.368		-	3543.0						-	4996.1					3.3	530			0.670		0.00	69	7.1	6.8
	09/10/13	5.096	0.778	2.330	2.416	2.409	4.20	2.250		-	3543.0					230	4469.406	4890.8			9	96.1%	3.2	570	3330	2838	0.678	11992	0.00	68	7.4	6.7
	09/11/13	5.321	0.936	2.355	2.403	2.405	4.20	1.803	166.7	3274.1	3509.4			34.7	79.2%		-	4890.8					3.3	520			0.656		0.00	70	7.1	6.6
	09/12/13	5.743	0.700	2.321	2.383	2.399	4.20	1.768		-	3503.1						-	4845.7					3.7	510			0.671		0.27	71	7.4	6.7
	09/13/13	7.713	0.830	2.473	2.391	2.400	4.20	2.291		-	3378.0						-	4845.7					3.3	510			0.677		0.11	70	7.3	6.7
	09/14/13	4.833	0.937	2.284	2.371	2.398	4.20	2.156		-	3378.0						-	4845.7						560			0.674		0.00	69	7.2	6.7
	09/15/13	5.028	0.936	2.273	2.343	2.393	4.20	2.181		-	3378.0						-	4845.7						580			0.660		0.00	69	7.2	6.8
	09/16/13	6.993	0.723	2.244	2.326	2.389	4.20	2.069		-	3378.0						-	4845.7					3.2	550			0.628		0.06	68	7.3	6.9
	09/17/13	4.650	0.617	2.167	2.302	2.383	4.20	2.021	193.7	3500.7	3395.5			11.1	94.3%	246	4445.904	4765.7			9	96.3%	4.0	550	3305		0.623	12340	0.00	67	7.9	7.0
	09/18/13	4.860	0.617	2.159	2.274	2.376	4.20	2.114	191.0	3439.2	3400.9			14.4	92.5%		-	4765.7					3.2	560			0.629		0.00	68	7.4	6.8
	09/19/13	5.167	0.670	2.161	2.252	2.371	4.20	2.032		-	3485.7						-	4936.6					3.3	500			0.631		0.00	68	7.3	6.4
	09/20/13	6.030	0.723	2.253	2.220	2.369	4.20	2.107		-	3525.6						-	4936.6					3.0	500			0.810		0.00	69	7.2	6.3
	09/21/13	5.853	0.566	2.262	2.217	2.362	4.20	2.262		-	3525.6						-	4936.6						290			1.105		0.32	69	7.3	6.1
	09/22/13	5.367	0.613	2.230	2.211	2.359	4.20	2.230		-	3525.6						-	4936.6						490			1.330		0.09	69	7.3	6.9
	09/23/13	6.160	0.583	2.230	2.209	2.358	4.20	2.230		-	3525.6						-	4936.6					3.7	550			1.299		0.00	67	7.3	6.7
	09/24/13	7.665	0.641	2.199	2.213	2.355	4.20	2.199		-	3525.6					225	4126.424	4774.6			5	97.8%	4.0	470	3391	2795	1.292	8460	0.00	66	7.6	6.7
	09/25/13	6.143	0.663	2.214	2.221	2.353	4.20	2.214	197.3	3643.1	3542.4			9.7	95.1%		-	4774.6					3.8	470			1.340		0.00	67	7.5	6.0
	09/26/13	6.856	0.670	2.204	2.227	2.330	4.20	2.204		-	3339.1						-	4271.7					4.2	500			1.354		0.00	67	7.4	6.1
	09/27/13	5.875	0.750	2.235	2.225	2.324	4.20	2.235		-	3339.1						-	4271.7					3.9	500			1.288		0.00	66	7.4	6.2
	09/28/13	4.433	0.660	2.199	2.216	2.319	4.20	2.199		-	3339.1						-	4271.7						780			1.341		0.00	67	7.1	5.4
	09/29/13	4.860	0.560	2.246	2.218	2.315	4.20	2.246		-	3339.1						-	4271.7						820			1.323		0.00	67	6.9	5.8
	09/30/13	5.219	0.630	2.206	2.215	2.310	4.20	2.206		-	3339.1						-	4271.7					3.8	530			1.406		0.00	66	7.2	6.3
Oct'13	10/01/13	5.113	0.550	2.121	2.204	2.298	4.20	2.056		-	3339.1					214	3785.476	4174.4			2	99.1%	3.7	740	3589	2976	1.426	8232	0.00	66	7.5	6.7
	10/02/13	4.625	0.460	2.100	2.187	2.285	4.20	2.100		-	3339.1						-	4174.4					3.4	760			1.549		0.00	68	7.4	6.8
	10/03/13	4.967	0.457	2.097	2.172	2.271	4.20	1.979		-	3358.4						-	4206.8					3.8	790			1.491		0.00	68	7.4	7.0
	10/04/13	4.563	0.600	2.076	2.149	2.259	4.20	2.076		-	3464.3						-	4206.8						760			1.408		0.00	69	7.4	7.0
	10/05/13	5.626	0.463	2.176	2.146	2.250	4.20	2.089		-	3464.3						-	4206.8						800			1.404		0.00	67	7.2	7.2
	10/06/13	4.469	0.632	2.206	2.140	2.243	4.20	2.206		-	3464.3						-	4206.8						800			1.429		0.17	67	7.2	7.2
	10/07/13	4.499	0.607	2.177	2.136	2.234	4.20	2.177		-	3464.3						-	4206.8					3.4	760			1.426		0.16	69	7.4	7.0
	10/08/13	5.346	0.483	2.120	2.136	2.223	4.20	2.120		-	3464.3					247	4367.158	4238.9			1	99.6%	3.8	770	4343	3607	1.401	8496	0.00	66	7.5	7.2
	10/09/13	3.971	0.557	2.061	2.130	2.213	4.20	2.061		-	3464.3						-	4238.9					3.8	740			1.381		0.00	66	7.8	7.3
	10/10/13	4.740	0.380	2.043	2.123	2.203	4.20	2.043		-	3464.3						-	4181.2					4.0	760			1.451		0.00	65	7.6	7.2
	10/11/13	4.672	0.570	2.085	2.124	2.194	4.20	2.085		-	3527.7						-	4181.2					4.3	760			1.460		0.00	66	7.4	7.1
	10/12/13	4.848	0.573	2.096	2.113	2.187	4.20	2.096		-	3527.7						-	4181.2						780			1.420		0.00	67	8.2	7.2
	10/13/13	5.948	0.637	2.073	2.094	2.173	4.20	2.073		-	3527.7						-	4181.2						780			1.409		0.00	66	7.5	7.2
	10/14/13	5.672	0.556	2.097	2.082	2.167	4.20	2.097		-	3527.7						-	4181.2						760			1.385		0.00	65	7.6	7.2
	10/15/13	5.252	0.487	2.058	2.073	2.160	4.20	2.058		-	3527.7					257	4411.076	4227.2			4	98.4%	4.0	800	4505	3773	1.376	9032	0.00	65	7.4	7.1
	10/16/13	4.325	0.390	2.090	2.077	2.155	4.20	2.090	216.0	3765.0	3587.0			9.2	95.7%		-	4227.2					3.7	750			1.371		0.00	64	7.4	7.2
	10/17/13	6.093	0.573	2.095	2.085	2.152	4.20	2.095		-	3615.8						-	4172.5					4.2	780			1.342		0.00	64	7.4	7.2
	10/18/13	5.359	0.473	2.056	2.081	2.149	4.20	2.056		-	3704.1						-	4172.5					3.8	780			1.302		0.00	66	7.4	7.2
	10/19/13	4.789	0.473	2.043	2.073	2.145	4.20	2.043		-	3704.1						-	4172.5						780			1.312		0.01	65	7.6	7.1
	10/20/13	4.212	0.467	2.089	2.075	2.139	4.20	2.089		-	3704.1						-	4172.5						790			1.306		0.00	65	7.5	7.1
	10/21/13	5.162	0.450	2.024	2.065	2.132	4.20	2.024		-	3704.1						-	4172.5					3.6	810			1.282		0.00	65	7.4	7.2
	10/22/13	4.205	0.483	2.016	2.059	2.124	4.20	2.016		-	3704.1					269	4522.815	4242.6			7	97.4%	3.5	800	4703		1.279	9860	0.00	64	7.5	7.2
	10/23/13	4.590	0.447	2.004	2.047	2.117	4.20	2.004	255.0	4261.9	3890.0			16.6	93.5%		-	4242.6					3.8	790			1.268		0.00	64	7.5	7.2
	10/24/13	4.617	0.383	1.999	2.033	2.110	4.20	1.999		-	3890.0						-	4271.6					3.5	810			1.264		0.00	63	7.5	7.2
	10/25/13	3.964	0.557	1.950	2.018	2.101	4.20	1.936		-	4013.5						-	4271.6					3.8	800			1.271		0.00	62	7.3	7.2
	10/26/13	4.179	0.437	1.993	2.011	2.094	4.20	1.993		-	4013.5						-	4271.6						800			1.308		0.02	61	7.5	7.2
	10/27/13	4.055	0.440	1.996	1.997	2.086	4.20	1.933		-	4013.5						-	4271.6						820			1.285		0.00	61	7.5	7.1
	10/28/13	4.288	0.516	1.944	1.986	2.078	4.20	1.944		-	4013.5						-	4271.6					3.2	800			1.251		0.00	62	7.6	7.2
	10/29/13	4.142	0.326	1.913	1.971	2.067	4.20	1.913		-	4013.5					244	3892.878	4195.9			12	95.1%	3.1	820	4886	4244	1.246	9744	0.00	61	7.6	7.2
	10/30/13	4.069	0.433	1.946	1.963	2.058	4.20	1.910		-	4013.5						-	4195.9					3.0	800			1.387		0.00	62	7.5	7.2
	10/31/13	4.702	0.470	1.929	1.953	2.052	4.20	1.929		-	4013.5						-	4298.5					3.5	800			1.442		0.04	61	7.5	7.2

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD								TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
Nov'13	11/01/13	4.506	0.453	1.976	1.957	2.048	4.20	1.976		-	4013.5						-	4298.5					3.6	800			1.435		0.02	62	7.6	7.2
	11/02/13	5.550	0.430	1.977	1.954	2.044	4.20	1.977		-	4013.5						-	4298.5						800			1.437		0.00	63	7.6	7.1
	11/03/13	4.703	0.343	1.998	1.955	2.041	4.20	1.998		-	4013.5						-	4298.5						810			1.387		0.00	62	7.4	7.2
	11/04/13	4.910	0.353	1.912	1.950	2.032	4.20	1.741		-	4013.5						-	4298.5					3.3	850			1.363		0.00	60	7.5	7.2
	11/05/13	5.076	0.327	1.909	1.950	2.022	4.20	1.692		-	4013.5					270	4298.686	4298.5			6	97.8%	2.9	840	4878	4249	1.377	9080	0.00	61	7.6	7.1
	11/06/13	4.095	0.337	1.992	1.956	2.016	4.20	1.992		-	4013.5						-	4298.5					2.6	830			1.636		0.00	61	7.6	7.1
	11/07/13	5.715	0.444	2.194	1.994	2.019	4.20	2.194		-	4013.5						-	4281.4					2.9	830			1.457		0.59	62	7.5	7.1
	11/08/13	5.167	0.425	2.054	2.005	2.018	4.20	2.054		-	4013.5						-	4281.4					2.8	780			1.433		0.00	61	7.4	7.3
	11/09/13	4.115	0.430	1.999	2.008	2.017	4.20	1.999		-	4013.5						-	4281.4						790			1.425		0.00	58	9.0	7.2
	11/10/13	4.155	0.477	1.991	2.007	2.014	4.20	1.991		-	4013.5						-	4281.4						850			1.452		0.00	61	7.2	7.3
	11/11/13	3.756	0.433	1.981	2.017	2.010	4.20	1.955		-	4013.5						-	4281.4						880			1.429		0.00	59	7.2	7.2
	11/12/13	5.643	0.468	1.951	2.023	2.006	4.20	1.750	195.8	3185.1	3737.3			15.4	92.1%	241	3921.393	4209.4			11	95.4%	3.0	870	4610	4054	1.283	9384	0.16	58	8.3	7.3
	11/13/13	4.035	0.407	1.925	2.014	2.000	4.20	1.123	96.7	1552.5	3191.1			12.0	87.6%		-	4209.4					3.0	380			0.923		0.00	57	7.5	7.1
	11/14/13	5.176	0.370	1.931	1.976	1.996	4.20	1.452		-	3191.1						-	4158.9					3.1	350			0.664		0.00	59	7.4	6.9
	11/15/13	4.390	0.506	1.930	1.958	1.991	4.20	1.913		-	2999.8						-	4158.9					4.0	400			0.661		0.00	58	7.5	7.0
	11/16/13	5.306	0.447	1.951	1.951	1.986	4.20	1.883		-	2999.8						-	4158.9						460			0.687		0.00	59	7.1	7.1
	11/17/13	5.042	0.400	2.011	1.954	1.984	4.20	2.011		-	2999.8						-	4158.9						550			0.686		0.00	59	7.0	7.1
	11/18/13	5.115	0.459	2.138	1.977	1.987	4.20	1.947		-	2999.8						-	4158.9					2.7	470			0.677		0.49	59	7.4	7.1
	11/19/13	5.084	0.361	1.880	1.967	1.980	4.20	1.837	190.0	2979.0	2994.6			23.5	87.6%	211	3308.311	3988.8			11	94.8%	2.9	620	2795	2442	0.694	7868	0.00	60	7.5	7.0
	11/20/13	6.537	0.439	1.878	1.960	1.976	4.20	1.487	176.9	2769.9	2949.7			9.0	94.9%		-	3988.8					3.2	570			0.781		0.00	57	7.5	7.1
	11/21/13	4.862	0.384	1.896	1.955	1.972	4.20	1.192		-	2949.7						-	3855.3					3.8	780			0.644		0.00	57	7.6	7.1
	11/22/13	4.529	0.447	2.072	1.975	1.974	4.20	1.540		-	2621.6						-	3855.3					3.9	720			0.704		0.23	57	7.5	7.0
	11/23/13	4.293	0.530	1.971	1.978	1.973	4.20	1.312		-	2621.6						-	3855.3						770			0.654		0.00	56	7.5	7.6
	11/24/13	4.877	0.440	1.973	1.973	1.974	4.20	1.244		-	2621.6						-	3855.3						800			0.627		0.00	53	7.1	7.1
	11/25/13	4.214	0.434	1.930	1.943	1.972	4.20	1.129		-	2621.6						-	3855.3					3.6	760			0.599		0.00	53	7.5	7.0
	11/26/13	5.566	0.393	2.024	1.963	1.973	4.20	1.368	205.0	3460.4	2789.4			34.7	83.1%	292	4929.007	4070.1			12	95.9%	3.3	760	3540	3037	1.139	10820	0.92	54	7.6	7.1
	11/27/13	7.323	0.927	3.470	2.191	2.023	4.20	2.826		-	2789.4						-	4070.1					3.5	620			1.300		2.01	56	7.7	7.2
	11/28/13	5.088	0.883	2.453	2.270	2.041	4.20	1.996		-	2789.4						-	4114.3						830			1.341		0.00	54	7.3	7.0
	11/29/13	4.760	0.728	2.375	2.314	2.056	4.20	1.728		-	2789.4						-	4114.3					4.0	880			1.343		0.00	53	7.5	7.2
	11/30/13	4.606	0.739	2.376	2.372	2.071	4.20	1.667		-	2789.4						-	4114.3						900			1.393		0.00	54	7.3	7.1
Dec'13	12/01/13	4.555	1.003	2.470	2.443	2.087	4.20	1.802		-	2789.4						-	4114.3						890			1.430		0.08	55	7.3	7.0
	12/02/13	5.215	0.991	2.435	2.515	2.102	4.20	1.898		-	2789.4						-	4114.3					3.3	900			1.567		0.00	54	7.4	7.1
	12/03/13	5.201	0.640	2.448	2.575	2.117	4.20	1.936	155	3164.5	2851.9			14.8	90.5%	183	3736.187	4038.7			7	96.2%	3.8	830	4168	3628	1.459	9932	0.00	54	7.7	7.2
	12/04/13	4.763	0.673	2.441	2.428	2.135	4.20	1.941		-	2851.9						-	4038.7					5.1	870			1.438		0.00	54	7.7	7.0
	12/05/13	4.840	0.780	2.424	2.424	2.152	4.20	2.045		-	2851.9						-	3973.7					5.8	850			1.458		0.02	54	7.5	6.9
	12/06/13	4.878	0.817	2.445	2.434	2.167	4.20	1.986		-	2851.9						-	3973.7					5.6	850			1.487		0.60	55	7.6	7.0
	12/07/13	4.670	0.957	2.579	2.463	2.180	4.20	2.217		-	2851.9						-	3973.7						850			1.460		0.00	54	7.3	7.1
	12/08/13	4.555	0.909	2.519	2.470	2.196	4.20	2.140		-	2851.9						-	3973.7						860			1.447		0.00	53	7.3	7.5
	12/09/13	4.772	0.841	2.658	2.502	2.218	4.20	2.054		-	2851.9						-	3973.7					5.2	820			1.442		0.29	52	7.4	7.0
	12/10/13	4.520	0.990	2.688	2.536	2.241	4.20	1.988		-	2851.9					186	4169.733	4012.9			5	97.3%	5.0	810	4039	3447	1.450	8680	0.13	52	7.8	6.9
	12/11/13	4.531	0.749	2.628	2.563	2.262	4.20	1.847	161.7	3544.1	2950.8			17.5	89.2%		-	4012.9					5.1	810			1.441		0.00	51	8.1	6.9
	12/12/13	4.877	0.887	2.636	2.593	2.285	4.20	1.938		-	2911.7						-	4035.8					5.7	780			1.438		0.00	52	7.6	6.9
	12/13/13	4.627	0.818	2.611	2.617	2.308	4.20	1.911		-	3183.6						-	4035.8					5.7	820			1.430		0.00	51	7.5	6.8
	12/14/13	4.629	0.837	2.592	2.619	2.330	4.20	2.160		-	3183.6						-	4035.8						800			1.430		0.86	53	7.0	6.7
	12/15/13	5.472	1.408	3.246	2.723	2.374	4.20	2.769		-	3183.6						-	4035.8						690			1.461		0.02	52	7.2	6.5
	12/16/13	5.336	1.083	2.920	2.760	2.406	4.20	2.284		-	3183.6						-	4035.8					4.3	740			1.522		0.00	52	7.2	6.6
	12/17/13	4.889	1.132	2.896	2.790	2.436	4.20	2.164	141.7	3422.4	3223.4			15.7	88.9%	169	4081.796	4045.0			12	92.9%	5.1	730	3762	3163	1.418	9000	0.00	49	7.4	6.9
	12/18/13	5.248	1.233	3.003	2.843	2.465	4.20	2.278		-	3223.4						-	4045.0					5.1	730			1.403		0.00	50	7.5	6.8
	12/19/13	4.973	1.194	2.973	2.892	2.501	4.20	2.195		-	3272.3						-	4229.2					4.7	650			1.418		0.00	50	7.5	6.6
	12/20/13	5.232	1.141	2.965	2.942	2.537	4.20	2.228		-	3397.9						-	4229.2					4.4	580			1.433		0.00	53	7.3	6.5
	12/21/13	4.850	1.163	3.014	3.002	2.575	4.20	2.462		-	3397.9						-	4229.2						750			1.482		0.00	56	6.2	6.6
	12/22/13	5.236	1.486	3.041	2.973	2.607	4.20	2.711		-	3397.9						-	4229.2						880			1.487		0.00	55	6.8	6.7
	12/23/13	5.384	1.660	3.233	3.018	2.649	4.20	2.747		-	3397.9						-	4229.2					3.7	790			1.517		0.78	51	7.4	6.8
	12/24/13	5.416	1.768	3.423	3.093	2.697	4.20	2.910		-	3397.9					149	4253.625	4234.1			6	96.0%		720	3482	2934	1.547	8972	0.00	50	7.4	6.6
	12/25/13	5.429	1.983	3.234	3.126	2.741	4.20	2.731	125.7	3390.3	3396.4			16.3	87.0%		-	4234.1						790			1.503		0.00	51	7.3	6.6
	12/26/13	5.806	1.936	3.441	3.193	2.788	4.20	2.777		-	3380.3						-	4060.3					3.4	880			1.484		0.15	53	7.2	6.7
	12/27/13	6.024	1.550	3.483	3.267	2.788	4.20	2.755		-	3380.3						-	4060.3					4.6	760			1.519		0.00	51	7.4	6.7
	12/28/13	6.420	1.600	3.291	3.307	2.816	4.20	2.584		-	3380.3						-	4060.3						600			1.556		0.00	52	7.2	6.3
	12/29/13	7.448	1.430	3.625	3.390	2.858	4.20	2.879		-	3380.3						-	4060.3						690			1.566		0.97	53	7.2	6.3
	12/30/13	7.767	2.430	4.018	3.502	2.913	4.20	3.371		-	3380.3						-	4060.3					3.9	480			1.534		0.00	50	7.3	6.3
	12/31/13	7.733	2.500	4.075	3.595	2.966	4.20	3.399		-	3380.3					193	6559.202	4560.1			7	96.4%		500	2874	2418	1.478	9540	0.00	48	7.3	6.4
Jan'14	01/01/14	7.039	2.520	3.765	3.671	3.011	4.20	2.983	132.3	4154.2	3535.1			13.0	90.2%		-	4560.1						500			1.500		0.00	49	7.3	6.2
	01/02/14	7.331	2.426	3.757	3.716	3.054	4.20	3.115		-	3627.8						-	4766.1					4.5	540			1.502		0.00	47	7.4	6.3
	01/03/14	6.686	1.780	3.671	3.743	3.095	4.20	2.989		-	3627.8						-	4766.1					5.7	520			1.472		0.00	46	7.4	6.4
	01/04/14	6.506	2.060	3.515	3.775	3.132	4.20	2.805		-	3627.8						-	4766.1						500			1.488		0.00	50	7.4	6.2
	01/05/14	6.559	1.690	3.537	3.763	3.168	4.20	2.689		-	3627.8						-	4766.1						550			1.531		0.33	49	7.3	6.4
	01/06/14	8.329	2.700	4.633	3.850	3.236	4.20	3.902		-	3627.8						-	4766.1					4.1	420			1.534		0.15	51	7.4	6.6
	01/07/14	8.346	3.317	4.545	3.918	3.304	4.20	3.911	106.0	4018.0	3705.8			15.8	85.1%	111	4207.488	4654.4			12	89.2%	5.0	370	2189	1841	1.476	8676	0.00	46	7.2	6.5
	01/08/14	8.626	2.876	4.344	4.000	3.360	4.20	3.609	111.0	4021.4	3758.4			16.1	85.5%		-	4654.4					5.3	380			1.447		0.00	47	7.2	6.4
	01/09/14	8.552	2.547	4.148	4.056	3.409	4.20	3.305		-	3758.4						-	4775.5						420			1.454		0.00	48	7.3	6.3
	01/10/14	7.693	2.714	4.050	4.110	3.456	4.20	3.338		-	3801.3						-	4775.5					4.9	450			1.476		0.12	48	7.3	6.2
	01/11/14	8.379	2.493	4.470	4.247	3.517	4.20	4.258		-	3801.3						-	4775.5						480			1.554		1.08	52	7.1	6.2
	01/12/14	9.822	3.673	5.153	4.478	3.602	4.20	5.021		-	3801.3						-	4775.5						330			1.543		0.00	52	7.1	6.3
	01/13/14	9.442	3.357	4.923	4.519	3.680	4.20	4.802		-	3801.3						-	4775.5					3.5	400			1.502		0.00	50	7.3	6.5
	01/14/14	9.908	3.363	5.202	4.613	3.745	4.20	5.053	83.5	3622.6	3771.5			13.8	83.5%	83	3600.928	4540.6			7	91.6%	4.8	400	2103	1774	1.532	8568	0.82	50	7.3	6.5
	01/15/14	9.706	4.084	5.606	4.793	3.834	4.20	5.450	63.0	2945.5	3653.5			17.3	72.5%		-	4540.6					5.0	330			1.495		0.00	50	7.3	6.5

Somerset WPCF Daily Data
2013-2018

	DATE	Sewage Flows(mgd) Max	Min	Influent Flow ADF	7-Day	30-Day	NPDES Permit Flow	Effluent Flow	BOD raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	TSS raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	Aeration Tanks final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Weather Rain	Inf Temp	pH Influent Hi	pH Effluent Low
	01/16/14	9.065	3.838	5.431	4.976	3.919	4.20	5.229		-	3692.0						-	4655.3					3.9	330			1.438		0.00	50	7.3	6.4
	01/17/14	8.964	3.683	5.146	5.133	3.990	4.20	4.782		-	3692.0						-	4655.3					3.7	330			1.451		0.00	50	7.3	6.5
	01/18/14	10.498	3.416	5.508	5.281	4.075	4.20	4.961		-	3692.0						-	4655.3						380			1.460		0.85	50	7.3	6.5
	01/19/14	9.201	4.027	5.718	5.362	4.167	4.20	4.981		-	3692.0						-	4655.3						360			1.476		0.00	49	7.1	6.7
	01/20/14	8.706	3.890	5.417	5.433	4.247	4.20	4.706		-	3692.0						-	4655.3						400			1.460		0.00	49	7.2	6.6
	01/21/14	8.265	3.157	4.974	5.400	4.311	4.20	4.524		-	3692.0					133	5517.26	4827.7			17	87.2%	4.3	380	1453	1225	1.467	8804	0.00	47	7.2	6.7
	01/22/14	8.733	2.789	4.894	5.298	4.367	4.20	4.609	144.3	5889.7	4006.0			18.7	87.0%		-	4827.7					4.9	300			1.500		0.00	44	7.3	6.6
	01/23/14	7.845	2.975	4.510	5.167	4.403	4.20	4.174		-	4006.0						-	4971.2					4.4	320			1.488		0.00	45	7.4	6.8
	01/24/14	7.916	2.646	4.285	5.044	4.438	4.20	4.018		-	4108.6						-	4971.2					4.8	490			1.486		0.00	45	7.7	6.7
	01/25/14	7.894	2.495	4.305	4.872	4.467	4.20	3.983		-	4108.6						-	4971.2						530			1.502		0.00	49	7.2	6.7
	01/26/14	8.093	2.517	4.065	4.636	4.486	4.20	3.820		-	4108.6						-	4971.2						310			1.496		0.00	48	7.2	6.7
	01/27/14	7.371	2.207	3.919	4.422	4.507	4.20	3.637		-	4108.6						-	4971.2					2.8	560			1.512		0.00	47	7.3	6.9
	01/28/14	5.443	1.986	3.572	4.221	4.505	4.20	3.289	157.5	4692.0	4191.9			9.8	93.8%	124	3694.02	4715.8			7	94.4%	4.1	630	2607	2217	1.478	8168	0.00	46	7.4	6.8
	01/29/14	6.332	1.990	3.570	4.032	4.490	4.20	3.274	117.3	3492.5	4104.5			10.4	91.1%		-	4715.8					4.3	630			1.482		0.00	46	7.5	6.7
	01/30/14	6.632	1.777	3.561	3.897	4.473	4.20	3.230		-	4104.5						-	4254.9					4.4	600			1.507		0.00	48	7.5	6.8
	01/31/14	6.951	1.810	3.663	3.808	4.470	4.20	3.327		-	4097.4						-	4254.9					3.8	640			1.526		0.00	46	7.4	6.7
Feb'14	02/01/14	6.720	1.803	3.567	3.702	4.463	4.20	2.946		-	4097.4						-	4254.9						640			1.546		0.00	49	7.3	6.7
	02/02/14	8.021	1.716	3.627	3.640	4.462	4.20	3.180		-	4097.4						-	4254.9						700			1.579		0.00	50	7.3	6.8
	02/03/14	6.066	1.490	3.392	3.565	4.458	4.20	2.781		-	4097.4						-	4254.9					3.1	690			1.584		0.00	46	7.4	6.9
	02/04/14	5.953	1.663	3.462	3.549	4.455	4.20	2.753	131.0	3782.4	4058.0			17.7	86.5%	145	4186.597	4241.3			14	90.3%	3.7	710	2959	2495	1.549	8016	0.00	47	7.5	6.8
	02/05/14	7.643	1.776	3.804	3.582	4.428	4.20	3.216	123.0	3902.2	4040.7			24.0	80.5%		-	4241.3					3.5	680			1.547		0.00	46	7.4	6.8
	02/06/14	7.018	1.866	3.627	3.592	4.397	4.20	2.984		-	4043.5						-	4249.7					3.9	660			1.549		0.00	47	7.3	6.8
	02/07/14	7.296	1.966	3.625	3.586	4.373	4.20	2.890		-	4046.7						-	4249.7					4.0	640			1.531		0.00	47	7.3	6.6
	02/08/14	7.006	1.941	3.636	3.596	4.356	4.20	3.299		-	4046.7						-	4249.7						730			1.497		0.00	48	7.0	6.5
	02/09/14	7.359	2.164	3.654	3.600	4.343	4.20	3.308		-	4046.7						-	4249.7						500			1.216		0.00	48	7.2	6.8
	02/10/14	6.510	2.080	3.419	3.604	4.308	4.20	3.110		-	4046.7						-	4249.7					3.9	680			1.563		0.00	46	7.3	6.9
	02/11/14	11.385	1.213	3.315	3.583	4.247	4.20	3.032	142.3	3934.2	4032.6			9.6	93.3%	138	3815.3	4162.8			5	96.4%	4.4	710	2807	2364	1.463	8060	0.00	46	7.5	6.7
	02/12/14	6.736	1.562	3.248	3.503	4.191	4.20	2.636	129.0	3494.4	3972.8			9.6	92.6%		-	4162.8					4.9	730			1.387		0.00	46	7.5	6.7
	02/13/14	8.590	1.457	4.326	3.603	4.162	4.20	3.651		-	4016.6						-	4303.3					4.9	730			1.674		1.67	46	7.4	6.8
	02/14/14	9.724	4.512	6.013	3.944	4.175	4.20	5.404		-	4169.6						-	4303.3					5.1	350			1.497		0.00	46	7.2	6.7
	02/15/14	8.860	3.916	5.501	4.211	4.177	4.20	4.782		-	4169.6						-	4303.3						400			1.527		0.40	47	7.3	6.5
	02/16/14	9.352	3.716	5.301	4.446	4.183	4.20	4.675		-	4169.6						-	4303.3						450			1.563		0.00	47	7.1	6.5
	02/17/14	8.331	3.376	4.953	4.665	4.164	4.20	4.194		-	4169.6						-	4303.3						430			1.564		0.00	47	7.0	6.5
	02/18/14	8.770	3.147	4.930	4.896	4.138	4.20	4.215	146.0	6003.0	4398.8			6.4	95.6%	151	6208.546	4684.3			7	95.4%		450	2211	1868	1.538	8728	0.12	45	8.9	6.5
	02/19/14	8.145	2.987	4.964	5.141	4.123	4.20	4.325	75.3	3117.4	4256.4			10.6	85.9%		-	4684.3					4.7	450			1.530		0.40	47	7.1	6.5
	02/20/14	9.487	3.343	5.236	5.271	4.131	4.20	4.537		-	4256.4						-	4476.1					5.0	400			1.475		0.00	48	7.2	6.4
	02/21/14	9.807	3.906	6.027	5.273	4.169	4.20	5.216		-	4052.3						-	4476.1					5.8	380			1.491		0.23	46	7.1	6.4
	02/22/14	10.924	5.130	7.104	5.502	4.256	4.20	6.308		-	4052.3						-	4476.1						280			1.585		0.00	49	6.8	6.4
	02/23/14	11.022	5.398	7.103	5.760	4.350	4.20	6.411		-	4052.3						-	4476.1						280			1.510		0.00	48	6.8	6.4
	02/24/14	9.973	5.150	6.687	6.007	4.429	4.20	6.105		-	4052.3						-	4476.1					4.7	280			1.575		0.00	47	7.1	6.6
	02/25/14	10.078	3.248	6.101	6.175	4.497	4.20	5.395	85.9	4370.8	4087.6			5.7	93.4%	95	4833.822	4547.7			6	93.7%	4.9	290	3993	3367	1.656	8772	0.00	45	8.6	6.5
	02/26/14	8.142	2.426	5.736	6.285	4.557	4.20	4.985	95.6	4573.3	4136.2			4.8	95.0%		-	4547.7					5.1	310			1.649		0.00	45	7.5	6.4
	02/27/14	7.877	2.677	5.373	6.304	4.618	4.20	4.903		-	4074.5						-	4761.1					5.1	350			1.667		0.00	45	7.1	6.4
	02/28/14	7.539	2.096	4.997	6.157	4.665	4.20	4.301		-	4147.2						-	4761.1					4.6	420			1.663		0.00	46	7.0	6.5
Mar'14	03/01/14	6.712	1.241	4.692	5.813	4.703	4.20	3.983		-	4147.2						-	4761.1						400			1.683		0.00	46	7.1	6.4
	03/02/14	6.697	1.047	4.615	5.457	4.735	4.20	3.857		-	4147.2						-	4761.1						360			1.736		0.00	48	7.0	6.4
	03/03/14	6.436	0.642	4.297	5.116	4.759	4.20	3.581		-	4147.2						-	4761.1					4.0	450			1.722		0.00	45	7.1	6.6
	03/04/14	6.350	0.243	4.117	4.832	4.775	4.20	3.343	70.3	2413.8	3954.6					82	2815.534	4372.0			1	98.8%	4.5	460	2646	2216	1.727	7832	0.00	47	7.2	6.5
	03/05/14	6.361	0.639	4.076	4.595	4.798	4.20	3.267	78.7	2675.3	3826.7						-	4372.0					4.2	520			1.758		0.00	47	7.1	6.5
	03/06/14	6.510	0.801	3.896	4.384	4.812	4.20	3.268		-	3831.6						-	4418.3					4.3	550			1.770		0.00	47	7.1	6.5
	03/07/14	5.948	0.407	3.894	4.227	4.815	4.20	3.083		-	3822.8						-	4418.3					3.6	500			1.805		0.00	49	6.8	6.5
	03/08/14	6.700	0.671	3.925	4.117	4.825	4.20	3.412		-	3822.8						-	4418.3						450			1.797		0.00	48	6.9	6.3
	03/09/14	6.216	0.300	3.774	3.997	4.830	4.20	3.210		-	3822.8						-	4418.3						490			1.778		0.00	47	6.8	6.3
	03/10/14	6.202	2.140	3.713	3.914	4.833	4.20	3.142		-	3822.8						-	4418.3					3.5	600			1.755		0.00	48	7.3	6.6
	03/11/14	8.201	1.220	3.654	3.847	4.833	4.20	3.039	96.3	2934.7	3724.1			5.1	94.7%	70	2133.205	3961.3			1	98.6%	3.7	510	2869	2401	1.741	7312	0.00	46	7.2	6.5
	03/12/14	6.054	1.780	3.678	3.791	4.842	4.20	3.062	121.0	3711.6	3722.8			7.4	93.9%		-	3961.3					4.0	520			1.746		0.62	50	7.2	6.3
	03/13/14	6.410	0.989	3.792	3.776	4.857	4.20	3.221		-	3699.4						-	3997.8					3.7	400			1.731		0.00	43	7.2	6.3
	03/14/14	5.816	1.840	3.692	3.747	4.872	4.20	3.008		-	3725.0						-	3997.8					4.2	490			1.748		0.00	46	7.1	6.2
	03/15/14	6.855	1.291	3.817	3.731	4.855	4.20	3.072		-	3725.0						-	3997.8						410			1.795		0.00	46	7.0	6.3
	03/16/14	5.790	0.521	3.701	3.721	4.778	4.20	2.964		-	3725.0						-	3997.8						490			1.798		0.00	48	6.9	6.4
	03/17/14	6.029	1.344	3.730	3.723	4.719	4.20	2.919		-	3725.0						-	3997.8					4.3	490			1.723		0.00	45	7.2	6.5
	03/18/14	5.847	0.523	3.543	3.708	4.661	4.20	2.817	131.0	3870.9	3741.2			8.4	93.6%	184	5436.946	4285.6			3	98.4%	6.2	440	2719	2280	1.698	7088	0.00	46	7.2	6.1
	03/19/14	5.546	0.078	3.468	3.678	4.611	4.20	2.726	181.0	5235.1	3890.6			8.9	95.1%		-	4285.6					6.1	440			1.701		0.34	46	7.2	6.0
	03/20/14	5.776	0.293	3.633	3.655	4.568	4.20	3.001		-	3655.9						-	3804.9					4.5	400			1.744		0.00	47	7.2	6.1
	03/21/14	5.591	1.480	3.442	3.619	4.517	4.20	2.819		-	3723.2						-	3804.9					4.6	430			1.742		0.00	46	7.3	6.4
	03/22/14	5.514	1.460	3.451	3.567	4.458	4.20	2.772		-	3723.2						-	3804.9						470			1.755		0.00	47	7.0	6.3
	03/23/14	5.307	0.738	3.410	3.525	4.370	4.20	2.692		-	3723.2						-	3804.9						500			1.751		0.00	48	7.0	6.4
	03/24/14	5.494	1.810	3.299	3.464	4.244	4.20	2.641		-	3723.2						-	3804.9					3.9	520			1.682		0.00	46	7.3	6.6
	03/25/14	5.695	1.420	3.237	3.420	4.115	4.20	2.558	144.3	3895.6	3742.3			8.3	94.2%	191	5156.347	4075.2			5	97.4%	4.5	500	3034	2543	1.680	7764	0.00	47	7.3	6.4
	03/26/14	5.472	0.512	3.306	3.397	4.002	4.20	2.810	154.0	4246.1	3792.7			9.1	94.1%		-	4075.2					4.4	540			1.685		0.00	45	7.2	6.4
	03/27/14	5.913	0.688	3.247	3.342	3.907	4.20	2.714		-	3728.5						-	3885.5					4.4	530			1.680		0.00	46	7.3	6.3
	03/28/14	5.913	0.819	3.247	3.314	3.824	4.20	2.730		-	3622.9						-	3885.5					4.4	530			1.696		0.07	47	7.4	6.3
	03/29/14	7.203	0.688	3.339	3.298	3.756	4.20	2.960		-	3622.9						-	3885.5						390			1.679		3.60	49	7.0	6.3
	03/30/14	15.282	2.609	8.640	4.045	3.878	4.20	8.242		-	3622.9						-	3885.5						180			1.334		1.58	51	6.8	6.3
	03/31/14	13.891	7.904	9.745	4.966	4.046	4.20	9.215		-	3622.9						-	3885.5					3.5	150			1.254		0.07	46	6.8	6.3
Apr'14	04/01/14	11.714	6.390	8.295	5.688	4.169	4.20	7.871	46.5	3216.9	3577.8			13.6	70.8%	55	3804.917	3869.4			9	83.6%	5.8	170	1287		1.253	9604	0.00	47	6.9	6.4

Somerset WPCF Daily Data
2013-2018

	DATE	Sewage Flows(mgd) Max	Min	Influent Flow ADF	7-Day	30-Day	NPDES Permit Flow	Effluent Flow	BOD raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	TSS raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	Aeration Tanks final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Weather Rain	Inf Temp	pH Influent Hi	Effluent Low
	04/02/14	10.375	5.740	7.819	6.333	4.286	4.20	7.366		-	3577.8			14.8			-	3869.4					5.5	180			1.197		0.00	48	7.1	6.7
	04/03/14	9.255	3.429	7.045	6.876	4.384	4.20	6.697		-	3723.3						-	4132.9					6.0	190			1.185		0.00	48	7.0	6.9
	04/04/14	8.667	3.061	6.430	7.330	4.462	4.20	5.951		-	3873.0						-	4132.9					6.1	200			1.188		0.19	48	7.1	6.7
	04/05/14	7.873	2.688	5.980	7.708	4.532	4.20	5.697		-	3873.0						-	4132.9						200			1.207		0.00	49	7.0	6.6
	04/06/14	7.296	2.406	5.472	7.255	4.584	4.20	5.187		-	3873.0						-	4132.9						230			1.205		0.00	49	7.0	6.6
	04/07/14	7.800	2.381	5.452	6.642	4.635	4.20	5.126		-	3873.0						-	4132.9					5.4	230			1.184		0.00	50	7.2	6.8
	04/08/14	8.252	3.590	5.768	6.281	4.702	4.20	5.330	71.3	3429.9	3817.6			14.2	80.1%	106	5099.143	4326.1			6	94.3%	5.6	230	1960	1669	1.194	9500	0.71	49	7.1	6.7
	04/09/14	7.830	3.886	5.431	5.940	4.759	4.20	5.088	70.0	3170.6	3745.7			13.7	80.4%		-	4326.1					6.4	220			1.195		0.00	50	7.3	6.6
	04/10/14	7.045	3.193	5.005	5.648	4.804	4.20	4.643		-	3847.1						-	4874.3					6.2	230			1.203		0.00	50	7.2	6.7
	04/11/14	6.913	3.310	5.060	5.453	4.850	4.20	4.622		-	3866.4						-	4874.3					6.4	240			1.218		0.00	50	7.2	6.7
	04/12/14	6.560	2.800	4.590	5.254	4.876	4.20	4.262		-	3866.4						-	4874.3						250			1.246		0.00	52	7.1	6.6
	04/13/14	6.723	2.801	4.638	5.135	4.908	4.20	4.239		-	3866.4						-	4874.3						250			1.256		0.00	52	7.2	6.7
	04/14/14	6.798	2.740	4.730	5.032	4.938	4.20	4.411		-	3866.4						-	4874.3					5.1	270			1.256		0.00	52	7.2	6.7
	04/15/14	7.531	2.493	4.765	4.888	4.974	4.20	4.192	99.3	3946.2	3876.4			24.0	75.8%	126	5007.253	4900.9			11	91.3%	5.9	250	2236	1876	1.271	9016	1.90	52	7.3	6.7
	04/16/14	9.031	4.354	6.232	5.003	5.057	4.20	5.795		-	3876.4						-	4900.9					5.8	200			1.278		0.00	50	7.2	6.8
	04/17/14	8.703	4.530	5.962	5.140	5.138	4.20	5.457		-	3877.2						-	4766.9					6.7	200			1.252		0.00	50	7.2	6.5
	04/18/14	7.619	4.163	5.787	5.243	5.215	4.20	5.328		-	3650.9						-	4766.9						210			1.282		0.00	49	7.2	6.7
	04/19/14	7.489	3.797	5.570	5.383	5.280	4.20	5.149		-	3650.9						-	4766.9						200			1.291		0.00	53	7.1	6.6
	04/20/14	7.544	3.340	5.096	5.449	5.335	4.20	4.924		-	3650.9						-	4766.9						230			1.308		0.00	51	6.9	6.5
	04/21/14	6.759	2.992	4.918	5.476	5.384	4.20	4.678		-	3650.9						-	4766.9						240			1.308		0.00	53	7.0	6.7
	04/22/14	7.169	2.763	4.894	5.494	5.433	4.20	4.364		-	3650.9					125	5101.995	4833.9			7	94.4%	4.1	250	2223	1873	1.302	9292	0.07	52	7.2	6.6
	04/23/14	7.187	2.779	4.907	5.305	5.487	4.20	4.790	116.5	4767.7	3810.4			12.5	89.3%		-	4833.9					5.0	260			1.305		0.48	52	7.2	6.6
	04/24/14	6.503	2.689	4.655	5.118	5.534	4.20	4.567		-	3796.2						-	4753.3					6.0	280			1.297		0.00	52	7.0	6.7
	04/25/14	7.282	2.970	4.538	4.940	5.575	4.20	4.457		-	3706.3						-	4753.3					4.4	280			1.289		0.00	52	7.3	6.6
	04/26/14	7.900	2.573	4.446	4.779	5.615	4.20	4.446		-	3706.3						-	4753.3						320			1.318		0.24	52	7.2	6.6
	04/27/14	7.892	2.582	4.290	4.664	5.650	4.20	4.290		-	3706.3						-	4753.3						310			1.315		0.00	52	7.1	6.6
	04/28/14	7.560	2.053	4.083	4.545	5.675	4.20	3.996		-	3706.3						-	4753.3					4.3	330			1.289		0.00	53	7.2	6.7
	04/29/14	6.556	2.217	3.891	4.401	5.516	4.20	3.846	64.5	2093.1	3437.4			25.8	60.0%	71	2304.017	4263.5			8	88.7%	4.9	390	2844	2392	1.279	9776	0.00	51	7.2	6.7
	04/30/14	7.083	2.037	3.934	4.262	5.323	4.20	3.934	59.0	1935.8	3222.9			19.5	66.9%		-	4263.5					5.0	370			1.291		1.31	51	7.3	6.7
May'14	05/01/14	8.201	2.520	5.160	4.335	5.218	4.20	5.160		-	3223.9						-	4378.1					4.8	310			1.304		0.15	52	7.2	6.7
	05/02/14	7.320	3.792	5.159	4.423	5.130	4.20	5.159		-	3223.9						-	4378.1					5.2	290			1.314		0.00	52	7.2	6.7
	05/03/14	6.831	3.123	4.988	4.501	5.061	4.20	4.892		-	3223.9						-	4378.1						300			1.350		0.00	54	7.0	6.6
	05/04/14	7.188	2.953	4.848	4.580	5.008	4.20	4.842		-	3223.9						-	4378.1						320			1.339		0.00	55	7.2	6.6
	05/05/14	6.797	2.444	4.510	4.641	4.959	4.20	4.465		-	3223.9						-	4378.1					4.5	340			1.323		0.00	53	7.3	6.7
	05/06/14	6.491	2.643	4.273	4.696	4.919	4.20	4.225	100.7	3588.6	3276.0			28.2	72.0%	98	3492.408	4201.0			11	88.8%	4.8	360	2804	2350	1.312	10824	0.00	53	7.3	6.6
	05/07/14	6.425	2.079	4.114	4.722	4.875	4.20	3.996	101.0	3465.4	3299.7			24.7	75.5%		-	4201.0					4.8	360			1.300		0.00	54	7.3	6.6
	05/08/14	6.117	2.003	3.997	4.556	4.816	4.20	3.997		-	3281.1						-	3976.4					5.0	370			1.301		0.00	55	7.2	6.7
	05/09/14	8.564	2.253	3.839	4.367	4.763	4.20	3.783		-	3299.5						-	3976.4					5.4	420			1.318		0.00	54	7.2	6.6
	05/10/14	5.861	1.830	3.858	4.206	4.724	4.20	3.858		-	3299.5						-	3976.4						410			1.325		0.07	57	7.1	6.7
	05/11/14	5.822	1.853	3.710	4.043	4.679	4.20	3.710		-	3299.5						-	3976.4						410			1.326		0.00	55	6.9	6.6
	05/12/14	6.059	1.850	3.771	3.937	4.652	4.20	3.694		-	3299.5						-	3976.4					3.8	400			1.399		0.00	57	7.2	6.8
	05/13/14	5.512	1.666	3.406	3.814	4.611	4.20	3.377	166.0	4715.4	3501.7			25.8	84.5%	202	5738.02	4328.7			8	96.0%	4.9	500	3821	2777	1.442	9362	0.00	54	7.2	6.8
	05/14/14	6.409	1.651	3.374	3.708	4.566	4.20	3.374	149.0	4192.7	3588.1			16.1	89.2%		-	4328.7					4.2	510			1.457		0.00	56	7.6	6.9
	05/15/14	6.848	1.550	3.458	3.631	4.522	4.20	3.366		-	3537.0						-	4159.1					4.0	420			1.490		0.00	56	7.5	6.8
	05/16/14	6.001	1.580	3.390	3.567	4.428	4.20	3.302		-	3537.0						-	4159.1					4.3	530			1.499		0.42	58	7.3	6.9
	05/17/14	5.385	1.643	3.379	3.498	4.341	4.20	3.379		-	3537.0						-	4159.1						490			1.504		0.00	57	7.1	6.5
	05/18/14	5.132	1.750	3.214	3.427	4.256	4.20	3.153		-	3537.0						-	4159.1						570			1.508		0.00	57	7.0	6.2
	05/19/14	7.424	1.383	3.151	3.339	4.175	4.20	3.151		-	3537.0						-	4159.1					3.9	620			1.435		0.00	57	7.2	6.4
	05/20/14	5.146	1.267	3.063	3.290	4.107	4.20	3.063	125.7	3211.1	3496.2			15.9	87.4%	164	4189.449	4165.2			8	95.1%	4.0	640	3971	3310	1.512	9196	0.00	56	7.4	6.8
	05/21/14	5.625	1.427	3.039	3.242	4.045	4.20	2.944		-	3496.2						-	4165.2					4.0	620			1.492		0.00	58	7.4	6.6
	05/22/14	5.433	1.232	3.033	3.181	3.983	4.20	3.033		-	3496.2						-	3931.0						600			1.489		0.16	56	7.5	6.5
	05/23/14	5.179	1.267	2.944	3.118	3.917	4.20	2.944		-	3314.6						-	3931.0					3.8	700			1.457		0.00	58	7.3	6.1
	05/24/14	4.962	1.239	2.883	3.047	3.858	4.20	2.883		-	3314.6						-	3931.0						710			1.465		0.00	58	7.1	6.0
	05/25/14	4.962	1.203	2.808	2.989	3.800	4.20	2.694		-	3314.6						-	3931.0						780			1.468		0.00	58	7.1	6.3
	05/26/14	5.292	1.126	2.847	2.945	3.747	4.20	2.847		-	3314.6						-	3931.0						680			1.479		0.02	57	7.1	6.1
	05/27/14	5.126	0.983	2.766	2.903	3.696	4.20	2.766	230.0	5305.7	3563.5			11.5	95.0%	258	5951.658	4335.1			8	96.9%	4.1	670	3990	3354	1.467	9384	0.00	58	7.3	6.2
	05/28/14	4.943	1.017	2.765	2.864	3.652	4.20	2.764	180.6	4164.7	3630.3						-	4335.1					4.0	640			1.460		0.00	56	7.5	6.1
	05/29/14	5.005	0.970	2.703	2.817	3.613	4.20	2.703		-	3822.4						-	4842.9					4.2	780			1.459		0.00	59	7.3	5.9
	05/30/14	5.917	0.930	2.983	2.822	3.581	4.20	2.983		-	4091.9						-	4842.9					3.0	650			1.479		0.21	60	7.1	6.5
	05/31/14	5.092	0.963	2.652	2.789	3.498	4.20	2.652		-	4091.9						-	4842.9						670			1.526		0.00	58	7.2	6.8
Jun'14	06/01/14	4.786	0.913	2.586	2.757	3.412	4.20	2.586		-	4091.9						-	4842.9						680			1.511		0.00	59	7.1	6.8
	06/02/14	5.169	0.777	2.686	2.734	3.335	4.20	2.686		-	4091.9						-	4842.9					3.5	730			1.492		0.00	60	7.3	6.9
	06/03/14	4.759	0.837	2.638	2.716	3.261	4.20	2.638	214.0	4708.2	4169.0			28.8	86.5%	265	5830.244	5040.4			8	97.0%	3.7	700	3377	2869	1.466	8068	0.00	60	7.4	7.2
	06/04/14	4.850	0.457	2.651	2.700	3.199	4.20	2.651	202.5	4477.1	4203.2			19.3	90.5%		-	5040.4					4.4	770			1.484		0.07	58	7.4	7.1
	06/05/14	4.837	0.126	2.761	2.708	3.149	4.20	2.761		-	4280.0						-	5427.3					3.9	700			1.485		0.66	58	7.2	7.2
	06/06/14	5.830	1.080	2.690	2.666	3.102	4.20	2.690		-	4396.4						-	5427.3					2.9	750			1.460		0.00	62	7.3	6.7
	06/07/14	5.314	1.010	2.609	2.660	3.055	4.20	2.609		-	4396.4						-	5427.3						790			1.489		0.00	63	7.3	6.8
	06/08/14	5.718	0.940	2.595	2.661	3.014	4.20	2.595		-	4396.4						-	5427.3						770			1.494		0.00	64	6.9	6.3
	06/09/14	5.736	0.840	2.665	2.658	2.974	4.20	2.665		-	4396.4						-	5427.3					3.7	780			1.476		0.03	61	7.2	6.4
	06/10/14	5.208	0.750	2.687	2.665	2.940	4.20	2.687	270.0	6050.6	4603.2			15.8	94.1%	335	7507.209	5843.3			7	97.9%	3.5	750	3692	3141	1.477	9116	0.00	61	7.4	6.1
	06/11/14	4.980	0.690	2.552	2.651	2.899	4.20	2.552	209.3	4454.7	4586.7			19.6	90.6%		-	5843.3					3.9	760			1.479		0.00	60	7.3	6.2
	06/12/14	4.830	0.920	2.535	2.619	2.870	4.20	2.535		-	4570.6						-	5869.6					3.9	730			1.474		0.25	62	7.2	6.0
	06/13/14	4.966	0.810	2.676	2.617	2.847	4.20	2.608		-	4624.6						-	5869.6					4.1	750			1.467		0.23	60	7.3	6.0
	06/14/14	4.714	0.649	2.593	2.615	2.818	4.20	2.593		-	4624.6						-	5869.6						710			1.488		0.00	61	6.9	6.2
	06/15/14	4.544	0.780	2.522	2.604	2.789	4.20	2.443		-	4624.6						-	5869.6						700			1.476		0.00	62	7.0	6.4
	06/16/14	5.156	0.860	2.671	2.605	2.766	4.20	2.566		-	4624.6						-	5869.6						570			1.463		0.00	64	7.1	6.4

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	06/17/14	4.785	0.960	2.576	2.589	2.744	4.20	2.277	212.5	4565.3	4617.2			15.4	92.8%	250	5370.96	5769.9			5	98.0%	3.8	670	4048	3395	1.461	9104	0.07	63	7.3	6.3
	06/18/14	5.441	0.810	2.460	2.576	2.721	4.20	2.302	203.3	4171.0	4567.6			21.4	89.5%		-	5769.9					3.8	730			1.450		0.00	64	7.2	6.3
	06/19/14	4.895	0.890	2.413	2.559	2.700	4.20	2.205		-	4737.2						-	6165.0					3.4	730			1.482		0.12	61	7.2	6.2
	06/20/14	4.518	0.720	2.359	2.513	2.677	4.20	2.277		-	4737.2						-	6165.0					3.6	720			1.485		0.00	64	7.2	6.5
	06/21/14	4.903	0.750	2.295	2.471	2.652	4.20	2.295		-	4737.2						-	6165.0						770			1.491		0.00	64	7.2	6.3
	06/22/14	5.421	0.640	2.316	2.441	2.631	4.20	2.316		-	4737.2						-	6165.0						790			1.484		0.00	64	7.4	6.4
	06/23/14	5.498	0.540	2.282	2.386	2.611	4.20	2.188		-	4737.2						-	6165.0					4.1	760			1.482		0.00	63	7.3	6.6
	06/24/14	6.196	0.510	2.182	2.330	2.591	4.20	2.182	327.5	5959.8	4873.0			19.9	93.9%	356	6478.445	6227.7			4	98.9%	4.2	740	4366	3656	1.483	9844	0.00	63	7.3	6.6
	06/25/14	4.988	0.690	2.238	2.298	2.570	4.20	2.184	350.0	6532.7	5039.0						-	6227.7					4.1	780			1.471		0.00	63	7.2	6.9
	06/26/14	4.806	0.780	2.233	2.272	2.552	4.20	2.233		-	5009.3						-	6296.7					3.8	750			1.438		0.13	64	7.3	6.7
	06/27/14	4.776	0.670	2.223	2.253	2.534	4.20	2.158		-	5114.9						-	6296.7					3.6	750			1.328		0.00	65	7.3	6.7
	06/28/14	4.330	0.670	2.185	2.237	2.517	4.20	2.185		-	5114.9						-	6296.7						780			1.506		0.00	64	7.5	6.8
	06/29/14	4.490	0.780	2.193	2.219	2.491	4.20	2.001		-	5114.9						-	6296.7						750			1.511		0.00	66	7.2	6.7
	06/30/14	4.453	0.570	2.205	2.208	2.476	4.20	1.915		-	5114.9						-	6296.7					3.8	770			1.499		0.00	64	7.0	6.7
Jul'14	07/01/14	4.456	0.570	2.167	2.206	2.462	4.20	1.881	204.0	3686.8	4956.3			17.7	91.3%	220	3976.012	5832.6			1	99.5%	4.1	780	4427	3694	1.508	8948		64	7.4	7.1
	07/02/14	7.771	0.650	2.135	2.192	2.444	4.20	1.752		-	4956.3						-	5832.6					6.0	750			1.493			67	7.3	7.1
	07/03/14	5.034	0.571	2.215	2.189	2.429	4.20	1.899		-	4987.3						-	5833.2					3.3	740			1.559			69	7.3	6.8
	07/04/14	5.762	0.700	2.844	2.278	2.436	4.20	2.844		-	5060.1						-	5833.2						800			1.412			66	7.2	6.4
	07/05/14	4.702	1.020	2.452	2.316	2.426	4.20	2.452		-	5060.1						-	5833.2						720			1.389		3.05	67	7.2	6.6
	07/06/14	4.695	0.880	2.456	2.353	2.418	4.20	2.349		-	5060.1						-	5833.2						700			1.377			68	7.2	6.7
	07/07/14	5.968	0.980	2.546	2.402	2.416	4.20	2.238		-	5060.1						-	5833.2					3.2	700			1.358			67	7.1	6.5
	07/08/14	5.565	0.570	2.477	2.446	2.412	4.20	1.701	202.5	4183.3	4950.5			21.6	89.3%	203	4193.611	5505.2			9	95.6%	2.9	710	4001	3341	1.016	9396		68	7.3	6.9
	07/09/14	4.724	0.766	2.520	2.501	2.407	4.20	1.891	245.0	5149.1	4972.6			21.6	91.2%		-	5505.2					2.3	480			0.812		0.10	68	7.2	6.8
	07/10/14	4.644	0.447	2.381	2.525	2.397	4.20	2.007		-	4837.8						-	5004.8					2.8	400			0.688			68	7.2	6.1
	07/11/14	4.899	0.673	2.440	2.467	2.393	4.20	2.404		-	4892.6						-	5004.8					2.6	410			0.800			68	7.3	6.6
	07/12/14	5.381	0.723	2.356	2.454	2.387	4.20	2.307		-	4892.6						-	5004.8						390			0.682			67	7.2	6.5
	07/13/14	5.499	0.829	2.410	2.447	2.378	4.20	2.410		-	4892.6						-	5004.8						400			0.695			67	6.9	6.5
	07/14/14	6.653	0.563	2.407	2.427	2.372	4.20	2.363		-	4892.6						-	5004.8					3.4	420			0.681		0.12	68	7.1	6.4
	07/15/14	4.485	0.717	2.382	2.414	2.367	4.20	2.355	201.5	4003.0	4781.4			30.0	85.1%	283	5622.044	5128.2			4	98.6%	3.4	420	3132	2596	0.693	10808	1.08	66	7.1	7.1
	07/16/14	10.520	0.646	3.520	2.557	2.396	4.20	3.492		-	4781.4						-	5128.2					3.2	410			0.696		1.30	68	7.3	6.8
	07/17/14	6.332	1.122	2.861	2.625	2.405	4.20	2.662		-	4812.2						-	5067.5					2.6	350			0.694			70	7.1	6.5
	07/18/14	5.479	0.880	2.669	2.658	2.412	4.20	2.600		-	4919.1						-	5067.5					2.8	350			0.681			69	7.4	6.5
	07/19/14	4.862	0.810	2.593	2.692	2.418	4.20	2.561		-	4919.1						-	5067.5						370			0.696			69	7.1	6.7
	07/20/14	5.191	0.778	2.618	2.721	2.427	4.20	2.540		-	4919.1						-	5067.5						370			0.702			68	7.1	6.7
	07/21/14	4.824	0.786	2.658	2.757	2.439	4.20	2.555		-	4919.1						-	5067.5					2.8	380			0.676			69	7.2	6.6
	07/22/14	6.264	0.897	2.558	2.782	2.447	4.20	2.352		-	4919.1					174	3712.067	4796.4			3	98.3%	2.8	390	3089	2594	0.684	12032		70	7.2	6.7
	07/23/14	5.759	0.723	2.748	2.672	2.462	4.20	2.406		-	4919.1						-	4796.4					2.2	370			0.719		0.19	71	7.3	6.9
	07/24/14	4.658	0.873	2.556	2.629	2.475	4.20	2.387		-	4711.0						-	4375.9					2.8	390			0.659			70	7.3	6.8
	07/25/14	5.880	0.703	2.492	2.603	2.483	4.20	2.463		-	4255.6						-	4375.9					3.0	360			0.640			71	7.3	6.8
	07/26/14	6.115	0.913	2.495	2.589	2.492	4.20	2.495		-	4255.6						-	4375.9						360			0.664			69	7.1	6.8
	07/27/14	6.380	0.773	2.512	2.574	2.502	4.20	2.477		-	4255.6						-	4375.9						380			0.660			70	7.2	6.8
	07/28/14	5.893	0.793	2.556	2.560	2.514	4.20	2.529		-	4255.6						-	4375.9					3.7	390			0.643		0.20	68	7.2	6.9
	07/29/14	5.412	0.686	2.429	2.541	2.522	4.20	2.429	206.0	4173.1	4239.1			27.4	86.7%	242	4902.402	4481.2			9	96.3%	3.4	400	3155	2650	0.630	11504		68	7.5	7.0
	07/30/14	5.749	0.710	2.369	2.487	2.527	4.20	2.369		-	4239.1						-	4481.2					3.5	400			0.616			68	7.3	6.9
	07/31/14	5.183	0.680	2.361	2.459	2.534	4.20	2.361		-	4377.1						-	4607.5					1.6	400			0.694			71	7.2	6.7
Aug'14	08/01/14	5.140	0.637	2.344	2.438	2.541	4.20	2.344		-	4377.1						-	4607.5					2.9	410			0.741		0.02	72	7.2	6.7
	08/02/14	6.335	0.690	2.427	2.428	2.548	4.20	2.427		-	4377.1						-	4607.5						440			0.746		0.40	70	7.2	6.7
	08/03/14	6.086	0.807	2.382	2.410	2.533	4.20	2.382		-	4377.1						-	4607.5						440			0.760		0.03	69	7.2	6.7
	08/04/14	5.728	0.807	2.387	2.386	2.530	4.20	2.310		-	4377.1						-	4607.5					3.3	380			0.725		0.00	69	7.2	6.7
	08/05/14	5.866	0.687	2.426	2.385	2.529	4.20	2.250	232.8	4710.2	4443.7			30.0	87.1%	291	5887.756	4863.6			15	94.8%	3.2	440	3230	2693	0.729	10380	0.00	70	7.3	6.5
	08/06/14	5.993	0.740	2.446	2.396	2.526	4.20	1.977	164.0	3345.5	4260.7			12.4	92.4%		-	4863.6					3.2	400			0.681		0.00	69	7.2	6.4
	08/07/14	4.634	0.570	2.334	2.392	2.521	4.20	1.891		-	4276.2						-	5031.1					2.6	390			0.705		0.24	70	7.3	6.3
	08/08/14	4.438	0.730	2.289	2.384	2.514	4.20	2.235		-	4058.0						-	5031.1					2.8	390			0.719		0.00	71	7.2	6.7
	08/09/14	4.917	0.671	2.270	2.362	2.510	4.20	2.270		-	4058.0						-	5031.1						410			0.736		0.00	70	7.3	6.8
	08/10/14	5.394	0.683	2.269	2.346	2.504	4.20	2.269		-	4058.0						-	5031.1						430			0.755		0.00	70	7.2	6.7
	08/11/14	5.424	0.417	2.349	2.340	2.504	4.20	2.349		-	4058.0						-	5031.1					2.8	410			0.728		0.00	72	7.2	6.7
	08/12/14	4.995	0.463	2.271	2.318	2.499	4.20	2.271	226.0	4280.5	4102.5			13.5	94.0%	219	4147.891	4854.4			15	93.2%	2.8	350	3643	3032	0.718	11548	0.25	72	7.3	6.4
	08/13/14	9.990	0.557	2.511	2.328	2.503	4.20	2.511		-	4102.5						-	4854.4					2.7	380			0.722		0.00	71	7.3	6.7
	08/14/14	4.356	0.710	2.266	2.318	2.499	4.20	2.266		-	4127.3						-	4662.5					2.6	320			0.721		0.00	72	7.3	6.7
	08/15/14	4.230	0.587	2.292	2.318	2.458	4.20	2.292		-	4127.3						-	4662.5						320			0.725		0.00	71	7.3	6.7
	08/16/14	4.026	0.603	2.239	2.314	2.437	4.20	2.239		-	4127.3						-	4662.5						400			0.735		0.00	70	7.1	6.8
	08/17/14	4.133	0.674	2.239	2.310	2.423	4.20	2.239		-	4127.3						-	4662.5						400			0.732		0.00	70	7.2	6.9
	08/18/14	4.103	0.577	2.197	2.288	2.410	4.20	2.197		-	4127.3						-	4662.5					3.3	430			0.718		0.00	70	7.3	6.9
	08/19/14	4.118	0.483	2.136	2.269	2.394	4.20	2.136	181.0	3224.4	3946.7			9.6	94.7%	200	3562.848	4442.6			3	98.5%	3.2	430	3729	3088	0.720	11592	0.00	69	7.3	6.7
	08/20/14	4.296	0.637	2.122	2.213	2.376	4.20	2.122	201.0	3557.2	3881.8			9.9	95.1%		-	4442.6					2.6	400			0.727		0.00	72	7.3	6.7
	08/21/14	3.938	0.583	2.097	2.189	2.360	4.20	2.097		-	3881.8						-	4625.2					2.8	360			0.728		0.00	72	7.3	6.7
	08/22/14	3.826	0.553	2.101	2.162	2.339	4.20	2.101		-	3881.8						-	4625.2					3.1	340			0.721		0.02	69	7.4	6.6
	08/23/14	4.045	0.560	2.100	2.142	2.324	4.20	2.100		-	3881.8						-	4625.2						310			0.725		0.00	70	7.4	6.8
	08/24/14	4.022	0.561	2.110	2.123	2.311	4.20	2.110		-	3881.8						-	4625.2						340			0.723		0.00	70	7.2	6.8
	08/25/14	3.990	0.419	2.105	2.110	2.298	4.20	2.105		-	3881.8						-	4625.2					2.2	350			0.711		0.00	72	7.3	6.9
	08/26/14	3.992	0.430	2.117	2.107	2.285	4.20	2.061	184.0	3248.7	3791.4			27.7	84.9%	225	3972.551	4494.7			12	94.7%	3.3	350	3442	2873	0.716	10200	0.00	70	7.3	6.8
	08/27/14	4.127	0.509	2.116	2.107	2.270	4.20	2.033	172.5	3044.2	3698.0			14.4	91.7%		-	4494.7					3.4	340			0.713		0.00	70	7.3	6.7
	08/28/14	4.022	0.353	2.063	2.102	2.258	4.20	2.005		-	3630.1						-	4392.8						330			0.714		0.00	71	7.3	6.7
	08/29/14	4.342	0.575	2.084	2.099	2.248	4.20	2.084		-	3630.1						-	4392.8					2.8	320			0.722		0.00	70	7.3	6.8
	08/30/14	4.021	0.510	1.933	2.075	2.234	4.20	1.933		-	3630.1						-	4392.8						380			0.722		0.00	71	7.3	7.0
	08/31/14	3.877	0.510	1.962	2.054	2.221	4.20	1.962		-	3630.1						-	4392.8						430			0.728		0.15	72	7.3	7.1

Somerset WPCF Daily Data
2013-2018

	DATE	Sewage Flows(mgd) Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	BOD raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	TSS raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	Aeration Tanks final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Weather Rain	Inf Temp	pH Influent Hi	pH Effluent Low
				ADF	7-Day	30-Day																										
Sep'14	09/01/14	3.973	0.458	2.072	2.050	2.210	4.20	2.025		-	3630.1						-	4392.8						440			0.733		0.00	71	7.3	6.9
	09/02/14	6.130	0.460	2.123	2.050	2.201	4.20	1.931	180.0	3187.0	3574.7			24.2	86.6%	245	4337.926	4381.8			4	98.4%	2.9	500	3671	3076	0.670	10836	0.00	73	7.3	7.0
	09/03/14	3.983	0.460	1.967	2.029	2.187	4.20	1.700	221.7	3636.9	3581.6			27.6	87.6%		-	4381.8					3.6	480			0.712		0.00	71	7.4	7.1
	09/04/14	3.821	0.510	1.965	2.015	2.172	4.20	1.669		-	3440.6						-	4005.3					3.5	450			0.717		0.00	71	7.5	7.0
	09/05/14	5.491	0.460	1.973	1.999	2.156	4.20	1.669		-	3454.1						-	4005.3					2.6	480			0.726		0.00	73	7.3	6.9
	09/06/14	4.043	0.353	1.987	2.007	2.144	4.20	1.746		-	3454.1						-	4005.3						450			0.740		0.16	71	7.5	6.8
	09/07/14	4.146	0.510	2.052	2.020	2.136	4.20	1.989		-	3454.1						-	4005.3						440			0.738		0.00	71	7.4	6.8
	09/08/14	4.136	0.353	1.952	2.003	2.126	4.20	1.941		-	3454.1						-	4005.3					3.2	410			0.704		0.00	71	7.3	6.8
	09/09/14	3.906	0.297	1.976	1.982	2.116	4.20	1.976	177.5	2925.2	3388.0			8.9	95.0%	240	3955.162	3995.3			10	95.8%	3.6	490	3609	2968	0.701	10980	0.00	70	7.4	6.9
	09/10/14	3.766	0.380	1.910	1.974	2.101	4.20	1.910	166.7	2655.4	3306.6			7.1	95.7%		-	3995.3					3.5	470			0.700		0.00	70	7.5	6.7
	09/11/14	3.812	0.300	1.930	1.969	2.090	4.20	1.930		-	3184.9						-	3957.1					3.5	470			0.678		0.00	72	7.3	6.6
	09/12/14	3.887	0.400	1.976	1.969	2.072	4.20	1.976		-	3184.9						-	3957.1					3.5	440			0.719		0.00	70	7.3	6.6
	09/13/14	4.033	0.400	1.977	1.968	2.062	4.20	1.977		-	3184.9						-	3957.1						450			0.758		0.15	71	7.4	7.0
	09/14/14	4.149	0.403	1.978	1.957	2.052	4.20	1.978		-	3184.9						-	3957.1						430			0.762		0.00	69	7.3	7.0
	09/15/14	4.050	0.460	1.932	1.954	2.042	4.20	1.932		-	3184.9						-	3957.1					3.3	450			0.738		0.00	69	7.3	6.9
	09/16/14	3.973	0.460	1.933	1.948	2.032	4.20	1.933	281.0	4530.1	3334.3			6.8	97.6%	281	4530.063	4071.7			6	97.9%	3.5	460	4014	3322	0.719	11232	0.00	70	7.4	6.9
	09/17/14	4.154	0.350	1.913	1.948	2.022	4.20	1.913	250.0	3988.6	3399.8			7.9	96.8%		-	4071.7					3.7	440			0.839		0.00	69	7.5	6.9
	09/18/14	4.219	0.353	1.918	1.947	2.015	4.20	1.900		-	3419.3						-	4198.9					3.6	440			0.715		0.00	69	7.5	6.7
	09/19/14	3.963	0.297	1.835	1.927	2.005	4.20	1.835		-	3402.0						-	4198.9					3.5	440			0.714		0.00	70	7.4	6.9
	09/20/14	3.879	0.297	1.877	1.912	1.998	4.20	1.877		-	3402.0						-	4198.9						400			0.725		0.00	69	7.4	6.6
	09/21/14	3.903	0.424	1.904	1.902	1.991	4.20	1.904		-	3402.0						-	4198.9						410			0.722		0.05	70	7.3	6.7
	09/22/14	3.837	0.297	1.923	1.900	1.985	4.20	1.923		-	3402.0						-	4198.9					3.6	450			0.711		0.00	70	7.4	6.9
	09/23/14	3.892	0.352	1.878	1.893	1.978	4.20	1.878	342.5	5364.4	3620.1			7.3	97.9%		-	4198.9			10	#DIV/0!	3.6	440	3997	3314	0.696	11224	0.00	68	7.2	6.5
	09/24/14	4.008	0.300	1.889	1.889	1.971	4.20	1.889	267.5	4214.3	3679.5			7.6	97.2%		-	4198.9					3.7	450			0.693		0.00	68	7.3	6.5
	09/25/14	4.126	0.457	1.871	1.882	1.962	4.20	1.817		-	3727.3						-	4274.4					3.4	410			0.706		0.26	68	7.3	6.8
	09/26/14	4.543	0.400	1.882	1.889	1.955	4.20	1.784		-	3812.7						-	4274.4					3.7	430			0.699		0.00	68	7.2	6.6
	09/27/14	4.272	0.353	1.870	1.888	1.948	4.20	1.870		-	3812.7						-	4274.4						450			0.730		0.00	69	7.2	6.7
	09/28/14	4.270	0.403	1.899	1.887	1.942	4.20	1.899		-	3812.7						-	4274.4						490			0.729		0.00	70	7.0	6.6
	09/29/14	5.611	0.460	1.870	1.880	1.940	4.20	1.870		-	3812.7						-	4274.4					3.3	500			0.717		0.00	68	7.0	6.7
	09/30/14	3.853	0.400	1.841	1.875	1.936	4.20	1.841	262.5	4030.4	3836.9			18.7	92.9%	321	4928.615	4437.9			11	96.6%	3.4	490	4126	3429	0.713	11536	0.09	67	7.0	6.7
Oct'14	10/01/14	4.013	0.400	1.954	1.884	1.932	4.20	1.954	242.5	3951.9	3848.4			17.5	92.8%		-	4437.9					3.3	470			0.699		0.73	67	7.0	6.7
	10/02/14	4.036	0.460	1.960	1.897	1.926	4.20	1.960		-	3921.9						-	4471.3					3.4	440			0.703		0.05	66	7.1	6.6
	10/03/14	4.204	0.620	1.927	1.903	1.925	4.20	1.927		-	3957.5						-	4471.3					3.4	480			0.700		0.03	66	7.2	6.8
	10/04/14	4.173	0.353	1.948	1.914	1.925	4.20	1.948		-	3957.5						-	4471.3						420			0.711		0.13	67	7.3	6.8
	10/05/14	4.012	0.510	1.974	1.925	1.925	4.20	1.974		-	3957.5						-	4471.3						610			0.713		0.00	66	7.2	6.8
	10/06/14	4.636	0.300	1.931	1.934	1.923	4.20	1.931		-	3957.5						-	4471.3					3.4	540			0.714		0.00	66	7.1	6.7
	10/07/14	5.750	0.300	1.915	1.944	1.918	4.20	1.915	290.0	4631.6	4032.4			33.6	88.4%		-	4471.3			10	#DIV/0!	3.5	560	3667	3049	0.706	10688	0.00	66	7.2	6.6
	10/08/14	3.747	0.353	1.938	1.942	1.918	4.20	1.938	221.7	3583.3	3987.5						-	4471.3					3.4	520			0.698		0.08	67	7.5	6.9
	10/09/14	4.013	0.297	1.890	1.932	1.915	4.20	1.890		-	4105.6						-	4729.3					3.5	500			0.696		0.00	66	7.1	6.6
	10/10/14			1.872	1.924	1.914	4.20	1.872		-	4286.8						-	4729.3					3.7	500			0.700		0.05	66	7.1	6.7
	10/11/14			1.962	1.926	1.915	4.20	1.962		-	4286.8						-	4729.3						550			0.706		0.41	64	7.2	7.0
	10/12/14			1.859	1.910	1.911	4.20	1.859		-	4286.8						-	4729.3						530			0.706		0.00	66	7.3	6.5
	10/13/14			1.972	1.915	1.911	4.20	1.972		-	4286.8						-	4729.3						580			0.706		0.00	65	7.2	6.5
	10/14/14			1.905	1.914	1.908	4.20	1.905	224.0	3558.8	4205.9			35.3	84.2%	262	4162.577	4540.4			13	95.0%	3.7	620	3569	3008	0.706	10048	0.00	66	7.1	6.6
	10/15/14	3.470	0.457	1.690	1.879	1.900	4.20	1.690	214.7	3026.1	4088.0						-	4540.4					3.8	610			0.651		0.00	66	7.1	6.5
	10/16/14	4.666	0.410	2.122	1.912	1.906	4.20	2.122		-	4038.8						-	4545.6					3.6	650			0.727		1.15	66	7.1	6.7
	10/17/14	3.666	0.387	1.981	1.927	1.909	4.20	1.981		-	4045.1						-	4545.6					3.7	550			0.719		0.00	66	7.0	6.2
	10/18/14	4.087	0.420	1.967	1.928	1.910	4.20	1.967		-	4045.1						-	4545.6						510			0.720		0.03	67	7.3	6.1
	10/19/14	3.762	0.507	1.980	1.945	1.915	4.20	1.980		-	4045.1						-	4545.6						570			0.724		0.00	65	7.2	6.4
	10/20/14	4.256	0.387	1.959	1.943	1.918	4.20	1.959		-	4045.1						-	4545.6					3.5	570			0.729		0.00	64	7.0	6.4
	10/21/14	4.220	0.500	1.987	1.955	1.921	4.20	1.987	237.7	3939.1	4033.3			27.4	88.5%	273	4524.041	4538.4			10	96.3%	3.8	610	3339	2792	0.724	9536	0.00	64	7.1	6.2
	10/22/14	4.847	0.410	2.214	2.030	1.930	4.20	2.214	195.0	3600.6	3990.1						-	4538.4					3.5	540			0.719		1.20	63	7.1	5.9
	10/23/14	4.344	0.713	2.443	2.076	1.949	4.20	2.443		-	3837.3						-	4538.4					3.8	450			0.703		0.53	63	7.1	6.2
	10/24/14	4.309	0.600	2.234	2.112	1.961	4.20	2.234		-	3790.2						-	4538.4					3.3	450			0.687		0.00	62	7.3	6.5
	10/25/14	4.059	0.607	2.254	2.153	1.973	4.20	2.254		-	3790.2						-	4538.4						480			0.700		0.00	62	7.2	6.6
	10/26/14	4.256	0.493	2.295	2.198	1.987	4.20	2.295		-	3790.2						-	4538.4						490			0.709		0.00	63	7.2	6.6
	10/27/14	4.268	0.500	2.265	2.242	2.000	4.20	2.265		-	3790.2						-	4538.4					2.5	500			0.687		0.00	65	7.1	6.6
	10/28/14	4.180	0.690	2.186	2.270	2.010	4.20	2.186	235.0	4284.3	3845.1			29.4	87.5%	239	4357.266	4493.1			12	95.0%	3.6	500	3185	2681	0.711	9996	0.00	64	7.4	6.5
	10/29/14	4.042	0.510	2.235	2.273	2.022	4.20	2.235	218.3	4069.1	3867.5			38.6	82.3%		-	4493.1					3.3	450			0.711		0.04	64	7.2	6.4
	10/30/14	9.986	0.510	2.207	2.239	2.034	4.20	2.207		-	3849.4						-	4348.0					3.4	570			0.712		0.00	63	7.3	6.4
	10/31/14	4.997	0.610	2.170	2.230	2.041	4.20	2.170		-	3836.6						-	4348.0					3.3	570			0.709		0.00	62	7.3	6.3
Nov'14	11/01/14	4.216	0.627	2.307	2.238	2.053	4.20	2.191		-	3836.6						-	4348.0						540			0.720		0.52	62	7.6	6.2
	11/02/14	4.533	0.610	2.332	2.243	2.066	4.20	2.097		-	3836.6						-	4348.0						600			0.722		0.50	59	7.2	6.4
	11/03/14	4.246	0.506	2.242	2.240	2.076	4.20	1.890		-	3836.6						-	4348.0					3.3	560			0.726		0.00	60	7.1	6.5
	11/04/14	4.576	0.520	2.238	2.247	2.085	4.20	2.089	201.0	3751.6	3827.2			25.4	87.4%	224.0	4180.942	4306.2			4.0	98.2%	3.8	580	3207	2708	1.088	10340	0.00	61	7.2	6.4
	11/05/14	5.362	0.500	2.225	2.246	2.095	4.20	2.154	195.0	3618.5	3806.3			20.3	89.6%		-	4306.2					4.4	550			1.284		0.00	61	7.2	6.5
	11/06/14	4.252	0.594	2.250	2.252	2.106	4.20	2.189		-	3714.6						-	4306.2					4.1	640			1.260		0.39	61	7.3	6.4
	11/07/14	5.984	0.520	2.215	2.258	2.115	4.20	2.099		-	3731.0						-	4306.2					4.1	640			1.238		0.00	60	7.3	6.4
	11/08/14	4.083	0.530	2.185	2.241	2.125	4.20	2.056		-	3731.0						-	4306.2						490			1.254		0.00	60	7.1	6.6
	11/09/14	3.921	0.607	2.234	2.227	2.137	4.20	2.108		-	3731.0						-	4306.2						630			1.259		0.00	60	7.3	7.0
	11/10/14	5.739	0.500	2.181	2.218	2.144	4.20	2.054		-	3731.0						-	4306.2					3.3	600			1.235		0.00	62	7.2	6.7
	11/11/14	3.747	0.560	2.138	2.204	2.154	4.20	2.033	167.5	2986.7	3648.3			24.5	85.4%	194.0	3459.198	4136.8			15.0	92.3%		650	3924	3350	1.248	9056	0.00	61	7.1	6.7
	11/12/14	4.556	0.590	2.178	2.197	2.161	4.20	1.909		-	3648.3						-	4136.8					3.7	600			1.240		0.00	60	7.2	6.6
	11/13/14	4.553	0.660	2.193	2.189	2.170	4.20	1.641		-	3659.5						-	4130.4					3.7	600			1.235		0.00	60	7.1	6.5
	11/14/14	4.168	0.650	2.170	2.183	2.186	4.20	1.382		-	3750.0						-	4130.4					3.9	600			1.231		0.36	59	7.2	6.5
	11/15/14	4.078	0.547	2.190	2.183	2.189	4.20	1.439		-	3750.0						-	4130.4						630			1.261		0.00	59	7.4	6.5

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD								TSS								Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	11/16/14	4.322	0.571	2.242	2.185	2.197	4.20	1.513		-	3750.0						-	4130.4						700			1.261		0.00	59	7.3	6.7
	11/17/14	4.582	0.670	2.683	2.256	2.221	4.20	1.994		-	3750.0						-	4130.4					3.6	590			1.234		1.46	56	7.2	6.8
	11/18/14	6.777	0.750	2.586	2.320	2.241	4.20	2.095	164.3	3543.5	3724.2			27.3	83.4%	149.0	3213.519	3947.0			16.0	89.3%	3.9	620	3763	3204	1.202	10048	0.00	57	7.2	6.5
	11/19/14	4.555	0.747	2.498	2.366	2.259	4.20	2.205	168.0	3500.0	3699.3			22.3	86.7%		-	3947.0					3.8	620			1.164		0.00	56	7.2	6.3
	11/20/14	4.390	0.577	2.547	2.417	2.278	4.20	1.988		-	3669.3						-	3802.7					4.1	600			1.163		0.00	56	7.4	6.4
	11/21/14	4.364	0.814	2.477	2.460	2.287	4.20	1.825		-	3679.1						-	3802.7					3.7	540			1.146		0.00	55	7.4	6.4
	11/22/14	4.390	0.732	2.523	2.508	2.289	4.20	2.173		-	3679.1						-	3802.7						650			1.184		0.00	55	7.0	7.4
	11/23/14	4.452	0.824	2.571	2.555	2.301	4.20	2.457		-	3679.1						-	3802.7						700			1.196		0.00	58	7.0	6.7
	11/24/14	5.923	0.750	2.834	2.577	2.320	4.20	2.834		-	3679.1						-	3802.7					3.7	620			1.164		0.56	57	7.2	6.7
	11/25/14	6.589	0.840	2.700	2.593	2.333	4.20	2.700	186.5	4199.6	3744.2			18.2	90.2%	189.0	4255.902	3893.4			6.0	96.8%	3.8	640	3888	3316	1.159	10816	0.00	58	7.3	6.5
	11/26/14	6.085	0.980	3.713	2.766	2.382	4.20	3.713		-	3744.2						-	3893.4					3.6	640			1.103		1.91	56	7.2	6.6
	11/27/14	5.669	1.881	4.086	2.986	2.445	4.20	4.086		-	3667.0						-	3777.4						390			1.063		0.00	57	7.0	6.4
	11/28/14	5.138	2.533	3.909	3.191	2.501	4.20	3.784		-	3600.0						-	3777.4					3.0	470			1.035		0.00	54	7.1	6.7
	11/29/14	5.622	1.868	3.773	3.369	2.553	4.20	3.495		-	3600.0						-	3777.4						510			1.042		0.00	56	7.1	6.5
	11/30/14	5.031	0.954	3.784	3.543	2.607	4.20	3.519		-	3600.0						-	3777.4						500			1.033		0.00	57	7.1	6.6
Dec'14	12/01/14	5.566	1.449	3.606	3.653	2.650	4.20	3.435		-	3600.0						-	3777.4					3.0	520			1.019		0.00	56	7.0	6.6
	12/02/14	6.995	1.550	3.455	3.761	2.688	4.20	3.199	133.3	3841.0	3634.4			12.5	90.6%	136.0	3918.799	3805.7			9.0	93.4%	3.1	560	3398	2922	1.032	12576	0.16	54	7.2	6.4
	12/03/14	6.322	1.800	3.553	3.738	2.731	4.20	3.451	112.3	3327.7	3596.1			10.9	90.3%		-	3805.7					3.1	470			1.024		0.08	56	7.2	6.3
	12/04/14	5.313	1.680	3.422	3.643	2.771	4.20	3.422		-	3573.9						-	3711.9					3.9	590			1.031		0.00	57	8.6	6.5
	12/05/14	5.040	1.630	3.288	3.554	2.806	4.20	3.245		-	3566.4						-	3711.9					3.7	530			1.030		0.14	53	7.3	6.5
	12/06/14	5.886	1.933	3.626	3.533	2.852	4.20	3.421		-	3566.4						-	3711.9						550			1.054		1.17	56	7.4	6.5
	12/07/14	5.969	1.569	4.185	3.591	2.918	4.20	3.913		-	3566.4						-	3711.9						390			1.055		0.00	54	7.6	6.6
	12/08/14	7.626	2.690	4.116	3.664	2.982	4.20	3.736		-	3566.4						-	3711.9					4.3	400			1.126		0.00	51	7.2	6.5
	12/09/14	10.915	2.790	6.257	4.064	3.116	4.20	5.977	73.0	3809.4	3601.1			22.1	69.7%	83.0	4331.221	3835.7			14.0	83.1%	3.8	420	3113	2618	1.238	11328	2.40	52	7.0	6.3
	12/10/14	10.520	2.803	8.005	4.700	3.310	4.20	7.754		-	3601.1						-	3835.7					4.4	190			1.178		0.16	53	6.9	6.5
	12/11/14	10.139	2.672	7.284	5.252	3.482	4.20	6.996		-	3703.5						-	3929.9					3.7	210			1.140		0.00	52	7.2	6.6
	12/12/14	9.147	1.478	6.392	5.695	3.622	4.20	5.993		-	3703.5						-	3929.9					3.6	220			1.140		0.00	52	7.0	6.6
	12/13/14	8.492	1.315	5.960	6.028	3.748	4.20	5.722		-	3703.5						-	3929.9						240			1.134		0.00	54	7.2	6.9
	12/14/14	7.784	1.130	5.562	6.225	3.861	4.20	5.324		-	3703.5						-	3929.9						280			1.151		0.00	54	7.0	6.5
	12/15/14	7.438	0.434	5.100	6.366	3.958	4.20	4.897		-	3703.5						-	3929.9					4.5	290			1.146		0.00	53	7.1	6.6
	12/16/14	8.240	0.333	5.148	6.207	4.055	4.20	4.914	63.5	2726.3	3563.9			10.8	83.0%	62.0	2661.928	3676.3			1.0	98.4%	4.4	300	2757	2306	1.144	12504	0.00	52	7.0	6.4
	12/17/14	7.359	1.214	5.579	5.861	4.151	4.20	5.459	63.5	2954.6	3487.8			13.6	78.6%		-	3676.3					4.5	300			1.122		0.40	52	7.0	6.4
	12/18/14	7.035	3.224	4.930	5.524	4.229	4.20	4.869		-	3479.8						-	3792.0					4.9	300			1.119		0.00	52	7.0	6.5
	12/19/14	8.515	3.200	4.427	5.244	4.294	4.20	4.282		-	3476.4						-	3792.0					5.0	390			1.133		0.00	52	7.3	6.5
	12/20/14	8.531	2.920	4.261	5.001	4.351	4.20	4.111		-	3476.4						-	3792.0						430			1.156		0.11	53	7.2	6.8
	12/21/14	7.191	2.680	4.252	4.814	4.410	4.20	4.146		-	3476.4						-	3792.0						480			1.158		0.04	53	7.1	6.7
	12/22/14	7.020	2.270	4.290	4.698	4.469	4.20	4.179		-	3476.4						-	3792.0					5.5	490			1.167		0.00	52	7.2	6.8
	12/23/14	7.300	2.590	5.090	4.690	4.553	4.20	4.984		-	3476.4					166.0	7046.8	4442.9			1.0	99.4%	3.9	480	3172	2640	1.155	11728	0.17	52	7.0	6.6
	12/24/14	7.361	0.942	4.495	4.535	4.608	4.20	4.369		-	3476.4						-	4442.9						750			1.142		0.84	52	7.2	6.7
	12/25/14	7.841	3.410	4.813	4.518	4.679	4.20	4.783		-	3331.8						-	4489.7					4.0	280			1.150		0.14	55	6.9	6.3
	12/26/14	7.880	2.770	4.840	4.577	4.716	4.20	4.840		-	3331.8						-	4489.7						300			1.118		0.00	52	7.0	6.3
	12/27/14	7.578	3.100	4.731	4.644	4.738	4.20	4.674		-	3331.8						-	4489.7						270			1.114		0.00	54	7.4	6.4
	12/28/14	7.290	3.360	4.653	4.702	4.763	4.20	4.653		-	3331.8						-	4489.7						280			1.088		0.00	54	6.8	6.4
	12/29/14	6.670	2.790	4.348	4.710	4.782	4.20	4.348		-	3331.8						-	4489.7					3.7	260			1.066		0.00	54	7.1	6.5
	12/30/14	6.253	2.840	4.128	4.573	4.793	4.20	3.727	98.0	3373.9	3338.8			9.1	90.7%	117.0	4028.02	4397.4			5.0	95.7%	4.2	300	2966	2471	1.110	12508	0.00	50	7.1	6.2
	12/31/14	6.526	2.610	4.070	4.512	4.809	4.20	4.070		-	3338.8						-	4397.4					4.1	280			1.098		0.00	49	7.3	6.4
Jan'15	01/01/15	6.052	2.720	3.941	4.387	4.825	4.20	3.671		-	3238.4						-	4517.0						290			1.121		0.00	51	7.0	6.5
	01/02/15	6.343	2.500	3.789	4.237	4.833	4.20	3.487		-	3216.0						-	4517.0					3.9	310			1.112		0.00	51	7.1	6.4
	01/03/15	5.617	2.100	3.680	4.087	4.841	4.20	3.454		-	3216.0						-	4517.0						300			1.138		0.70	51	7.2	6.6
	01/04/15	6.570	2.650	4.409	4.052	4.879	4.20	4.096		-	3216.0						-	4517.0						270			1.141		0.26	54	7.1	6.5
	01/05/15	6.313	2.710	4.415	4.062	4.905	4.20	3.919		-	3216.0						-	4517.0					3.5	290			1.115		0.00	51	7.2	6.4
	01/06/15	8.899	2.410	4.134	4.063	4.903	4.20	3.420	129.7	4471.7	3467.2					128.0	4413.128	4496.2			9.0	93.0%	3.6	270	2996	2508	1.133	10948	0.00	48	7.9	6.3
	01/07/15	7.060	2.610	4.074	4.063	4.902	4.20	3.442	111.7	3795.2	3521.9			21.6	80.7%		-	4496.2					4.1	300			1.161		0.00	48	7.5	6.6
	01/08/15	6.501	1.920	3.770	4.039	4.819	4.20	3.244		-	3464.4						-	4537.5					4.4	320			1.164		0.00	46	7.3	6.6
	01/09/15	7.245	1.970	3.763	4.035	4.678	4.20	3.143		-	3464.4						-	4537.5						310			1.154		0.00	48	7.3	6.6
	01/10/15	6.245	2.260	3.571	4.019	4.554	4.20	3.308		-	3464.4						-	4537.5						320			1.153		0.00	50	7.3	6.8
	01/11/15	6.398	1.940	3.510	3.891	4.458	4.20	3.213		-	3464.4						-	4537.5						380			1.153		0.00	51	7.3	6.8
	01/12/15	6.549	1.750	3.613	3.776	4.380	4.20	3.288		-	3464.4						-	4537.5					3.7	420			1.159		0.46	50	7.3	6.8
	01/13/15	6.512	1.740	3.405	3.672	4.308	4.20	3.032	113.0	3208.9	3421.8			11.5	89.8%	131.0	3720.099	4374.0			6.0	95.4%	4.0	420	3225	2713	1.154	11236	0.00	48	7.6	6.8
	01/14/15	7.052	1.640	3.392	3.575	4.251	4.20	3.115	124.7	3527.7	3436.9			11.6	90.7%		-	4374.0					4.1	460			1.179		0.00	48	7.5	6.8
	01/15/15	6.070	1.730	3.414	3.524	4.193	4.20	2.990		-	3555.3						-	4802.0					4.8	420			1.173		0.00	48	7.4	6.8
	01/16/15	6.479	1.800	3.318	3.460	4.118	4.20	2.987		-	3675.5						-	4802.0					5.0	430			1.161		0.00	48	7.5	6.9
	01/17/15	5.606	1.440	3.169	3.403	4.059	4.20	2.463		-	3675.5						-	4802.0						430			1.170		0.00	47	7.2	6.9
	01/18/15	6.142	1.620	3.309	3.374	4.022	4.20	2.565		-	3675.5						-	4802.0						450			1.155		0.22	51	7.1	6.9
	01/19/15	5.849	1.640	3.285	3.327	3.989	4.20	2.512		-	3675.5						-	4802.0						390			1.164		0.00	50	7.0	6.8
	01/20/15	6.550	1.520	3.143	3.290	3.952	4.20	2.487	168.3	4411.6	3798.2			9.7	94.2%	164.0	4298.87	4701.4			6.0	96.3%	4.8	480	3511	2973	1.141	11140	0.00	48	9.0	6.9
	01/21/15	5.507	1.160	3.079	3.245	3.912	4.20	2.338		-	3798.2			9.1			-	4701.4					5.4	490			1.148		0.00	48	7.4	6.9
	01/22/15	6.128	1.310	3.096	3.200	3.845	4.20	2.365		-	3798.2						-	4115.0					5.6	450			1.141		0.00	49	7.6	6.9
	01/23/15	5.155	1.490	3.027	3.158	3.796	4.20	2.295		-	3798.2						-	4115.0					5.9	490			1.148		0.00	48	7.4	6.8
	01/24/15	7.634	1.390	3.513	3.207	3.753	4.20	2.744		-	3798.2						-	4115.0						390			1.167		0.84	50	7.5	7.0
	01/25/15	6.801	1.610	3.408	3.222	3.705	4.20	2.725		-	3798.2						-	4115.0						420			1.171		0.00	50	7.3	6.9
	01/26/15	5.686	1.840	3.346	3.230	3.659	4.20	2.648		-	3798.2						-	4115.0					5.6	480			1.157		0.00	47	9.3	6.9
	01/27/15	5.685	1.640	3.357	3.261	3.616	4.20	2.696	100.6	2816.5	3657.9						-	4115.0						450	3455	2915	1.172	10980	0.00	47	7.5	7.0
	01/28/15	6.929	1.870	3.324	3.296	3.582	4.20	2.581	135.7	3761.9	3670.9			11.4	91.6%	130.0	3603.881	4012.8			4.0	96.9%	6.9	480			1.145		0.00	46	7.6	6.8
	01/29/15	6.088	1.440	3.167	3.306	3.550	4.20	2.389		-	3713.4						-	4009.0					6.4	500			1.142		0.00	48	7.5	6.9
	01/30/15	7.131	1.460	3.224	3.334	3.522	4.20	2.493		-	3713.4						-	4009.0					4.4	490			1.149		0.45	48	7.5	6.8

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	01/31/15	5.687	1.610	3.152	3.283	3.495	4.20	2.398		-	3713.4						-	4009.0						500			1.180		0.00	45	7.2	6.9
Feb'15	02/01/15	6.871	1.460	3.098	3.238	3.472	4.20	2.300		-	3713.4						-	4009.0						560			1.194		0.34	48	7.2	7.0
	02/02/15	6.999	1.450	3.195	3.217	3.456	4.20	2.647		-	3713.4						-	4009.0						560			1.178		0.00	48	7.3	6.8
	02/03/15	5.720	1.250	2.999	3.166	3.409	4.20	2.704	127.3	3184.0	3647.2			9.8	92.3%	132.0	3301.539	3867.5			1.0	99.2%	5.8	540	3567	3015	1.174	11192	0.00	47	7.5	6.9
	02/04/15	5.950	1.340	3.200	3.148	3.369	4.20	2.854	152.0	4056.6	3692.7			8.3	94.5%		-	3867.5					4.8	530			1.195		0.00	48	7.5	6.9
	02/05/15	5.350	1.280	3.320	3.170	3.341	4.20	2.979		-	3595.3						-	3731.1					4.2	500			1.210		0.00	48	7.5	6.8
	02/06/15	5.206	1.360	2.987	3.136	3.305	4.20	2.650		-	3566.7						-	3731.1					4.8	450			1.212		0.00	46	7.3	6.8
	02/07/15	6.376	1.340	3.001	3.114	3.280	4.20	2.747		-	3566.7						-	3731.1						550			1.267		0.00	47	6.9	6.8
	02/08/15	6.274	1.210	2.985	3.098	3.254	4.20	2.526		-	3566.7						-	3731.1						620			1.262		0.00	48	6.9	6.7
	02/09/15	6.355	1.130	2.986	3.068	3.234	4.20	2.409		-	3566.7						-	3731.1						590			1.228		0.00	46	7.4	7.0
	02/10/15	4.300	1.230	4.060	3.220	3.252	4.20	3.558	140.7	4764.2	3716.4			7.0	95.0%	183.0	6196.453	4224.2			5.0	97.3%	3.9	540	3859	3263	1.253	10708	0.00	46	7.4	6.9
	02/11/15	5.213	1.340	2.912	3.179	3.229	4.20	2.284	132.7	3222.8	3661.6			15.4	88.4%		-	4224.2					4.7	540			1.247		0.00	46	7.7	6.9
	02/12/15	5.847	0.940	2.924	3.122	3.213	4.20	2.321		-	3718.1						-	4350.2					4.9	530			1.236		0.00	46	7.6	6.9
	02/13/15	5.534	1.290	2.671	3.077	3.189	4.20	2.141		-	3745.4						-	4350.2					4.9	500			1.238		0.00	44	7.5	7.1
	02/14/15	6.012	1.030	2.796	3.048	3.168	4.20	2.119		-	3745.4						-	4350.2						540			1.247		0.57	45	7.3	7.1
	02/15/15	5.260	1.290	2.838	3.027	3.152	4.20	2.110		-	3745.4						-	4350.2						550			1.267		0.00	45	7.3	6.9
	02/16/15	6.527	1.320	2.859	3.009	3.142	4.20	2.213		-	3745.4						-	4350.2						590			1.270		0.00	46	7.1	6.9
	02/17/15	5.538	1.240	2.913	2.845	3.129	4.20	2.206	134.3	3262.7	3685.0			11.0	91.8%	160.0	3887.107	4257.6			3.0	98.1%	4.6	580	4102	3466	1.255	10884	0.00	44	7.6	6.9
	02/18/15	6.274	1.070	2.942	2.849	3.117	4.20	2.137		-	3685.0						-	4257.6					5.5	600			1.251		0.00	45	7.4	6.9
	02/19/15	6.057	1.220	2.978	2.857	3.112	4.20	2.131		-	3581.2						-	4247.2					5.3	560			1.239		0.00	46	8.0	6.9
	02/20/15	6.321	0.850	2.834	2.880	3.104	4.20	2.138		-	3581.2						-	4247.2					5.6	610			1.229		0.00	44	7.4	6.9
	02/21/15	5.896	0.910	2.906	2.896	3.097	4.20	2.324		-	3581.2						-	4247.2						590			1.244		0.69	47	7.3	6.9
	02/22/15	7.485	1.840	3.492	2.989	3.113	4.20	2.950		-	3581.2						-	4247.2						380			1.254		0.00	47	7.1	6.9
	02/23/15	6.239	1.340	3.141	3.029	3.101	4.20	2.545		-	3581.2						-	4247.2					4.9	500			1.243		0.00	46	7.5	6.9
	02/24/15	5.609	0.910	3.097	3.056	3.090	4.20	2.519	131.0	3383.6	3556.5			9.9	92.4%	164.0	4235.953	4245.0			4.0	97.6%	6.4	560	4114	3433	1.235	11496	0.00	45	7.6	6.8
	02/25/15	7.269	1.560	3.194	3.092	3.085	4.20	2.464		-	3556.5						-	4245.0					5.6	500			1.228		0.00	46	7.4	6.9
	02/26/15	6.748	1.580	3.129	3.113	3.077	4.20	2.384		-	3662.2						-	4245.0					6.0	490			1.217		0.00	45	7.5	6.8
	02/27/15	6.554	1.370	3.032	3.142	3.068	4.20	2.324		-	3645.6						-	4405.3					6.0	890			1.226		0.00	48	7.2	6.7
	02/28/15	5.940	1.050	3.057	3.163	3.064	4.20	2.374		-	3645.6						-	4405.3						540			1.252		0.00	47	7.1	6.8
Mar'15	03/01/15	5.940	1.580	3.127	3.111	3.061	4.20	2.475		-	3645.6						-	4405.3						610			1.245		0.71	48	7.1	6.8
	03/02/15	5.547	1.650	3.148	3.112	3.061	4.20	2.386		-	3645.6						-	4405.3					5.0	550			1.230		0.00	49	7.2	7.0
	03/03/15	5.608	1.130	3.023	3.101	3.058	4.20	2.357	123.0	3101.1	3567.8			7.0	94.3%	307.0	7740.029	5072.2			4.0	98.7%	6.1	500	4141	3469	1.252	11632	0.44	49	7.2	6.9
	03/04/15	6.319	0.650	3.453	3.138	3.067	4.20	2.736	80.0	2303.8	3409.8			5.1	93.6%		-	5072.2					5.1	400			1.251		0.34	49	7.1	7.0
	03/05/15	6.080	2.470	3.675	3.216	3.089	4.20	3.081		-	3442.1						-	5514.9					4.8	360			1.250		0.41	47	7.1	6.7
	03/06/15	7.060	2.140	3.707	3.313	3.106	4.20	2.981		-	3339.7						-	5514.9					5.6	380			1.252		0.00	49	7.2	6.8
	03/07/15	8.453	1.870	3.762	3.414	3.121	4.20	3.049		-	3339.7						-	5514.9						390			1.262		0.00	47	7.2	6.8
	03/08/15	7.956	2.230	3.944	3.530	3.153	4.20	3.228		-	3339.7						-	5514.9						360			1.270		0.00	47	6.7	6.7
	03/09/15	7.275	2.300	3.853	3.631	3.181	4.20	3.199		-	3339.7						-	5514.9					4.8	440			1.202		0.00	48	7.1	6.7
	03/10/15	8.045	2.480	4.297	3.813	3.225	4.20	3.658	92.7	3322.1	3337.2			16.2	82.5%	125.0	4479.623	5307.8			6.0	95.2%	4.9	400	3585	2996	1.254	13152	0.48	48	9.1	6.8
	03/11/15	10.990	3.970	6.674	4.273	3.348	4.20	6.309	59.3	3300.7	3332.6			13.5	77.2%		-	5307.8					3.5	260			1.235		0.00	47	7.0	6.7
	03/12/15	10.756	5.390	7.077	4.759	3.449	4.20	7.026		-	3128.1						-	5085.7					5.3	210			1.185		0.00	45	7.0	6.6
	03/13/15	10.748	4.860	6.744	5.193	3.576	4.20	6.744		-	3112.3						-	5085.7					5.6	220			1.286		0.00	45	7.0	6.7
	03/14/15	13.595	4.964	8.369	5.851	3.758	4.20	8.369		-	3112.3						-	5085.7						220			1.393		1.00	47	6.9	6.7
	03/15/15	13.545	8.132	10.575	6.798	4.021	4.20	10.575		-	3112.3						-	5085.7						160			1.058		0.00	47	6.9	6.5
	03/16/15	13.332	6.880	9.066	7.543	4.230	4.20	9.066		-	3112.3						-	5085.7					6.9	170			0.991		0.00	45	7.1	6.6
	03/17/15	12.715	6.401	8.647	8.165	4.424	4.20	8.647	50.5	3641.9	3188.0			11.7	76.8%	50.0	3605.799	4789.7			8.0	84.0%	7.3	190	1866		0.951	17948	0.22	45	6.8	6.5
	03/18/15	12.525	5.863	8.086	8.366	4.598	4.20	7.993	42.0	2832.4	3143.5						-	4789.7					7.7	200			0.945		0.00	45	7.1	6.6
	03/19/15	11.307	5.771	7.205	8.385	4.741	4.20	6.960		-	3126.5						-	5015.4					7.8	200			0.927		0.00	45	7.1	6.5
	03/20/15	10.281	5.136	6.642	8.370	4.864	4.20	6.478		-	3126.5						-	5015.4					8.1	220			0.945		0.00	45	7.0	6.4
	03/21/15	9.512	4.990	6.434	8.094	4.980	4.20	6.258		-	3126.5						-	5015.4						220			0.974		0.15	47	6.7	6.6
	03/22/15	9.411	4.601	6.058	7.448	5.087	4.20	5.972		-	3126.5						-	5015.4						240			0.978		0.00	47	7.1	6.8
	03/23/15	8.686	4.202	5.598	6.953	5.177	4.20	5.461		-	3126.5						-	5015.4					7.1	270			0.983		0.00	46	6.9	6.4
	03/24/15	9.179	3.975	5.165	6.455	5.233	4.20	4.979	61.3	2640.6	3065.8			13.1	78.6%	91.0	3919.925	4796.3			6.0	93.4%	6.8	280	2891	2398	0.977	16272	0.00	46	7.3	6.5
	03/25/15	7.693	3.807	5.298	6.057	5.305	4.20	5.081	62.7	2770.4	3032.9			20.9	66.7%		-	4796.3					7.2	280			1.059		0.00	48	7.1	6.6
	03/26/15	9.146	3.880	5.970	5.881	5.400	4.20	5.780		-	2989.1						-	4936.3					7.9	290			1.129		1.47	47	7.1	6.5
	03/27/15	10.052	6.273	7.762	6.041	5.553	4.20	7.660		-	2989.1						-	4936.3					7.1	230			1.158		0.15	46	8.4	6.5
	03/28/15	9.770	6.100	7.482	6.190	5.698	4.20	7.268		-	2989.1						-	4936.3						240			1.208		0.20	48	6.7	6.7
	03/29/15	9.910	6.084	7.206	6.354	5.837	4.20	6.941		-	2989.1						-	4936.3						230			1.199		0.00	48	6.7	6.5
	03/30/15	9.439	5.290	6.946	6.547	5.966	4.20	6.541		-	2989.1						-	4936.3					5.8	240			1.225		0.00	47	6.9	6.4
	03/31/15	8.743	4.663	6.386	6.721	6.075	4.20	5.819	57.3	3051.8	2996.1			17.3	69.8%	67.0	3568.369	4662.7			7.0	89.6%	6.8	270	2434	2019	1.250	13556	0.00	48	6.9	6.5
Apr'15	04/01/15	8.360	4.788	6.015	6.824	6.171	4.20	5.379	60.3	3025.0	2999.0			13.5	77.6%		-	4662.7					6.6	280			1.271		0.00	48	6.9	6.5
	04/02/15	7.567	4.003	5.559	6.765	6.255	4.20	5.376		-	2987.6						-	3893.4					7.3	290			1.286		0.00	48	7.2	6.9
	04/03/15	7.877	4.216	5.568	6.452	6.326	4.20	5.568		-	3073.1						-	3893.4						300			1.300		0.43	48	7.0	6.8
	04/04/15	8.029	4.355	5.551	6.176	6.388	4.20	5.551		-	3073.1						-	3893.4						300			1.316		0.00	50	7.1	6.8
	04/05/15	7.584	3.567	5.163	5.884	6.437	4.20	5.163		-	3073.1						-	3893.4						300			1.320		0.14	50	7.1	6.7
	04/06/15	7.766	3.766	5.017	5.608	6.479	4.20	5.017		-	3073.1						-	3893.4					5.9	320			1.333		0.00	49	7.1	6.8
	04/07/15	6.879	3.316	4.890	5.395	6.510	4.20	4.890	83.0	3385.0	3107.7			19.8	76.1%	100.0	4078.26	3930.4			5.0	95.0%	6.6	320	2898	2362	1.339	11732	0.38	48	7.4	6.8
	04/08/15	6.806	3.211	4.817	5.224	6.542	4.20	4.801	67.3	2703.7	3067.3			17.7	73.7%		-	3930.4					7.0	340			1.355		0.21	48	7.5	7.1
	04/09/15	6.514	3.390	4.885	5.127	6.562	4.20	4.885		-	3039.0						-	3793.1					7.4	330			1.372		0.03	48	7.3	6.9
	04/10/15	7.083	3.082	4.950	5.039	6.504	4.20	4.950		-	3006.3						-	3793.1					6.8	320			1.366		0.09	49	7.2	6.9
	04/11/15	7.248	3.033	4.798	4.931	6.428	4.20	4.798		-	3006.3						-	3793.1						310			1.381		0.00	50	7.1	6.9
	04/12/15	6.412	3.077	4.568	4.846	6.356	4.20	4.568		-	3006.3						-	3793.1						350			1.384		0.00	51	7.0	6.6
	04/13/15	6.361	2.810	4.412	4.760	6.224	4.20	4.412		-	3006.3						-	3793.1					5.7	350			1.368		0.00	52	7.3	6.8
	04/14/15	6.750	2.846	4.287	4.674	6.014	4.20	4.287	76.7	2742.3	2977.0			12.7	83.4%	96.0	3432.344	3720.9			2.0	97.9%	6.2	350	3041	2480	1.377	11316	0.00	50	8.9	6.9
	04/15/15	6.048	2.716	4.229	4.590	5.853	4.20	4.229	84.0	2962.7	2975.6			18.1	78.5%		-	3720.9					5.7	400			1.374		0.00	52	9.1	7.0
	04/16/15			4.008	4.465	5.699	4.20	4.008		-	2901.5						-	3749.7					5.8	410			1.413		0.00	51	7.4	7.0

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	04/17/15	6.350	2.398	4.224	4.361	5.570	4.20	4.224		-	2910.2						-	3749.7					5.5	380			1.395		0.27	51	7.3	7.0
	04/18/15	6.282	2.524	4.038	4.252	5.464	4.20	4.038		-	2910.2						-	3749.7						350			1.401		0.00	52	7.1	7.0
	04/19/15	5.743	2.223	3.849	4.150	5.371	4.20	3.849		-	2910.2						-	3749.7						440			1.431		0.00	51	7.0	6.7
	04/20/15			3.222	3.980	5.264	4.20	3.222		-	2910.2						-	3749.7						440			1.164		0.60	51	7.0	6.7
	04/21/15	6.831	2.363	6.334	4.272	5.273	4.20	6.334	90.3	4770.1	3116.8			19.7	78.2%	146.0	7712.532	4542.3			1.0	99.3%	4.1	350	2974	2447	2.135	11032	0.11	53	7.2	6.7
	04/22/15	9.112	2.819	4.132	4.258	5.224	4.20	4.132	88.3	3042.9	3109.4			23.4	73.5%		-	4542.3					3.7	380			1.385		0.06	55	7.3	6.8
	04/23/15	6.202	2.676	4.045	4.263	5.187	4.20	4.045		-	3161.5						-	4697.9					4.6	400			1.395		0.00	52	7.4	6.9
	04/24/15	6.536	2.447	3.900	4.217	5.140	4.20	3.900		-	3210.4						-	4697.9					4.5	400			1.382		0.00	50	7.3	6.8
	04/25/15	5.829	2.289	3.821	4.186	5.069	4.20	3.821		-	3210.4						-	4697.9						400			1.404		0.00	50	7.2	6.9
	04/26/15	5.727	2.360	3.806	4.180	4.937	4.20	3.806		-	3210.4						-	4697.9						400			1.416		0.00	53	7.2	6.8
	04/27/15	6.015	2.103	3.675	4.245	4.810	4.20	3.675		-	3210.4						-	4697.9					3.8	420			1.404		0.20	52	7.3	6.9
	04/28/15	5.940	2.033	3.608	3.855	4.690	4.20	3.608	100.0	3009.1	3188.0			30.5	69.5%	111.0	3340.07	4426.3			8.0	92.8%	4.4	370	3198		1.375	10624	0.00	52	7.4	6.9
	04/29/15	5.763	1.940	3.525	3.769	4.576	4.20	3.525	103.8	3051.6	3174.4			18.3	82.4%		-	4426.3					4.4	410			1.373		0.00	55	7.4	6.7
	04/30/15	6.393	1.873	3.515	3.693	4.480	4.20	3.515		-	3188.0						-	4640.8					4.8	410			1.377		0.00	52	7.4	6.5
May'15	05/01/15	6.577	1.690	3.370	3.617	4.392	4.20	3.370		-	3208.4						-	4640.8					4.5	450			1.387		0.00	52	7.4	6.5
	05/02/15	5.678	1.937	3.329	3.547	4.318	4.20	3.329		-	3208.4						-	4640.8						430			1.412		0.00	54	7.3	6.3
	05/03/15	5.632	1.714	3.294	3.474	4.242	4.20	3.294		-	3208.4						-	4640.8						450			1.440		0.00	54	7.2	6.4
	05/04/15	6.560	1.773	3.218	3.408	4.164	4.20	3.218		-	3208.4						-	4640.8					3.6	440			1.399		0.00	56	8.1	6.7
	05/05/15	7.564	1.652	3.230	3.354	4.100	4.20	3.230	135.5	3650.1	3257.5			17.5		157.0	4229.297	4558.5			18.0	88.5%	3.6	400	3265	2694	1.371	9916	0.00	57	7.4	6.6
	05/06/15	6.089	1.683	3.041	3.285	4.034	4.20	3.014		-	3257.5						-	4558.5						450			1.414		0.00			
	05/07/15	6.070	1.483	3.041	3.218	3.972	4.20	3.040		-	3241.6						-	4678.6					4.2	460			1.407		0.00	58	7.4	6.9
	05/08/15	5.401	1.480	2.982	3.162	3.911	4.20	2.982		-	3318.4						-	4678.6					4.3	470			1.408		0.00	58	7.5	6.7
	05/09/15	6.068	1.457	2.975	3.112	3.848	4.20	2.975		-	3318.4						-	4678.6						440			1.419		0.00	55	7.2	6.5
	05/10/15	6.402	1.480	3.007	3.071	3.783	4.20	2.998		-	3318.4						-	4678.6						440			1.419		0.00	57	6.9	6.5
	05/11/15	5.619	1.404	2.972	3.035	3.722	4.20	2.927		-	3318.4						-	4678.6					3.9	460			1.427		0.00	59	7.4	6.9
	05/12/15	6.092	1.218	3.029	3.007	3.671	4.20	2.935	122.0	3081.9	3288.8			35.9	70.6%	136.0	3435.613	4430.0			25.0	81.6%	4.1	560	3214	2584	1.410	9588	0.21	57	7.5	6.9
	05/13/15	6.090	1.233	2.961	2.995	3.622	4.20	2.961	137.5	3395.5	3300.7			22.8	83.4%		-	4430.0					4.4	540			1.396		0.00	58	7.4	6.8
	05/14/15	5.268	1.196	2.886	2.973	3.576	4.20	2.886		-	3370.5						-	4679.4					4.2	600			1.390		0.00	58	7.6	6.7
	05/15/15	6.097	1.360	2.904	2.962	3.531	4.20	2.904		-	3428.8						-	4679.4					4.1	420			1.373		0.00	58	7.5	6.2
	05/16/15	4.750	1.056	2.887	2.949	3.494	4.20	2.887		-	3428.8						-	4679.4						440			1.396		0.07	57	7.2	6.3
	05/17/15	4.982	1.253	2.888	2.932	3.449	4.20	2.888		-	3428.8						-	4679.4						450			1.420		0.00	58	7.1	6.4
	05/18/15	6.546	1.103	2.848	2.915	3.410	4.20	2.848		-	3428.8						-	4679.4					3.9	470			1.396		0.00	57	7.4	6.6
	05/19/15	5.740	1.167	2.961	2.905	3.380	4.20	2.961	157.5	3889.4	3486.3			35.7	77.3%	152.0	3753.6	4494.2			25.0	83.6%	4.0	450	2941	2447	1.398	8076	0.62	57	7.5	6.8
	05/20/15	6.413	0.985	2.843	2.888	3.368	4.20	2.843	148.3	3516.3	3489.7			21.8	85.3%		-	4494.2					4.1	410			1.400		0.00	58	7.6	6.8
	05/21/15	6.738	1.197	2.696	2.861	3.246	4.20	2.696		-	3329.6						-	3689.6					4.4	410			1.405		0.09	60	7.6	6.7
	05/22/15	4.723	1.133	2.632	2.822	3.196	4.20	2.632		-	3370.6						-	3689.6					3.7	390			1.451		0.00	61	7.5	6.3
	05/23/15	4.400	1.051	2.545	2.773	3.146	4.20	2.545		-	3370.6						-	3689.6						500			1.450		0.00	59	7.4	6.7
	05/24/15	4.590	1.152	2.502	2.718	3.100	4.20	2.502		-	3370.6						-	3689.6						500			1.431		0.00	60	7.5	6.8
	05/25/15	5.702	0.918	2.639	2.688	3.060	4.20	2.639		-	3370.6						-	3689.6						640			1.416		0.00	59	7.1	6.6
	05/26/15	5.126	0.963	2.614	2.639	3.021	4.20	2.614	172.5	3760.6	3419.3			22.5	87.0%	199.0	4338.351	3819.4			6.0	97.0%	4.1	530	3237	2715	1.455	7952	0.00	60	7.4	6.9
	05/27/15	6.240	1.020	2.580	2.601	2.984	4.20	2.580	161.0	3464.3	3424.3						-	3819.4					4.3	470			1.413		0.00	60	7.5	6.9
	05/28/15	5.382	1.178	2.550	2.580	2.949	4.20	2.550		-	3476.2						-	3939.2					4.4	470			1.378		0.00	60	7.6	6.9
	05/29/15	4.404	0.963	2.568	2.571	2.917	4.20	2.568		-	3536.9						-	3939.2					3.8	440			1.399		0.00	63	7.5	7.0
	05/30/15	4.540	1.183	2.574	2.575	2.886	4.20	2.574		-	3536.9						-	3939.2						390			1.424		0.00	61	7.3	6.9
	05/31/15	4.795	1.059	2.803	2.618	2.867	4.20	2.803		-	3536.9						-	3939.2						430			1.457		0.81	61	7.0	6.9
Jun'15	06/01/15	6.266	1.023	2.675	2.623	2.845	4.20	2.675		-	3536.9						-	3939.2					3.8	420			1.444		0.63	59	7.5	7.0
	06/02/15	5.734	1.255	2.828	2.654	2.829	4.20	2.828	160.0	3773.7	3566.5			29.9	81.3%	200.0	4717.104	4094.8			10.0	95.0%	3.8	390	3014	2529	1.483	7948	0.15	59	7.5	6.9
	06/03/15	4.502	1.209	2.641	2.663	2.810	4.20	2.641	138.5	3050.6	3509.2			15.8	88.6%		-	4094.8					4.1	380			1.411		0.00	60	7.5	6.9
	06/04/15	4.841	1.180	2.656	2.678	2.791	4.20	2.656		-	3491.5						-	4061.2					3.8	360			1.490		0.00	63	7.5	6.9
	06/05/15	6.042	1.243	2.663	2.691	2.778	4.20	2.663		-	3491.5						-	4061.2					3.6	350			1.402		0.00	62	7.5	6.9
	06/06/15	4.502	1.040	2.606	2.696	2.764	4.20	2.606		-	3491.5						-	4061.2						430			1.457		0.00	62	7.6	6.8
	06/07/15	4.559	1.082	2.577	2.664	2.750	4.20	2.577		-	3491.5						-	4061.2						450			1.461		0.00	62	7.3	6.7
	06/08/15	5.629	1.040	2.539	2.644	2.736	4.20	2.539		-	3491.5						-	4061.2					3.9	450			1.505		0.00	61	7.4	6.8
	06/09/15	6.121	1.010	2.529	2.602	2.720	4.20	2.529	211.5	4460.9	3599.3					224.0	4724.577	4193.8			10.0	95.5%	4.0	490	2831	2368	1.452	7692	0.01	61	7.6	7.0
	06/10/15	5.886	1.009	2.468	2.577	2.703	4.20	2.468	156.5	3221.3	3561.5			14.1	91.0%		-	4193.8					4.1	500			1.448		0.00	62	7.6	6.8
	06/11/15	5.427	..891	2.427	2.544	2.683	4.20	2.427		-	3614.7						-	4383.4					4.5	480			1.467		0.00	64	7.6	7.0
	06/12/15	4.892	0.840	2.396	2.506	2.664	4.20	2.396		-	3642.1						-	4383.4					4.0	440			1.454		0.00	65	7.6	7.0
	06/13/15	4.355	0.933	2.372	2.473	2.647	4.20	2.372		-	3642.1						-	4383.4						400			1.504		0.00	64	7.1	7.1
	06/14/15	4.614	0.886	2.333	2.438	2.628	4.20	2.333		-	3642.1						-	4383.4						530			1.506		0.00	65	7.1	7.0
	06/15/15	5.873	0.638	2.564	2.441	2.617	4.20	2.564		-	3642.1						-	4383.4					3.6	540			1.500		0.90	61	7.4	7.1
	06/16/15	5.642	0.912	2.528	2.441	2.605	4.20	2.528	161.7	3409.2	3616.3			32.9	79.7%	189.0	3984.785	4303.7			9.0	95.2%	3.4	500	3010	2527	1.481	7180	0.00	62	7.6	7.2
	06/17/15	5.502	0.974	2.412	2.433	2.591	4.20	2.412	160.3	3224.6	3577.1			25.1	84.3%		-	4303.7					4.2	570			1.511		0.00	63	7.3	6.9
	06/18/15	5.298	0.817	2.466	2.439	2.574	4.20	2.466		-	3542.4						-	4441.2					4.2	550			1.510		0.00	62	7.5	6.8
	06/19/15	4.849	0.613	2.312	2.427	2.557	4.20	2.312		-	3545.6						-	4441.2					4.0	580			1.512		0.00	65	7.5	6.8
	06/20/15	5.566	0.904	2.363	2.425	2.545	4.20	2.363		-	3545.6						-	4441.2						520			1.525		0.26	63	7.3	6.6
	06/21/15	6.344	0.834	2.608	2.465	2.545	4.20	2.608		-	3545.6						-	4441.2						600			1.539		0.51	66	7.1	6.8
	06/22/15	5.835	0.883	2.413	2.443	2.540	4.20	2.413		-	3545.6						-	4441.2					3.8	570			1.539		0.00	64	7.5	7.1
	06/23/15	4.436	0.848	2.372	2.421	2.536	4.20	2.372	160.0	3165.2	3503.4			25.6	84.0%	204.0	4035.626	4360.1			1.0	99.5%	3.8	620	3315	2809	1.546	7780	0.08	66	7.3	7.0
	06/24/15	4.410	0.743	2.368	2.415	2.527	4.20	2.368	158.3	3126.3	3465.7			20.6	87.0%		-	4360.1					3.7	550			1.537		0.00	64	7.4	7.1
	06/25/15	4.632	0.826	2.342	2.397	2.518	4.20	2.342		-	3432.9						-	4365.5					3.0	630			1.361		0.00	64	7.3	6.9
	06/26/15	4.531	0.600	2.364	2.404	2.511	4.20	2.364		-	3429.0						-	4365.5					2.8	460			0.882		0.00	65	7.3	6.4
	06/27/15	5.648	0.750	2.270	2.391	2.501	4.20	2.270		-	3429.0						-	4365.5						430			0.756		0.92	64	7.3	6.5
	06/28/15	5.586	0.925	2.662	2.399	2.504	4.20	2.662		-	3429.0						-	4365.5						390			0.751		0.08	64	7.2	6.6
	06/29/15	6.221	1.037	2.456	2.405	2.500	4.20	2.456		-	3429.0						-	4365.5					3.6	410			0.728		0.00	63	7.2	6.7
	06/30/15	6.194	0.769	2.365	2.404	2.486	4.20	2.365		-	3429.0					202.0	3984.268	4289.3			12.0	94.1%	3.6	420	3174	2668	0.731	10884	0.00	6	7.3	6.5
Jul'15	07/01/15	5.374	0.973	2.570	2.433	2.482	4.20	2.570	155.6	3335.1	3418.5			5.5	96.5%		-	4289.3					3.4	440			0.731		0.78	64	7.3	6.4

Somerset WPCF Daily Data
2013-2018

	DATE	Sewage Flows(mgd) Max	Min	Influent Flow ADF	Influent Flow 7-Day	Influent Flow 30-Day	NPDES Permit Flow	Effluent Flow	BOD raw mg/L	BOD raw LBD	BOD raw 30D MA	BOD pri eff	BOD % Pri	BOD final	BOD % Tot	TSS raw	TSS raw LBD	TSS raw 30D MA	TSS pri eff	TSS % Pri	TSS final	TSS % Tot	Aeration Tanks final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Weather Rain	Inf Temp	pH Influent Hi	pH Effluent Low
	07/02/15	5.353	0.816	2.495	2.455	2.471	4.20	2.495		-	3374.1						-	4182.3					3.0	380			0.803		0.00	65	7.0	6.3
	07/03/15	6.240	0.900	2.515	2.476	2.467	4.20	2.515		-	3420.4						-	4182.3					3.2	390			0.740		0.00	65	7.0	6.4
	07/04/15	4.705	1.030	2.391	2.493	2.458	4.20	2.391		-	3420.4						-	4182.3						390			0.753		0.00	66	7.1	6.6
	07/05/15	4.545	0.831	2.372	2.452	2.449	4.20	2.372		-	3420.4						-	4182.3						440			0.743		0.00	65	7.1	6.7
	07/06/15	4.213	0.823	2.391	2.443	2.441	4.20	2.391		-	3420.4						-	4182.3						430			0.727		0.00	65	7.0	6.6
	07/07/15	5.334	0.833	2.467	2.457	2.438	4.20	2.467		-	3420.4					184.0	3785.76	4103.0			7.0	96.2%	3.4	450	3196	2668	0.722	10660	0.00	66	7.1	6.5
	07/08/15	6.318	0.870	2.516	2.450	2.437	4.20	2.516	172.5	3619.6	3445.3			14.9	91.4%		-	4103.0					3.2	460			0.722		0.43	68	7.1	6.5
	07/09/15	6.061	0.723	2.333	2.426	2.430	4.20	2.333		-	3300.2						-	3947.6					3.6	470			0.730		0.13	68	7.2	6.6
	07/10/15	4.922	0.850	2.363	2.405	2.427	4.20	2.363		-	3313.3						-	3947.6					3.6	500			0.737		0.00	67	7.1	6.7
	07/11/15	5.555	0.869	2.278	2.389	2.422	4.20	2.278		-	3313.3						-	3947.6						480			0.758		0.00	69	7.0	6.7
	07/12/15	4.771	0.727	2.264	2.373	2.418	4.20	2.264		-	3313.3						-	3947.6						520			0.747		0.00	69	7.2	6.7
	07/13/15	4.978	0.790	2.256	2.354	2.414	4.20	2.256		-	3313.3						-	3947.6					3.7	530			0.719		0.00	68	7.0	6.7
	07/14/15	6.073	0.859	2.369	2.340	2.415	4.20	2.369	183.3	3621.5	3357.4			10.6	94.2%	205.0	4050.279	3968.1			2.0	99.0%	3.7	470	3269	2717	0.667	10964	0.53	70	7.0	6.8
	07/15/15	5.996	0.680	2.354	2.317	2.408	4.20	2.354	159.4	3129.4	3328.9			13.4	91.6%		-	3968.1					3.0	510			0.640		1.09	69	7.1	6.7
	07/16/15	4.221	,567	2.213	2.300	2.397	4.20	2.213		-	3317.4						-	3964.0					3.3	450			0.640		0.00	70	7.1	6.8
	07/17/15	6.890	0.582	2.215	2.278	2.391	4.20	2.109		-	3332.9						-	3964.0					3.2	500			0.734		0.00	69	7.1	6.9
	07/18/15	4.169	0.693	2.243	2.273	2.383	4.20	2.217		-	3332.9						-	3964.0						500			0.624		0.00	67	7.2	6.8
	07/19/15	4.376	0.650	2.260	2.273	2.382	4.20	2.084		-	3332.9						-	3964.0						540			0.631		0.00	69	7.1	6.8
	07/20/15	4.779	0.660	2.304	2.280	2.380	4.20	2.129		-	3332.9						-	3964.0					3.3	460			0.630		0.00	71	7.0	6.8
	07/21/15	6.666	0.887	2.292	2.269	2.369	4.20	1.865		-	3332.9						-	3964.0					3.2	480	3149	2614	0.623	11384	0.00	70	7.1	6.8
	07/22/15	5.764	0.781	2.269	2.257	2.364	4.20	1.812		-	3332.9					195.0	3690.075	3909.2			6.0	96.9%	2.9	480			0.619		0.00	70	7.2	7.1
	07/23/15	5.216	0.780	2.219	2.257	2.359	4.20	1.790		-	3366.4						-	3877.6					3.0	540			0.623		0.00	71	7.2	6.9
	07/24/15	3.969	0.567	2.229	2.259	2.355	4.20	2.009		-	3426.4						-	3877.6					2.7	460			0.694		0.02	70	7.2	6.9
	07/25/15	4.041	0.723	2.245	2.260	2.351	4.20	2.159		-	3426.4						-	3877.6						430			0.617		0.00	67	7.1	6.8
	07/26/15	4.242	0.777	2.258	2.259	2.348	4.20	2.219		-	3426.4						-	3877.6						440			0.614		1.28	68	7.1	6.9
	07/27/15	5.359	1.116	2.706	2.317	2.362	4.20	2.566		-	3426.4						-	3877.6					2.6	310			0.577		0.35	70	7.1	7.0
	07/28/15	6.579	0.893	2.683	2.373	2.363	4.20	2.308	174.4	3902.4	3521.6			35.4	79.7%	279.0	6242.965	4350.7			14.0	95.0%	3.2	440	3102	2571	0.566	12536	1.25	68	7.4	7.0
	07/29/15	4.377	0.891	2.563	2.415	2.367	4.20	2.359	150.8	3223.4	3471.9			33.0	78.1%		-	4350.7					3.1	400			0.554		0.00	70	7.2	6.8
	07/30/15	6.481	0.993	2.628	2.473	2.375	4.20	2.415		-	3471.9						-	4442.3					3.0	400			0.555		0.13	70	7.7	6.9
	07/31/15	4.505	0.820	2.581	2.523	2.376	4.20	2.223		-	3499.3						-	4442.3					2.4	420			0.575		0.00	72	7.2	6.9
Aug'15	08/01/15	4.293	0.757	2.503	2.560	2.376	4.20	2.418		-	3499.3						-	4442.3						420			0.587		0.15	71	7.4	7.0
	08/02/15	4.427	0.823	2.409	2.582	2.372	4.20	2.409		-	3499.3						-	4442.3						470			0.575		0.00	72	7.1	6.8
	08/03/15	6.242	0.833	2.538	2.558	2.377	4.20	2.538		-	3499.3						-	4442.3					3.1	450			0.562		0.00	72	7.1	6.8
	08/04/15	9.990	0.923	2.896	2.588	2.395	4.20	2.896	120.0	2898.3	3399.1			9.7	91.9%	161.0	3888.575	4331.5			4.0	97.5%	2.8	420	2355	1971	0.719	13632	1.70	72	7.1	6.9
	08/05/15	5.653	0.923	2.595	2.593	2.402	4.20	2.570	149.7	3239.9	3376.4			17.0	88.6%		-	4331.5					2.7	500			0.801		0.00	72	7.2	6.6
	08/06/15	6.350	1.043	2.582	2.586	2.405	4.20	2.582		-	3376.4						-	4468.0					2.6	530			0.804		0.00	72	7.2	6.7
	08/07/15	6.313	0.897	2.549	2.582	2.407	4.20	2.549		-	3335.8						-	4468.0					2.9	530			0.806		0.00	72	7.2	6.9
	08/08/15	4.334	0.743	2.405	2.568	2.409	4.20	2.405		-	3335.8						-	4468.0						510			0.814		0.00	69	7.1	6.8
	08/09/15	4.576	0.839	2.411	2.568	2.411	4.20	2.411		-	3335.8						-	4468.0						550			0.803		0.00	69	7.1	6.7
	08/10/15	4.897	0.852	2.459	2.557	2.417	4.20	2.459		-	3335.8						-	4468.0					2.8	520			0.778		0.00	70	7.2	6.8
	08/11/15	5.291	0.783	2.632	2.519	2.429	4.20	2.632	161.1	3536.3	3364.5			15.0	90.7%	175.0	3841.404	4342.7			3.0	98.3%	2.6	530	3461	2834	0.771	8980	1.05	70	7.2	6.8
	08/12/15	4.503	1.013	2.563	2.514	2.439	4.20	2.563	140.0	2992.6	3318.0			10.0	92.9%		-	4342.7					2.7	440			0.771		0.00	71	7.1	6.8
	08/13/15	4.486	0.882	2.496	2.502	2.443	4.20	2.496		-	3274.6						-	4415.8					2.8	440			0.772		0.00	71	7.3	6.7
	08/14/15	4.278	0.967	2.411	2.482	2.445	4.20	2.411		-	3298.8						-	4415.8					3.0	420			0.767		0.00	71	7.1	6.7
	08/15/15	4.143	0.826	2.369	2.477	2.450	4.20	2.369		-	3298.8						-	4415.8						430			0.705		0.00	70	7.2	6.7
	08/16/15	4.299	0.839	2.331	2.466	2.454	4.20	2.297		-	3298.8						-	4415.8						500			0.692		0.00	71	7.1	6.6
	08/17/15	5.674	0.633	2.320	2.446	2.457	4.20	2.202		-	3298.8						-	4415.8					3.3	480			0.666		0.00	73	7.2	6.8
	08/18/15	6.302	0.737	2.325	2.402	2.459	4.20	2.095	206.0	3994.4	3398.2			35.3	82.9%	245.0	4750.673	4482.7			15.0	93.9%	4.3	470	3059	2503	0.688	11120	0.00	71	7.3	6.9
	08/19/15	4.605	0.893	2.375	2.375	2.461	4.20	2.288	174.0	3446.5	3404.2			9.6	94.5%		-	4482.7					3.5	460			0.675		0.00	71	7.4	6.7
	08/20/15	5.435	0.963	2.355	2.355	2.464	4.20	2.355		-	3404.2						-	4482.7					2.5	410			0.689		0.00	72	7.2	6.7
	08/21/15	5.270	0.710	2.395	2.353	2.468	4.20	2.395		-	3404.2						-	4680.9					2.9	400			0.703		0.16	72	7.3	6.5
	08/22/15	4.294	0.861	2.330	2.347	2.471	4.20	2.330		-	3404.2						-	4680.9						500			0.733		0.00	71	7.3	6.6
	08/23/15	4.556	0.791	2.314	2.345	2.474	4.20	2.314		-	3404.2						-	4680.9						530			0.739		0.00	71	7.3	6.8
	08/24/15	6.240	0.768	2.322	2.345	2.477	4.20	2.322		-	3404.2						-	4680.9					3.6	520			0.706		0.00	70	7.1	6.9
	08/25/15	6.047	0.787	2.265	2.337	2.477	4.20	2.265	252.5	4769.8	3555.9			11.6	95.4%	336.0	6347.074	5014.1			7.0	97.9%	3.4	420	2952	2431	0.691	10748	0.43	72	7.3	6.7
	08/26/15	5.603	0.993	2.388	2.338	2.466	4.20	2.388	176.0	3505.2	3550.9			8.5	95.2%		-	5014.1					3.4	440			0.690		0.00	72	7.3	6.9
	08/27/15	4.513	0.660	2.241	2.322	2.452	4.20	2.241		-	3511.8						-	4706.9						460			0.677		0.00	73	7.2	6.6
	08/28/15	5.154	0.789	2.169	2.290	2.439	4.20	2.169		-	3547.9						-	4706.9						440			0.664		0.00	73	7.3	6.8
	08/29/15	4.282	0.673	2.104	2.258	2.421	4.20	2.104		-	3547.9						-	4706.9						360			0.693		0.00	71	7.2	7.1
	08/30/15	4.409	0.657	2.122	2.230	2.406	4.20	2.085		-	3547.9						-	4706.9						420			0.703		0.00	73	7.2	6.7
	08/31/15	4.914	0.630	2.124	2.202	2.393	4.20	1.936		-	3547.9						-	4706.9					3.6	460			0.687		0.00	72	7.3	7.0
Sep'15	09/01/15	6.133	0.557	2.249	2.200	2.388	4.20	2.050	192.0	3601.3	3553.8			4.0	97.9%	218.0	4088.952	4583.3			2.0	99.1%	3.2	440	3178	2634	0.689	9048	0.00	72	7.5	7.0
	09/02/15	4.010	0.607	2.161	2.167	2.375	4.20	1.999	206.5	3721.7	3570.6			4.5	97.8%		-	4583.3					3.6	390			0.685		0.00	73	7.3	6.7
	09/03/15	4.896	0.711	2.047	2.139	2.347	4.20	1.868		-	3645.3						-	4757.0					3.7	410			0.674		0.00	73	7.3	6.9
	09/04/15	4.940	0.530	2.095	2.129	2.330	4.20	2.071		-	3696.0						-	4757.0					3.2	330			0.695		0.00	73	7.2	6.9
	09/05/15	3.687	0.607	1.970	2.110	2.310	4.20	1.865		-	3696.0						-	4757.0						340			0.729		0.00	71	7.6	6.8
	09/06/15	3.594	0.516	1.926	2.082	2.289	4.20	1.926		-	3696.0						-	4757.0						380			0.729		0.00	72	7.5	6.9
	09/07/15	4.246	0.419	2.043	2.070	2.277	4.20	2.001		-	3696.0						-	4757.0						470			0.723		0.00	73	7.1	7.0
	09/08/15	5.273	0.583	2.024	2.038	2.264	4.20	1.804	255.0	4304.4	3763.6			10.0	96.1%	310.0	5232.85	4852.2			10.0	96.8%	3.5	470	3240	2719	0.707	9328	0.00	72	7.6	7.1
	09/09/15	4.152	0.523	2.008	2.016	2.249	4.20	1.824	215.0	3600.5	3747.3			6.5	97.0%		-	4852.2					3.6	470			0.702		0.00	73	7.4	7.2
	09/10/15	4.047	0.490	2.147	2.030	2.233	4.20	1.993		-	3770.7						-	5104.9					3.4	560			0.689		1.25	74	7.3	7.0
	09/11/15	5.665	0.853	2.168	2.041	2.220	4.20	2.168		-	3868.0						-	5104.9					3.3	450			0.713		0.00	70	7.5	7.0
	09/12/15	4.616	0.571	2.046	2.052	2.205	4.20	2.046		-	3868.0						-	5104.9						430			0.728		0.07	72	7.6	7.1
	09/13/15	6.340	0.627	2.398	2.119	2.204	4.20	2.398		-	3868.0						-	5104.9						440			0.729		1.14	71	7.5	7.1
	09/14/15	4.072	0.617	2.212	2.143	2.199	4.20	2.212		-	3868.0						-	5104.9					3.2	490			0.704		0.00	71	7.5	7.1
	09/15/15	4.637	0.617	2.126	2.158	2.192	4.20	2.126	182.5	3235.9	3797.7			19.2	89.5%	229.0	4060.362	4896.0			13.0	94.3%	3.3	470	3366	2827	0.690	10392	0.00	71	7.4	7.0

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	09/16/15	4.692	0.503	2.144	2.177	2.186	4.20	2.144	249.0	4452.4	3863.2			35.9	85.6%		-	4896.0					3.1	460			0.689		0.00	73	7.3	6.9
	09/17/15	5.248	0.513	2.152	2.178	2.181	4.20	2.152		-	3848.6						-	4932.3					3.6	450			0.707		0.00	72	7.5	7.0
	09/18/15	4.263	0.523	2.106	2.169	2.172	4.20	2.106		-	3898.9						-	4932.3					3.3	440			0.713		0.00	73	7.3	7.1
	09/19/15	5.285	0.583	2.111	2.178	2.164	4.20	2.111		-	3898.9						-	4932.3						500			0.740		0.00	72	7.3	7.1
	09/20/15	5.164	0.699	2.160	2.144	2.156	4.20	2.160		-	3898.9						-	4932.3						500			0.739		0.00	73	7.3	7.0
	09/21/15	6.585	0.493	2.077	2.125	2.147	4.20	2.077		-	3898.9						-	4932.3					3.9	520			0.722		0.00	70	7.4	7.1
	09/22/15	3.878	0.620	2.055	2.115	2.139	4.20	2.055	208.3	3570.0	3862.3			34.1	83.6%	265.0	4541.756	4854.2			9.0	96.6%	3.9	550	3647	3027	0.736	10664	0.00	70	7.4	7.0
	09/23/15	3.907	0.513	2.114	2.111	2.132	4.20	2.114	205.7	3626.6	3838.8			38.9	81.1%		-	4854.2					3.5	580			0.657		0.00	70	7.4	7.1
	09/24/15	4.367	0.565	2.087	2.101	2.126	4.20	2.087		-	3735.3						-	4481.0					3.8	390			0.600		0.00	70	7.1	6.6
	09/25/15	3.957	0.401	2.075	2.097	2.115	4.20	2.075		-	3764.1						-	4481.0					3.3	560			0.832		0.00	72	7.3	6.9
	09/26/15	5.956	0.517	2.107	2.096	2.111	4.20	2.107		-	3764.1						-	4481.0						490			0.843		0.00	70	7.4	7.0
	09/27/15	4.137	0.381	2.145	2.094	2.110	4.20	2.145		-	3764.1						-	4481.0						550			0.830		0.00	69	7.4	6.9
	09/28/15			1.991	2.082	2.106	4.20	1.955		-	3764.1						-	4481.0					3.6	560			0.825		0.00	70	7.4	7.1
	09/29/15			2.202	2.103	2.109	4.20	2.202	282.5	5188.0	3922.3			35.4	87.5%	359.0	6592.92	4903.4			16.0	95.5%	3.5	400	3690	3062	0.619	10132	0.00	70	7.4	7.0
	09/30/15	5.517	0.507	2.752	2.194	2.130	4.20	2.752	201.0	4613.3	3991.4			33.0	83.6%		-	4903.4					2.4	390			0.661		2.22	70	7.5	7.2
Oct'15	10/01/15	4.200	0.687	2.298	2.224	2.132	4.20	2.298		-	4034.8						-	5107.0					3.3	380			0.666		0.30	68	7.5	6.8
	10/02/15	4.486	0.880	2.574	2.296	2.145	4.20	2.574		-	4073.9						-	5107.0					3.3	370			0.620		0.86	66	7.4	7.1
	10/03/15	5.270	0.897	2.675	2.377	2.166	4.20	2.675		-	4073.9						-	5107.0						320			0.631		0.00	66	7.3	6.6.
	10/04/15	5.017	1.160	2.720	2.459	2.187	4.20	2.720		-	4073.9						-	5107.0						330			0.645		0.00	67	7.1	6.9
	10/05/15	5.072	1.156	2.655	2.554	2.210	4.20	2.655		-	4073.9						-	5107.0					3.0	350			0.631		0.00	66	7.3	7.0
	10/06/15	6.035	1.003	2.631	2.615	2.233	4.20	2.631	232.8	5108.2	4188.8			35.4	84.8%	281.0	6165.854	5318.7			11.0	96.1%	3.0	320	2860	2362	0.618	12232	0.00	67	7.4	6.7
	10/07/15	5.434	0.886	2.573	2.589	2.251	4.20	2.573	236.7	5079.3	4277.9			28.5	88.0%		-	5318.7					3.0	340			0.654		0.00	68	7.3	6.7
	10/08/15	4.801	0.966	2.621	2.636	2.271	4.20	2.621		-	4274.9						-	5340.2					3.1	300			0.695		0.00	67	7.3	6.7
	10/09/15		0.965	2.735	2.659	2.295	4.20	2.735		-	4359.2						-	5340.2					2.5	310			0.801		0.18	68	7.4	6.7
	10/10/15	4.246	0.867	2.550	2.641	2.309	4.20	2.550		-	4359.2						-	5340.2						330			0.742		0.00	66	7.5	7.0
	10/11/15	4.210	0.849	2.539	2.615	2.321	4.20	2.539		-	4359.2						-	5340.2						360			0.732		0.00	66	7.1	7.0
	10/12/15	4.271	0.966	2.565	2.602	2.338	4.20	2.494		-	4359.2						-	5340.2						450			0.706		0.00	66	7.2	7.1
	10/13/15	4.725	0.897	2.609	2.599	2.345	4.20	2.609	185.0	4025.4	4322.1			32.4	82.5%	233.0	5069.861	5286.2			8.0	96.6%	3.7	420	2963	2461	0.697	10536	0.27	65	7.2	6.9
	10/14/15	4.283	0.776	2.542	2.594	2.356	4.20	2.529	188.5	3996.3	4289.5			29.4	84.4%		-	5286.2					3.9	420			0.670		0.00	66	7.3	7.1
	10/15/15	4.602	0.789	2.512	2.579	2.369	4.20	2.512		-	4406.6						-	5592.6					3.9	420			0.673		0.00	65	7.3	6.4
	10/16/15	4.383	0.878	2.520	2.548	2.382	4.20	2.520		-	4400.9						-	5592.6					3.5	400			0.675		0.00	64	7.3	6.7
	10/17/15	4.318	0.687	2.521	2.544	2.394	4.20	2.521		-	4400.9						-	5592.6						460			0.690		0.00	65	7.5	6.7
	10/18/15	4.502	0.688	2.511	2.540	2.408	4.20	2.467		-	4400.9						-	5592.6						480			0.686		0.00	65	7.7	7.0
	10/19/15	5.313	0.790	2.440	2.522	2.419	4.20	2.367		-	4400.9						-	5592.6					3.7	530			0.686		0.00	63	7.5	7.0
	10/20/15	4.935	0.590	2.450	2.499	2.428	4.20	2.367	217.5	4444.2	4405.7			23.8	89.1%	240.0	4903.92	5454.9			7.0	97.1%	3.7	550	2809	2342	0.691	9544	0.00	64	7.7	6.9
	10/21/15	4.450	0.667	2.383	2.477	2.438	4.20	2.274	177.5	3527.7	4317.9			21.9	87.7%		-	5454.9					3.7	560			0.682		0.00	64	7.5	6.6
	10/22/15	4.249	0.791	2.347	2.453	2.448	4.20	2.275		-	4401.0						-	5683.1					3.7	550			0.693		0.00	66	7.5	6.8
	10/23/15	4.171	0.660	2.263	2.416	2.453	4.20	2.263		-	4497.8						-	5683.1					3.5	540			0.692		0.00	63	7.4	7.0
	10/24/15	3.997	0.786	2.266	2.380	2.459	4.20	2.109		-	4497.8						-	5683.1						600			0.696		0.00	64	7.2	6.6
	10/25/15	4.240	0.785	2.375	2.361	2.469	4.20	2.162		-	4497.8						-	5683.1						610			0.707		0.00	63	7.1	6.8
	10/26/15	4.689	0.707	2.273	2.337	2.475	4.20	2.072		-	4497.8						-	5683.1					3.7	620			0.713		0.00	62	7.4	6.9
	10/27/15	3.964	0.479	2.256	2.309	2.478	4.20	2.032	178.3	3354.7	4370.8			15.7	91.2%	231.0	4346.274	5415.8			9.0	96.1%	3.6	670	2977	2502	0.709		0.00	63	7.3	6.5
	10/28/15	4.135	0.590	2.334	2.302	2.490	4.20	2.194	235.0	4574.4	4391.1			21.7	90.8%		-	5415.8					3.5	600			0.712		1.05	62	7.3	6.5
	10/29/15	4.567	1.033	2.654	2.346	2.505	4.20	2.590		-	4302.6						-	5121.5					3.7	470			0.711		0.02	64	7.5	6.5
	10/30/15	4.103	0.707	2.437	2.371	2.494	4.20	2.363		-	4263.8						-	5121.5					3.6	570			0.716		0.00	64	7.2	6.4
	10/31/15	4.344	0.567	2.376	2.386	2.497	4.20	2.354		-	4263.8						-	5121.5						600			0.730		0.00	63	7.4	6.6
Nov'15	11/01/15	6.531	0.611	2.568	2.414	2.497	4.20	2.534		-	4263.8						-	5121.5						570			0.761		0.00	64	7.6	6.7
	11/02/15	4.468	1.043	2.470	2.442	2.490	4.20	2.377		-	4263.8						-	5121.5					3.5	540			0.710		0.00	62	7.2	6.7
	11/03/15	4.764	0.696	2.333	2.453	2.477	4.20	2.224	221.0	4300.0	4267.8			33.0	85.1%	247.0	4805.933	5058.4			8.0	96.8%	3.8	650	2953	2492	0.721	9328	0.00	63	7.5	7.0
	11/04/15	4.256	0.573	2.292	2.447	2.465	4.20	2.154	241.7	4620.2	4303.0			23.5	90.3%		-	5058.4					3.6	640			0.722		0.00	63	7.4	6.9
	11/05/15	4.439	0.678	2.340	2.402	2.455	4.20	2.221		-	4213.6						-	4781.5					3.7	610			0.703		0.04	63	7.4	6.9
	11/06/15	5.667	0.678	2.510	2.413	2.453	4.20	2.385		-	4105.4						-	4781.5					3.1	560			0.708		0.00	63	7.5	7.0
	11/07/15	4.095	0.610	2.319	2.405	2.443	4.20	2.214		-	4105.4						-	4781.5						690			0.504		0.00	64	7.1	6.9
	11/08/15	3.953	0.783	2.304	2.367	2.429	4.20	2.259		-	4105.4						-	4781.5						500			0.574		0.00	64	7.1	6.8
	11/09/15	10.260	0.613	2.349	2.350	2.422	4.20	2.247		-	4105.4						-	4781.5						720			1.017		0.00	62	7.3	6.9
	11/10/15	4.330	0.603	2.314	2.347	2.414	4.20	2.162		-	4105.4					205.0	3956.246	4616.4			1.0	99.5%	4.1	800	3377	2858	1.501	6780	0.30	62	7.4	6.9
	11/11/15	3.979	0.677	2.300	2.348	2.406	4.20	2.263	156.0	2992.4	3981.7			29.1	81.3%		-	4616.4						810			1.501		0.02	62	7.2	6.7
	11/12/15	5.742	0.703	2.362	2.351	2.397	4.20	2.362		-	3976.2						-	4503.1					4.3	800			1.434		0.05	61	7.4	6.7
	11/13/15	4.458	0.698	2.334	2.326	2.390	4.20	2.268		-	3973.4						-	4503.1					4.3	890			1.446		0.00	61	7.3	6.6
	11/14/15	4.097	0.573	2.280	2.320	2.383	4.20	2.248		-	3973.4						-	4503.1						810			1.465		0.00	61	7.2	6.7
	11/15/15			2.307	2.321	2.376	4.20	2.217		-	3973.4						-	4503.1						870			1.448		0.00	61	7.2	6.7
	11/16/15			2.343	2.320	2.370	4.20	2.269		-	3973.4						-	4503.1					3.6	840			1.406		0.00	62	7.1	6.8
	11/17/15	3.881	0.446	2.168	2.299	2.358	4.20	2.089	200.0	3616.2	3928.7			24.9	87.6%	209.0	3778.954	4358.3			7.0	96.7%	4.5	870	3422	2847	1.447	7332	0.00	60	7.4	6.7
	11/18/15	4.786	0.487	2.224	2.288	2.351	4.20	2.224	185.0	3431.4	3873.5			14.4	92.2%		-	4358.3					4.3	880			1.521		0.00	60	7.5	6.8
	11/19/15	4.660	0.687	2.234	2.270	2.344	4.20	2.130		-	3802.1						-	4221.9					3.5	830			1.509		0.81	62	7.3	6.6
	11/20/15	4.364	1.032	2.593	2.307	2.351	4.20	2.525		-	3841.3						-	4221.9					4.5	840			1.525		0.00	61	8.5	7.0
	11/21/15	4.153	0.759	2.439	2.330	2.354	4.20	2.352		-	3841.3						-	4221.9						850			1.549		0.00	60	7.3	6.8
	11/22/15	6.340	0.583	2.703	2.386	2.369	4.20	2.664		-	3841.3						-	4221.9						870			1.563		0.86	60	7.2	6.9
	11/23/15	5.833	1.150	2.826	2.455	2.387	4.20	2.707		-	3841.3						-	4221.9					3.9	850			1.512		0.00	59	7.2	6.8
	11/24/15	4.423	1.006	2.673	2.527	2.397	4.20	2.539	200.7	4474.2	3920.4			19.8	90.1%	199.0	4436.271	4264.7			9.0	95.5%	4.5	630	2353	1944	1.441	16464	0.00	59	7.3	6.6
	11/25/15	4.475	0.959	2.747	2.602	2.413	4.20	2.645		-	3920.4						-	4264.7					4.4	840			1.523		0.00	60	7.4	6.8
	11/26/15	5.179	1.040	2.742	2.675	2.429	4.20	2.505		-	4001.3						-	4244.4						800			1.553		0.00	59	7.1	6.7
	11/27/15	4.585	1.027	2.743	2.696	2.443	4.20	2.590		-	3905.7						-	4244.4					4.0	880			1.553		0.00	60	7.2	6.8
	11/28/15	4.314	1.430	2.699	2.733	2.444	4.20	2.460		-	3905.7						-	4244.4						850			1.575		0.06	60	6.9	6.7
	11/29/15	4.316	1.332	2.672	2.729	2.452	4.20	2.476		-	3905.7						-	4244.4						830			1.552		0.00	59	7.4	6.8
	11/30/15	4.306	0.760	2.604	2.697	2.460	4.20	2.422		-	3905.7						-	4244.4					4.2	870			1.464		0.00	58	7.4	6.9

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
Dec'15	12/01/15	6.559	0.936	2.681	2.698	2.464	4.20	2.466	218.5	4885.6	4045.7			26.1	88.1%	235.0	5254.492	4446.4			7.0	97.0%	3.6	850	3154	2659	1.391	7296	0.19	59	7.2	6.7
	12/02/15	4.927	0.976	2.737	2.697	2.472	4.20	2.572	189.0	4314.2	4079.3			26.7	85.9%		-	4446.4					4.2	860			1.384		0.07	57	7.3	6.7
	12/03/15	4.161	0.980	2.663	2.686	2.483	4.20	2.474		-	4047.7						-	4356.5					4.3	850			1.353		0.00	58	7.3	6.8
	12/04/15	5.531	0.945	2.618	2.668	2.494	4.20	2.444		-	3952.3						-	4356.5					4.7	880			1.241		0.00	58	7.2	6.7
	12/05/15	4.280	1.047	2.556	2.647	2.501	4.20	2.360		-	3952.3						-	4356.5						850			1.258		0.00	57	7.1	6.6
	12/06/15	4.522	1.273	2.612	2.639	2.505	4.20	2.432		-	3952.3						-	4356.5						880			1.263		0.00	57	7.1	6.6
	12/07/15	7.979	1.017	2.633	2.643	2.515	4.20	2.418		-	3952.3						-	4356.5					4.0	840			1.239		0.00	57	7.3	6.9
	12/08/15	6.031	1.223	2.540	2.623	2.523	4.20	2.377	201.7	4272.7	3998.1			27.3	86.5%	250.0	5295.9	4544.4			12.0	95.2%	4.0	840	3392	2828	1.236	8304	0.03	56	7.3	6.8
	12/09/15	5.010	1.020	2.559	2.597	2.530	4.20	2.403	191.5	4087.0	4009.2			34.8	81.8%		-	4544.4					3.7	840			1.249		0.00	56	7.5	6.8
	12/10/15	4.390		2.574	2.585	2.539	4.20	2.387		-	4009.2						-	4691.4					3.9	830			1.210		0.00	56	7.4	6.7
	12/11/15	5.409	0.850	2.620	2.585	2.550	4.20	2.432		-	4154.5						-	4691.4					3.9	830			1.215		0.00	56	7.6	6.9
	12/12/15	4.394	0.952	2.597	2.591	2.557	4.20	2.436		-	4154.5						-	4691.4						780			1.228		0.00	58	7.5	7.0
	12/13/15	4.990	1.070	2.602	2.589	2.566	4.20	2.432		-	4154.5						-	4691.4						790			1.222		0.00	58	7.4	6.9
	12/14/15	4.823	1.033	2.643	2.591	2.578	4.20	2.447		-	4154.5						-	4691.4					2.5	800			1.211		0.78	59	7.3	6.8
	12/15/15	6.720	1.316	2.816	2.630	2.595	4.20	2.617	211.0	4955.4	4254.6			43.3	79.5%	235.0	5519.078	4856.9			6.0	97.4%	4.0	770	3633	3018	1.234	10596	0.00	56	7.3	6.8
	12/16/15	4.660	0.967	2.625	2.640	2.605	4.20	2.451	213.3	4669.7	4300.7			32.0	85.0%		-	4856.9					4.0	770			1.220		0.00	55	7.3	6.7
	12/17/15	5.999	1.057	2.892	2.685	2.629	4.20	2.711		-	4386.3						-	5126.4					4.0	760			1.235		0.58	54	7.6	6.8
	12/18/15	5.396	1.250	2.899	2.725	2.651	4.20	2.729		-	4522.7						-	5126.4					4.9	760			1.237		0.00	55	7.2	6.7
	12/19/15	4.592	1.597	2.903	2.769	2.674	4.20	2.882		-	4522.7						-	5126.4						750			1.180		0.00	55	7.1	6.8
	12/20/15	4.510	1.433	2.893	2.810	2.684	4.20	2.893		-	4522.7						-	5126.4						800			1.150		0.05	55	7.2	6.6
	12/21/15	7.328	1.137	2.927	2.851	2.700	4.20	2.927		-	4522.7						-	5126.4					3.9	730			1.147		0.00	54	7.4	6.5
	12/22/15	4.843	1.342	2.975	2.873	2.709	4.20	2.975	216.5	5371.7	4628.8			26.7	87.7%	216.0	5359.284	5173.0			3.0	98.6%	3.9	740	3897	3220	1.136	11396	0.19	55	7.3	6.6
	12/23/15	5.421	1.493	3.199	2.955	2.721	4.20	3.199		-	4628.8						-	5173.0					3.7	710			1.142		2.09	55	7.6	6.9
	12/24/15	12.077	3.757	5.677	3.353	2.822	4.20	5.677		-	4650.9						-	5357.2						360			1.173		0.00	60	6.9	6.4
	12/25/15	6.755	3.492	4.794	3.624	2.890	4.20	4.794		-	4650.9						-	5357.2						390			1.151		0.00	58	6.9	6.3
	12/26/15	6.742	3.116	4.616	3.869	2.952	4.20	4.616		-	4650.9						-	5357.2						410			1.128		0.12	58	7.0	6.3
	12/27/15	6.601	2.511	4.677	4.124	3.017	4.20	4.677		-	4650.9						-	5357.2						360			1.123		0.19	58	7.0	6.3
	12/28/15	6.431	3.114	4.319	4.322	3.071	4.20	4.319		-	4650.9						-	5357.2					3.3	450			1.199		0.00	54	7.0	6.4
	12/29/15	7.369	2.451	4.869	4.593	3.144	4.20	4.869	125.0	5075.9	4704.0			33.6	73.1%	129.0	5238.362	5333.4			14.0	89.1%	3.4	480	3335	2770	1.212	10636	0.55	52	7.6	6.2
	12/30/15	7.823	3.540	5.118	4.867	3.228	4.20	5.118	107.9	4605.6	4693.1			27.0	75.0%		-	5333.4					3.5	420			1.217		0.00	52	7.1	6.1
	12/31/15	10.266	3.827	5.192	4.798	3.312	4.20	5.192		-	4669.0						-	5353.2					3.3	350			1.198		0.20	53	7.0	6.1
Jan'16	01/01/16	8.565	3.446	4.876	4.810	3.383	4.20	4.876		-	4719.7						-	5353.2						390			1.210		0.00	54	6.8	6.2
	01/02/16	9.351	3.436	4.713	4.823	3.451	4.20	4.634		-	4719.7						-	5353.2						480			1.211		0.00	54	6.8	6.0
	01/03/16	8.582	2.987	4.626	4.816	3.518	4.20	4.474		-	4719.7						-	5353.2						540			1.204		0.00	54	6.8	6.1
	01/04/16	7.687	2.657	4.318	4.816	3.577	4.20	4.176		-	4719.7						-	5353.2					3.9	490			1.211		0.00	52	7.0	6.2
	01/05/16	7.388	2.326	4.069	4.702	3.625	4.20	3.811		-	4719.7					136.0	4615.223	5205.6			13.0	90.4%	3.5	610	3275	2700	1.194	11476	0.00	54	6.7	6.2
	01/06/16	7.253	2.520	4.088	4.555	3.674	4.20	3.903	144.3	4919.8	4744.7			24.4	83.1%		-	5205.6					4.3	560			1.199		0.00	52	7.2	6.0
	01/07/16	7.886	2.563	3.981	4.382	3.722	4.20	3.760		-	4812.2						-	5183.0					3.6	550			1.207		0.00	52	7.3	6.3
	01/08/16	7.174	1.897	3.851	4.235	3.765	4.20	3.668		-	4933.0						-	5183.0					3.8	570			1.205		0.00	52	8.9	6.5
	01/09/16	6.954	2.120	3.692	4.089	3.802	4.20	3.491		-	4933.0						-	5183.0						550			1.241		0.03	53	7.3	6.1
	01/10/16	10.275	2.368	4.645	4.092	3.870	4.20	4.462		-	4933.0						-	5183.0						680			1.268		1.29	54	7.1	6.2
	01/11/16	7.947	3.191	4.746	4.153	3.941	4.20	4.573		-	4933.0						-	5183.0					3.5	400			1.230		0.00	54	7.4	6.4
	01/12/16	7.949	3.035	4.734	4.248	4.012	4.20	4.546	99.1	3912.6	4787.2			24.5	75.3%	99.0	3908.674	4928.1			9.0	90.9%	4.5	400	2980	2460	1.189	11264	0.22	51	7.3	6.5
	01/13/16	8.648	3.439	4.649	4.328	4.079	4.20	4.441	100.0	3877.3	4673.5			24.2	75.8%		-	4928.1					4.7	400			1.225		0.00	51	7.6	6.5
	01/14/16	7.535	3.241	4.497	4.402	4.135	4.20	4.301		-	4633.2						-	4780.4					4.9	440			1.220		0.00	50	7.6	6.6
	01/15/16	8.408	3.099	4.441	4.486	4.196	4.20	4.240		-	4627.1						-	4780.4					4.7	470			1.232		0.59	51	7.4	6.5
	01/16/16	8.479	3.080	4.963	4.668	4.265	4.20	4.769		-	4627.1						-	4780.4						420			1.264		0.25	52	7.5	6.4
	01/17/16	8.230	3.563	4.916	4.707	4.332	4.20	4.711		-	4627.1						-	4780.4						330			1.239		0.22	51	7.3	6.5
	01/18/16	7.600	3.450	4.849	4.721	4.397	4.20	4.671		-	4627.1						-	4780.4						290			1.206		0.00	51	7.2	6.4
	01/19/16	7.604	3.136	4.612	4.704	4.454	4.20	4.423	91.5	3519.5	4468.9			19.4	78.8%	105.0	4038.728	4632.1			12.0	88.6%	5.1	330	3045	2526	1.186	9948	0.00	50	7.4	6.6
	01/20/16	6.818	2.866	4.403	4.669	4.504	4.20	4.198	96.0	3525.2	4350.9			15.9	83.4%		-	4632.1					5.7	340			1.204		0.00	49	7.5	6.5
	01/21/16	7.851	1.957	4.223	4.630	4.545	4.20	4.036		-	4205.1						-	4450.2					4.5	360			1.188		0.00	50	7.7	6.3
	01/22/16	6.867	2.529	4.073	4.577	4.574	4.20	3.862		-	4205.1						-	4450.2					5.7	340			1.167		0.00	49	7.4	6.5
	01/23/16			4.259	4.476	4.527	4.20	4.081		-	4205.1						-	4450.2						330			1.195		0.29	50	7.4	6.1
	01/24/16			3.953	4.339	4.499	4.20	3.743		-	4205.1						-	4450.2						340			1.194		0.00	49	7.2	6.4
	01/25/16	6.623	2.136	3.798	4.189	4.472	4.20	3.587		-	4205.1						-	4450.2					4.6	370			1.225		0.00	50	7.5	6.5
	01/26/16	6.226	2.320	3.911	4.089	4.446	4.20	3.713	105.0	3424.9	4107.6			18.0	82.9%	126.0	4109.835	4382.2			11.0	91.3%	4.2	380	3418	2855	1.211	9856	0.00	50	7.5	6.1
	01/27/16	7.191	2.441	3.953	4.024	4.434	4.20	3.861	107.7	3550.7	4045.7			17.9	83.4%		-	4382.2					5.0	300			1.209		0.00	50	7.4	6.4
	01/28/16	7.029	2.520	3.984	3.990	4.404	4.20	3.937		-	3916.9						-	4168.1					3.5	340			1.177		0.00	51	7.4	6.2
	01/29/16	6.116	2.371	3.906	3.966	4.364	4.20	3.844		-	3818.5						-	4168.1					4.8	290			1.134		0.00	50	7.3	6.0
	01/30/16	6.132	2.056	3.726	3.890	4.315	4.20	3.726		-	3818.5						-	4168.1						340			1.180		0.00	51	7.6	5.6
	01/31/16			3.588	3.838	4.272	4.20	3.588		-	3818.5						-	4168.1						310			1.157		0.00	52	7.1	6.0
Feb'16	02/01/16	7.175	1.915	3.842	3.844	4.243	4.20	3.842		-	3818.5						-	4168.1					3.9	330			1.143		0.00	50	7.3	6.4
	02/02/16	7.212	2.161	3.538	3.791	4.207	4.20	3.538	94.0	2773.7	3687.9			9.3	90.1%	94.0	2773.65	3889.2			6.0	93.6%	4.0	480	3344	2816	1.224	10036	0.00	50	7.4	6.5
	02/03/16	6.286	1.814	3.729	3.759	4.187	4.20	3.729	320.0	9952.0	4383.9			24.9	92.2%		-	3889.2					3.8	430			1.318		0.81	51	7.1	6.2
	02/04/16	8.290	2.211	4.095	3.775	4.188	4.20	4.094		-	4383.9						-	3707.7					3.7	380			1.324		0.62	50	7.3	6.6
	02/05/16	8.463	2.437	4.728	3.892	4.210	4.20	4.700		-	4317.0						-	3707.7						350			1.316		0.00	47	7.4	6.3
	02/06/16	8.589	3.538	5.029	4.078	4.244	4.20	4.953		-	4317.0						-	3707.7						320			1.329		0.00	50	7.1	6.8
	02/07/16	10.193	3.813	5.309	4.324	4.293	4.20	5.152		-	4317.0						-	3707.7						340			1.344		0.00	51	7.1	6.8
	02/08/16	9.301	3.565	5.452	4.554	4.352	4.20	5.262		-	4317.0						-	3707.7					2.8	350			1.319		0.00	48	7.3	7.0
	02/09/16	8.499	3.659	5.321	4.809	4.374	4.20	5.132	62.5	2773.6	4145.5			6.4	89.8%	137.0	6079.668	4182.1			4.0	97.1%	3.7	340	2791	2370	1.299	11696	0.00	48	7.2	6.7
	02/10/16	7.945	3.662	5.130	5.009	4.387	4.20	4.927	91.0	3893.4	4120.3			15.9	82.5%		-	4182.1					3.7	350			1.251		0.00	50	7.2	6.4
	02/11/16	8.015	3.637	4.863	5.119	4.391	4.20	4.639		-	4143.3						-	4250.5					4.5	380			1.276		0.00	47	7.2	7.1
	02/12/16	7.811	3.030	4.573	5.097	4.389	4.20	4.364		-	4176.6						-	4250.5					4.6	400			1.292		0.00	47	7.4	6.4
	02/13/16	7.251	3.039	4.575	5.032	4.391	4.20	4.383		-	4176.6						-	4250.5						420			1.286		0.00	47	7.3	6.3
	02/14/16	8.237	2.974	4.282	4.885	4.386	4.20	4.080		-	4176.6						-	4250.5						460			1.280		0.00	46	7.3	6.4

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	02/15/16	7.093	2.253	4.284	4.718	4.363	4.20	4.117		-	4176.6						-	4250.5						450			1.291		0.38	47	7.0	6.3
	02/16/16	9.253	3.971	5.831	4.791	4.394	4.20	5.694	110.3	5363.9	4308.5			19.2	82.6%	139.0	6759.645	4752.3			12.0	91.4%	3.9	340	2996	2541	1.301	11856	0.33	48	7.3	6.2
	02/17/16	8.151	4.476	6.004	4.916	4.432	4.20	5.809	91.7	4591.7	4336.8			20.4	77.8%		-	4752.3					3.4	300			1.281		0.00	49	8.7	6.8
	02/18/16	7.517	4.341	5.641	5.027	4.467	4.20	5.466		-	4427.7						-	4930.7					4.4	310			1.276		0.00	48	7.4	6.7
	02/19/16	7.145	3.613	5.434	5.150	4.501	4.20	5.193		-	4540.5						-	4930.7					5.1	360			1.277		0.00	48	7.4	6.6
	02/20/16	7.265	3.991	5.447	5.275	4.542	4.20	5.279		-	4540.5						-	4930.7						310			1.320		0.00	50	7.5	6.8
	02/21/16	6.922	3.438	5.180	5.403	4.579	4.20	5.120		-	4540.5						-	4930.7						330			1.327		0.00	50	7.0	6.5
	02/22/16	7.102	2.984	4.893	5.490	4.600	4.20	4.739		-	4540.5						-	4930.7					3.8	400			1.320		0.00	49	7.5	6.9
	02/23/16	8.149	3.057	4.669	5.324	4.624	4.20	4.610	72.8	2834.8	4350.9			10.7	85.3%	78.0	3037.278	4552.0			4.0	94.9%	4.2	430	3516	2970	1.311	12372	0.20	48	7.4	6.4
	02/24/16	8.188	2.829	4.917	5.169	4.661	4.20	4.857	68.5	2809.0	4196.8			12.5	81.8%		-	4552.0					4.2	440			1.317		1.13	48	7.5	6.5
	02/25/16	8.460	3.426	5.940	5.211	4.729	4.20	5.893		-	4282.5						-	4662.6					6.5	130			1.159		0.00	50	7.4	6.8
	02/26/16	10.736	3.860	5.421	5.210	4.778	4.20	5.382		-	4374.0						-	4662.6					5.9	260			1.322		0.00	48	7.5	6.7
	02/27/16	9.319	3.220	5.120	5.163	4.816	4.20	5.000		-	4374.0						-	4662.6						270			1.320		0.00	50	7.2	6.3
	02/28/16	10.348	3.273	4.969	5.133	4.851	4.20	4.879		-	4374.0						-	4662.6						290			1.346		0.00	50	7.2	6.2
	02/29/16	9.701	3.220	4.786	5.117	4.886	4.20	4.717		-	4374.0						-	4662.6					4.3	310			1.347		0.00	50	7.3	6.6
Mar'16	03/01/16	8.023	2.790	4.467	5.089	4.916	4.20	4.420	85.5	3185.3	4241.9			16.7	80.5%	114.0	4247.045	4579.5			12.0	89.5%	5.3	320	3470	2896	1.344	11740	0.00	49	7.5	5.4
	03/02/16	7.559	3.049	4.546	5.036	4.939	4.20	4.454	117.9	4470.0	4264.7			8.8	92.5%		-	4579.5					3.6	320			1.340		0.20	50	7.5	6.3
	03/03/16	7.274	2.381	4.155	4.781	4.960	4.20	4.025		-	4430.4						-	5030.9					4.6	330			1.308		0.00	49	7.4	6.4
	03/04/16	7.775	2.490	4.092	4.591	4.972	4.20	3.776		-	3740.2						-	5030.9					4.6	330			1.296		0.00	50	7.3	5.5
	03/05/16	7.374	2.372	4.077	4.442	4.971	4.20	3.790		-	3740.2						-	5030.9						300			1.308		0.00	49	7.7	5.1
	03/06/16	7.201	2.413	4.026	4.307	4.948	4.20	3.803		-	3740.2						-	5030.9						330			1.310		0.00	49	7.4	6.4
	03/07/16	7.346	2.327	3.961	4.189	4.912	4.20	3.748		-	3740.2						-	5030.9					3.1	330			1.300		0.00	50	7.4	6.1
	03/08/16	8.863	2.160	3.789	4.092	4.862	4.20	3.653	133.4	4215.5	3793.0			8.3	93.8%	102.0	3223.227	4669.4			4.0	96.1%	3.4	320	3408	2861	1.316	11088	0.00	51	7.2	5.9
	03/09/16	9.273	2.146	3.662	3.966	4.802	4.20	3.559	125.3	3826.8	3796.4			6.5	94.8%		-	4669.4					3.5	320			1.313		0.00	52	7.3	6.2
	03/10/16	6.459	2.054	3.576	3.883	4.744	4.20	3.452			3910.0						-	4316.8					3.7	410			1.336		0.13	52	7.8	6.2
	03/11/16	8.296	2.083	3.539	3.804	4.691	4.20	3.408		-	3912.1						-	4316.8					3.8	410			1.366		0.00	52	7.3	6.1
	03/12/16	7.919	1.897	3.497	3.721	4.645	4.20	3.393		-	3912.1						-	4316.8						430			1.365		0.00	53	7.3	6.1
	03/13/16	6.490	1.937	3.476	3.643	4.609	4.20	3.371		-	3912.1						-	4316.8						460			1.355		0.00	53	7.2	6.0
	03/14/16	5.882	1.950	3.292	3.547	4.566	4.20	3.194		-	3912.1						-	4316.8					3.7	530			1.289		1.05	51	7.2	6.2
	03/15/16	7.785	2.427	4.281	3.618	4.566	4.20	4.214		-	3912.1					146.0	5212.717	4496.0			5.0	96.6%	3.6	380	3320	2801	1.408	11404	0.24	50	7.3	6.4
	03/16/16	7.568	2.500	4.217	3.697	4.564	4.20	4.091	142.3	5004.7	4033.5			21.0	85.2%		-	4496.0					3.7	350			1.525		0.04	50	7.4	6.0
	03/17/16	6.374	2.780	4.228	3.790	4.510	4.20	4.125		-	3867.2						-	3930.1					3.7	370			1.372		0.01	51	7.4	6.4
	03/18/16	9.556	2.590	4.112	3.872	4.447	4.20	3.996		-	3763.7						-	3930.1					3.5	370			1.335		0.02	52	8.1	6.3
	03/19/16	7.302	2.430	3.957	3.938	4.391	4.20	3.847		-	3763.7						-	3930.1						360			1.328		0.00	51	7.5	6.2
	03/20/16	6.295	2.321	3.892	3.997	4.339	4.20	3.726		-	3763.7						-	3930.1						390			1.304		0.00	51	7.3	6.4
	03/21/16	7.515	2.517	3.995	4.097	4.291	4.20	3.729		-	3763.7						-	3930.1					3.7	440			1.322		0.00	49	7.5	6.6
	03/22/16	6.650	2.254	3.818	4.031	4.246	4.20	3.678		-	3763.7						-	3930.1					4.2	420	3436	2902	1.273	11916	0.00	50	7.4	6.4
	03/23/16	7.179	2.326	3.779	3.969	4.209	4.20	3.664	131.3	4138.2	3810.5			8.4	93.6%	126.0	3971.124	3938.3			5.0	96.0%	3.9	410			1.345		0.00	53	7.4	6.4
	03/24/16	6.763	2.267	3.634	3.884	4.174	4.20	3.532		-	3949.9						-	4163.5					4.9	430			1.343		0.00	50	7.5	6.5
	03/25/16	7.302	2.047	3.651	3.818	4.132	4.20	3.544		-	4140.1						-	4163.5						400			1.318		0.00	51	7.4	6.4
	03/26/16	5.402	1.857	3.550	3.760	4.052	4.20	3.469		-	4140.1						-	4163.5						400			1.353		0.00	52	7.5	6.4
	03/27/16	5.589	1.990	3.497	3.703	3.988	4.20	3.405		-	4140.1						-	4163.5						460			1.343		0.00	51	7.3	6.4
	03/28/16	7.558	1.960	3.666	3.656	3.940	4.20	3.590		-	4140.1						-	4163.5					3.8	460			1.395		0.31	50	7.5	6.5
	03/29/16	6.389	2.030	3.512	3.613	3.891	4.20	3.431	123.3	3611.5	4064.6					109.0	3192.619	3969.3			1.0	99.1%	4.2	500	3536	2988	1.350	10320	0.00	51	7.6	6.7
	03/30/16	6.371	1.713	3.408	3.560	3.845	4.20	3.343	280.0	7958.4	4551.3			28.5	89.8%		-	3969.3					3.4	600			1.370		0.00	53	7.4	6.4
	03/31/16	6.262	1.868	3.396	3.526	3.809	4.20	3.268		-	4746.4						-	3899.9					4.1	510			1.359		0.00	52	8.6	6.8
Apr'16	04/01/16	6.584	1.903	3.341	3.481	3.769	4.20	3.275		-	4792.5						-	3899.9					3.6	570			1.347		0.05	52	7.4	6.7
	04/02/16	5.893	1.660	3.553	3.482	3.749	4.20	3.446		-	4792.5						-	3899.9						530			1.363		1.05	53	7.6	6.5
	04/03/16	7.241	2.009	3.973	3.550	3.745	4.20	3.821		-	4792.5						-	3899.9						390			1.352		0.19	51	7.0	6.1
	04/04/16	8.640	2.270	3.964	3.592	3.741	4.20	3.842		-	4792.5						-	3899.9					3.7	400			1.354		0.00	49	7.4	6.3
	04/05/16	8.340	2.217	4.044	3.668	3.742	4.20	3.845	148.3	5001.7	4822.4			12.7	91.4%	165.0	5564.948	4232.9			8.0	95.2%	4.3	390	3176	2690	1.338	10408	0.00	49	8.0	6.1
	04/06/16	7.126	2.554	4.264	3.791	3.752	4.20	4.083	130.7	4647.9	4800.6			12.6	90.4%		-	4232.9					4.9	400			1.324		0.00	51	7.6	6.5
	04/07/16	8.537	2.616	5.333	4.067	3.804	4.20	5.216		-	4884.2						-	4485.4					4.2	350			1.348		0.96	52	7.8	6.5
	04/08/16	8.160	4.260	6.102	4.462	3.885	4.20	6.017		-	5060.4						-	4485.4					3.6	260			1.319		0.00	52	7.5	6.3
	04/09/16	9.223	4.263	5.794	4.782	3.959	4.20	5.629		-	5060.4						-	4485.4						300			1.326		0.00	53	7.5	6.1
	04/10/16	8.100	3.559	5.393	4.985	4.021	4.20	5.182		-	5060.4						-	4485.4						300			1.342		0.00	51	7.3	6.4
	04/11/16	7.714	3.417	5.156	5.155	4.076	4.20	5.031		-	5060.4						-	4485.4					3.6	320			1.309		0.00	51	7.4	6.6
	04/12/16	8.719	3.532	5.005	5.292	4.127	4.20	4.872	74.9	3126.5	4784.1			14.3	80.9%	83.0	3464.561	4281.2			9.0	89.2%	3.5	330	2952	2501	1.306	11684	0.30	51	7.4	6.0
	04/13/16	8.811	3.253	4.745	5.361	4.175	4.20	4.646		-	4784.1						-	4281.2					3.9	340			1.334		0.00	52	8.5	6.6
	04/14/16	7.300	3.103	4.551	5.249	4.184	4.20	4.499		-	4784.1						-	4048.3					3.9	390			1.298		0.00	52	7.5	6.5
	04/15/16	6.971	2.969	4.380	5.003	4.190	4.20	4.283		-	4747.3						-	4048.3					3.6	360			1.297		0.00	53	8.4	6.0
	04/16/16	6.435	2.320	4.259	4.784	4.191	4.20	4.072		-	4747.3						-	4048.3						360			1.300		0.00	53	7.3	6.0
	04/17/16	6.168	2.308	4.167	4.609	4.193	4.20	4.064		-	4747.3						-	4048.3						360			1.361		0.00	53	7.1	6.3
	04/18/16	7.198	2.506	4.102	4.458	4.197	4.20	3.928		-	4747.3						-	4048.3						390			1.395		0.00	53	7.1	6.2
	04/19/16	9.853	2.157	4.190	4.342	4.207	4.20	3.989	119.7	4182.9	4666.7			8.5	92.9%	132.0	4612.687	4161.2			1.0	99.2%	4.3	410	3489	2914	1.394	11448	0.00	52	7.4	6.5
	04/20/16	6.492	2.310	3.834	4.212	4.202	4.20	3.719	150.7	4818.7	4685.7			17.1	88.7%		-	4161.2					4.3	430			1.375		0.00	53	7.7	6.4
	04/21/16	7.221	2.165	3.749	4.097	4.200	4.20	3.641		-	4685.7						-	4161.2					3.5	520			1.372		0.00	54	9.0	6.8
	04/22/16	7.260	2.084	3.640	3.992	4.195	4.20	3.442		-	4763.9						-	4208.7					4.2	480			1.422		0.11	54	7.7	6.6
	04/23/16	6.745	2.164	3.639	3.903	4.195	4.20	3.541		-	4763.9						-	4208.7						460			1.443		0.03	55	7.7	6.4
	04/24/16	6.087	1.992	3.541	3.814	4.192	4.20	3.451		-	4763.9						-	4208.7						530			1.442		0.00	54	7.3	6.3
	04/25/16	7.596	1.917	3.453	3.721	4.188	4.20	3.356		-	4763.9						-	4208.7					4.4	530			1.442		0.00	53	7.7	6.7
	04/26/16	6.087	1.740	3.407	3.609	4.185	4.20	3.255	169.0	4802.0	4768.7			21.9	87.0%	157.0	4461.058	4259.2			7.0	95.5%	4.0	530	3968	3297	1.431	11120	0.23	53	8.6	6.6
	04/27/16	6.118	1.670	3.324	3.536	4.174	4.20	3.167	160.0	4435.5	4731.7			26.4	83.5%		-	4259.2					3.9	540			1.414		0.00	54	7.7	7.0
	04/28/16	6.060	1.553	3.266	3.467	4.166	4.20	3.128		-	4871.7						-	4525.8					3.6	530			1.415		0.00	55	8.7	6.8
	04/29/16	5.537	1.736	3.152	3.397	4.157	4.20	3.016		-	4430.7						-	4525.8					4.0	540			1.413		0.00	53	7.6	6.7
	04/30/16	6.344	1.417	3.141	3.326	4.149	4.20	3.093		-	4430.7						-	4525.8						650			1.433		0.00	56	7.4	6.6

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH Influent	pH Effluent
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Hi	Low
				ADF	7-Day	30-Day																										
May'16	05/01/16	7.291	1.410	3.165	3.273	4.143	4.20	3.017		-	4430.7						-	4525.8						600			1.440		0.13	56	7.2	6.6
	05/02/16	7.002	1.513	3.225	3.240	4.132	4.20	3.069		-	4430.7						-	4525.8					4.1	600			1.426		0.26	54	7.5	6.6
	05/03/16	6.730	1.505	3.233	3.215	4.107	4.20	3.092	161.7	4360.0	4421.9			23.8	85.3%	139.0	3747.888	4370.2			11.0	92.1%	4.0	590	3789	3185	1.429	11264	0.19	53	7.6	6.3
	05/04/16	7.063	1.439	3.384	3.224	4.088	4.20	3.268	159.5	4501.5	4430.7			27.2	82.9%		-	4370.2					3.9	480			1.454		0.63	54	7.7	6.8
	05/05/16	7.026	1.850	3.458	3.251	4.068	4.20	3.344		-	4359.4						-	4071.5					3.7	470			1.446		0.22	53	9.1	6.9
	05/06/16	6.803	1.797	3.362	3.281	4.038	4.20	3.249		-	4318.2						-	4071.5					4.0	430			1.432		0.04	54	7.6	6.8
	05/07/16	6.757	1.764	3.358	3.312	3.973	4.20	3.358		-	4318.2						-	4071.5						440			1.436		0.00	55	7.3	6.6
	05/08/16	6.267	1.709	3.441	3.352	3.884	4.20	3.441		-	4318.2						-	4071.5						440			1.442		0.03	56	7.2	6.4
	05/09/16	7.406	1.792	3.358	3.371	3.803	4.20	3.358		-	4318.2						-	4071.5					3.7	430			1.439		0.00	55	7.5	6.5
	05/10/16	6.316	1.519	3.179	3.363	3.729	4.20	3.179	170.0	4507.2	4341.8			24.6	85.5%	165.0	4374.622	4132.2			17.0	89.7%	3.7	460	3789	3172	1.448	11216	0.00	55	7.7	6.9
	05/11/16	5.393	1.465	3.131	3.327	3.661	4.20	3.131	137.0	3577.4	4256.9			26.6	80.6%		-	4132.2					3.8	430			1.430		0.00	56	7.5	6.4
	05/12/16	6.400	1.577	3.111	3.277	3.598	4.20	3.111		-	4398.2						-	4299.1					3.8	470			1.398		0.00	57	7.5	6.2
	05/13/16	6.088	1.590	3.124	3.243	3.544	4.20	3.124		-	4398.2						-	4299.1					3.6	230			0.941		0.22	56	7.7	6.4
	05/14/16	6.796	1.743	3.269	3.230	3.501	4.20	3.269		-	4398.2						-	4299.1						260			0.710		0.00	58	7.6	6.0
	05/15/16	5.853	1.580	3.244	3.202	3.464	4.20	3.244		-	4398.2						-	4299.1						260			0.703		0.00	57	7.5	6.3
	05/16/16	6.395	1.373	3.037	3.156	3.423	4.20	3.037		-	4398.2						-	4299.1					3.5	280			0.707		0.00	55	7.6	6.7
	05/17/16	5.429	1.247	2.918	3.119	3.381	4.20	2.918	145.3	3536.0	4302.4			12.9	91.1%	156.0	3796.435	4198.5			5.0	96.8%	3.4	310	3380	2830	0.714	12432	0.00	56	7.7	6.5
	05/18/16	6.855	1.087	2.906	3.087	3.341	4.20	2.906	305.0	7392.0	4611.3			21.1	93.1%		-	4198.5					3.5	270			0.821		0.00	57	7.6	6.3
	05/19/16	6.286	1.260	3.059	3.080	3.304	4.20	3.059		-	4658.9						-	4095.0					2.2	240			0.686		0.03	58	7.7	6.3
	05/20/16	6.000	1.167	2.802	3.034	3.269	4.20	2.802		-	4639.0						-	4095.0					3.0	260			0.726		0.00	60	7.5	6.3
	05/21/16	5.327	1.173	2.778	2.963	3.237	4.20	2.778		-	4639.0						-	4095.0						280			0.719		0.00	59	7.4	6.1
	05/22/16	5.638	1.174	2.830	2.904	3.210	4.20	2.830		-	4639.0						-	4095.0						270			0.711		0.00	59	7.3	6.3
	05/23/16	5.117	1.033	2.735	2.861	3.180	4.20	2.735		-	4639.0						-	4095.0					3.3	270			0.704		0.00	58	7.6	6.5
	05/24/16	6.256	1.036	2.795	2.844	3.155	4.20	2.795	141.6	3300.7	4490.3			13.8	90.3%	198.0	4615.439	4199.1			6.0	97.0%	3.2	270	3316	2794	0.686	12456	0.13	56	7.7	6.4
	05/25/16	6.635	1.146	2.729	2.818	3.131	4.20	2.729	162.5	3698.5	4411.1			15.0	90.8%		-	4199.1					3.3	250			0.652		0.00	58	7.8	6.4
	05/26/16	5.536	0.963	2.630	2.757	3.105	4.20	2.630		-	4367.6						-	4133.6					3.0	260			0.724		0.00	61	7.7	6.8
	05/27/16	5.814	1.149	2.606	2.729	3.081	4.20	2.606		-	4359.2						-	4133.6					2.8	250			0.767		0.00	62	7.5	6.4
	05/28/16	4.093	1.036	2.559	2.698	3.057	4.20	2.559		-	4359.2						-	4133.6						250			0.766		0.00	60	7.4	7.1
	05/29/16	4.533	0.846	2.500	2.651	3.036	4.20	2.500		-	4359.2						-	4133.6						270			0.745		1.25	60	7.6	6.7
	05/30/16	7.943	0.835	3.058	2.697	3.033	4.20	3.058		-	4359.2						-	4133.6						300			0.762		0.65	61	7.3	6.5
	05/31/16	6.817	1.137	2.719	2.686	3.018	4.20	2.660	156.0	3537.5	4267.9			27.9	82.1%	195.0	4421.91	4191.3			9.0	95.4%	3.2	290	3644	3088	0.791	12388	0.00	60	7.4	6.8
Jun'16	06/01/16	5.303	0.973	2.677	2.678	3.000	4.20	2.534	156.5	3494.0	4190.5						-	4191.3					3.5	320			0.786		0.00	61	7.6	7.0
	06/02/16	7.307	1.013	2.646	2.681	2.980	4.20	2.520		-	4171.7						-	4302.1					3.6	320			0.730		0.00	60	7.6	6.8
	06/03/16	4.966	1.193	2.656	2.688	2.956	4.20	2.495		-	4130.4						-	4302.1					3.0	300			0.787		0.02	62	7.3	6.9
	06/04/16	5.013	0.987	2.619	2.696	2.928	4.20	2.507		-	4130.4						-	4302.1						300			0.724		0.00	63	7.3	6.8
	06/05/16	5.895	0.940	2.715	2.727	2.906	4.20	2.580		-	4130.4						-	4302.1						300			0.738		0.35	63	7.3	6.5
	06/06/16	5.687	1.203	2.680	2.673	2.884	4.20	2.629		-	4130.4						-	4302.1					3.6	300			0.723		0.00	62	7.2	6.7
	06/07/16	4.893	1.043	2.603	2.657	2.856	4.20	2.455		-	4130.4					239.0	5188.456	4479.4			5.0	97.9%	3.4	310	3646	3080	0.714	12808	0.00	62	7.5	6.7
	06/08/16	9.990	1.007	2.793	2.673	2.837	4.20	2.686		-	4130.4						-	4479.4					3.2	320			0.662		0.65	61	7.5	6.9
	06/09/16	5.298	0.965	2.568	2.662	2.817	4.20	2.454		-	4076.6						-	4505.6					3.2	300			0.702		0.00	60	7.6	6.7
	06/10/16	5.746	1.053	2.453	2.633	2.794	4.20	2.357		-	4159.8						-	4505.6					2.9	310			0.720		0.00	63	7.3	6.8
	06/11/16	4.745	0.703	2.546	2.623	2.775	4.20	2.426		-	4159.8						-	4505.6						290			0.723		0.27	62	7.6	6.9
	06/12/16	4.768	0.950	2.557	2.600	2.756	4.20	2.419		-	4159.8						-	4505.6						290			0.742		0.00	63	7.1	6.2
	06/13/16	6.206	0.697	2.455	2.568	2.729	4.20	2.305		-	4159.8						-	4505.6					3.2	320			0.728		0.00	62	7.4	6.7
	06/14/16	5.727	0.767	2.380	2.536	2.700	4.20	2.259		-	4159.8					197.0	3910.292	4386.5			14.0	92.9%	3.1	320	3972	3358	0.793	12968	0.00	62	7.7	6.9
	06/15/16	4.949	0.820	2.330	2.470	2.677	4.20	2.157	87.0	1690.6	3807.1			4.0	95.4%		-	4386.5					3.4	360			0.868		0.00	62	7.6	7.2
	06/16/16	5.585	0.853	2.339	2.437	2.657	4.20	2.161		-	3852.2						-	4534.0					3.5	360			0.864		0.00	64	7.5	7.2
	06/17/16	5.713	0.717	2.282	2.413	2.637	4.20	2.154		-	3144.3						-	4534.0					3.2	380			0.863		0.03	64	7.4	7.3
	06/18/16	4.483	0.670	2.262	2.372	2.610	4.20	2.126		-	3144.3						-	4534.0						380			0.878		0.00	65	7.4	7.0
	06/19/16	4.234	0.707	2.275	2.332	2.593	4.20	2.142		-	3144.3						-	4534.0						400			0.885		0.00	65	7.3	6.3
	06/20/16	4.197	0.833	2.258	2.304	2.575	4.20	2.141		-	3144.3						-	4534.0					3.1	400			0.885		0.00	65	7.2	6.6
	06/21/16	6.825	0.704	2.295	2.292	2.557	4.20	2.105	230.0	4402.3	3353.9			38.2	83.4%	292.0	5588.968	4745.0			16.0	94.5%	3.2	360	3836	3204	0.887	11684	0.54	62	7.3	7.1
	06/22/16	5.414	0.787	2.234	2.278	2.541	4.20	1.995	256.0	4769.7	3556.2			33.6	86.9%		-	4745.0					3.4	410			0.883		0.00	63	8.7	7.2
	06/23/16	5.609	0.661	2.268	2.268	2.523	4.20	2.109		-	3598.8						-	4777.4					3.3	400			0.889		0.00	64	7.6	7.0
	06/24/16	5.488	0.797	2.414	2.287	2.513	4.20	2.288		-	3578.8						-	4777.4					2.6	370			0.889		0.00	67	8.0	6.8
	06/25/16	4.416	0.687	2.319	2.295	2.502	4.20	2.108		-	3578.8						-	4777.4						370			0.903		0.00	64	7.5	6.9
	06/26/16	4.667	0.677	2.339	2.304	2.493	4.20	2.205		-	3578.8						-	4777.4						380			0.893		0.00	64	7.6	6.5
	06/27/16	6.354	0.670	2.380	2.321	2.487	4.20	2.204		-	3578.8						-	4777.4					3.0	420			0.880		0.00	65	8.0	6.7
	06/28/16	6.053	0.726	2.343	2.328	2.482	4.20	2.232	260.0	5080.6	3829.1			34.5	86.7%	273.0	5334.589	4888.8			30.0	89.0%	3.2	400	3584	3058	0.881	10320	0.00	64	7.4	6.4
	06/29/16	5.043	0.710	2.332	2.342	2.458	4.20	2.167	241.1	4689.1	3952.0			18.3	92.4%		-	4888.8					2.9	370			0.830		0.04	64	8.9	6.9
	06/30/16	4.477	0.607	2.290	2.345	2.444	4.20	2.125		-	4021.0						-	5005.6					2.4	330			0.792		0.00	67	7.3	6.8
Jul'16	07/01/16	5.419	0.680	2.427	2.347	2.435	4.20	2.229		-	4126.4						-	5005.6					2.0	330			0.775		0.22	67	7.4	6.4
	07/02/16	4.365	0.707	2.174	2.326	2.420	4.20	2.034		-	4126.4						-	5005.6						310			0.682		0.00	65	7.5	7.2
	07/03/16	4.083	0.458	2.108	2.293	2.401	4.20	2.010		-	4126.4						-	5005.6						330			0.685		0.00	65	7.2	6.4
	07/04/16	4.317	0.533	2.136	2.259	2.385	4.20	1.991		-	4126.4						-	5005.6						350			0.703		0.42	65	7.5	6.2
	07/05/16	6.273	0.773	2.354	2.260	2.373	4.20	2.200	230.6	4527.2	4193.2			14.5	93.7%	218.0	4279.854	4860.4			6.0	97.2%	3.0	340	3254	2767	0.687	11156	0.00	67	7.5	6.2
	07/06/16	4.980	0.640	2.171	2.237	2.356	4.20	1.981	226.5	4101.0	4180.1			15.9	93.0%		-	4860.4					3.3	350			0.678		0.00	68	7.5	6.9
	07/07/16	5.786	0.620	2.267	2.234	2.345	4.20	2.136		-	4180.1						-	4778.4					3.1	340			0.666		0.00	69	7.4	6.4
	07/08/16	5.262	0.527	2.218	2.204	2.326	4.20	2.094		-	4180.1						-	4778.4					3.0	340			0.664		0.00	67	7.7	6.9
	07/09/16	3.999	0.656	2.089	2.192	2.310	4.20	2.018		-	4180.1						-	4778.4						330			0.676		0.02	67	7.6	6.9
	07/10/16	4.407	0.543	2.071	2.187	2.297	4.20	1.902		-	4180.1						-	4778.4						390			0.693		0.05	66	7.1	5.6
	07/11/16	5.503	0.601	2.110	2.183	2.283	4.20	1.986		-	4180.1						-	4778.4					3.1	400			0.683		0.00	68	7.2	6.3
	07/12/16	5.369	0.646	1.999	2.132	2.264	4.20	1.809	295.0	4918.1	4272.3			32.0	89.2%	336.0	5601.678	4943.1			16.0	95.2%	3.4	390	3538	3002	0.670	9620	0.00	68	7.3	6.8
	07/13/16	5.559	0.553	2.021	2.111	2.250	4.20	1.889		-	4272.3						-	4943.1					3.6	370			0.657		0.00	68	7.4	6.8
	07/14/16			2.194	2.100	2.243	4.20	2.022		-	4272.3						-	5201.3					3.3	370			0.653		0.35	68	7.5	6.9
	07/15/16			2.299	2.112	2.242	4.20	2.143		-	4641.1						-	5201.3					2.6	360			0.684		0.52	70	8.3	6.6

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	07/16/16			2.042	2.105	2.232	4.20	1.907		-	4641.1						-	5201.3						350			0.676		0.00	71	7.8	6.9
	07/17/16			2.001	2.095	2.223	4.20	1.753		-	4641.1						-	5201.3						410			0.636		0.61	71	7.5	5.6
	07/18/16	6.168	0.580	2.118	2.096	2.218	4.20	1.896		-	4641.1						-	5201.3					2.8	370			0.659		0.00	71	7.0	6.2
	07/19/16	5.391	0.460	2.042	2.102	2.210	4.20	1.848	232.7	3962.9	4556.4			39.4	83.1%	273.0	4649.266	5090.9			24.0	91.2%	3.4	390	3416	2900	0.651	11020	0.00	68	7.5	6.9
	07/20/16	4.170	0.541	2.007	2.100	2.202	4.20	2.007	317.5	5314.4	4640.6			30.0	90.6%		-	5090.9					3.8	340			0.643		0.00	69	7.3	6.3
	07/21/16	5.599	0.633	2.084	2.085	2.195	4.20	2.084		-	4670.4						-	4966.3					3.1	340			0.653		0.00	69	7.7	7.0
	07/22/16	5.666	0.567	2.186	2.069	2.193	4.20	2.026		-	4656.2						-	4966.3					2.5	310			0.656		0.79	71	7.5	6.9
	07/23/16	4.167	0.736	2.140	2.083	2.189	4.20	2.057		-	4656.2						-	4966.3						280			0.679		0.02	69	7.7	6.8
	07/24/16	3.736	0.657	2.034	2.087	2.177	4.20	2.034		-	4656.2						-	4966.3						340			0.690		0.00	70	7.3	4.7
	07/25/16	6.174	0.447	2.133	2.089	2.170	4.20	1.936		-	4656.2						-	4966.3					3.3	370			0.662		0.00	70	7.2	6.1
	07/26/16	5.009	0.653	2.039	2.089	2.160	4.20	1.519	340.0	5781.8	4796.9			30.0	91.2%	303.0	5152.594	5003.6			31.0	89.8%	3.3	300	2838	2418	0.685	9020	0.00	70	7.4	6.8
	07/27/16	4.447	0.587	2.133	2.107	2.152	4.20	1.534	227.5	4047.0	4713.6			19.4	91.5%		-	5003.6					2.9	240			0.748		0.00	71	7.3	6.5
	07/28/16	4.647	0.450	2.094	2.108	2.144	4.20	1.435		-	4667.7						-	4920.8					2.3	200			0.767		0.00	72	7.5	6.2
	07/29/16	5.164	0.576	2.165	2.105	2.138	4.20	1.952		-	4664.7						-	4920.8					2.1	190			0.784		0.25	72	7.4	7.1
	07/30/16	3.830	0.553	2.018	2.088	2.129	4.20	1.769		-	4664.7						-	4920.8						150			0.904		0.00	73	7.3	6.9
	07/31/16	3.894	0.437	2.095	2.097	2.118	4.20	1.880		-	4664.7						-	4920.8						180			0.892		0.16	73	7.2	6.0
Aug'16	08/01/16	5.297	0.557	2.335	2.126	2.123	4.20	2.211		-	4664.7						-	4920.8					2.1	180			0.842		0.00	73	7.0	6.5
	08/02/16	5.518	0.437	2.192	2.147	2.126	4.20	2.069	278.8	5096.8	4718.7			20.1	92.8%	238.0	4350.945	4806.9			18.0	92.4%	2.4	220	1662	1431	0.848	6240	0.25	72	7.1	6.3
	08/03/16	5.110	0.538	1.979	2.125	2.121	4.20	1.822	297.5	4910.2	4740.0			12.2	95.9%		-	4806.9					2.5	180			0.842		0.00	73	7.4	7.1
	08/04/16	6.030	0.403	1.933	2.102	2.107	4.20	1.741		-	4766.6						-	4938.6					2.6	180			0.856		0.00	72	7.4	7.1
	08/05/16	4.234	0.455	1.999	2.079	2.101	4.20	1.840		-	4861.6						-	4938.6					2.3	190			0.866		0.00	73	7.2	6.7
	08/06/16	5.223	0.427	1.979	2.073	2.092	4.20	1.884		-	4861.6						-	4938.6						200			0.915		0.30	72	7.7	7.0
	08/07/16	4.990	0.563	1.893	2.044	2.081	4.20	1.830		-	4861.6						-	4938.6						230			0.923		0.00	72	7.6	6.9
	08/08/16	5.669	0.452	1.960	1.991	2.077	4.20	1.867		-	4861.6						-	4938.6					2.2	380			0.892		0.00	72	7.2	6.5
	08/09/16	6.198	0.447	1.897	1.949	2.071	4.20	1.774	264.0	4176.7	4776.0			12.1	95.4%	270.0	4271.665	4805.2			16.0	94.1%	2.2	450	1669	1436	0.922	5056	0.00	72	7.5	7.0
	08/10/16	5.213	0.410	2.119	1.969	2.071	4.20	2.015	359.5	6353.2	4951.3			26.3	92.7%		-	4805.2					2.3	360			0.871		0.27	72	7.3	6.6
	08/11/16	6.090	0.452	1.960	1.972	2.070	4.20	1.805		-	4955.4						-	4606.1					2.2	330			0.795		0.00	73	7.3	6.8
	08/12/16	4.260	0.530	2.025	1.976	2.070	4.20	1.662		-	4955.4						-	4606.1					2.2	530			0.742		0.07	73	7.3	6.9
	08/13/16	4.032	0.687	2.039	1.985	2.065	4.20	1.644		-	4955.4						-	4606.1						730			0.796		0.08	73	7.8	7.2
	08/14/16	3.878	0.632	2.046	2.007	2.056	4.20	1.482		-	4955.4						-	4606.1						750			0.787		0.00	73	7.7	6.9
	08/15/16	4.943	0.347	2.087	2.025	2.058	4.20	1.571		-	4955.4						-	4606.1					2.1	650			0.724		0.00	74	7.5	7.0
	08/16/16	5.745	0.337	2.073	2.050	2.060	4.20	1.572		-	4955.4					263.0	4546.96	4594.3			61.0	76.8%	3.1	670	680	606	0.654	2030	0.00	72	7.6	7.4
	08/17/16	6.061	0.533	1.985	2.031	2.056	4.20	1.546		-	4955.4					204.0	3377.2	4391.4			23.0	88.7%	3.8	720			0.591		0.00	72	7.4	7.3
	08/18/16			2.472	2.104	2.070	4.20	1.851		-	5097.2					255.0	5257.202	4492.8			27.0	89.4%	1.0	470			0.823		0.00	74	7.6	7.5
	08/19/16			2.140	2.120	2.074	4.20	1.987		-	5061.0						-	4492.8					2.8	890			1.407		0.00	74	7.3	7.7
	08/20/16	3.985	0.330	1.969	2.110	2.071	4.20	1.842		-	5061.0						-	4492.8						880			1.456		0.00	74	8.3	7.6
	08/21/16	3.967	0.549	1.918	2.092	2.062	4.20	1.810		-	5061.0						-	4492.8						920			1.436		0.00	74	7.1	7.1
	08/22/16	3.882	0.530	2.003	2.080	2.057	4.20	1.814		-	5061.0						-	4492.8					3.4	930			1.404		0.52	74	7.1	6.8
	08/23/16	4.792	0.411	1.850	2.048	2.051	4.20	1.771	230.7	3559.5	4846.5					254.0	3918.966	4410.8			8.0	96.9%	3.7	950	1318	1148	1.359	2812	0.00	72	7.2	7.3
	08/24/16	3.974	0.337	1.857	2.030	2.042	4.20	1.712	247.5	3833.1	4719.8						-	4410.8					2.5	900			1.204		0.00	74	7.5	7.3
	08/25/16	3.675	0.350	1.845	1.940	2.035	4.20	1.665		-	4568.1						-	4287.2					2.7	450			0.748		0.00	75	7.4	7.2
	08/26/16	3.775	0.433	1.887	1.904	2.027	4.20	1.717		-	4654.9						-	4287.2					2.5	860			0.767		0.00	76	7.4	6.5
	08/27/16	3.733	0.407	1.750	1.873	2.016	4.20	1.750		-	4654.9						-	4287.2						820			0.587		0.00	75	7.4	7.6
	08/28/16	3.864	0.347	1.761	1.850	2.002	4.20	1.761		-	4654.9						-	4287.2						880			0.588		0.00	73	7.3	7.1
	08/29/16	5.559	0.449	1.808	1.823	1.995	4.20	1.808		-	4654.9						-	4287.2					3.5	760			0.572		0.00	73	7.4	6.9
	08/30/16	3.864	0.340	1.764	1.810	1.984	4.20	1.682	226.1	3326.3	4465.1			19.5	91.4%	230.0	3383.705	4158.1			7.0	97.0%	2.2	720	2433	2108	0.648	6880	0.00	74	8.0	6.9
	08/31/16	5.432	0.403	1.891	1.815	1.969	4.20	1.740	224.8	3544.5	4350.1			4.0	98.2%		-	4158.1					2.4	690			0.573		0.00	75	8.5	6.9
Sep'16	09/01/16	4.930	0.133	1.851	1.816	1.958	4.20	1.708		-	4243.4						-	4125.9					3.4	380			0.566		0.33	72	7.6	7.5
	09/02/16	4.053	0.357	1.814	1.806	1.953	4.20	1.751		-	4132.2						-	4125.9					2.3	350			0.567		0.00	74	7.5	7.1
	09/03/16	3.945	0.453	1.794	1.812	1.948	4.20	1.714		-	4132.2						-	4125.9						280			0.575		0.00	72	7.6	7.1
	09/04/16	3.875	0.343	1.736	1.808	1.939	4.20	1.736		-	4132.2						-	4125.9						300			0.609		0.00	73	7.6	5.9
	09/05/16	4.137	0.348	1.821	1.810	1.934	4.20	1.821		-	4132.2						-	4125.9						380			0.629		0.32	71	7.1	6.5
	09/06/16	4.798	0.404	1.862	1.824	1.933	4.20	1.808	219.2	3404.0	4028.2			21.3	90.3%	270.0	4192.852	4135.5			8.0	97.0%	2.5	350	2919	2564	0.600	8964	0.09	73	7.3	6.9
	09/07/16	4.994	0.424	1.847	1.818	1.929	4.20	1.699		-	4028.2						-	4135.5					3.6	280			0.599		0.03	72	7.6	7.2
	09/08/16	5.332	0.444	1.848	1.817	1.927	4.20	1.610		-	4003.4						-	4112.8					3.1	270			0.629		0.00	72	7.4	6.8
	09/09/16	4.436	0.353	1.831	1.820	1.918	4.20	1.654		-	3533.5						-	4112.8					2.8	240			0.666		0.00	74	7.6	7.0
	09/10/16	3.525	0.353	1.693	1.805	1.909	4.20	1.504		-	3533.5						-	4112.8						220			0.732		0.00	74	8.1	4.1
	09/11/16	3.747	0.353	1.798	1.814	1.901	4.20	1.632		-	3533.5						-	4112.8						260			0.741		0.00	73	7.5	5.3
	09/12/16	5.242	0.353	1.859	1.820	1.895	4.20	1.738		-	3533.5						-	4112.8					3.3	220			0.732		0.00	72	7.4	7.2
	09/13/16	3.853	0.403	1.857	1.819	1.889	4.20	1.650	233.0	3608.6	3546.0			14.0	94.0%	256.0	3964.769	4091.7			7.0	97.3%	3.7	230	2676	2327	0.729	7752	0.00	72	7.3	7.1
	09/14/16	4.172	0.461	1.839	1.818	1.881	4.20	1.693	327.5	5023.0	3757.0			19.4	94.1%		-	4091.7					4.0	220			0.729		0.03	72	7.4	6.9
	09/15/16	3.540	0.297	1.769	1.807	1.871	4.20	1.622		-	3757.0						-	4015.8					3.5	200			0.735		0.00	71	7.4	7.3
	09/16/16	5.840	0.459	1.809	1.803	1.865	4.20	1.666		-	3757.0						-	4143.5					2.3	200			0.751		0.00	73	7.4	7.3
	09/17/16	3.535	0.297	1.738	1.810	1.840	4.20	1.630		-	3757.0						-	3865.1						220			0.780		0.00	71	7.6	7.1
	09/18/16	3.544	0.459	1.806	1.811	1.829	4.20	1.639		-	3757.0						-	3865.1						270			0.781		0.01	71	7.5	7.2
	09/19/16			1.834	1.807	1.825	4.20	1.672		-	3757.0						-	3865.1					2.6	350			0.780		0.50	71	7.3	7.3
	09/20/16	5.353	0.459	1.841	1.805	1.822	4.20	1.641	191.8	2944.9	3655.5			21.4	88.8%	295.0	4529.412	3997.9			10.0	96.6%	3.8	400	2608	2286	0.756	7052	0.14	71	7.4	7.4
	09/21/16	3.427	0.405	1.735	1.790	1.813	4.20	1.613	191.0	2763.8	3556.4			24.3	87.3%		-	3997.9					3.7	370			0.766		0.00	72	7.5	7.2
	09/22/16	3.327	0.459	1.817	1.797	1.812	4.20	1.705		-	3556.0						-	4017.7					3.6	360			0.755		0.00	72	7.5	6.9
	09/23/16	3.380	0.353	1.701	1.782	1.807	4.20	1.535		-	3516.4						-	4017.7					2.6	400			0.849		0.06	73	7.5	6.8
	09/24/16	3.693	0.510	1.724	1.780	1.803	4.20	1.596		-	3516.4						-	4017.7						640			0.729		0.00	71	7.6	7.2
	09/25/16	3.485	0.297	1.723	1.768	1.797	4.20	1.604		-	3516.4						-	4017.7						740			0.720		0.00	70	7.6	7.3
	09/26/16	3.540	0.247	1.707	1.750	1.796	4.20	1.582		-	3516.4						-	4017.7					3.4	720			0.670		0.00	70	7.5	7.3
	09/27/16	6.026	0.297	1.786	1.742	1.797	4.20	1.607	179.1	2667.7	3410.3			15.7	91.2%	274.0	4081.296	4030.4			3.0	98.9%	3.3	600	3114	2690	0.692	8456	0.49	70	7.5	7.4
	09/28/16	4.703	0.297	1.704	1.737	1.793	4.20	1.602	236.7	3363.8	3405.2			21.2	91.0%		-	4030.4					3.4	700			0.697		0.02	68	7.5	7.3
	09/29/16	3.273	0.458	1.712	1.722	1.792	4.20	1.585		-	3415.0						-	4192.1					3.8	680			0.677		0.00	68	7.5	7.2

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD								TSS								Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	09/30/16	4.650	0.353	1.776	1.733	1.788	4.20	1.649		-	3396.5						-	4192.1					3.3	600			0.831		2.03	68	7.7	7.4
Oct'16	10/01/16	4.605	0.566	2.321	1.818	1.803	4.20	2.214		-	3396.5						-	4192.1						270			0.663		0.36	67	7.4	7.1
	10/02/16	4.387	0.353	1.886	1.842	1.806	4.20	1.731		-	3396.5						-	4192.1						620			0.665		0.00	68	7.5	7.0
	10/03/16	4.380	0.297	1.851	1.862	1.808	4.20	1.663		-	3396.5						-	4192.1					2.8	700			0.655		0.00	70	7.4	7.2
	10/04/16	3.641	0.510	1.867	1.874	1.812	4.20	1.605	250.0	3892.7	3458.5			20.1	92.0%	229.0	3565.709	4066.8			11.0	95.2%	3.3	690	2990	2550	0.654	8740	0.00	68	7.6	7.2
	10/05/16	4.650	0.458	1.905	1.903	1.815	4.20	1.691	119.5	1898.6	3285.2			9.6	92.0%		-	4066.8					2.5	660			0.644		0.00	70	7.6	7.1
	10/06/16	5.680	0.300	1.924	1.933	1.817	4.20	1.772		-	3270.4						-	4035.3					3.6	620			0.642		0.00	70	7.5	7.2
	10/07/16	3.593	0.510	1.847	1.943	1.817	4.20	1.760		-	3270.4						-	4035.3					3.0	580			0.636		0.00	69	7.5	7.4
	10/08/16	3.747	0.353	1.831	1.873	1.816	4.20	1.831		-	3270.4						-	4035.3						620			0.646		0.46	68	7.5	7.1
	10/09/16	7.837	0.510	2.572	1.971	1.841	4.20	2.572		-	3270.4						-	4035.3						530			0.641		1.77	70	7.5	7.3
	10/10/16	4.383	0.670	2.151	2.014	1.856	4.20	2.151		-	3270.4						-	4035.3						400			0.652		0.00	67	7.6	7.0
	10/11/16	4.990	0.565	2.064	2.042	1.865	4.20	2.064	118.0	2031.2	3132.7			23.1	80.4%	194.0	3339.469	3896.1			5.0	97.4%	3.2	400	2718	2282	0.633	7432	0.00	65	7.5	7.1
	10/12/16	4.383	0.617	2.073	2.066	1.872	4.20	2.073	149.4	2582.9	3077.7			22.9	84.7%		-	3896.1					2.9	440			0.640		0.00	69	7.4	7.1
	10/13/16	4.282	0.617	2.107	2.092	1.881	4.20	2.107		-	3018.7						-	3879.0					2.5	500			0.639		0.00	68	7.4	7.2
	10/14/16	4.490	0.565	2.089	2.127	1.889	4.20	2.089		-	2768.2						-	3879.0					3.3	530			0.642		0.00	65	7.5	7.1
	10/15/16	4.298	0.510	2.155	2.173	1.902	4.20	2.155		-	2768.2						-	3879.0						550			0.647		0.00	65	7.5	7.0
	10/16/16	4.562	0.510	2.226	2.124	1.916	4.20	2.226		-	2768.2						-	3879.0						510			0.650		0.00	66	7.5	7.0
	10/17/16	4.836	0.672	2.243	2.137	1.933	4.20	2.243		-	2768.2						-	3879.0					3.2	520			0.631		0.00	66	7.4	7.1
	10/18/16	4.474	0.671	2.128	2.146	1.943	4.20	2.128	127.8	2267.2	2712.5			24.9	80.5%	209.0	3709.232	3845.0			13.0	93.8%	2.4	580	3124	2726	0.631	9632	0.00	69	7.5	7.3
	10/19/16	3.907	0.566	2.102	2.150	1.952	4.20	2.055	141.5	2480.6	2689.3			13.9	90.2%		-	3845.0					2.7	540			0.653		0.00	69	7.5	7.2
	10/20/16	3.807	0.565	2.030	2.139	1.959	4.20	2.030		-	2661.0						-	3673.9					2.8	580			0.765		0.00	69	7.8	7.2
	10/21/16	5.258	0.566	2.132	2.145	1.972	4.20	2.132		-	2648.1						-	3673.9					3.5	520			0.745		0.31	66	7.4	7.3
	10/22/16	5.061	0.673	2.164	2.146	1.983	4.20	2.164		-	2648.1						-	3673.9						490			0.679		0.10	67	7.5	7.0
	10/23/16	4.113	0.353	2.111	2.130	1.997	4.20	2.111		-	2648.1						-	3673.9						670			0.683		0.00	65	7.5	7.1
	10/24/16	4.330	0.617	2.063	2.104	2.008	4.20	1.999		-	2648.1						-	3673.9					3.2	680			0.660		0.08	64	7.4	7.3
	10/25/16	4.224	0.565	2.000	2.086	2.018	4.20	1.767	168.8	2814.8	2666.6			27.2	83.9%	228.0	3803.04	3699.7			10.0	95.6%	3.6	740	3206	2730	0.712	9648	0.00	63	7.5	7.2
	10/26/16	4.753	0.510	2.034	2.076	2.028	4.20	1.774	215.0	3647.2	2764.7			17.1	92.0%		-	3699.7					2.6	630			0.660		0.00	65	7.4	7.3
	10/27/16	4.500	0.353	2.167	2.096	2.041	4.20	1.977		-	2775.4						-	3604.4					3.0	590			0.645		0.70	64	7.5	7.1
	10/28/16	4.438	0.670	2.180	2.103	2.057	4.20	2.084		-	2701.9						-	3604.4					3.9	560			0.632		0.00	62	7.5	7.2
	10/29/16	5.319	0.670	2.154	2.101	2.072	4.20	2.154		-	2701.9						-	3604.4						590			0.649		0.00	63	7.1	7.2
	10/30/16	5.081	0.723	2.297	2.128	2.089	4.20	2.297		-	2701.9						-	3604.4						650			0.646		0.40	66	7.5	7.1
	10/31/16	5.211	0.716	2.226	2.151	2.086	4.20	2.147		-	2701.9						-	3604.4					3.0	630			0.625		0.00	62	7.3	7.2
Nov'16	11/01/16	5.885	0.457	2.166	2.175	2.095	4.20	2.132	160.8	2903.9	2724.3			10.0	93.8%	187.0	3378.05	3559.1			1.0	99.5%	4.1	690	2386	2028	0.619	8116	0.00	62	7.5	7.1
	11/02/16	4.757	0.723	2.199	2.198	2.107	4.20	2.101	161.5	2961.9	2748.1			12.0	92.6%		-	3559.1					2.8	600			0.618		0.00	65	7.5	7.0
	11/03/16	4.760	0.565	2.157	2.197	2.117	4.20	2.105		-	2620.9						-	3557.4					3.1	640			0.629		0.00	65	7.6	7.1
	11/04/16	4.206	0.723	2.156	2.194	2.125	4.20	2.021		-	2711.2						-	3557.4					3.5	610			0.600		0.00	62	7.5	7.2
	11/05/16	4.627	0.563	2.189	2.199	2.134	4.20	2.143		-	2711.2						-	3557.4						620			0.616		0.05	61	7.5	7.3
	11/06/16	5.573	0.670	2.244	2.191	2.147	4.20	2.153		-	2711.2						-	3557.4						680			0.618		0.00	63	7.5	7.3
	11/07/16	6.574	0.723	2.170	2.183	2.158	4.20	2.072		-	2711.2						-	3557.4						720			0.623		0.00	63	7.4	7.3
	11/08/16	4.695	0.563	2.145	2.180	2.144	4.20	2.052	248.0	4436.5	2902.9			38.9	84.3%	216.0	3864.089	3618.8			19.0	91.2%	3.1	740	2662	2279	0.659	9076	0.00	61	7.5	7.2
	11/09/16	4.091	0.830	2.117	2.168	2.143	4.20	2.017	206.0	3637.1	2976.3			18.2	91.2%		-	3618.8					2.9	620			0.652		0.00	62	7.5	7.1
	11/10/16	5.539	0.571	2.098	2.160	2.144	4.20	1.983		-	3081.3						-	3688.6					3.1	640			0.649		0.00	63	7.5	7.0
	11/11/16	4.762	0.617	2.089	2.150	2.145	4.20	2.022		-	3143.6						-	3688.6						600			0.665		0.00	62	7.5	7.0
	11/12/16	3.912	0.617	2.081	2.135	2.144	4.20	2.030		-	3143.6						-	3688.6						650			0.650		0.00	61	7.3	6.9
	11/13/16	5.567	0.457	2.144	2.121	2.146	4.20	2.071		-	3143.6						-	3688.6						680			0.655		0.00	61	7.4	7.0
	11/14/16	5.879	0.565	2.144	2.117	2.145	4.20	1.995		-	3143.6						-	3688.6					3.9	700			0.668		0.00	61	7.3	7.1
	11/15/16	4.248	0.617	2.347	2.146	2.149	4.20	2.247	201.8	3949.1	3233.1			11.0	94.5%	218.0	4267.128	3804.3			8.0	96.3%	3.6	650	3086	2533	0.600	10076	0.75	60	7.4	7.0
	11/16/16	4.250	0.830	2.255	2.165	2.150	4.20	2.135	185.8	3494.3	3259.2			17.2	90.7%		-	3804.3					2.9	520			0.561		0.00	62	7.3	6.9
	11/17/16	4.739	0.723	2.194	2.179	2.152	4.20	2.105		-	3369.5						-	3828.1					2.9	590			0.596		0.00	62	7.5	7.0
	11/18/16	3.950	0.565	2.163	2.190	2.154	4.20	2.097		-	3480.6						-	3828.1					3.6	580			0.609		0.00	60	7.5	7.1
	11/19/16	4.095	0.565	2.168	2.202	2.158	4.20	2.123		-	3480.6						-	3828.1						580			0.609		0.05	60	7.6	7.0
	11/20/16	4.188	0.670	2.220	2.213	2.161	4.20	2.220		-	3480.6						-	3828.1						620			0.610		0.00	59	7.6	7.2
	11/21/16	5.409	0.670	2.152	2.214	2.161	4.20	2.152		-	3480.6						-	3828.1					3.6	630			0.703		0.00	58	7.4	7.2
	11/22/16	8.128	0.617	2.141	2.185	2.162	4.20	2.141	237.0	4231.9	3564.1			32.8	86.2%	242.0	4321.137	3926.7			19.0	92.1%	2.8	690	3015	2615	0.588	10680	0.00	59	7.5	7.2
	11/23/16	4.187	0.563	2.158	2.171	2.165	4.20	2.158		-	3564.1						-	3926.7					3.6	730			0.591		0.00	58	7.6	7.3
	11/24/16	5.172	0.563	2.076	2.154	2.168	4.20	2.076		-	3657.7						-	3957.6						650			0.610		0.00	58	7.2	7.0
	11/25/16	5.375	0.510	2.128	2.149	2.171	4.20	2.128		-	3659.2						-	3957.6					3.4	690			0.596		0.15	58	7.4	7.2
	11/26/16	6.741	0.566	2.148	2.146	2.170	4.20	2.148		-	3659.2						-	3957.6						670			0.615		0.00	58	7.3	7.1
	11/27/16	7.384	0.617	2.206	2.144	2.171	4.20	2.206		-	3659.2						-	3957.6						640			0.616		0.00	58	7.3	7.1
	11/28/16	5.646	0.456	2.134	2.142	2.170	4.20	2.134		-	3659.2						-	3957.6					3.4	740			0.599		0.00	57	7.4	7.2
	11/29/16	7.448	0.353	2.409	2.180	2.174	4.20	2.409	173.0	3475.8	3636.3			13.2	92.4%	219.0	4399.942	4046.1			17.0	92.2%	3.5	710	3189	2757	0.599	10560	0.87	57	7.6	7.1
	11/30/16	4.273	0.670	2.330	2.204	2.178	4.20	2.330	197.5	3837.9	3658.7			26.1	86.8%		-	4046.1					3.3	650			0.592		0.38	60	7.4	7.0
Dec'16	12/01/16	7.360	0.990	2.411	2.252	2.186	4.20	2.411		-	3753.0						-	4213.1					3.8	470			0.582		0.00	60	7.5	7.1
	12/02/16	7.000	0.830	2.334	2.282	2.190	4.20	2.334		-	3866.1						-	4213.1					4.7	490			0.581		0.00	58	7.6	7.1
	12/03/16	7.436	0.670	2.335	2.308	2.196	4.20	2.335		-	3866.1						-	4213.1						570			0.607		0.00	58	7.4	7.1
	12/04/16	7.857	0.688	2.334	2.327	2.202	4.20	2.334		-	3866.1						-	4213.1						570			0.600		0.00	56	7.1	6.9
	12/05/16	6.480	0.670	2.386	2.363	2.209	4.20	2.386		-	3866.1						-	4213.1					3.9	550			0.577		0.11	56	7.3	6.9
	12/06/16	6.390	0.830	2.410	2.363	2.214	4.20	2.243	201.5		3866.1			18.4/4	93.8%	211.0	4240.973	4218.7			17.0	91.9%	3.4	500	2376	2093	0.569	10720	0.15	58	7.2	6.8
	12/07/16	7.343	0.777	2.490	2.386	2.225	4.20	2.302	190.7	3960.2	3877.8			18.0	90.6%		-	4218.7					4.2	490			0.609		0.00	58	7.4	7.1
	12/08/16	7.065	0.670	2.495	2.398	2.237	4.20	2.153		-	3798.0						-	4307.3					3.0	520			0.683		0.03	58	7.5	6.8
	12/09/16	4.520	0.777	2.378	2.404	2.245	4.20	2.048		-	3824.8						-	4307.3					2.8	550			0.796		0.00	55	7.4	7.0
	12/10/16	4.244	0.617	2.271	2.395	2.251	4.20	1.921		-	3824.8						-	4307.3						580			0.698		0.00	56	7.4	7.0
	12/11/16	7.204	1.095	2.513	2.420	2.265	4.20	1.941		-	3824.8						-	4307.3						590			0.691		0.00	56	7.5	7.2

Somerset WPCF Daily Data
2013-2018

	DATE	Max	Min	Sewage Flows(mgd) Influent Flow			NPDES Permit Flow	Effluent Flow	BOD raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	TSS raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	Aeration Tanks final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Weather Rain	Inf Temp	pH Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	12/12/16	7.482	0.723	2.715	2.467	2.286	4.20	2.069		-	3824.8						-	4307.3					2.9	540			0.657		0.47	52	7.3	7.1
	12/13/16	7.298	0.882	2.494	2.479	2.298	4.20	1.927	172.5		3824.8			31.5/18	84.2%	185.0	3847.993	4215.4			15.0	91.9%	3.8	580	2886	2475	0.689	10300	0.00	54	7.1	6.9
	12/14/16	7.238	0.830	2.595	2.494	2.313	4.20	1.998	157.5	3408.7	3765.4			45.8	70.9%		-	4215.4					3.8	600			0.676		0.00	55	7.2	6.9
	12/15/16	7.397	1.043	2.505	2.496	2.318	4.20	1.712		-	3734.8						-	4202.5					4.1	620			0.709		0.00	55	7.3	6.9
	12/16/16	7.178	0.723	2.409	2.500	2.323	4.20	1.711		-	3782.9						-	4202.5						580			0.741		0.17	51	7.3	6.9
	12/17/16	7.051	0.765	2.819	2.579	2.344	4.20	2.058		-	3782.9						-	4202.5						580			0.765		0.55	52	7.1	6.7
	12/18/16	7.155	1.043	2.898	2.634	2.369	4.20	2.057		-	3782.9						-	4202.5						460			0.732		0.02	54	7.0	6.7
	12/19/16	7.533	0.936	2.745	2.638	2.388	4.20	2.048		-	3782.9						-	4202.5					3.8	570			0.701		0.00	50	7.3	6.9
	12/20/16	7.151	0.936	2.779	2.679	2.407	4.20	1.985	141.0	3267.9	3697.0			16.0	88.7%	158.0	3661.944	4094.4			12.0	92.4%	3.9	450	2489	2117	0.699	10412	0.00	51	7.4	6.9
	12/21/16	7.711	0.989	2.824	2.711	2.429	4.20	2.399	126.0	2967.6	3592.8			21.9	82.6%		-	4094.4					3.2	550			0.699		0.00	54	7.3	6.9
	12/22/16	7.573	1.203	2.778	2.750	2.450	4.20	2.480		-	3486.3						-	4037.7					3.2	560			0.733		0.00	54	7.3	6.9
	12/23/16	8.067	1.043	2.902	2.821	2.475	4.20	2.696		-	3486.3						-	4037.7						590			1.235		0.00	50	7.4	7.0
	12/24/16	8.642	1.096	3.052	2.854	2.508	4.20	2.875		-	3486.3						-	4037.7						750			1.374		0.54	53	7.0	6.8
	12/25/16	7.398	0.937	2.672	2.822	2.526	4.20	2.559		-	3486.3						-	4037.7						790			1.385		0.00	53	7.0	6.7
	12/26/16	7.015	1.043	2.789	2.828	2.547	4.20	2.460		-	3486.3						-	4037.7						750			1.380		0.00	52	7.1	6.7
	12/27/16	7.452	1.307	3.110	2.875	2.577	4.20	2.962	92.0	2386.2	3329.2			17.0	81.5%	178.0	4616.857	4153.5			8.0	95.5%	3.8	800	3682	3151	1.349	9508	0.00	51	7.1	6.9
	12/28/16	7.195	1.043	2.778	2.869	2.599	4.20	2.669	136.7	3167.1	3308.9			34.0	75.1%		-	4153.5					5.5	830			1.344		0.00	52	7.2	6.8
	12/29/16	9.107	1.257	3.056	2.908	2.620	4.20	2.955		-	3285.1						-	4091.9					3.9	810			1.341		0.63	52	7.1	6.8
	12/30/16	10.066	1.203	3.010	2.924	2.643	4.20	2.919		-	3193.0						-	4091.9					4.0	780			1.345		0.00	53	7.0	6.8
	12/31/16	5.868	1.256	2.938	2.908	2.660	4.20	2.824		-	3193.0						-	4091.9						800			1.360		0.14	51	7.1	6.7
Jan'17	01/01/17	6.931	1.520	2.906	2.941	2.680	4.20	2.822		-	3193.0						-	4091.9						780			1.359		0.00	52	7.1	6.9
	01/02/17	7.619	1.096	2.926	2.961	2.699	4.20	2.806		-	3193.0					152.0	3709.232	4015.4			8.0	94.7%		830			1.350		0.00	51	7.3	6.9
	01/03/17	7.403	1.520	3.280	2.985	2.731	4.20	3.115	108.0	2954.4	3158.9			14.0	87.0%		-	4015.4					3.7	790	3427	2932	1.331	9216	0.86	52	7.2	6.8
	01/04/17	8.201	1.787	3.567	3.098	2.770	4.20	3.338	102.5	3049.2	3145.2			23.4	77.2%	90.0	2677.39	3792.4			6.0	93.3%	3.8	690			1.354		0.00	53	7.2	6.8
	01/05/17	6.859	1.840	3.437	3.152	2.804	4.20	3.195	93.3	2674.4	3092.9			23.1	75.2%		-	3702.7						510			1.336		0.00	53	7.1	6.8
	01/06/17	8.262	2.053	3.365	3.203	2.834	4.20	2.988		-	2984.4						-	3702.7					3.8	690			1.342		0.10	51	7.4	6.8
	01/07/17	7.090	1.840	3.405	3.269	2.864	4.20	2.765		-	2984.4						-	3702.7						680			1.358		0.52	50	6.9	6.7
	01/08/17	7.413	2.000	3.461	3.349	2.900	4.20	2.920		-	2984.4						-	3702.7						710			1.367		0.00	48	7.0	6.7
	01/09/17	7.133	1.573	3.339	3.408	2.936	4.20	2.821		-	2984.4					101.0	2812.573	3554.3			9.0	91.1%	3.7	780			1.337		0.00	51	7.1	6.9
	01/10/17	7.066	1.693	3.402	3.425	2.965	4.20	2.867	128.0	3631.7	3056.4			11.0	91.4%		-	3554.3					3.5	750	3386	2822	1.327	9408	0.28	52	7.3	6.8
	01/11/17	10.021	2.107	4.233	3.520	3.016	4.20	3.850	89.6	3163.2	3067.0			26.5	70.4%	90.0	3177.29	3500.5			2.0	97.8%	3.9	660			1.336		0.25	53	7.2	6.8
	01/12/17	9.850	3.007	4.519	3.675	3.083	4.20	4.153	86.3	3252.5	3083.9			15.5	82.0%		-	3442.5					3.8	500			1.342		0.02	53	7.2	6.8
	01/13/17	8.333	2.420	4.344	3.815	3.142	4.20	4.075		-	3051.4						-	3442.5					3.6	535			1.333		0.00	53	7.1	6.9
	01/14/17	9.379	2.532	4.245	3.935	3.200	4.20	3.847		-	3051.4						-	3442.5						650			1.344		0.00	52	7.1	6.8
	01/15/17	9.804	2.468	4.082	4.023	3.255	4.20	3.739		-	3051.4						-	3442.5						655			1.345		0.00	50	7.2	6.8
	01/16/17	9.461	2.633	3.917	4.106	3.292	4.20	3.497		-	3051.4					99.0	3234.11	3412.8			9.0	90.9%		665			1.344		0.00	50	7.3	6.9
	01/17/17	9.033	2.473	3.844	4.169	3.324	4.20	3.355	85.0	2725.0	3021.8			6.0	92.9%		-	3412.8					3.2	680	3063	2598	1.324	10716	0.24	52	7.1	6.8
	01/18/17	7.660	2.177	3.975	4.132	3.365	4.20	3.653	85.5	2834.5	3006.1			15.6	81.8%	96.0	3182.544	3384.0			6.0	93.8%	3.5	650			1.336		0.05	53	7.1	6.8
	01/19/17	6.954	2.066	3.884	4.042	3.401	4.20	3.689	94.5	3061.1	2988.9			12.4	86.9%		-	3344.3					4.2	615			1.329		0.00	53	7.2	6.8
	01/20/17	7.550	2.270	3.874	3.974	3.436	4.20	3.711		-	2990.8						-	3344.3					3.6	675			1.328		0.00	50	7.1	6.8
	01/21/17	7.027	2.114	3.804	3.911	3.471	4.20	3.792		-	2990.8						-	3344.3						700			1.359		0.00	51	6.9	6.6
	01/22/17	6.902	2.307	3.745	3.863	3.499	4.20	3.745		-	2990.8						-	3344.3						775			1.356		0.00	50	6.9	6.7
	01/23/17	6.824	1.988	3.710	3.834	3.521	4.20	3.710		-	2990.8					99.0	3063.199	3309.1			1.0	99.0%	3.4	780			1.332		1.26	52	7.2	6.8
	01/24/17	8.050	3.086	5.443	4.062	3.613	4.20	5.443	66.0	2996.0	2991.3			4.0	93.9%		-	3309.1					4.5	360	2258	1914	1.271	10468	0.75	51	6.8	6.6
	01/25/17	8.190	4.288	6.349	4.401	3.732	4.20	6.349	45.2	2393.4	2945.3			8.6	81.0%	53.0	2806.385	3253.3			1.0	98.1%	5.2	320			1.270		0.00	51	7.0	6.7
	01/26/17	8.232	4.413	6.121	4.721	3.832	4.20	6.121	65.2	3328.4	3017.8			13.7	79.0%		-	3082.8					5.4	330			1.258		0.07	52	7.0	6.7
	01/27/17	7.868	4.106	5.651	4.975	3.928	4.20	5.651		-	3005.3						-	3082.8					5.3	340			1.254		0.00	53	7.0	6.6
	01/28/17	7.935	3.632	5.403	5.203	4.006	4.20	5.352		-	3005.3						-	3082.8						375			1.308		0.00	50	7.1	6.6
	01/29/17	7.238	3.444	5.211	5.413	4.079	4.20	4.985		-	3005.3						-	3082.8						380			1.298		0.00	50	7.2	6.6
	01/30/17	8.510	2.670	5.080	5.608	4.151	4.20	4.865		-	3005.3					74.0	3135.173	3088.7			1.0	98.6%	3.8	400			1.272		0.00	50	6.9	6.5
	01/31/17	7.928	2.960	4.771	5.512	4.213	4.20	4.385	65.0	2586.4	2973.1			7.0	89.2%		-	3088.7					5.0	390	2303	1932	1.327	10160	0.13	50	6.9	6.5
Feb'17	02/01/17	6.607	2.653	4.569	5.258	4.268	4.20	4.166	97.5	3715.3	3026.1			16.1	83.5%	85.0	3238.964	3036.4			3.0	96.5%	4.6	505			1.404		0.00	50	7.2	6.5
	02/02/17	6.094	2.607	4.397	5.012	4.305	4.20	4.063	84.8	3109.7	3037.2			20.8	75.5%		-	3036.4					4.1	490			1.390		0.00	51	7.2	6.5
	02/03/17	7.649	2.460	4.270	4.814	4.328	4.20	3.890		-	3036.3						-	3081.3					4.3	540			1.360		0.00	50	7.1	6.4
	02/04/17	7.659	2.657	4.114	4.630	4.351	4.20	3.579		-	3066.4						-	3081.3						530			1.412		0.00	49	6.7	6.5
	02/05/17	7.419	2.425	4.142	4.478	4.377	4.20	3.684		-	3066.4						-	3081.3						490			1.436		0.00	49	8.2	6.9
	02/06/17	6.931	2.356	3.981	4.321	4.396	4.20	3.531		-	3066.4					97.0	3220.549	3096.8			3.0	96.9%	3.0	605			1.412		0.00	49	6.8	7.0
	02/07/17	7.260	1.821	3.979	4.207	4.413	4.20	3.705	82.0	2721.2	3039.9			8.0	90.2%		-	3096.8					4.3	555	2978	2485	1.378	8640	0.15	51	7.2	6.6
	02/08/17	7.526	2.086	3.837	4.103	4.430	4.20	3.553	110.0	3520.1	3074.2			16.1	85.4%	99.0	3168.057	3136.3			1.0	99.0%	4.5	490			1.391		0.00	52	7.4	6.8
	02/09/17	7.180	2.073	3.798	4.017	4.443	4.20	3.516	120.0	3801.0	3086.3			25.8	78.5%		-	3136.3					3.2	590			1.405		0.97	51	7.4	6.6
	02/10/17	7.358	1.901	3.686	3.934	4.425	4.20	3.157		-	3080.3						-	3131.1					3.6	590			1.397		0.00	50	7.5	6.7
	02/11/17	7.491	2.080	3.734	3.880	4.399	4.20	3.274		-	3066.0						-	3131.1						555			1.420		0.23	49	7.4	6.8
	02/12/17	7.227	1.643	3.838	3.836	4.382	4.20	3.322		-	3066.0						-	3131.1						615			1.402		0.42	47	7.2	6.8
	02/13/17	7.510	2.454	4.052	3.846	4.375	4.20	3.620		-	3066.0					106.0	3582.13	3181.2			3.0	97.2%	3.4	610			1.415		0.05	49	7.2	6.5
	02/14/17	7.633	2.016	4.063	3.858	4.375	4.20	3.492	114.0	3862.9	3127.3			6.0	94.7%		-	3181.2					4.0	385	2946	2441	1.432	9152	0.00	50	8.2	6.4
	02/15/17	7.421	2.267	4.245	3.917	4.386	4.20	3.742	82.0	2903.1	3111.3			14.5	82.3%	100.0	3540.33	3215.3			5.0	95.0%	3.1	530			1.421		0.08	49	7.2	6.5
	02/16/17	7.699	2.513	4.245	3.980	4.399	4.20	3.755	95.0	3363.3	3156.9			10.0	89.5%		-	3215.3					3.9	465			1.395		0.00	50	7.2	6.4
	02/17/17	7.805	2.337	4.212	4.056	4.407	4.20	3.718		-	3181.7						-	3219.3					3.4	495			1.371		0.00	49	7.1	6.4
	02/18/17	7.430	2.447	4.326	4.140	4.422	4.20	3.757		-	3191.7						-	3219.3						480			1.393		0.00	49	8.2	6.8
	02/19/17	9.748	2.908	4.621	4.252	4.447	4.20	4.201		-	3191.7						-	3219.3						405			1.376		0.00	50	6.9	6.4
	02/20/17	8.887	2.970	4.811	4.360	4.480	4.20	4.316		-	3191.7					84.0	3370.394	3236.1			9.0	89.3%		375			1.359		0.00	49	6.9	6.4
	02/21/17	8.482	3.106	4.736	4.457	4.513	4.20	4.329	69.0	2725.4	3155.9			8.0	88.4%		-	3236.1					2.8	435	2785	2369	1.317	10564	0.00	50	7.1	6.5
	02/22/17	7.730	2.917	4.700	4.522	4.546	4.20	4.182	84.3	3304.4	3166.5			10.6	87.4%	87.0	3410.226	3274.7			6.0	93.1%	2.8	380			1.326		0.00	51	7.1	6.5

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD								TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	02/23/17	7.987	2.447	4.621	4.575	4.519	4.20	4.163	82.5	3179.5	3179.6			11.7	85.8%		-	3274.7					3.0	430			1.313		0.00	52	7.1	6.4
	02/24/17	8.063	2.771	4.551	4.624	4.459	4.20	4.242		-	3240.0						-	3333.2					2.8	415			1.314		0.00	52	7.1	6.4
	02/25/17	7.632	2.726	4.413	4.636	4.402	4.20	4.066		-	3232.7						-	3333.2						385			1.317		0.21	53	7.3	6.7
	02/26/17	7.193	2.570	4.271	4.586	4.356	4.20	3.922		-	3232.7						-	3333.2						380			1.295		0.00	52	7.3	6.8
	02/27/17	7.808	2.372	4.182	4.496	4.315	4.20	3.933		-	3232.7					108.0	3766.811	3381.4			4.0	96.3%	3.2	325			1.276		0.00	51	7.1	6.5
	02/28/17	7.049	2.173	4.150	4.413	4.280	4.20	3.878	206.0	7129.9	3532.5			5.0	97.6%		-	3381.4					3.3	345	2934	2500	1.278	10448	0.06	52	7.1	6.4
Mar'17	03/01/17	7.464	1.910	4.259	4.350	4.252	4.20	3.983	89.8	3189.7	3508.0			15.4	82.9%	85.0	3019.205	3368.5			6.0	92.9%	3.0	340			1.313		0.20	52	7.2	6.4
	03/02/17	9.111	1.697	4.079	4.272	4.229	4.20	3.650		-	3578.9						-	3368.5					4.1	345			1.354		0.00	52	7.2	6.4
	03/03/17	6.769	1.846	3.816	4.167	4.204	4.20	3.349		-	3567.5						-	3384.7					3.1	400			1.397		0.00	50	7.2	6.4
	03/04/17	6.880	1.687	3.703	4.066	4.181	4.20	3.234		-	3609.1						-	3384.7						340			1.397		0.00	49	7.2	6.5
	03/05/17	7.236	2.003	3.720	3.987	4.163	4.20	3.155		-	3609.1						-	3384.7						360			1.413		0.00	48	7.2	6.7
	03/06/17	6.824	1.823	3.678	3.915	4.148	4.20	3.043		-	3609.1					124.0	3803.64	3431.3			13.0	89.5%	3.5	370			1.408		0.00	50	7.2	6.4
	03/07/17	7.143	2.106	3.689	3.849	4.133	4.20	3.092	96.0	2953.6	3554.5			14.0	85.4%		-	3431.3					3.3	350	3020	2530	1.448	8736	0.08	50	7.1	6.2
	03/08/17	6.941	1.783	3.693	3.768	4.124	4.20	3.134	100.5	3095.4	3519.2			14.6	85.5%	99.0	3049.162	3412.2			4.0	96.0%	3.2	270			1.519		0.04	52	7.2	6.3
	03/09/17	6.752	1.687	3.436	3.676	4.106	4.20	2.925	96.3	2759.6	3522.1			16.4	83.0%		-	3412.2					3.0	330			1.591		0.00	52	7.3	6.5
	03/10/17	6.791	1.460	3.455	3.625	4.093	4.20	2.837		-	3522.3						-	3442.7					3.0	490			1.549		0.30	51	7.1	6.8
	03/11/17	6.627	1.227	3.325	3.571	4.077	4.20	2.691		-	3497.0						-	3442.7						595			1.638		0.00	48	7.1	6.7
	03/12/17	6.675	1.238	3.317	3.513	4.065	4.20	2.639		-	3497.0						-	3442.7						620			1.637		0.00	48	7.3	6.9
	03/13/17	6.730	1.112	3.241	3.451	4.048	4.20	2.557		-	3497.0					127.0	3432.802	3441.6			5.0	96.1%	2.8	725			1.598		0.00	50	7.1	6.8
	03/14/17	10.608	1.281	4.811	3.611	4.081	4.20	4.164	249.0	9990.8	4038.1			4.0	98.4%		-	3441.6					3.3	725	3491	2923	1.642	8684	1.73	48	7.1	6.7
	03/15/17	8.752	3.596	5.101	3.812	4.116	4.20	4.526	67.0	2850.3	3946.8			16.0	76.1%	78.0	3318.303	3412.3			12.0	84.6%	3.0	515			1.601		0.00	48	7.0	6.7
	03/16/17	8.558	3.400	4.924	4.025	4.144	4.20	4.363	57.2	2349.0	3830.3			5.2	90.9%		-	3412.3					3.5	460			1.601		0.00	48	6.9	6.7
	03/17/17	8.613	2.847	4.768	4.212	4.162	4.20	4.241		-	3907.6						-	3396.3					3.8	430			1.600		0.00	49	6.9	6.6
	03/18/17	8.120	2.856	4.779	4.420	4.180	4.20	4.331		-	3957.0						-	3396.3						475			1.625		0.00	48	6.9	6.7
	03/19/17	8.102	3.319	4.880	4.643	4.202	4.20	4.336		-	3957.0						-	3396.3						465			1.621		0.00	48	6.9	6.7
	03/20/17	7.770	2.582	4.732	4.856	4.215	4.20	4.203		-	3957.0					93.0	3670.234	3426.8			6.0	93.5%	3.8	510			1.580		0.00	50	6.9	6.7
	03/21/17	8.000	3.057	4.570	4.822	4.214	4.20	4.077	125.0	4764.2	4024.3			9.0	92.8%		-	3426.8					3.7	510	2823	2395	1.522	9584	0.00	51	6.9	6.7
	03/22/17	7.684	2.581	4.364	4.717	4.199	4.20	3.724	83.2	3028.1	3947.7			7.4	91.1%	75.0	2729.682	3355.6			5.0	93.3%	3.5	535			1.554		0.00	50	6.9	6.7
	03/23/17	6.892	2.575	4.130	4.603	4.179	4.20	3.425	92.2	3175.8	3982.3			7.8	91.5%		-	3355.6					3.2	605			1.551		0.00	49	7.0	6.7
	03/24/17	7.384	2.170	4.202	4.522	4.162	4.20	3.646		-	4038.8						-	3348.7					3.0	590			1.548		0.00	50	7.0	6.7
	03/25/17	7.363	2.336	3.977	4.408	4.141	4.20	3.474		-	4116.9						-	3348.7						580			1.588		0.00	50	7.1	6.7
	03/26/17	6.607	2.490	3.909	4.269	4.119	4.20	3.377		-	4116.9						-	3348.7						695			1.599		0.00	51	7.2	6.6
	03/27/17	7.043	2.263	3.855	4.144	4.101	4.20	3.355		-	4116.9					104.0	3343.673	3348.2			6.0	94.2%	2.5	665			1.526		0.33	50	7.0	6.8
	03/28/17	6.234	2.053	3.937	4.053	4.089	4.20	3.360	116.0	3808.8	4091.3			4.0	96.6%		-	3348.2					3.4	670	3189	2697	1.600	7886	0.51	51	7.0	6.7
	03/29/17	6.955	2.645	4.163	4.025	4.089	4.20	4.034	101.2	3513.6	4046.8			7.5	92.6%	95.0	3298.345	3296.1			5.0	94.7%	3.4	610			1.615		0.00	51	7.0	6.7
	03/30/17	7.558	2.197	4.087	4.019	4.087	4.20	4.015	118.0	4022.1	3807.8			11.5	90.3%		-	3296.1					2.5	650			1.627		0.00	51	7.1	6.6
	03/31/17	7.727	2.217	4.131	4.008	4.082	4.20	4.069		-	3859.3						-	3330.7					3.4	450			1.654		1.37	51	7.0	6.7
Apr'17	04/01/17	10.999	3.893	6.722	4.401	4.171	4.20	6.722		-	3859.3						-	3330.7						375			1.506		0.68	48	6.7	6.7
	04/02/17	7.882	5.137	6.787	4.812	4.270	4.20	6.787		-	3859.3						-	3330.7						270			1.443		0.00	49	6.3	6.5
	04/03/17	9.410	4.902	6.969	5.257	4.378	4.20	6.898		-	3859.3					55.0	3196.68	3315.8			3.0	94.5%	4.0	305			1.379		0.00	52	6.8	6.6
	04/04/17	9.609	4.893	7.022	5.697	4.488	4.20	6.937	62.0	3630.9	3841.7			4.0	93.5%		-	3315.8					4.1	255	2084	1776	1.366	10456	0.88	50	6.8	6.5
	04/05/17	10.625	5.927	7.485	6.172	4.615	4.20	7.485	47.8	2983.9	3780.4			6.7	86.0%	68.0	4244.893	3364.9			4.0	94.1%	3.4	265			1.351		0.00	51	6.7	6.5
	04/06/17	10.258	5.561	7.419	6.648	4.740	4.20	7.419	41.8	2586.4	3754.2			5.0	88.0%		-	3364.9					4.0	275			1.331		1.38	50	6.7	6.5
	04/07/17	12.595	6.467	9.557	7.423	4.935	4.20	9.440		-	3804.9						-	3404.3					3.5	210			1.289		0.00	50	6.5	6.4
	04/08/17	10.797	6.214	8.275	7.645	5.096	4.20	8.175		-	3892.0						-	3404.3						225			1.300		0.00	50	6.9	6.7
	04/09/17	10.786	5.825	7.575	7.757	5.234	4.20	7.455		-	3892.0						-	3404.3						265			1.295		0.00	52	6.8	6.5
	04/10/17	10.685	4.969	6.711	7.721	5.347	4.20	6.592		-	3892.0					51.0	2854.457	3343.2			6.0	88.2%	2.9	275			1.264		0.00	52	6.8	6.5
	04/11/17	10.520	4.777	6.163	7.598	5.442	4.20	6.116	73.0	3752.2	3881.2			5.0	93.2%		-	3343.2					3.5	290	2320	1982	1.261	11824	0.00	52	6.8	6.3
	04/12/17	9.494	3.758	5.748	7.350	5.525	4.20	5.748	76.2	3652.9	3864.9			6.8	91.1%	73.0	3499.497	3350.6			1.0	98.6%	3.2	285			1.318		0.00	54	6.9	6.4
	04/13/17	8.941	3.668	5.321	7.050	5.542	4.20	5.297		-	3393.7						-	3350.6					3.6	300			1.345		0.00	53	7.0	6.5
	04/14/17	8.025	3.251	5.011	6.401	5.539	4.20	4.916		-	3439.0						-	3354.7					3.8	300			1.394		0.00	53	7.1	6.4
	04/15/17	8.748	3.513	4.874	5.915	5.537	4.20	4.874		-	3538.1						-	3354.7						280			1.450		0.03	53	7.1	6.7
	04/16/17	8.901	3.026	4.738	5.509	5.536	4.20	4.605		-	3538.1						-	3354.7						285			1.493		0.02	54	7.1	6.8
	04/17/17	8.288	2.720	4.389	5.178	5.523	4.20	4.196		-	3538.1					130.0	4758.554	3510.7			13.0	90.0%		315			1.476		0.00	56	7.1	6.7
	04/18/17	7.676	2.620	4.216	4.900	5.501	4.20	4.092	136.0	4782.0	3641.7			7.0	94.9%		-	3510.7					3.0	335	2830	2384	1.438	9504	0.00	55	6.9	6.2
	04/19/17	7.110	2.367	4.128	4.668	5.481	4.20	3.959	104.2	3587.3	3637.6			9.7	90.7%	67.0	2306.644	3359.2			7.0	89.6%	3.6	285			1.445		0.10	54	7.4	6.3
	04/20/17	7.673	2.463	4.151	4.501	5.467	4.20	4.102	177.0	6127.6	3742.4			10.3	94.2%		-	3359.2					3.3	260			1.504		0.00	54	7.3	6.2
	04/21/17	7.614	2.249	4.124	4.374	5.459	4.20	4.122		-	3802.0						-	3437.8					4.1	240			1.591		0.30	54	7.4	6.2
	04/22/17	7.521	2.065	4.056	4.257	5.457	4.20	4.056		-	3858.9						-	3437.8						220			1.600		0.09	52	6.7	6.4
	04/23/17	7.527	2.113	3.974	4.148	5.449	4.20	3.974		-	3858.9						-	3437.8						220			1.636		0.00	53	7.0	6.2
	04/24/17	9.188	1.911	3.973	4.089	5.449	4.20	3.973		-	3858.9					113.0	3744.235	3471.9			31.0	72.6%	2.9	230			1.645		0.00	56	6.9	6.0
	04/25/17	7.145	2.224	3.993	4.057	5.452	4.20	3.990	133.0	4429.1	3906.4			17.0	87.2%		-	3471.9					3.9	205	2365	2032	1.692	6836	1.25	55	7.4	6.2
	04/26/17	6.270	3.357	4.827	4.157	5.484	4.20	4.827	109.0	4388.0	3943.4			19.7	81.9%	84.0	3381.603	3476.1			8.0	90.5%	3.1	250			1.660		0.29	56	7.0	6.6
	04/27/17	7.102	2.936	4.824	4.253	5.514	4.20	4.824	62.0	2494.4	3842.3			12.6	79.7%		-	3476.1					3.4	250			1.572		0.01	55	6.9	6.5
	04/28/17	6.201	3.327	4.698	4.335	5.532	4.20	4.698		-	3869.7						-	3498.3					3.1	265			1.688		0.02	55	6.9	6.5
	04/29/17	6.046	2.930	4.580	4.410	5.548	4.20	4.580		-	3855.9						-	3498.3						260			1.744		0.00	56	6.7	6.5
	04/30/17	5.788	3.059	4.386	4.469	5.557	4.20	4.386		-	3855.9						-	3498.3						300			1.775		0.00	54	6.7	6.6
May'17	05/01/17	6.426	2.656	4.323	4.519	5.477	4.20	4.323		-	3855.9					102.0	3677.49	3518.2			10.0	90.2%	3.3	325			1.639		0.00	56	7.0	6.7
	05/02/17	7.102	2.760	4.697	4.619	5.407	4.20	4.697	83.0	3251.4	3805.5			4.0	95.2%		-	3518.2					3.0	295	2813	2411	1.699	10556	0.73	56	7.0	6.5
	05/03/17	7.680	2.747	4.429	4.562	5.322	4.20	4.429	89.3	3298.6	3766.5			10.4	88.4%	91.0	3361.345	3536.5			11.0	87.9%	3.3	315			1.689		0.00	57	7.0	6.6
	05/04/17	7.344	2.590	4.242	4.479	5.230	4.20	4.242	120.5	4263.1	3815.1			10.9	91.0%		-	3536.5					3.4	315			1.699		0.00	56	7.0	6.3
	05/05/17	7.760	2.573	4.498	4.451	5.130	4.20	4.498		-	3884.4						-	3448.0					3.8	310			1.667		0.86	56	7.0	6.4
	05/06/17	7.914	3.387	5.495	4.581	5.066	4.20	5.495		-	4002.4						-	3448.0						205			1.664		0.62	57	7.0	6.4

Somerset WPCF Daily Data
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		Sewage Flows(mgd)							BOD								TSS								Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	05/07/17	7.602	4.136	5.703	4.770	4.937	4.20	5.703		-	4002.4						-	3448.0						230			1.658		0.00	56	7.1	6.6
	05/08/17	7.974	3.884	5.425	4.927	4.842	4.20	5.425		-	4002.4					78.0	3529.071	3457.0			7.0	91.0%	3.4	250			1.641		0.00	57	6.8	6.2
	05/09/17	7.296	3.483	5.087	4.983	4.759	4.20	5.087	96.0	4072.9	4008.3			4.0	95.8%		-	3457.0					3.6	210	1786	1542	1.623	7468	0.00	56	7.1	6.3
	05/10/17	6.473	2.843	4.823	5.039	4.697	4.20	4.823	76.0	3057.0	3935.1			6.6	91.3%	70.0	2815.667	3452.7			2.0	97.1%	3.5	250			1.614		0.00	57	7.0	6.2
	05/11/17	8.471	2.817	4.771	5.115	4.650	4.20	4.771	85.7	3410.0	3908.8			5.2	93.9%		-	3452.7					3.1	220			1.668		0.00	57	7.1	6.2
	05/12/17	7.405	2.793	4.479	5.112	4.608	4.20	4.479		-	3930.1						-	3446.8					3.8	240			1.635		0.00	56	6.9	6.2
	05/13/17	8.200	2.240	4.289	4.940	4.573	4.20	4.289		-	3930.1						-	3446.8						250			1.593		1.18	55	6.7	6.2
	05/14/17	7.122	3.367	5.319	4.885	4.584	4.20	5.319		-	3930.1						-	3446.8						260			1.590		0.31	55	6.6	6.3
	05/15/17	7.692	3.269	5.422	4.884	4.602	4.20	5.422		-	3930.1					79.0	3572.339	3460.8			2.0	97.5%	3.0	275			1.565		0.00	55	6.8	6.3
	05/16/17	7.519	3.224	5.197	4.900	4.617	4.20	5.197	85.0	3684.2	3911.2			6.0	92.9%		-	3460.8					3.0	290	1643	1438	1.482	7614	0.00	57	6.9	6.4
	05/17/17	7.518	2.980	5.003	4.926	4.638	4.20	5.003		-	3911.2					70.0	2920.751	3256.6			1.0	98.6%	2.8	280			1.397		0.00	58	6.9	6.4
	05/18/17	8.368	2.950	4.837	4.935	4.658	4.20	4.837	74.2	2993.3	3773.6			15.6	79.0%		-	3256.6					3.2	130			1.113		0.00	60	6.9	6.6
	05/19/17	8.366	2.660	4.517	4.941	4.671	4.20	4.517		-	3789.1						-	3375.3					2.7	285			1.406		0.00	60	7.0	6.8
	05/20/17	7.030	2.047	4.217	4.930	4.674	4.20	4.217		-	3576.5						-	3375.3						530			1.517		0.00	58	7.2	6.8
	05/21/17	7.627	2.556	4.140	4.762	4.674	4.20	4.140		-	3576.5						-	3375.3						610			1.587		0.00	59	7.1	6.8
	05/22/17	8.350	2.070	4.208	4.588	4.679	4.20	4.208		-	3576.5					119.0	4176.272	3464.3			3.0	97.5%	2.5	595			1.575		0.31	59	7.0	6.5
	05/23/17	8.109	2.214	4.141	4.438	4.685	4.20	4.141	155.0	5353.1	3724.6			4.0	97.4%		-	3464.3					2.6	595	2959	2551	1.571	9862	0.00	59	6.9	6.3
	05/24/17	6.303	2.137	3.940	4.286	4.684	4.20	3.940		-	3724.6					117.0	3844.573	3475.5			9.0	92.3%	2.8	565	`		1.407		0.00	59	7.0	6.3
	05/25/17	6.892	2.168	3.843	4.144	4.679	4.20	3.843	118.0	3782.0	3670.6			4.3	96.4%		-	3475.5					2.9	585	2412		1.577	6850	0.69	59	7.0	6.5
	05/26/17	6.212	2.587	4.259	4.107	4.660	4.20	4.259		-	3605.4						-	3487.2					2.8	610			1.530		0.32	58	6.9	6.2
	05/27/17	7.080	2.137	4.066	4.085	4.634	4.20	4.066		-	3716.5						-	3487.2						585			1.591		0.00	58	6.8	6.4
	05/28/17	7.133	2.460	3.927	4.055	4.609	4.20	3.927		-	3716.5						-	3487.2						595			1.611		0.00	57	6.8	6.5
	05/29/17	7.027	2.200	4.004	4.026	4.590	4.20	4.004		-	3716.5					127.0	4240.957	3570.9			6.0	95.3%		655			1.615		0.29	57	6.4	6.4
	05/30/17	6.742	2.180	3.888	3.990	4.573	4.20	3.888	130.0	4215.4	3761.9			6.0	95.4%		-	3570.9					3.1	650	2566	2228	1.589	9002	0.00	59	7.0	6.3
	05/31/17	8.046	1.957	3.986	3.996	4.562	4.20	3.986	106.0	3523.8	3742.0			5.1	95.2%	105.0	3490.54	3550.2			3.0	97.1%	2.4	725			1.556		0.20	60	6.9	6.2
Jun'17	06/01/17	6.115	2.400	4.131	4.037	4.543	4.20	4.131	111.5	3841.5	3791.2			7.1	93.6%		-	3550.2					2.9	650	2561		1.417	9268	0.20	61	6.9	6.3
	06/02/17	7.510	2.291	4.144	4.021	4.533	4.20	4.144		-	3836.0						-	3573.8					2.5	250			0.966		0.07	60	7.0	6.4
	06/03/17	7.345	2.217	3.975	4.008	4.524	4.20	3.975		-	3793.3						-	3573.8						260			0.708		0.04	60	7.3	6.6
	06/04/17	7.016	2.137	3.948	4.011	4.506	4.20	3.948		-	3793.3						-	3573.8						310			0.706		0.34	62	7.3	6.7
	06/05/17	7.083	2.553	4.062	4.019	4.458	4.20	4.062		-	3793.3					124.0	4200.758	3643.4			13.0	89.5%	2.3	300			0.952		0.12	60	7.1	6.5
	06/06/17	6.123	2.280	4.103	4.050	4.405	4.20	4.103	82.0	2806.0	3703.5			4.0	95.1%		-	3643.4					2.7	370	2095	1812	0.796	10512	0.23	59	6.8	6.3
	06/07/17	6.215	2.233	4.110	4.068	4.361	4.20	4.110	87.5	2999.3	3644.8			6.4	92.7%	93.0	3187.798	3605.5			1.0	98.9%	2.7	400			0.796		0.00	60	7.0	6.3
	06/08/17	6.743	2.127	4.041	4.055	4.326	4.20	4.041	111.0	3740.9	3617.2			7.0	93.7%		-	3605.5					2.5	320			0.858		0.00	61	7.0	6.3
	06/09/17	5.940	2.297	3.927	4.024	4.296	4.20	3.927		-	3668.1						-	3704.2					3.4	310			0.814		0.00	62	6.9	6.5
	06/10/17	6.723	2.214	3.697	3.984	4.261	4.20	3.697		-	3693.9						-	3704.2						290			0.753		0.00	60	6.8	6.2
	06/11/17	6.872	1.963	3.636	3.939	4.233	4.20	3.636		-	3693.9						-	3704.2						300			0.756		0.00	60	6.8	6.4
	06/12/17	6.655	1.603	3.482	3.857	4.206	4.20	3.482		-	3693.9					122.0	3542.865	3686.3			4.0	96.7%	3.0	300			0.747		0.00	63	7.1	6.5
	06/13/17	5.949	1.842	3.363	3.751	4.140	4.20	3.363	102.0	2860.8	3618.2			4.0	96.1%		-	3686.3					3.1	360	2301	1991	0.747	10292	0.00	62	6.9	6.4
	06/14/17			3.642	3.684	4.081	4.20	3.642	109.7	3332.1	3594.3			6.9	93.7%	115.0	3493.042	3677.5			4.0	96.5%	2.2	400			0.748		0.00	64	6.9	6.2
	06/15/17	6.148	1.806	3.539	3.612	4.026	4.20	3.539	144.0	4250.2	3641.5			10.6	92.6%		-	3677.5					3.0	320			0.747		0.00	63	6.9	6.3
	06/16/17	7.889	1.927	3.575	3.562	3.978	4.20	3.575		-	3641.5						-	3772.1					3.1	310			0.708		0.82	62	7.0	6.4
	06/17/17	6.198	1.701	3.403	3.520	3.930	4.20	3.403		-	3700.4						-	3772.1						330			0.733		0.03	63	7.1	6.4
	06/18/17	6.644	1.750	3.436	3.491	3.894	4.20	3.436		-	3700.4						-	3772.1						350			0.727		0.00	62	7.4	6.7
	06/19/17	6.058	1.792	3.366	3.475	3.866	4.20	3.366		-	3700.4					142.0	3986.286	3795.9			1.0	99.3%	2.8	310			0.713		0.03	64	7.1	6.5
	06/20/17	6.543	1.613	3.289	3.464	3.838	4.20	3.289	148.0	4059.7	3730.4			8.0	94.6%		-	3795.9					2.8	300	2276	1970	0.710	10448	0.00	64	7.0	6.4
	06/21/17	6.537	1.506	3.272	3.411	3.807	4.20	3.272	135.0	3683.9	3726.8			9.7	92.8%	140.0	3820.387	3756.4			1.0	99.3%	2.2	360			0.701		0.00	65	7.1	6.4
	06/22/17	6.924	1.556	3.167	3.358	3.774	4.20	3.167	124.3	3283.1	3567.6			6.1	95.1%		-	3756.4					2.8	320			0.710		0.00	64	7.0	6.4
	06/23/17	5.816	1.609	3.218	3.307	3.750	4.20	3.218		-	3567.6						-	3745.3					2.6	280			0.718		0.00	63	7.0	6.6
	06/24/17	9.946	1.610	3.330	3.297	3.733	4.20	3.330		-	3549.7						-	3745.3						300			0.736		1.07	63	6.9	6.6
	06/25/17	6.332	1.690	3.111	3.250	3.695	4.20	3.111		-	3549.7						-	3745.3						300			0.733		0.00	63	7.0	6.8
	06/26/17	6.683	1.544	3.098	3.212	3.662	4.20	3.098		-	3549.7					139.0	3591.387	3728.2			1.0	99.3%	2.2	310			0.704		0.00	64	7.0	6.7
	06/27/17	5.821	1.632	3.194	3.199	3.638	4.20	3.194	131.0	3489.6	3545.1			10.0	92.4%		-	3728.2					3.2	340	2240	1942	0.703	10020	0.00	64	7.2	6.7
	06/28/17	5.927	1.500	2.971	3.156	3.603	4.20	2.971		-	3545.1					166.0	4113.171	3714.0			2.0	98.8%	3.3	290			0.707		0.00	64	7.1	6.7
	06/29/17	5.828	1.383	2.931	3.122	3.572	4.20	2.931	142.3	3478.5	3488.4			23.2	83.7%		-	3714.0					2.7	300			0.706		0.00	65	7.1	6.6
	06/30/17	6.115	1.493	2.878	3.073	3.535	4.20	2.878		-	3485.5						-	3742.0					2.8	270			0.715		0.09	65	7.2	6.6
July'17	07/01/17	7.466	1.384	2.839	3.003	3.492	4.20	2.839		-	3453.1						-	3742.0						280			0.732		0.00	65	7.4	7.0
	07/02/17	5.904	1.248	2.701	2.945	3.443	4.20	2.701		-	3453.1					144.0	3243.793	3686.6			1.0	99.3%		280			0.727		0.00	66	7.3	7.0
	07/03/17	6.354	0.985	2.686	2.886	3.401	4.20	2.686		-	3453.1						-	3686.6					2.8	300	2371	2041	0.709	8976	0.00	66	7.2	6.8
	07/04/17	5.763	1.096	2.486	2.785	3.352	4.20	2.486	131.6	2728.5	3392.7			16.8	87.2%		-	3686.6						300			0.741		0.00	67	7.2	7.0
	07/05/17	5.123	0.830	2.644	2.738	3.305	4.20	2.644	141.6	3122.4	3371.9	108.0	23.7%	17.6	87.6%	155.0	3417.899	3599.6			2.0	98.7%	2.7	300			0.708		0.00	65	7.0	6.8
	07/06/17	5.834	0.883	2.487	2.674	3.251	4.20	2.487		-	3419.1						-	3599.6					3.1	280			0.725		0.00	65	7.1	6.7
	07/07/17	7.376	0.780	2.717	2.651	3.204	4.20	2.717		-	3457.2						-	3651.1					2.5	280			0.708		0.72	65	7.0	6.6
	07/08/17	5.675	1.095	2.517	2.605	3.153	4.20	2.517		-	3428.9						-	3651.1						270			0.732		0.00	64	6.8	6.8
	07/09/17	5.923	0.990	2.445	2.569	3.104	4.20	2.445		-	3428.9						-	3651.1						290			0.740		0.00	64	7.0	6.9
	07/10/17	6.801	0.937	2.428	2.532	3.062	4.20	2.428		-	3428.9					195.0	3948.656	3684.2	58	70.3%	3.0	98.5%	2.6	310			0.728		0.00	64	7.1	6.7
	07/11/17	7.668	0.830	2.624	2.552	3.028	4.20	2.624	135.0	2954.4	3385.7			17.0	87.4%		-	3684.2					2.4	300	2521	2148	0.715	9156	0.63	66	7.2	6.7
	07/12/17	10.425	0.932	2.591	2.544	2.998	4.20	2.591	134.7	2910.7	3346.2			21.8	83.8%	181.0	3911.218	3725.1			2.0	98.9%	3.1	300			0.719		0.33	68	7.0	6.7
	07/13/17	6.458	1.097	2.776	2.585	2.979	4.20	2.776	111.0	2569.9	3321.9	92.5	16.7%	9.7	91.3%		-	3725.1					2.8	300			0.716		0.42	68	7.2	6.6
	07/14/17	6.716	1.096	2.686	2.581	2.947	4.20	2.686		-	3321.0						-	3754.1					3.1	300			0.731		0.00	66	7.1	6.6
	07/15/17	7.142	0.990	2.719	2.610	2.920	4.20	2.719		-	3228.1						-	3754.1						320			0.742		0.00	66	7.4	6.9
	07/16/17	6.388	0.990	2.679	2.643	2.890	4.20	2.679		-	3228.1						-	3754.1						310			0.742		0.00	67	7.3	6.9
	07/17/17	6.596	1.096	2.645	2.674	2.864	4.20	2.645		-	3228.1					182.0	4014.793	3783.1	70	61.5%	7.0	96.2%	2.6	330			0.731		0.00	67	7.1	6.7
	07/18/17	5.349	0.937	2.592	2.670	2.836	4.20	2.592	178.0	3847.9	3284.4			18.0	89.9%		-	3783.1					2.9	370	2534	2179	0.728	9100	0.00	69	7.1	6.8

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD								TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	07/19/17	6.023	0.990	2.571	2.667	2.810	4.20	2.571	151.5	3248.5	3281.4			11.4	92.5%	185.0	3966.796	3780.9	81	56.2%	9.0	95.1%	2.9	380			0.730		0.00	69	6.9	6.6
	07/20/17	5.659	0.937	2.528	2.631	2.784	4.20	2.528	139.0	2930.6	3187.3	120.0	13.7%	12.6	90.9%		-	3780.9					2.6	370			0.733		0.00	69	7.0	6.6
	07/21/17	6.896	0.830	2.483	2.602	2.758	4.20	2.483		-	3142.2						-	3776.0					2.6	390			0.734		0.00	72	6.9	6.5
	07/22/17	5.762	0.723	2.411	2.558	2.733	4.20	2.411		-	3128.1						-	3776.0						380			0.750		0.00	67	7.4	6.8
	07/23/17	5.939	0.883	2.404	2.519	2.706	4.20	2.404		-	3128.1						-	3776.0						380			0.740		0.00	66	7.3	6.8
	07/24/17	6.067	0.723	2.522	2.502	2.679	4.20	2.522		-	3128.1					200.0	4206.696	3823.8	78	61.0%	7.0	96.5%	2.0	400			0.726		0.60	67	6.9	6.8
	07/25/17	5.246	0.830	2.391	2.473	2.655	4.20	2.391	137.0	2731.9	3092.1			9.0	93.4%		-	3823.8					2.5	430	2747	2338	0.712	9608	0.00	67	7.0	6.6
	07/26/17	6.193	0.779	2.439	2.454	2.633	4.20	2.439	133.5	2715.6	3060.7			7.8	94.2%	169.0	3437.673	3806.7	69	59.2%	9.0	94.7%	2.7	410			0.714		0.00	69	6.9	6.6
	07/27/17	6.086	0.779	2.444	2.442	2.608	4.20	2.444	144.0	2935.1	3014.5	116.3	19.2%	8.9	93.8%		-	3806.7					2.1	400			0.687		0.04	68	6.8	6.5
	07/28/17	5.156	0.672	2.390	2.429	2.588	4.20	2.390		-	3014.5						-	3768.4					3.0	400			0.684		0.00	69	6.9	6.7
	07/29/17	5.103	0.000	2.279	2.410	2.567	4.20	2.279		-	2972.3						-	3768.4						410			0.649		0.00	67	7.2	7.1
	07/30/17	4.650	0.617	2.257	2.389	2.546	4.20	2.257		-	2972.3						-	3768.4						440			0.714		0.00	68	7.4	7.1
	07/31/17	6.004	0.723	2.267	2.352	2.527	4.20	2.267		-	2972.3					189.0	3573.381	3746.8	81		7.0	96.3%	3.0	390			0.693		0.00	67	6.6	6.6
Aug'17	08/01/17	4.437	0.617	2.200	2.325	2.510	4.20	2.200	132.0	2421.9	2926.4			2.0	98.5%		-	3809.6					3.3	420	2769	2342	0.705	9332	0.00	69	7.0	6.8
	08/02/17	4.496	0.617	2.209	2.292	2.494	4.20	2.209	159.2	2933.0	2926.9			7.5	95.3%	176.0	3242.459	3746.6			6.0	96.6%	3.4	470			0.697		0.00	70	7.1	6.7
	08/03/17	5.180	0.672	2.163	2.252	2.484	4.20	2.163	151.4	2731.2	2927.2	121.9	19.5%	8.6	94.3%		-	3746.6					3.1	500			0.703		0.00	70	7.8	6.9
	08/04/17	5.280	0.617	2.159	2.219	2.467	4.20	2.159		-	2910.9						-	3787.7					3.0	480			0.698		0.00	70	7.1	6.6
	08/05/17	5.030	0.460	2.137	2.199	2.456	4.20	2.137		-	2910.9						-	3787.7						460			0.724		0.08	67	7.4	6.8
	08/06/17	4.437	0.566	2.096	2.176	2.435	4.20	2.096		-	2910.9						-	3787.7						490			0.717		0.00	67	7.5	6.8
	08/07/17	4.277	0.617	2.114	2.154	2.422	4.20	2.114		-	2910.9					273.0	4813.197	3901.7	67.0	75.5%	2.0	99.3%	3.4	470			0.693		0.17	68	6.7	6.5
	08/08/17	5.009	0.617	2.107	2.141	2.410	4.20	2.107	68.0	1194.9	2778.9			4.0	94.1%		-	3901.7					2.8	460	3128	2609	0.713	9644	0.00	67	7.3	6.5
	08/09/17	9.988	0.510	2.061	2.120	2.398	4.20	2.061		-	2778.9					210.0	3609.635	3864.0			2.0	99.0%	3.2	480			0.670		0.00	68	6.9	6.7
	08/10/17	4.530	0.510	2.034	2.101	2.378	4.20	2.034	185.0	3138.3	2793.0	120.8	34.7%	5.5	97.0%		-	3864.0					2.4	390			0.666		0.00	69	7.0	6.5
	08/11/17	4.433	0.459	1.975	2.075	2.358	4.20	1.975		-	2783.2						-	3858.1					2.9	390			0.679		0.21	69	7.3	6.4
	08/12/17	4.650	0.510	2.045	2.062	2.334	4.20	2.045		-	2802.6						-	3858.1						380			0.673		0.00	67	7.8	6.8
	08/13/17	4.227	0.510	2.018	2.051	2.311	4.20	2.018		-	2802.6						-	3858.1						360			0.668		0.00	68	7.9	7.0
	08/14/17	3.963	0.566	1.992	2.033	2.287	4.20	1.992		-	2802.6					209.0	3472.176	3815.2	97.0	53.6%	14.0	93.3%	2.2	430			0.656		0.00	71	7.0	6.8
	08/15/17	3.734	0.510	1.998	2.018	2.264	4.20	1.998	255.0	4249.1	2923.2			13.0	94.9%		-	3815.2					2.1	410	3514	2920	0.674		0.08	71	6.9	6.7
	08/16/17	3.700	0.617	1.999	2.009	2.243	4.20	1.999	210.0	3501.0	2967.6			19.5	90.7%	231.0	3851.153	3797.0			17.0	92.6%	2.9	380			0.647		0.00	71	7.2	6.9
	08/17/17	3.960	0.510	1.960	1.998	2.222	4.20	1.960	188.5	3081.3	2908.6	135.0	28.4%	16.4	91.3%		-	3797.0					2.4	340			0.641	9144	0.00	70	7.2	6.7
	08/18/17	5.386	0.460	2.155	2.024	2.208	4.20	2.155		-	2880.3						-	3775.8					2.5	320			0.623		0.69	72	7.1	6.6
	08/19/17	4.860	0.723	2.035	2.022	2.191	4.20	2.035		-	2875.8						-	3775.8						340			0.629		0.00	72	7.3	6.9
	08/20/17	3.640	0.566	1.986	2.018	2.175	4.20	1.986		-	2875.8						-	3775.8						360			0.612		0.00	71	7.3	6.9
	08/21/17	4.013	0.459	2.024	2.022	2.162	4.20	2.024		-	2875.8					213.0	3595.474	3755.8	85.0	60.1%	6.0	97.2%	2.7	420			0.595		0.00	71	6.9	6.4
	08/22/17	4.063	0.510	2.027	2.027	2.149	4.20	2.027	177.0	2992.2	2885.5			6.0	96.6%		-	3755.8					2.6	410	2978	2487	0.631	10636	0.00	71	6.9	6.3
	08/23/17	4.437	0.566	2.054	2.034	2.134	4.20	2.054	206.2	3532.3	2935.2			11.8	94.3%	244.0	4179.808	3752.8			12.0	95.1%	3.3	410			0.649		0.00	71	6.9	6.4
	08/24/17	3.959	0.566	1.994	2.039	2.121	4.20	1.994	173.6	2887.0	2947.1	120.8	30.4%	7.0	96.0%		-	3752.8					3.2	440			0.728		0.00	71	7.0	6.4
	08/25/17	4.171	0.459	2.020	2.020	2.107	4.20	2.020		-	2966.4						-	3792.2					2.6	460			0.746		0.00	71	6.9	6.1
	08/26/17	4.014	0.459	1.967	2.010	2.091	4.20	1.967		-	2969.3						-	3792.2						420			0.767		0.00	70	7.5	6.7
	08/27/17	4.489	0.353	1.956	2.006	2.076	4.20	1.956		-	2969.3						-	3792.2						460			0.761		0.00	70	7.7	6.8
	08/28/17	4.102	0.353	1.949	1.995	2.065	4.20	1.949		-	2969.3					225.0	3657.299	3777.2	61.0	72.9%	2.0	99.1%	3.3	590			0.755		0.00	70	7.1	6.5
	08/29/17	4.066	0.297	1.952	1.985	2.055	4.20	1.952	221.0	3597.8	3021.7			7.0	96.8%		-	3777.2					3.2	490	3031	2557	0.757	8360	0.43	69	6.8	6.2
	08/30/17	4.477	0.566	1.980	1.974	2.046	4.20	1.980	206.6	3411.6	3051.7			14.7	92.9%	236.0	3897.115	3813.1			8.0	96.6%	2.7	540			0.757		0.00	70	7.2	6.6
	08/31/17	5.127	0.353	1.959	1.969	2.038	4.20	1.959	203.2	3319.9	3120.7	113.6	44.1%	17.8	91.2%		-	3813.1					2.7	530			0.738		0.00	71	7.1	6.7
Sep'17	09/01/17	4.433	0.297	1.848	1.944	2.025	4.20	1.848		-	3136.4						-	3884.5					3.0	580			0.722		0.00	70	7.2	6.6
	09/02/17	4.378	0.353	1.811	1.922	2.014	4.20	1.811		-	3173.2						-	3884.5						500			0.731		0.21	67	7.5	7.0
	09/03/17	4.533	0.403	1.861	1.909	2.004	4.20	1.861		-	3173.2						-	3884.5						590			0.737		0.04	67	7.5	7.1
	09/04/17	4.330	0.353	1.913	1.903	1.996	4.20	1.913		-	3173.2					210.0	3350.428	3825.1	87.0	58.6%	8.0	96.2%		560			0.721		0.00	68	7.6	7.1
	09/05/17	4.657	0.353	1.896	1.895	1.990	4.20	1.896	177.0	2798.8	3142.0			14.0	92.1%		-	3825.1					3.5	610	3045	2595	0.721	8128	0.00	71	7.2	6.9
	09/06/17	6.035	0.353	1.942	1.890	1.984	4.20	1.942	203.6	3297.6	3154.0			16.1	92.1%	247.0	4000.481	3734.8			2.0	99.2%	2.6	610			0.712		0.75	71	7.1	6.8
	09/07/17	4.271	0.337	2.030	1.900	1.981	4.20	2.030	219.8	3721.3	3348.3	110	50.0%	12.4	94.4%		-	3734.8					3.0	600			0.672		0.00	69	7.0	6.6
	09/08/17	5.628	0.411	1.889	1.906	1.976	4.20	1.889		-	3348.3						-	3750.5					3.0	600			0.586		0.00	71	7.2	6.6
	09/09/17	4.073	0.327	1.866	1.914	1.970	4.20	1.866		-	3365.8						-	3750.5						610			0.564		0.00	71	7.4	7.0
	09/10/17	3.873	0.333	1.930	1.924	1.969	4.20	1.930		-	3365.8						-	3750.5						630			0.566		0.00	69	7.2	7.0
	09/11/17	4.331	0.147	1.967	1.931	1.966	4.20	1.967		-	3365.8					232.0	3805.909	3756.6	79.0	65.9%	5.0	97.8%	2.7	630			0.540		0.00	70	7.2	6.9
	09/12/17	3.881	0.441	1.911	1.934	1.962	4.20	1.911	169.0	2693.5	3314.1			21.0	87.6%		-	3756.6					2.8	640	2637	2227	0.531	8552	0.00	70	7.0	6.8
	09/13/17	4.102	0.339	1.898	1.927	1.959	4.20	1.898	172.6	2732.1	3272.5			19.4	88.8%	205.0	3245.011	3731.4			9.0	95.6%	2.7	610			0.538		0.00	71	7.1	6.7
	09/14/17	5.876	0.000	1.884	1.906	1.955	4.20	1.884	203.0	3189.6	3196.9	152.8	24.7%	19.9	90.2%		-	3731.4					4.0	640			0.533		0.00	71	7.0	6.9
	09/15/17	4.108	0.353	1.937	1.913	1.953	4.20	1.937		-	3173.5						-	3716.4					3.3	630			0.571		0.07	70	7.2	6.8
	09/16/17	4.174	0.417	1.911	1.920	1.952	4.20	1.911		-	3181.1						-	3716.4						590			0.574		0.00	69	7.5	6.9
	09/17/17	4.248	0.327	1.974	1.926	1.946	4.20	1.974		-	3181.1						-	3716.4						600			0.556		0.00	69	7.4	7.0
	09/18/17	4.220	0.190	1.952	1.924	1.943	4.20	1.952		-	3181.1					256.0	4167.598	3766.6	104.0	59.4%	12.0	95.3%	2.6	660			0.590		0.00	70	7.2	6.8
	09/19/17	3.916	0.337	1.936	1.927	1.941	4.20	1.936	192.0	3100.1	3174.9			7.0	96.4%		-	3766.6					2.7	670	2951	2515	0.560	9272	0.46	70	7.2	6.8
	09/20/17	9.989	0.550	2.057	1.950	1.942	4.20	2.057	190.3	3264.7	3181.3			18.0	90.5%	215.0	3688.407	3776.9			1.0	99.5%	3.3	620			0.575		0.08	70	7.2	6.8
	09/21/17	3.937	0.325	1.926	1.956	1.939	4.20	1.926	207.1	3326.6	3205.2	177.8	14.1%	19.6	90.5%		-	3776.9					3.1	660			0.653		0.18	70	7.0	6.8
	09/22/17	4.039	0.330	2.006	1.966	1.937	4.20	2.006		-	3180.0						-	3726.5					2.6	650			0.704		0.37	68	7.6	6.9
	09/23/17	4.584	0.563	2.027	1.983	1.939	4.20	2.027		-	3204.5						-	3726.5						650			0.722		0.02	67	7.6	7.1
	09/24/17	4.413	0.453	2.023	1.990	1.939	4.20	2.023		-	3204.5						-	3726.5						660			0.720		0.00	68	7.6	7.1
	09/25/17	3.836	0.419	1.992	1.995	1.939	4.20	1.992		-	3204.5					227.0	3771.215	3731.5			2.0	99.1%	2.3	660			0.722		0.00	69	7.3	6.8
	09/26/17	3.845	0.461	1.947	1.997	1.939	4.20	1.947	133.0	2159.7	3124.1			8.0	94.0%		-	3731.5					2.7	710	3180	2702	0.722	9304	0.00	70	7.3	6.8
	09/27/17	4.344	0.450	2.059	1.997	1.943	4.20	2.059	171.0	2936.4	3110.7			12.1	92.9%	202.0	3468.756	3710.5			2.0	99.0%	2.7	710			0.719		0.00	71	7.3	6.6
	09/28/17	4.219	0.447	1.964	2.003	1.943	4.20	1.964	164.0	2686.3	3045.6	141.6	13.7%	23.2	85.9%		-	3710.5					2.8	660			0.725		0.00	70	7.4	6.5
	09/29/17	4.986	0.450	1.976	1.998	1.943	4.20	1.976		-	3017.4						-	3687.2					2.7	660			0.697		0.04	69	7.2	6.6

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	09/30/17	4.483	0.560	2.084	2.006	1.947	4.20	2.084		-	2992.2						-	3687.2						730			0.711		0.00	67	7.5	7.2
Oct'17	10/01/17	4.249	0.600	2.168	2.027	1.958	4.20	2.168		-	2992.2						-	3687.2						750			0.715		0.00	67	7.2	7.0
	10/02/17	5.335	0.560	2.013	2.030	1.965	4.20	2.013		-	2992.2					205.0	3441.626	3659.9	85	58.5%	2.0	99.0%	3.6	760			0.703		0.00	69	7.1	6.7
	10/03/17	4.601	0.425	1.905	2.024	1.966	4.20	1.905	164.0	2605.6	2962.5			15.0	90.9%		-	3659.9					4.9	740	3179	2672	0.705	8860	0.00	69	7.3	6.7
	10/04/17	4.886	0.147	1.959	2.010	1.968	4.20	1.959	219.7	3589.5	3007.3			11.4	94.8%	246.0	4019.163	3734.2			11.0	95.5%	3.4	720			1.138		0.00	69	7.3	6.9
	10/05/17	4.704	0.360	1.930	2.005	1.969	4.20	1.930	206.5	3323.9	3044.8	185.6	10.1%	22.8	89.0%		-	3734.2					3.6	785			1.305		0.03	70	7.2	6.8
	10/06/17	4.321	0.334	1.869	1.990	1.966	4.20	1.869		-	3025.3						-	3701.0					3.7	790			1.240		0.00	70	7.3	6.8
	10/07/17	4.224	0.357	1.864	1.958	1.961	4.20	1.864		-	2967.3						-	3701.0						850			1.251		0.00	68	8.7	7.4
	10/08/17	4.762	0.440	1.951	1.927	1.963	4.20	1.951		-	2967.3						-	3701.0						875			1.271		0.00	69	7.4	7.4
	10/09/17	4.285	0.469	1.994	1.925	1.967	4.20	1.994		-	2967.3					197.0	3276.102	3653.8	145	26.4%	10.0	94.9%		875			1.301		0.42	69	7.4	7.2
	10/10/17	4.207	0.356	1.920	1.927	1.967	4.20	1.920	131.0	2097.7	2900.4			14.0	89.3%		-	3653.8					3.4	925	4037	3406	1.290	10108	0.00	70	7.3	7.1
	10/11/17	3.831	0.440	1.876	1.915	1.964	4.20	1.876	208.2	3257.5	2925.9			24.3	88.3%	217.0	3395.147	3608.1			7.0	96.8%	3.3	805			1.296		0.00	69	7.3	7.2
	10/12/17	4.231	0.453	1.977	1.922	1.966	4.20	1.977	231.9	3823.6	3006.7	149.7	35.4%	20.6	91.1%		-	3608.1					3.3	840			0.985		0.00	69	7.4	7.0
	10/13/17	4.061	0.350	1.860	1.920	1.965	4.20	1.860		-	3027.8						-	3653.5					3.4	640			0.766		0.01	69	7.3	6.7
	10/14/17	4.815	0.350	1.939	1.931	1.967	4.20	1.939		-	3014.3						-	3653.5						430			0.667		0.24	67	7.5	7.0
	10/15/17	4.053	0.187	1.989	1.936	1.968	4.20	1.989		-	3014.3						-	3653.5						480			0.656		0.00	68	7.6	7.1
	10/16/17	4.186	0.437	1.882	1.920	1.967	4.20	1.882		-	3014.3					218.0	3421.702	3627.7	100	54.1%	17.0	92.2%	3.1	520			0.769		0.00	67	7.3	6.8
	10/17/17	4.019	0.363	1.842	1.909	1.963	4.20	1.842	177.0	2719.1	2991.6			12.0	93.2%		-	3627.7					4.2	410	2515	2119	0.791	10876	0.00	67	7.3	6.7
	10/18/17	4.557	0.446	1.879	1.910	1.960	4.20	1.879	202.5	3173.3	3004.6			17.0	91.6%	205.0	3212.526	3521.6			2.0	99.0%	3.4	230			0.639		0.00	67	7.1	6.6
	10/19/17	4.460	0.130	1.910	1.900	1.960	4.20	1.910	208.4	3319.7	3020.2	129.4	37.9%	18.9	90.9%		-	3521.6					3.3	260			0.678		0.00	67	7.2	6.7
	10/20/17	4.478	0.340	1.977	1.917	1.957	4.20	1.977		-	3001.4						-	3500.8					3.0	380			0.670		0.00	67	7.2	6.8
	10/21/17	4.148	0.173	1.854	1.905	1.955	4.20	1.854		-	2974.3						-	3500.8						450			0.653		0.00	66	7.4	7.0
	10/22/17	4.062	0.347	1.905	1.893	1.951	4.20	1.905		-	2974.3						-	3500.8						520			0.664		0.00	67	7.4	7.2
	10/23/17	4.571	0.426	2.095	1.923	1.953	4.20	2.095		-	2974.3					245.0	4280.714	3587.4	461		15.0	93.9%	3.7	580			0.844		0.00	67	6.9	6.7
	10/24/17	4.833	0.357	1.934	1.936	1.950	4.20	1.934	170.0	2742.0	2956.5			15.0	91.2%		-	3587.4					3.1	640	3092	2602	0.653	9416	0.60	69	7.3	6.8
	10/25/17	10.275	0.434	2.154	1.976	1.956	4.20	2.154	207.0	3718.6	3010.9			21.1	89.8%	182.0	3269.514	3531.7			15.0	91.8%	3.3	670			0.628		0.88	67	7.1	6.8
	10/26/17	4.811	0.707	2.179	2.014	1.964	4.20	2.179	190.0	3452.8	3103.3	122.2	35.7%	19.9	89.5%		-	3531.7					3.4	660			0.673		0.10	67	7.3	6.7
	10/27/17	4.764	0.540	2.022	2.020	1.962	4.20	2.022		-	3116.1						-	3539.6					3.7	670			0.628		0.00	64	7.3	6.6
	10/28/17	4.474	0.463	2.037	2.047	1.965	4.20	2.037		-	3151.9						-	3539.6						630			0.624		0.00	65	7.6	7.0
	10/29/17	6.050	0.452	2.328	2.107	1.977	4.20	2.328		-	3151.9						-	3539.6						750			0.637		2.81	65	7.6	7.1
	10/30/17	9.522	1.519	4.085	2.391	2.043	4.20	4.085		-	3151.9					121.0	4122.337	3604.3	155		10.0	91.7%	3.4	195			0.824		0.03	65	7.2	6.6
	10/31/17	5.009	1.367	2.947	2.536	2.069	4.20	2.947	59.0	1450.1	3021.0			12.0	79.7%		-	3604.3					2.8	115	821	713	0.959	11934	0.00	65	7.2	6.7
Nov'17	11/01/17	5.042	1.143	2.974	2.653	2.101	4.20	2.974	107.0	2653.9	2994.8			16.2	84.9%	126.0	3125.198	3569.2			12.0	90.5%	3.0	540			1.105		0.00	65	6.9	6.3
	11/02/17	5.437	1.310	3.106	2.786	2.141	4.20	3.106	170.4	4414.0	3124.0	80.8	52.6%	19.5	88.6%		-	3569.2					2.2	665			0.891		0.00	66	7.1	6.7
	11/03/17	6.272	1.390	2.993	2.924	2.176	4.20	2.993		-	3088.2						-	3512.9					2.3	340			0.778		0.00	66	7.1	6.7
	11/04/17	6.071	1.203	2.828	3.037	2.206	4.20	2.828		-	3068.5						-	3512.9						460			0.551		0.00	63	7.6	6.7
	11/05/17	5.582	1.110	2.881	3.116	2.239	4.20	2.881		-	3068.5						-	3512.9						400			0.567		0.05	64	7.4	6.8
	11/06/17	5.844	1.249	1.881	2.801	2.240	4.20	1.881		-	3068.5					174.0	2729.632	3425.9	55.0	68.4%	15.0	91.4%	2.4	450			0.566		0.00	66	7.1	6.8
	11/07/17	5.795	1.046	2.840	2.786	2.270	4.20	2.840	132.0	3126.5	3073.0			18.0	86.4%		-	3425.9					2.2	450	2473	2063	0.594	11372	0.23	65	7.1	6.6
	11/08/17	5.761	1.099	2.741	2.753	2.295	4.20	2.741	137.6	3145.5	3078.2			21.2	84.6%	161.0	3680.45	3470.8			7.0	95.7%	2.4	420			0.627		0.00	64	7.0	6.5
	11/09/17	5.776	0.983	2.750	2.702	2.322	4.20	2.750		-	3153.6						-	3470.8					2.4	380			0.708		0.05	64	7.0	6.7
	11/10/17	5.871	1.173	2.708	2.661	2.350	4.20	2.708		-	3144.9						-	3480.3						480			0.716		0.00	62	7.5	7.0
	11/11/17	5.403	0.873	2.644	2.635	2.372	4.20	2.644		-	3083.3						-	3480.3						490			0.728		0.00	61	7.5	7.0
	11/12/17	5.146	0.943	2.682	2.607	2.400	4.20	2.682		-	3083.3						-	3480.3						520			0.730		0.00	61	7.4	7.0
	11/13/17	6.481	1.007	2.699	2.723	2.425	4.20	2.699		-	3083.3					178.0	4006.719	3538.8	56.0	68.5%	15.0	91.6%	2.4	740			0.746		0.41	61	7.0	7.0
	11/14/17	5.559	0.933	2.646	2.696	2.447	4.20	2.646	126.0	2780.5	3058.0			9.0	92.9%		-	3538.8					2.5	720	2482	2106	0.797	8568	0.00	61	7.1	6.8
	11/15/17	5.215	0.893	2.627	2.679	2.472	4.20	2.627	131.0	2870.1	3043.6			17.0	87.0%	146.0	3198.74	3514.0			12.0	91.8%	2.5	670			0.849		0.00	61	7.2	6.8
	11/16/17	5.936	0.867	2.822	2.690	2.504	4.20	2.822	150.8	3549.2	3107.4			17.2	88.6%		-	3514.0					2.2	710			0.777		0.45	61	7.2	6.7
	11/17/17	5.067	1.112	2.740	2.694	2.533	4.20	2.740		-	3101.9						-	3551.7					2.3	600			0.786		0.00	62	7.2	6.8
	11/18/17	7.732	0.900	2.770	2.712	2.562	4.20	2.770		-	3082.1						-	3551.7						570			0.829		0.48	61	7.7	7.0
	11/19/17	6.000	1.260	3.088	2.770	2.599	4.20	3.088		-	3082.1						-	3551.7						500			0.822		0.07	61	7.6	7.0
	11/20/17	6.246	1.140	2.876	2.796	2.633	4.20	2.876		-	3082.1					155.0	3717.805	3570.1	49.0	68.4%	13.0	91.6%	2.3	730			0.845		0.00	61	7.2	6.9
	11/21/17	5.159	1.103	2.927	2.836	2.667	4.20	2.927	113.0	2758.5	3055.2			15.0	86.7%		-	3570.1					2.6	780	2219	1856	0.843	7544	0.00	61	7.1	6.9
	11/22/17	7.410	1.104	4.510	3.105	2.747	4.20	4.510		-	3055.2					71.0	2670.551	3391.2			3.0	95.8%	2.4	630			0.978		2.37	60	7.0	6.8
	11/23/17	7.257	2.704	4.731	3.377	2.841	4.20	4.731	81.2	3203.9	3093.6			17.5	78.4%		-	3391.2						540			1.309		0.01	59	7.2	6.8
	11/24/17	6.717	2.520	4.483	3.626	2.918	4.20	4.483		-	3036.8						-	3406.4					2.4	452			1.340		0.00	59	7.0	6.6
	11/25/17	6.429	2.767	4.441	3.865	2.994	4.20	4.441		-	2995.2						-	3406.4						695			1.332		0.00	59	7.3	6.8
	11/26/17	6.102	2.533	4.230	4.028	3.067	4.20	4.230		-	2995.2						-	3406.4						775			1.334		0.00	59	7.2	6.8
	11/27/17	6.107	2.488	4.061	4.198	3.135	4.20	4.061		-	2995.2					75.0	2540.156	3310.2	40.0	46.7%	7.0	90.7%	2.8	840			1.307		0.00	59	6.9	6.5
	11/28/17	5.900	2.047	3.816	4.325	3.184	4.20	3.816		-	2995.2						-	3310.2					2.8	730	2111	1816	1.240	6648	0.00	58	6.9	6.4
	11/29/17	6.096	2.360	3.781	4.220	3.174	4.20	3.781	80.6	2541.6	2954.0			11.2	86.1%	94.0	2964.153	3181.5			4.0	95.7%	2.9	730			1.118		0.00	59	6.9	6.4
	11/30/17	5.659	2.037	3.658	4.067	3.198	4.20	3.658	77.5	2364.3	3037.1			10.0	87.1%		-	3181.5					2.8	765			1.022		0.05	58	7.0	6.4
Dec'17	12/01/17			3.615	3.943	3.219	4.20	3.615		-	3075.4						-	3188.5					2.7	715			1.2 est.		0.00	59	6.9	6.4
	12/02/17			3.420	3.797	3.230	4.20	3.420		-	2926.7						-	3188.5						810			1.2 est.		0.00	57	7.4	7.4
	12/03/17			3.415	3.681	3.244	4.20	3.415		-	2926.7						-	3188.5						825			1.2 est.		0.00	57	7.3	7.1
	12/04/17			3.399	3.586	3.263	4.20	3.399		-	2926.7					123.0	3486.762	3221.7	63	48.8%	9.0	92.7%	2.9	860			1.2 est.		0.00	58	6.8	6.9
	12/05/17	8.090	0.317	3.419	3.530	3.281	4.20	3.419	92.9	2649.0	2898.9			16.3	82.5%		-	3221.7					2.9	875	2439	2078	1.156	7448	0.63	58	7.0	7.0
	12/06/17	8.126	0.470	3.707	3.519	3.342	4.20	3.707	80.0	2473.3	2860.2			13.0	83.8%	109.0	3369.885	3292.8			13.0	88.1%	2.4	855			1.231		0.20	58	6.9	7.0
	12/07/17	8.997	0.723	3.515	3.499	3.364	4.20	3.515	97.2	2849.4	2835.0	52.5	46.0%	19.8	79.6%		-	3292.8					2.7	885			1.353		0.00	58	7.0	6.9
	12/08/17	7.250	0.413	3.355	3.461	3.385	4.20	3.355		-	2804.0						-	3244.3					2.9	860			1.361		0.00	57	6.8	6.7
	12/09/17	6.360	1.309	3.412	3.460	3.407	4.20	3.412		-	2804.0						-	3244.3						830			1.148		0.44	56	7.5	6.9
	12/10/17	6.191	1.722	3.482	3.470	3.432	4.20	3.482		-	2804.0						-	3244.3						810			1.136		0.00	54	7.6	7.1
	12/11/17	7.196	0.426	3.348	3.463	3.456	4.20	3.348		-	2804.0					123.0	3434.445	3265.5	65	47.2%	5.0	95.9%	2.7	875			1.114		0.00	56	6.9	6.9

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	12/12/17	7.367	0.393	3.495	3.473	3.483	4.20	3.495	68.0	1982.1	2729.3			14.0	79.4%		-	3265.5					2.8	880	2586	2204	1.215	6384	0.09	56	6.8	6.7
	12/13/17	5.557	1.949	3.482	3.441	3.509	4.20	3.482	116.2	3374.4	2783.0			28.5	75.5%	109.0	3165.347	3172.0			9.0	91.7%	2.9	885			1.132		0.00	55	7.1	6.9
	12/14/17	6.639	0.397	3.348	3.417	3.532	4.20	3.348	135.2	3775.1	2865.9			24.7	81.7%		-	3172.0					2.8	860			1.141		0.07	55	7.0	6.8
	12/15/17	5.507	1.660	3.262	3.404	3.554	4.20	3.262		-	2865.5						-	3168.6					2.8	815			1.159		0.03	54	7.0	6.8
	12/16/17	6.421	1.962	3.324	3.392	3.570	4.20	3.324		-	2797.2						-	3168.6						840			1.160		0.00	54	7.6	7.3
	12/17/17	6.226	1.568	3.277	3.362	3.588	4.20	3.277		-	2797.2						-	3168.6						835			1.189		0.00	54	7.6	7.1
	12/18/17	7.200	0.000	3.197	3.341	3.602	4.20	3.197		-	2797.2					148.0	3946.121	3255.0	136	8.1%	4.0	97.3%	2.8	835			1.227		0.00	54	7.2	7.0
	12/19/17	6.647	0.000	3.243	3.305	3.608	4.20	3.243	79.0	2136.7	2737.1			7.0	91.1%		-	3255.0					2.8	870	3164	2677	1.248	8744	0.00	55	6.8	6.8
	12/20/17	7.116	0.000	3.101	3.250	3.615	4.20	3.101	166.6	4308.7	2868.1			20.5	87.7%	155.0	4008.663	3287.3			1.0	99.4%	2.7	870			1.238		0.00	56	7.0	6.9
	12/21/17	6.477	0.000	3.040	3.206	3.619	4.20	3.040		-	2878.0						-	3287.3					3.0	865			1.224		0.00	54	7.0	7.0
	12/22/17	4.704	1.378	2.967	3.164	3.567	4.20	2.967		-	2878.0						-	3364.4						870			1.227		0.01	54	7.3	7.0
	12/23/17	7.712	1.370	3.311	3.162	3.520	4.20	3.311		-	2845.5						-	3364.4						875			1.255		0.65	54	7.6	7.2
	12/24/17	5.626	1.456	3.295	3.165	3.481	4.20	3.295		-	2845.5						-	3364.4						855			1.217		0.11	53	7.4	7.1
	12/25/17	5.603	1.944	3.422	3.197	3.447	4.20	3.422		-	2845.5					125.0	3567.435	3387.0	52	58.4%	3.0	97.6%		825			1.299		0.11	53	7.4	7.1
	12/26/17	6.310	1.553	3.414	3.221	3.419	4.20	3.414	138.0	3929.2	2944.0			21.0	84.8%		-	3387.0						870	3212	2743	1.249	9624	0.00	53	7.2	6.9
	12/27/17	8.534	1.529	3.346	3.256	3.396	4.20	3.346	124.8	3482.6	2988.9			33.6	73.1%	126.0	3516.111	3495.4			15.0	88.1%	2.6	865			1.243		0.00	54	7.1	7.0
	12/28/17	4.989	1.657	3.292	3.292	3.378	4.20	3.292	116.9	3209.5	3005.8	79.2	32.2%	29.7	74.6%		-	3495.4					3.0	885			1.270		0.00	53	7.0	7.0
	12/29/17	5.547	1.673	3.305	3.341	3.362	4.20	3.305		-	3044.5						-	3561.8					2.8	885			1.217		0.00	53	7.1	7.1
	12/30/17	5.311	1.487	3.252	3.332	3.349	4.20	3.252		-	3106.4						-	3561.8						885			1.249		0.00	51	7.5	7.1
	12/31/17	5.615	1.461	3.151	3.312	3.333	4.20	3.151		-	3106.4						-	3561.8						870			1.261		0.00	51	7.4	7.0
Jan'18	01/01/18	5.199	1.237	3.018	3.254	3.320	4.20	3.018		-	3106.4					152.0	3825.858	3591.2	64	57.9%	16.0	89.5%		875			1.268		0.00	49	7.4	7.1
	01/02/18	5.761	1.283	2.976	3.191	3.305	4.20	2.976	120.0	2978.4	3095.7			14.0	88.3%		-	3591.2					2.9	890	3449	2916	1.243	10008	0.00	52	7.2	7.1
	01/03/18	5.494	1.327	3.010	3.143	3.292	4.20	3.010	112.8	2831.7	3075.4			45.6	59.6%	111.0	2786.477	3513.4			28.0	74.8%	3.0	860			1.276		0.00	52	7.0	6.9
	01/04/18	10.497	0.000	3.074	3.112	3.281	4.20	3.074	133.5	3422.6	3134.9			33.0	75.3%		-	3513.4					2.7	915			1.190		0.89	52	7.3	7.1
	01/05/18	5.075	1.264	2.851	3.047	3.252	4.20	2.851		-	3190.0						-	3531.3					3.3	875			1.113		0.00	49	7.2	7.2
	01/06/18	5.028	0.970	2.588	2.953	3.221	4.20	2.588		-	3221.0						-	3531.3						870			1.157		0.00	47	7.4	7.1
	01/07/18	4.678	0.833	2.592	2.873	3.196	4.20	2.592		-	3221.0						-	3531.3						875			1.163		0.00	49	7.4	7.1
	01/08/18	4.581	0.873	2.703	2.828	3.172	4.20	2.703		-	3221.0					170.0	3832.313	3564.8	81	52.4%	10.0	94.1%	3.3	885			1.145		0.00	52	7.2	7.2
	01/09/18	4.523	0.991	2.746	2.795	3.148	4.20	2.746	126.0	2885.6	3193.0			11.0	91.3%		-	3564.8					3.4	860	3713	3110	1.156	9536	0.00	52	7.3	7.1
	01/10/18	4.816	0.829	2.685	2.748	3.126	4.20	2.685	153.2	3430.6	3211.3			26.5	82.7%	151.0	3381.328	3558.9			7.0	95.4%	3.5	895			1.186		0.00	52	7.1	7.0
	01/11/18	4.478	0.917	2.689	2.693	3.099	4.20	2.689	152.0	3408.8	3321.1	90.6	40.4%	22.8	85.0%		-	3558.9					3.6	900			1.268		0.00	52	7.2	6.9
	01/12/18	10.879	1.323	4.761	2.966	3.141	4.20	4.761		-	3316.6						-	3608.0					3.2	885			1.249		2.69	53	7.1	6.9
	01/13/18	14.298	6.931	10.153	4.047	3.368	4.20	10.153		-	3274.9						-	3608.0						940			1.044		0.00	51	7.3	7.0
	01/14/18	9.497	4.236	7.445	4.740	3.508	4.20	7.445		-	3274.9						-	3608.0						195			1.020		0.00	46	7.2	7.1
	01/15/18	10.520	3.902	6.798	5.325	3.623	4.20	6.798		-	3274.9					43.0	2437.899	3478.0	35	18.6%	12.0	72.1%		145			1.001		0.00	46	7.1	7.0
	01/16/18	8.800	3.910	6.299	5.833	3.724	4.20	6.299	52.0	2731.8	3229.7			14.0	73.1%		-	3478.0					5.9	165	1064	920	1.097	7834	0.00	47	6.9	6.9
	01/17/18	8.476	3.676	6.315	6.351	3.828	4.20	6.315	58.5	3081.0	3218.2			19.5	66.7%	45.0	2370.02	3302.9			1.0	97.8%	5.1	225			1.105		0.16	50	6.7	6.7
	01/18/18	10.856	3.666	5.758	6.790	3.912	4.20	5.758	59.3	2847.7	3272.9	48.8	17.7%	23.7	60.0%		-	3302.9					5.7	205			1.155		0.00	51	6.8	6.8
	01/19/18	8.662	3.654	5.455	6.889	3.990	4.20	5.455		-	3186.6						-	3214.7					5.2	420			1.374		0.00	48	6.6	6.6
	01/20/18	7.196	3.465	5.095	6.166	4.059	4.20	5.095		-	3186.6						-	3214.7						500			1.340		0.00	49	7.2	6.7
	01/21/18	7.090	3.120	4.795	5.788	4.120	4.20	4.795		-	3186.6						-	3214.7						575			1.340		0.00	49	7.2	6.8
	01/22/18	6.538	2.927	4.630	5.478	4.164	4.20	4.630		-	3186.6					66.0	2548.537	3140.7	20	69.7%	1.0	98.5%	4.5	635			1.348		0.06	50	6.7	6.5
	01/23/18	9.985	2.923	5.939	5.427	4.252	4.20	5.939	52.0	2575.6	3139.6			6.0	88.5%		-	3140.7					4.6	460	3008	2547	1.310	10632	1.49	51	6.5	6.3
	01/24/18	8.413	4.916	6.558	5.461	4.356	4.20	6.558	53.5	2926.1	3124.4			13.1	75.5%	55.0	3008.155	3078.5			4.0	92.7%	5.3	400			1.349		0.00	51	6.9	6.8
	01/25/18	8.170	4.346	6.164	5.519	4.448	4.20	6.164	55.5	2853.1	3047.5	38.6	30.5%	11.7	78.9%		-	3078.5					5.0	470			1.458		0.00	51	6.8	6.6
	01/26/18	8.542	4.177	5.801	5.569	4.530	4.20	5.801		-	3014.0						-	3023.8					5.4	445			1.535		0.00	50	6.8	6.6
	01/27/18	7.698	3.913	5.588	5.639	4.606	4.20	5.588		-	2997.7						-	3023.8						450			1.558		0.00	49	7.2	6.6
	01/28/18	7.404	3.825	5.365	5.721	4.675	4.20	5.365		-	2997.7						-	3023.8						460			1.591		0.15	50	7.2	6.6
	01/29/18	7.472	3.501	5.242	5.808	4.741	4.20	5.242		-	2997.7					47.0	2054.759	2916.1	15	68.1%	1.0	97.9%	4.3	475			1.551		0.00	50	6.8	6.5
	01/30/18	7.467	3.534	5.039	5.680	4.804	4.20	5.039	43.0	1807.1	2906.2			4.0	90.7%		-	2916.1					4.9	455	2411	2043	1.603	9184	0.13	48	6.7	6.4
	01/31/18	6.482	3.070	4.708	5.415	4.861	4.20	4.708		-	2906.2						-	2802.4					4.9	495			1.613		0.00	48	6.7	6.5
Feb'18	02/01/18	8.704	3.043	4.778	5.217	4.921	4.20	4.778	94.5	3765.7	2966.7	45.1	52.3%	6.4	93.2%		-	2802.4					3.9	460			1.558		0.00	49	6.9	6.4
	02/02/18	8.987	3.253	4.863	5.083	4.983	4.20	4.863		-	2978.0						-	2804.7					5.0	370			1.503		0.24	49	6.7	6.4
	02/03/18	6.690	2.992	4.640	4.948	5.035	4.20	4.640		-	2937.6						-	2804.7						440			1.504		0.00	47	7.2	6.5
	02/04/18	6.903	3.077	4.793	4.866	5.100	4.20	4.793		-	2937.6						-	2804.7						245			1.448		0.81	47	7.1	6.5
	02/05/18	7.930	3.925	5.844	4.952	5.208	4.20	5.844		-	2937.6					80.0	3899.117	2941.5	34	57.5%	8.0	90.0%	4.6	310			1.332		0.00	49	6.6	6.4
	02/06/18	8.634	3.263	5.400	5.004	5.302	4.20	5.400	44.0	1981.6	2857.9			4.0	90.9%		-	2941.5					5.0	290	1976	1640	1.283	11228	0.00	50	6.8	6.5
	02/07/18	9.111	3.743	5.787	5.158	5.404	4.20	5.787	56.5	2726.9	2847.8			7.2	87.3%	70.0	3378.451	2884.8			1.0	98.6%	5.0	345			1.322		0.61	49	6.8	6.6
	02/08/18	9.207	4.335	5.994	5.332	5.513	4.20	5.994	60.5	3024.4	2858.5	47.3	21.8%	6.4	89.4%		-	2884.8					4.8	305			1.376		0.00	50	6.7	6.5
	02/09/18			5.985	5.492	5.623	4.20	5.985		-	2810.8						-	2813.8					4.6	330			1.434		0.00	50	6.8	6.4
	02/10/18	9.456	3.943	5.600	5.629	5.720	4.20	5.600		-	2756.5						-	2813.8						340			1.426		0.56	50	7.2	7.2
	02/11/18	9.323	4.284	6.677	5.898	5.784	4.20	6.677		-	2756.5						-	2813.8						280			1.203		0.77	50	7.3	6.5
	02/12/18	9.173	5.970	7.404	6.121	5.692	4.20	7.404		-	2756.5					50.0	3087.468	2848.1			5.0	90.0%	5.4	220			1.173		0.00	51	6.8	6.6
	02/13/18	8.519	5.145	6.745	6.313	5.669	4.20	6.745	42.0	2362.6	2723.6			6.0	85.7%		-	2848.1					4.9	250	1752	1519	1.205	11288	0.00	50	6.7	6.5
	02/14/18	8.257	5.138	6.445	6.407	5.657	4.20	6.445	54.8	2945.6	2740.7			5.2	90.5%	48.0	2580.062	2865.8			1.0	97.9%	4.9	270			1.317		0.15	50	6.7	6.5
	02/15/18	10.435	4.856	6.525	6.483	5.664	4.20	6.525	61.1	3325.0	2786.3	36.8	39.8%	6.0	90.2%		-	2865.8					4.8	260			1.409		0.23	50	6.7	6.7
	02/16/18	8.756	4.576	6.083	6.497	5.657	4.20	6.083		-	2761.8						-	2936.6					5.9	275			1.433		0.00	52	6.8	6.5
	02/17/18	7.989	4.141	5.558	6.491	5.650	4.20	5.558		-	2754.0						-	2936.6						355			1.478		0.51	49	7.3	6.5
	02/18/18	8.529	4.563	5.981	6.392	5.668	4.20	5.981		-	2754.0						-	2936.6						335			1.497		0.00	49	7.1	6.5
	02/19/18	7.890	4.310	5.955	6.185	5.696	4.20	5.955		-	2754.0					66.0	3277.87	2979.3			1.0	98.5%		340			1.454		0.00	49	7.1	6.5
	02/20/18	7.162	4.468	5.852	6.057	5.731	4.20	5.852	52.0	2537.9	2736.0			4.0	92.3%		-	2979.3					4.2	310	2336	2014	1.377	10976	0.06	53	6.8	6.4
	02/21/18	7.153	4.204	5.599	5.936	5.764	4.20	5.599	75.6	3530.2	2797.1			6.2	91.8%	70.0	3268.696	3069.3			4.0	94.3%	4.4	330			1.436		0.00	51	6.7	6.5
	02/22/18	8.521	3.523	5.478	5.787	5.748	4.20	5.478	77.4	3536.1	2870.9	59.4	23.3%	6.6	91.5%		-	3069.3					4.9	310			1.499		0.51	50	6.8	6.4

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	02/23/18	9.971	3.791	5.119	5.649	5.700	4.20	5.119		-	2866.3						-	3078.1					5.2	310			1.507		0.26	51	6.8	6.4
	02/24/18	7.639	3.856	5.203	5.598	5.668	4.20	5.203		-	2867.5						-	3078.1						295			1.534		0.36	50	7.3	6.6
	02/25/18	9.765	3.470	6.006	5.602	5.675	4.20	6.006		-	2867.5						-	3078.1						310			1.521		0.57	48	7.3	6.7
	02/26/18	12.028	4.123	6.301	5.651	5.699	4.20	6.301		-	2867.5					63.0	3310.671	3107.1	45	28.6%	8.0	87.3%	4.2	370			1.538		0.00	51	6.8	6.6
	02/27/18	8.855	3.493	5.926	5.662	5.718	4.20	5.926	57.0	2817.1	2863.3			4.0	93.0%		-	3107.1					2.8	275	2312	1984	1.524	10560	0.00	52	6.5	6.3
	02/28/18	8.149	4.021	5.736	5.681	5.734	4.20	5.736	84.8	4056.7	2955.1			6.6	92.2%	62.0	2965.971	3221.0			1.0	98.4%	2.8	245			1.526		0.00	52	6.6	6.3
Mar'18	03/01/18	7.879	3.957	5.401	5.670	5.746	4.20	5.401	74.1	3337.8	3072.9	50.5		7.1	90.4%		-	3221.0					3.7	275			1.520		0.57	53	6.5	6.3
	03/02/18	16.771	3.775	9.833	6.344	5.917	4.20	9.833		-	3072.9						-	3221.0						245			1.460		2.72	50	7.2	6.7
	03/03/18	16.717	9.778	13.390	7.513	6.204	4.20	13.390		-	3015.2						-	3221.0						240			1.179		0.03	49	6.9	6.5
	03/04/18	13.045	8.269	10.349	8.134	6.387	4.20	10.349		-	3015.2						-	3221.0									0.774		0.05	49	6.9	6.7
	03/05/18	12.115	7.010	9.260	8.556	6.541	4.20	9.260		-	3015.2					44.0	3398.05	3240.7	46		8.0	81.8%	3.3	155			0.948		0.01	49	6.8	6.7
	03/06/18	10.913	5.719	7.781	8.821	6.641	4.20	7.781	41.0	2660.6	2987.9			6.0	85.4%		-	3240.7					3.2	195	1800	1566	1.206	13940	0.00	49	6.9	6.7
	03/07/18	10.027	5.089	7.427	9.063	6.693	4.20	7.427	54.0	3344.8	3013.4			8.0	85.2%	85.0	5265	3392.5			3.0	96.5%	3.1	240			1.389		1.31	51	6.9	6.7
	03/08/18	10.010	5.209	8.972	9.573	6.812	4.20	8.972	45.9	3434.5	3117.2	51.9		8.9	80.6%		-	3392.5					2.4	195			1.372		0.02	51	6.9	6.7
	03/09/18	11.701	4.253	8.481	9.380	6.902	4.20	8.481		-	3147.2						-	3394.2					3.1	210			1.421		0.00	51	6.7	6.6
	03/10/18	8.992	5.930	7.479	8.536	6.952	4.20	7.479		-	3157.4						-	3394.2						235			1.471		0.00	51	7.2	7.1
	03/11/18	8.401	4.853	6.214	7.945	6.959	4.20	6.214		-	3157.4						-	3394.2						260			1.475		0.00	48	7.2	7.0
	03/12/18	10.354	5.056	7.000	7.622	7.006	4.20	7.000		-	3157.4						-	3394.2					2.2	260			1.492		0.00	50	6.6	6.4
	03/13/18	10.213	2.514	6.259	7.405	6.992	4.20	6.259	60.0	3132.0	3155.5			6.0	90.0%	54.0	2818.803	3330.3	32	40.7%	3.0	94.4%		275	2404	2091	1.464	11752	1.45	48	7.0	6.8
	03/14/18	9.746	4.587	6.290	7.242	6.955	4.20	6.290	72.5	3803.2	3201.7			7.3	89.9%		-	3360.6					3.7	240			1.521		0.00	50	7.1	6.4
	03/15/18	8.579	4.395	6.289	6.859	6.940	4.20	6.289	64.9	3404.0	3276.1	45.7	29.6%	7.9	87.8%	64.0	3356.817	3360.2			2.0	96.9%	3.1	245			1.537		0.00	51	6.6	6.4
	03/16/18	8.459	2.620	6.147	6.525	6.930	4.20	6.147		-	3301.5						-	3457.7					3.1	245			1.534		0.00	50	6.6	6.3
	03/17/18	8.156	4.583	6.048	6.321	6.914	4.20	6.048		-	3299.6						-	3457.7						240			1.562		0.00	49	7.0	6.4
	03/18/18	7.827	4.386	5.809	6.263	6.905	4.20	5.809		-	3299.6						-	3457.7						250			1.582		0.00	48	6.9	6.5
	03/19/18	6.916	3.990	5.476	6.045	6.902	4.20	5.476		-	3299.6					63.0	2877.2	3393.2	32	49.2%	2.0	96.8%	2.9	255			1.560		0.00	50	6.6	6.5
	03/20/18	8.687	1.403	5.417	5.925	6.883	4.20	5.417	54.0	2439.6	3233.4			4.0	92.6%		-	3393.2					3.3	255	2299	1996	1.522	9504	0.00	48	6.6	6.4
	03/21/18	7.158	3.811	5.197	5.769	6.858	4.20	5.197		-	3233.4					52.0	2253.835	3279.4			4.0	92.3%	3.8	250			1.544		0.24	48	6.6	6.4
	03/22/18	8.726	1.216	5.237	5.619	6.837	4.20	5.237	84.9	3708.1	3323.5	45.2	46.8%	5.3	93.8%		-	3279.4					3.6	240			1.608		0.03	49	6.6	6.4
	03/23/18	7.408	3.636	5.138	5.475	6.822	4.20	5.138		-	3306.2						-	3280.8					3.6	235			1.609		0.00	51	6.6	6.2
	03/24/18	6.861	3.430	5.056	5.333	6.808	4.20	5.056		-	3285.3						-	3280.8						240			1.651		0.00	51	7.1	6.4
	03/25/18	6.598	3.285	4.915	5.205	6.801	4.20	4.915		-	3285.3						-	3280.8						265			1.651		0.04	50	7.0	6.4
	03/26/18	6.578	3.380	4.777	5.105	6.787	4.20	4.777		-	3285.3					124.0	4940.182	3465.2	31	75.0%	3.0	97.6%	3.4	250			1.646		0.00	51	6.7	6.4
	03/27/18	7.144	2.904	4.718	5.005	6.744	4.20	4.718	88.0	3462.6	3300.1			4.0	95.5%		-	3465.2					5.1	255	2283	1980	1.678	8644	0.01	51	6.7	6.3
	03/28/18	6.527	2.940	4.698	4.934	6.691	4.20	4.698	96.8	3792.8	3338.0			4.6	95.2%	67.0	2625.148	3389.0			1.0	98.5%	3.6	225			1.686		0.00	51	6.6	6.2
	03/29/18	6.851	2.825	4.512	4.831	6.644	4.20	4.512		-	3381.4						-	3389.0					3.4	225			1.736		0.00	51	6.6	6.3
	03/30/18	6.731	2.897	4.459	4.734	6.601	4.20	4.459		-	3320.0						-	3441.9					4.3	225			1.757		0.05	51	7.1	6.5
	03/31/18	6.191	2.614	4.250	4.618	6.563	4.20	4.250		-	3318.2						-	3441.9						230			1.770		0.00	52	7.1	6.6
Apr'18	04/01/18	7.0	2.5	4.2	4.510	6.373	4.20	4.2		-	3318.2						-	3441.9						250			1.773		0.00	51	7.1	6.8
	04/02/18	6.4	2.2	4.0	4.396	6.060	4.20	4.0		-	3318.2					100.0	3321.822	3428.5	51	49.0%	7.0	93.0%	2.9	270			1.757		0.17	51	6.8	6.6
	04/03/18	6.4	2.2	4.0	4.300	5.850	4.20	4.0	99.0	3336.5	3319.9			4.0	96.0%		-	3428.5					3.0	265	2474	2108	1.717	7560	0.36	52	6.8	6.5
	04/04/18	7.5	0.7	4.3	4.237	5.683	4.20	4.3	100.3	3563.5	3340.2			3.5	96.5%	89.0	3162.028	3402.3			4.0	95.5%	3.0	250			1.700		0.07	51	6.7	6.4
	04/05/18	6.2	2.3	4.1	4.179	5.560	4.20	4.1	109.7	3756.6	3431.5	69.8	36.4%	5.4	95.1%		-	3402.3					3.2	255			1.689		0.00	52	6.8	6.5
	04/06/18	7.0	2.1	4.2	4.149	5.454	4.20	4.2		-	3439.4						-	3169.5					2.3	240			1.743		0.31	51	6.9	6.7
	04/07/18	6.4	2.5	4.1	4.123	5.291	4.20	4.1		-	3439.9						-	3169.5						375			1.682		0.00	50	7.2	7.0
	04/08/18	6.2	2.3	3.9	4.093	5.140	4.20	3.9		-	3439.9						-	3169.5						440			1.689		0.00	49	7.2	7.0
	04/09/18	6.2	2.2	3.7	4.057	5.015	4.20	3.7		-	3439.9					111.0	3451.159	3200.8	60	45.9%	7.0	93.7%	2.7	475			1.695		0.00	51	6.7	6.6
	04/10/18	5.2	2.0	3.9	4.036	4.937	4.20	3.9	108.0	3510.1	3446.3			4.0	96.3%		-	3200.8					3.3	435	3188	2759	1.691	6272	0.00	52	6.8	6.6
	04/11/18			3.9	3.985	4.834	4.20	3.9	104.5	3399.0	3442.3			6.6	93.7%	89.0	2894.814	3170.2			1.0	98.9%	3.2	490			1.693		0.00	52	6.7	6.5
	04/12/18			3.8	3.941	4.752	4.20	3.8		-	3470.5						-	3209.2					3.2	480			1.717		0.02	53	6.8	6.6
	04/13/18			3.6	3.849	4.663	4.20	3.6		-	3437.3						-	3209.2					3.2	500			1.730		0.00	51	7.0	6.8
	04/14/18			3.6	3.782	4.573	4.20	3.6		-	3441.0						-	3190.8						605			1.746		0.00	51	7.3	6.7
	04/15/18			3.5	3.718	4.485	4.20	3.5		-	3441.0						-	3190.8						605			1.574		0.32	49	7.1	6.7
	04/16/18			4.8	3.871	4.443	4.20	4.8		-	3441.0					98.0	3923.136	3272.1	73	25.5%	6.0	93.9%		585			1.397		1.26	51	7.3	6.9
	04/17/18			4.8	4.000	4.409	4.20	4.8	64.0	2562.0	3353.1			6.0	90.6%		-	3272.1					3.2	320	2812	2432	1.399	12294	0.00	51	6.8	6.6
	04/18/18			4.6	4.100	4.380	4.20	4.6	74.5	2858.1	3308.1			4.8	93.6%	63.0	2416.932	3221.0	29	54.0%	1.0	98.4%	3.5	335			1.399		0.19	52	6.6	6.5
	04/19/18			4.8	4.243	4.360	4.20	4.8	88.5	3542.8	3408.4	62	29.9%	8.2	90.7%		-	3221.0					2.8	370			1.399		0.23	51	6.4	6.4
	04/20/18			4.6	4.386	4.340	4.20	4.6		-	3408.4						-	3341.9					3.1	325			1.260		0.00	51	6.5	6.4
	04/21/18			4.4	4.500	4.312	4.20	4.4		-	3378.4						-	3341.9						370			1.470		0.00	52	7.2	6.7
	04/22/18			4.9	4.700	4.304	4.20	4.9		-	3378.4						-	3341.9						400			1.463		0.00	52	7.2	6.7
	04/23/18			4.4	4.643	4.282	4.20	4.4		-	3378.4					93.0	3412.728	3349.8	49		1.0	98.9%	3.0	450			1.475		0.00	52	6.8	6.6
	04/24/18			3.8	4.500	4.245	4.20	3.8	63.0	1996.6	3252.8			4.0	93.7%		-	3349.8					3.2	510	3437	2943	1.619	10664	0.00	53	6.7	6.6
	04/25/18			5.2	4.589	4.260	4.20	5.2	73.0	3178.0	3246.6			9.8	86.6%	73.0	3178.04	3154.0			1.0	98.6%	3.2	495			1.630		1.53	53	6.8	6.4
	04/26/18			5.8	4.729	4.295	4.20	5.8	63.7	3070.7	3213.9	47.2	25.9%	6.7	89.5%		-	3154.0					3.0	310			1.637		0.00	53	6.7	6.6
	04/27/18			5.7	4.879	4.327	4.20	5.7		-	3161.3						-	3220.1					2.9	310			1.593		0.63	53	6.7	6.6
	04/28/18			6.0	5.107	4.376	4.20	6.0		-	3161.3						-	3220.1						290					0.00	53	7.1	6.5
	04/29/18			6.3	5.301	4.436	4.20	6.3		-	3161.3						-	3220.1						330			1.245		0.18	52	7.1	6.6
	04/30/18	7.4	4.5	5.9	5.517	4.492	4.20	5.9		-	3161.3					62.0	3055.943	3201.8	61	1.6%	1.0	98.4%	3.4	190			1.052		0.00	53	6.6	6.4
May'18	05/01/18	4.97	3.04	3.11	5.419	4.457	4.20	3.11	52.0	1348.7	3010.2			4.0	92.3%		-	3201.8					3.0	210	2093	1793	1.05	12448	0.00	53	6.6	6.3
	05/02/18	4.53	2.62	3.30	5.144	4.434	4.20	3.30	63.8	1755.9	2913.7			5.6	91.2%	67.0	1843.974	3037.6			1.0	98.5%	2.8	205			1.03		0.00	56	6.4	6.3
	05/03/18	4.42	2.51	3.25	4.783	4.408	4.20	3.25	76.0	2060.0	2815.5	50	34.2%	5.0	93.4%		-	3037.6					3.9	225			1.01		0.00	56	6.5	6.3
	05/04/18	4.47	2.23	3.24	4.439	4.374	4.20	3.24		-	2753.2						-	3022.1					3.4	235			1.24		0.00	55	6.5	6.2
	05/05/18	4.36	2.34	3.12	4.027	4.341	4.20	3.12		-	2662.0						-	3022.1						275			1.44		0.00	55	7.2	6.9
	05/06/18	4.02	2.24	3.06	3.570	4.301	4.20	3.06		-	2662.0						-	3022.1						290			1.78		0.21	54	7.2	6.5

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH Influent	pH Effluent
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Hi	Low
				ADF	7-Day	30-Day																										
	05/07/18	4.01	2.00	3.01	3.156	4.266	4.20	3.01		-	2662.0					90.0	2259.306	2937.3	57	36.7%	1.0	98.9%	3.4	285			1.44		0.00	55	6.4	6.1
	05/08/18	4.07	1.86	2.89	3.124	4.231	4.20	2.89	69.0	1663.1	2578.8			4.0	94.2%		-	2937.3					4.7	275	2706	2325	1.38	8800	0.00	57	6.4	6.0
	05/09/18	4.01	1.77	2.89	3.066	4.203	4.20	2.89	90.6	2183.7	2548.4			13.3	85.3%	89.0	2145.131	2792.2			12.0	86.5%	2.8	265			1.48		0.00	57	6.4	5.9
	05/10/18	4.07	1.69	2.84	3.007	4.168	4.20	2.84	99.3	2352.0	2459.3	53	46.6%	15.8	84.1%		-	2792.2					3.1	325			1.61		0.00	57	6.4	6.0
	05/11/18	4.00	1.80	2.78	2.941	4.130	4.20	2.78		-	2381.0						-	2779.4					3.4	390			1.94		0.00	57	6.6	6.2
	05/12/18	3.90	1.80	2.72	2.884	4.094	4.20	2.72		-	2381.0						-	2779.4						490			1.89		0.00	58	7.2	6.4
	05/13/18	3.90	1.58	2.68	2.830	4.064	4.20	2.68		-	2381.0						-	2779.4						505			1.56		0.00	55	7.2	6.5
	05/14/18	3.94	1.71	2.63	2.776	4.031	4.20	2.63		-	2381.0					114.0	2500.499	2748.4	45	60.5%	1.0	99.1%	3.0	495			1.52		0.00	58	6.6	6.2
	05/15/18	4.07	1.52	2.60	2.734	4.001	4.20	2.60	141.0	3057.4	2433.0			5.0	96.5%		-	2748.4					3.4	485	2959	2539	1.53	8924	0.58	58	6.7	6.3
	05/16/18	5.36	1.45	3.04	2.756	3.943	4.20	3.04	121.0	3067.8	2478.4			10.1	91.7%	117.0	2966.371	2642.1			7.0	94.0%	3.2	395			1.53		0.00	58	6.7	6.2
	05/17/18	6.11	1.09	3.39	2.834	3.896	4.20	3.39	123.5	3491.7	2544.8	56.4	54.3%	5.2	95.8%		-	2642.1					3.5	440			1.54		0.27	58	6.6	6.3
	05/18/18	5.33	1.54	3.18	2.891	3.848	4.20	3.18		-	2520.6						-	2670.2					2.7	355			1.67		0.00	58	6.9	6.6
	05/19/18	5.15	1.59	3.23	2.964	3.796	4.20	3.23		-	2435.5						-	2670.2						550			1.34		0.35	56	7.4	6.8
	05/20/18	5.08	1.48	3.39	3.066	3.756	4.20	3.39		-	2435.5						-	2670.2						500			1.35		0.00	58	7.3	6.9
	05/21/18	5.83	1.47	3.39	3.174	3.722	4.20	3.39		-	2435.5					111.0	3138.259	2722.3	39	64.9%	4.0	96.4%	3.0	590			1.35		0.00	59	6.6	6.4
	05/22/18	5.83	0.95	3.28	3.271	3.668	4.20	3.28	108.0	2954.4	2475.4			4.0	96.3%		-	2722.3					2.7	515	3125	2693	1.39	9640	0.24	59	6.6	6.4
	05/23/18	5.31	1.47	3.24	3.300	3.629	4.20	3.24	132.5	3580.4	2554.3			4.9	96.3%	110.0	2972.376	2673.3			1.0	99.1%	2.7	425			1.45		0.00	560	6.8	6.5
	05/24/18	5.29	1.40	3.22	3.276	3.610	4.20	3.22	106.9	2870.8	2616.7	51.2	52.1%	7.4	93.1%		-	2673.3					3.0	450			1.34		0.00	60	6.7	6.4
	05/25/18	5.36	1.48	3.22	3.281	3.543	4.20	3.22		-	2573.6						-	2610.2					3.0	500			1.34		0.00	60	6.7	6.2
	05/26/18	5.85	1.34	3.19	3.276	3.457	4.20	3.19		-	2532.1						-	2610.2						545			1.37		0.00	60	7.3	6.5
	05/27/18	5.44	1.36	3.09	3.233	3.372	4.20	3.09		-	2532.1						-	2610.2						600			1.37		0.21	58	7.3	6.6
	05/28/18	6.37	1.94	3.45	3.241	3.287	4.20	3.45		-	2532.1					125.0	3596.625	2719.8	72		6.0	95.2%		440			1.38		0.00	59	7.3	6.6
	05/29/18	5.30	1.35	3.06	3.210	3.180	4.20	3.06	99.0	2526.5	2531.7			4.0	96.0%		-	2719.8					3.4	590	3378	8546	1.35	9858	0.00	62	7.0	6.4
	05/30/18	5.22	1.34	2.97	3.171	3.082	4.20	2.97	134.0	3319.2	2588.0			4.4	96.7%	136.0	3368.693	2754.6			9.0	93.4%	3.1	540			1.36		0.00	62	6.7	6.3
	05/31/18	5.30	1.28	2.90	3.126	3.075	4.20	2.90	139.3	3369.1	2732.3			10.0	92.8%		-	2754.6						520			1.13		0.02	64	6.8	6.6
Jun'18	06/01/18	5.49	1.24	2.99	3.093	3.065	4.20			-	2807.4						-	2868.4					2.3	220			0.73			61	6.6	6.2
	06/02/18	5.54	1.24	3.05	3.073	3.058	4.20			-	2869.7						-	2868.4						260			0.61			62	7.3	6.3
	06/03/18	4.89	1.11	2.81	3.033	3.044	4.20			-	2869.7						-	2868.4						260			0.61			62	7.4	6.6
	06/04/18	6.03	1.01	2.96	2.963	3.038	4.20			-	2869.7					143.0	3530.155	2941.9	44	69.2%	8.0	94.4%	1.8	260			0.58			60	6.6	6.2
	06/05/18	5.34	1.18	2.95	2.947	3.035	4.20		99.0	2435.7	2836.3			6.0	93.9%		-	2941.9					2.3	230	2183	1894	0.54	11488		62	6.5	6.1
	06/06/18	5.16	1.39	2.93	2.941	3.032	4.20		137.0	3347.8	2872.8			6.6	95.2%	144.0	3518.813	3081.9	45	68.8%	4.0	97.2%	2.7	230			0.70			61	6.7	6.1
	06/07/18	5.45	1.15	2.88	2.939	3.032	4.20		128.5	3086.5	2974.5	58	54.9%	6.4	95.0%		-	3081.9					2.4	250			0.80			61	6.7	6.2
	06/08/18	5.09	1.17	2.79	2.910	3.028	4.20			-	3035.3						-	3199.0					2.7	310			0.84			61	6.5	6.1
	06/09/18	4.62	1.04	2.66	2.854	3.022	4.20			-	3092.3						-	3199.0						320			0.86			60	7.3	6.2
	06/10/18	5.15	0.98	2.67	2.834	3.019	4.20			-	3092.3						-	3199.0						350			0.85			60	7.4	6.3
	06/11/18	5.37	1.58	2.85	2.819	3.023	4.20			-	3092.3					180.0	4278.42	3318.9	55	69.4%	10.0	94.4%	2.2	320			0.84			60	6.6	6.2
	06/12/18	4.91	1.05	2.64	2.774	3.022	4.20			-	3092.3						-	3318.9					2.8	270	2118	1830	0.85	10940		62	6.5	6.0
	06/13/18	4.42	1.04	2.66	2.736	3.023	4.20		135.0	2994.9	3084.8			5.0	96.3%	159.0	3527.32	3433.0	59	62.9%	9.0	94.3%	2.3	290			1.28			62	7.3	6.5
	06/14/18	4.72	1.04	2.60	2.696	3.023	4.20		186.0	4033.2	3159.8	109.5	41.1%	12.3	93.4%		-	3433.0					2.6	270			1.61			63	7.0	6.6
	06/15/18	4.87	0.78	2.54	2.660	3.006	4.20			-	3167.5						-	3491.3					2.4	200			1.62			62	6.9	6.6
	06/16/18	4.43	0.84	2.42	2.626	2.974	4.20			-	3138.0						-	3491.3						220			1.63			62	7.4	6.6
	06/17/18	4.92	0.72	2.58	2.613	2.954	4.20			-	3138.0						-	3491.3						300			1.64			63	7.2	6.8
	06/18/18	4.93	0.86	2.51	2.564	2.930	4.20			-	3138.0					212.0	4437.881	3596.5	59	72.2%	12.0	94.3%	2.6	250			0.93			64	7.0	7.0
	06/19/18	5.36	0.61	2.41	2.531	2.897	4.20		154.0	3095.3	3134.5			9.0	94.2%		-	3596.5					2.8	280	1706	1511	0.98	8848		64	6.8	6.5
	06/20/18	3.39	0.67	2.31	2.481	2.861	4.20		287.5	5538.8	3319.4			14.8	94.9%	182.0	3506.303	3637.4			11.0	94.0%	2.7	170			0.97			64	7.0	6.7
	06/21/18	4.77	0.67	2.32	2.441	2.829	4.20		174.2	3370.6	3351.4			11.7	93.3%		-	3637.4					2.8	150			0.89			64	6.9	6.6
	06/22/18	3.33	0.81	2.39	2.420	2.801	4.20			-	3332.4						-	3720.5					2.7	180			0.76			64	6.9	6.6
	06/23/18	4.66	0.81	2.35	2.410	2.772	4.20			-	3374.3						-	3720.5						160			0.77			62	7.4	6.6
	06/24/18	4.52	0.75	2.31	2.371	2.741	4.20			-	3374.3						-	3720.5						240			0.79			61	7.3	6.9
	06/25/18	4.50	0.70	2.25	2.334	2.710	4.20			-	3374.3					200.0	3753	3724.1	62	69.0%	2.0	99.0%	2.8	230			0.78			64	6.9	6.7
	06/26/18	4.08	0.62	2.16	2.299	2.679	4.20			-	3374.3						-	3724.1					2.8	250	2160	1887	0.78	8298		65	6.8	6.4
	06/27/18	4.13	0.59	2.16	2.277	2.636	4.20			-	3374.3					218.0	3927.139	3760.9			4.0	98.2%	2.8	210			0.78			64	6.8	6.4
	06/28/18				2.270	2.621	4.20			-	3459.1						-	3760.9						210						65		
	06/29/18				2.246	2.609	4.20			-	3474.6						-	3809.9														
	06/30/18				2.220	2.598	4.20			-	3487.8						-	3809.9														
Jul'18	07/01/18	4.19	0.59	2.15	2.180	2.567	4.20	2.15		-	3487.8						-	3809.9						240			0.75		0.00	66	7.4	6.7
	07/02/18	4.23	0.50	2.13	2.150	2.533	4.20	2.13	199.0	3535.1	3493.1			20.0	89.9%	189.0	3357.434	3759.6	89	52.9%	6.0	96.8%	2.2	200			0.73		0.00	67	7.0	7.0
	07/03/18	4.03	0.66	2.09	2.133	2.506	4.20	2.09		-	3493.1						-	3759.6					2.7	230	2421	2130	0.73	7748	0.00	67	6.6	6.6
	07/04/18	4.01	0.50	2.01	2.095	2.471	4.20	2.01	167.5	2807.9	3424.6			21.9	86.9%	202.0	3386.207	3743.6			9.0	95.5%		270			0.74		0.00	67	7.2	6.8
	07/05/18	4.30	0.48	2.10	2.096	2.440	4.20	2.10	197.5	3459.0	3526.9	168.6	14.6%	17.6	91.1%		-	3743.6					2.7	280			0.73		0.00	67	6.8	6.9
	07/06/18	5.51	0.60	2.30	2.130	2.416	4.20	2.30		-	3546.8						-	3771.7					2.8	270			0.74		0.41	67	6.9	6.8
	07/07/18	4.01	0.62	2.09	2.124	2.387	4.20	2.09		-	3604.3						-	3771.7						310			0.77		0.00	67	7.1	6.9
	07/08/18	3.98	0.59	2.06	2.111	2.360	4.20	2.06		-	3604.3						-	3771.7						340			0.77		0.00	66	7.4	6.7
	07/09/18	4.34	0.47	2.13	2.111	2.340	4.20	2.13		-	3604.3					230.0	4085.766	3806.6	78	66.1%	2.0	99.1%	2.3	360	2941	2556	0.75	9248	0.00	67	6.5	6.5
	07/10/18	4.12	0.59	2.08	2.110	2.319	4.20	2.08	168.0	2914.3	3527.7			5.0	97.0%		-	3806.6					2.5	320			0.78		0.00	67	6.8	6.5
	07/11/18	4.24	0.58	2.07	2.119	2.290	4.20	2.07	174.2	3007.4	3475.6			5.1	97.1%	249.0	4298.686	3808.9			6.0	97.6%	2.9	310			0.77		0.00	67	6.9	6.4
	07/12/18	4.59	0.49	2.04	2.110	2.267	4.20	2.04	145.0	2467.0	3383.9	117.1	19.2%				-	3808.9					2.8	280			0.77		0.00	67	6.8	6.5
	07/13/18	3.82	0.51	2.05	2.074	2.245	4.20	2.05		-	3422.9						-	3844.1					2.6	260			0.78		0.00	68	6.9	6.5
	07/14/18	4.04	0.50	2.00	2.061	2.223	4.20	2.00		-	3355.0						-	3844.1						270			0.80		0.00	64	7.5	6.7
	07/15/18	3.90	0.49	2.00	2.053	2.203	4.20	2.00		-	3355.0						-	3844.1						300			0.81		0.00	66	7.4	6.8
	07/16/18	3.88	0.50	2.03	2.039	2.188	4.20	2.03		-	3355.0					258.0	4367.992	3902.3	86	66.7%	5.0	98.1%	2.8	320			0.79		0.00	67	6.9	6.6
	07/17/18	3.78	0.50	2.06	2.036	2.169	4.20	2.06	154.0	2645.8	3284.1			4.0	97.4%		-	3902.3					3.1	260	2695	2365	0.68	10336	0.16	68	6.7	6.6
	07/18/18	4.20	0.47	2.02	2.029	2.151	4.20	2.02		-	3284.1					235.0	3958.998	3849.1			9.0	96.2%	2.5	270			0.71		0.00	69	6.8	6.4

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH	
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Influent Hi	Effluent Low
				ADF	7-Day	30-Day																										
	07/19/18	3.85	0.47	1.96	2.017	2.134	4.20	1.96	201.7	3297.1	3304.3	144.2	28.5%	15.3	92.4%		-	3849.1						220			0.71		0.00	69	6.6	6.4
	07/20/18	5.41	0.40	2.01	2.011	2.123	4.20	2.01		-	3056.0						-	3891.9						260			0.70		0.00	69	6.9	6.4
	07/21/18	3.64	0.55	1.93	2.001	2.109	4.20	1.93		-	3016.7						-	3891.9						210			0.74		0.04	67	7.5	6.6
	07/22/18	3.90	0.48	2.07	2.011	2.097	4.20	2.07		-	3016.7						-	3891.9						270			0.74		0.22	67	7.4	6.7
	07/23/18	3.88	0.41	2.01	2.009	2.084	4.20	2.01		-	3016.7					267.0	4475.828	3956.8			8.0	97.0%	2.8	230			0.74		0.00	70	6.9	6.6
	07/24/18	3.64	0.38	1.97	1.996	2.071	4.20	1.97	170.0	2793.1	2991.8			6.0	96.5%		-	3956.8					3.1	230	2119	1753	0.76	8816	0.00	70	6.8	6.5
	07/25/18	3.86	0.31	1.99	1.991	2.062	4.20	1.99		-	2991.8					244.0	4049.57	3989.7			4.0	98.4%	2.7	180			0.78		0.10	70	7.1	6.6
	07/26/18	3.83	0.49	2.01	1.999	2.056	4.20	2.01	231.7	3884.1	3081.1	131.1	43.4%	13.0	94.4%		-	3989.7					2.9	200			0.81		0.00	70	6.8	6.4
	07/27/18	4.52	0.41	2.04	2.003	2.052	4.20	2.04		-	3081.1						-	3997.6					2.9	160			0.85		0.00	71	7.0	6.6
	07/28/18	3.94	0.31	1.88	1.996	2.046	4.20	1.88		-	3081.1						-	3997.6						210			0.89		0.00	71	8.2	7.1
	07/29/18	3.55	0.38	1.86	1.966	2.039	4.20	1.86		-	3081.1						-	3997.6						280			0.90		0.00	71	7.3	7.0
	07/30/18	3.89	0.32	1.85	1.943	2.033	4.20	1.85		-	3081.1					242.0	3733.818	3968.3			2.0	99.2%	2.9	250			0.86		0.00	71	7.1	6.7
	07/31/18	3.70	0.47	1.86	1.927	2.023	4.20	1.86	173.0	2683.6	3044.9			8.0	95.4%		-	3968.3					3.1	210	1914	1707	1.37	7104	0.00	71	6.9	6.6
Aug'18	08/01/18	4.14	0.31	2.03	1.933	2.020	4.20	2.03	204.0	3453.8	3037.5			10.9	94.7%	234.0	3961.667	4035.4			7.0	97.0%	3.1	130			0.87		0.00	72	6.9	6.5
	08/02/18	3.70	0.49	1.95	1.924	2.015	4.20	1.95	199.7	3247.7	3055.1	127.5	36.2%	14.0	93.0%		-	4035.4					3.1	120			0.80		0.00	72	6.9	6.4
	08/03/18	4.28	0.45	1.90	1.904	2.012	4.20	1.90		-	3077.5						-	4116.5						120			0.79		0.00	72	7.0	6.1
	08/04/18	6.59	0.48	2.44	1.984	2.023	4.20	2.44		-	3039.4						-	4116.5						160			0.73		3.07	71	7.5	6.4
	08/05/18	3.82	0.48	1.97	2.000	2.012	4.20	1.97		-	3039.4						-	4116.5						200			0.72		0.00	71	7.5	6.6
	08/06/18	4.18	0.48	1.94	2.013	2.007	4.20	1.94		-	3039.4					217.0	3510.973	4049.3	63	71.0%	2.0	99.1%	2.6	220			0.70		0.00	72	6.8	6.5
	08/07/18	3.92	0.47	2.07	2.043	2.007	4.20	2.07	206.0	3556.3	3086.4			10.0	95.1%		-	4049.3					2.0	240	1721	1486	0.71	8980	0.00	72	6.7	6.6
	08/08/18	5.55	0.48	2.04	2.044	2.004	4.20	2.04	200.0	3402.7	3112.7			13.5	93.3%	235.0	3998.196	4039.5			10.0	95.7%	2.1	190			0.71		0.00	72	6.9	6.5
	08/09/18	5.62	0.37	1.99	2.050	2.001	4.20	1.99	176.0	2921.0	3113.3	133.3	24.3%	8.5	95.2%		-	4039.5					2.3	190			0.71		0.00	72	6.8	6.2
	08/10/18	3.84	0.38	1.96	2.059	1.998	4.20	1.96		-	3122.9						-	4007.1					2.4	210			0.72		0.25	72	6.7	6.2
	08/11/18	4.13	0.60	1.97	1.991	1.995	4.20	1.97		-	3188.5						-	4007.1						190			0.76		0.05	71	7.6	6.4
	08/12/18	6.19	0.37	2.48	2.064	2.010	4.20	2.48		-	3188.5						-	4007.1						140			0.77		1.00	71	7.4	6.9
	08/13/18	4.83	0.59	2.29	2.114	2.019	4.20	2.29		-	3188.5					200.0	3819.72	3986.3	101	49.5%	12.0	94.0%	3.6	210			0.73		1.12	72	6.9	6.5
	08/14/18	5.60	0.58	2.36	2.156	2.031	4.20	2.36	131.0	2578.4	3133.1			7.0	94.7%		-	3986.3						200	1977	1728	0.71	9212	0.00	73	6.8	6.4
	08/15/18	4.46	0.71	2.25	2.186	2.039	4.20	2.25	147.9	2775.3	3103.2			7.6	94.9%	186.0	3490.29	3888.8			12.0	93.5%	2.6	170			0.72		0.00	73	6.8	6.3
	08/16/18	4.43	0.62	2.25	2.223	2.045	4.20	2.25	149.4	2803.5	3116.4	120.5	19.3%	15.1	89.9%		-	3888.8					3.5	150			0.73		0.00	73	7.0	6.6
	08/17/18	4.31	0.61	2.19	2.256	2.051	4.20	2.19		-	3116.4						-	3880.0					2.6	170			0.75		0.00	73	7.0	6.6
	08/18/18	6.88	0.60	2.56	2.340	2.071	4.20	2.56		-	3100.0						-	3880.0						190			0.73		1.47	74	7.4	7.0
	08/19/18	4.57	0.92	2.46	2.337	2.086	4.20	2.46		-	3100.0						-	3880.0						200			0.76		0.07	71	7.5	6.7
	08/20/18	4.71	0.72	2.47	2.363	2.104	4.20	2.47		-	3100.0					173.0	3563.765	3844.9	96	44.5%	7.0	96.0%	3.7	240	2177	1866	0.77	8136	0.00	72	6.8	6.5
	08/21/18	5.19	0.86	2.43	2.373	2.116	4.20	2.43	137.0	2776.5	3073.0			8.0	94.2%		-	3844.9					3.3	300			0.81		0.00	72	6.8	6.3
	08/22/18	4.85	0.76	2.57	2.419	2.134	4.20	2.57	194.0	4158.2	3156.5			13.1	93.2%	175.0	3750.915	3764.3			10.0	94.3%	3.1	260			0.79		0.42	72	7.0	6.5
	08/23/18	4.90	0.77	2.41	2.441	2.149	4.20	2.41	132.2	2657.1	3146.0	120	9.2%	12.2	90.8%		-	3764.3					3.2	300			0.80		0.00	72	6.9	6.5
	08/24/18	4.68	0.66	2.30	2.457	2.159	4.20	2.30		-	3146.0						-	3728.7					3.5	250			0.80		0.00	72	6.9	6.5
	08/25/18	5.16	0.72	2.29	2.419	2.169	4.20	2.29		-	3084.5						-	3728.7						230			0.88		0.00	72	7.4	6.7
	08/26/18	4.83	0.69	2.29	2.394	2.177	4.20	2.29		-	3084.5						-	3728.7						200			0.91		0.00	72	7.1	7.0
	08/27/18	4.35	0.70	2.32	2.373	2.192	4.20	2.32		-	3084.5					196.0	3792.365	3735.7	74	62.2%	12.0	93.9%	2.3	280			0.84		0.00	72	7.0	6.8
	08/28/18	5.29	0.56	2.46	2.377	2.212	4.20	2.46	106.0	2174.7	3014.5			12.0	88.7%		-	3735.7					3.2	210	1678	1453	0.81	8372	0.00	73	6.9	6.7
	08/29/18	4.68	0.61	2.31	2.340	2.227	4.20	2.31	162.9	3138.3	3023.4			17.8	89.1%	193.0	3718.222	3734.0			1.0	99.5%	2.5	250			0.79		0.00	73	6.8	6.5
	08/30/18	4.59	0.58	2.23	2.314	2.239	4.20	2.23	161.2	2998.0	3045.8	97.1	39.8%	19.6	87.8%		-	3734.0					3.3	220			0.77		0.00	74	7.0	6.8
	08/31/18	4.70	0.46	2.16	2.294	2.244	4.20	2.16		-	3014.5						-	3705.6					2.8	200			0.77		0.00	73	6.9	6.7
Sept '18	09/01/18	4.24	0.47	2.11	2.269	2.249	4.20	2.11		-	2995.0						-	3705.6						240			0.78		0.00	70	7.8	7.0
	09/02/18	4.69	0.47	2.05	2.234	2.254	4.20	2.05		-	2995.0						-	3705.6						340			0.80		0.00	70	7.4	7.0
	09/03/18	4.19	0.57	2.13	2.207	2.244	4.20	2.13		-	2995.0					181.0	3215.32	3651.1	59	67.4%	1.0	99.4%		410			0.80		0.00	71	7.3	7.0
	09/04/18	4.20	0.50	2.11	2.157	2.248	4.20	2.11	206.0	3625.1	3043.5			24.0	88.3%		-	3651.1					2.4	460	1950	1639	0.78	7244	0.00	72	6.9	6.7
	09/05/18	4.89	0.37	2.05	2.120	2.252	4.20	2.05		-	3043.5					196.0	3351.012	3633.3			4.0	98.0%	2.4	570			0.78		0.00	74	7.0	6.7
	09/06/18	3.49	0.50	2.11	2.103	2.253	4.20	2.11	175.0	3079.5	3006.8	129.1	26.2%	26.0	85.1%		-	3633.3					3.2	470			0.77		0.20	73	6.8	6.6
	09/07/18	4.64	0.50	2.09	2.093	2.255	4.20	2.09		-	2973.8						-	3587.7					2.1	510			0.78		0.04	73	7.0	6.7
	09/08/18	4.35	0.41	2.02	2.080	2.256	4.20	2.02		-	2978.6						-	3587.7						550			0.79		0.00	72	7.3	7.0
	09/09/18	4.08	0.46	2.07	2.083	2.260	4.20	2.07		-	2978.6						-	3587.7						700			0.80		0.00	70	7.1	7.0
	09/10/18	5.13	0.50	2.24	2.099	2.269	4.20	2.24		-	2978.6					195.0	3642.912	3593.8	81	58.5%	2.0	99.0%	1.6	660			0.75		0.66	70	6.9	6.7
	09/11/18	4.44	0.82	2.25	2.119	2.261	4.20	2.25	181.0	3396.5	3013.4			7.0	96.1%		-	3593.8					2.1	620	2059	1789	0.74	5356	0.00	72	7.0	6.6
	09/12/18	4.76	0.38	2.23	2.144	2.259	4.20	2.23	144.4	2685.6	2988.2			7.0	95.2%	172.0	3198.89	3524.9			1.0	99.4%	1.9	640			0.73		0.89	71	7.0	6.6
	09/13/18	4.84	0.58	2.33	2.176	2.258	4.20	2.33	129.4	2514.5	2983.3	101.3	21.7%	7.0	94.6%		-	3524.9					2.1	590			0.71		0.03	71	6.9	6.5
	09/14/18	4.51	0.60	2.24	2.197	2.258	4.20	2.24		-	3000.6						-	3529.2					1.7	670			0.72		0.00	71	6.7	6.4
	09/15/18	4.74	0.68	2.19	2.221	2.256	4.20	2.19		-	3018.6						-	3529.2						700			0.75		0.00	70	7.4	6.7
	09/16/18	4.68	0.57	2.23	2.244	2.257	4.20	2.23		-	3018.6						-	3529.2						710			0.75		0.00	70	7.3	6.9
	09/17/18	4.18	0.52	2.17	2.234	2.244	4.20	2.17		-	3018.6					175.0	3167.115	3488.9	80	54.3%	3.0	98.3%	1.7	750			0.72		0.00	71	6.9	6.6
	09/18/18	4.90	0.60	2.29	2.240	2.238	4.20	2.29	205.0	3915.2	3093.3			7.0	96.6%		-	3488.9					2.0	750	1931	1616	0.69	5648	0.72	72	7.1	6.5
	09/19/18	4.29	0.67	2.23	2.240	2.230	4.20	2.23	141.9	2639.1	3058.3			8.6	93.9%	167.0	3105.899	3438.1			10.0	94.0%	2.2	700			0.70		0.00	71	7.1	6.5
	09/20/18	4.16	0.61	2.23	2.226	2.224	4.20	2.23	138.2	2570.3	3042.5	89.1	35.5%	8.6	93.8%		-	3438.1					2.1	720			0.71		0.00	71	7.0	6.4
	09/21/18	4.38	0.70	2.31	2.236	2.215	4.20	2.31		-	2949.5						-	3399.0					2.8	690			0.81		0.00	71	6.9	6.6
	09/22/18	4.89	0.69	2.33	2.256	2.212	4.20	2.33		-	2976.1						-	3399.0						780			0.87		0.00	70	7.3	6.7
	09/23/18	4.84	0.60	2.27	2.261	2.211	4.20	2.27		-	2976.1						-	3399.0						810			0.91		0.00	69	7.4	7.0
	09/24/18	4.24	0.49	2.16	2.260	2.207	4.20	2.16		-	2976.1					223.0	4017.211	3467.7	66	70.4%	2.0	99.1%	2.4	800			0.86		0.00	69	7.1	6.8
	09/25/18	4.82	0.49	2.42	2.279	2.211	4.20	2.42	188.0	3794.4	3044.3			49.0	73.9%		-	3467.7					2.4	820	1769	1541	0.80	6192	1.13	69	7.1	6.7
	09/26/18	4.51	0.73	2.50	2.317	2.217	4.20	2.50	120.3	2508.3	3003.0			17.2	85.7%		-	3427.1					1.3	720			0.76		0.41	70	7.0	6.6
	09/27/18	4.55	1.03	2.64	2.376	2.223	4.20	2.64	117.2	2580.5	3034.2	80.2	31.6%	10.3	91.2%	160.0	3522.816	3437.7			1.0	99.4%	2.3	810			0.68		0.07	69	6.9	6.5
	09/28/18	5.57	0.94	2.93	2.464	2.244	4.20	2.93		-	3025.6						-	3402.6					1.9	590			0.97		0.66	68	6.8	6.6
	09/29/18	5.11	1.46	2.91	2.547	2.267	4.20	2.91		-	3028.1						-	3402.6						515			1.12		0.00	67	7.4	6.8

Somerset WPCF Daily Data
2013-2018

		Sewage Flows(mgd)							BOD							TSS							Aeration Tanks						Weather		pH Influent	Effluent
	DATE	Max	Min	Influent Flow			NPDES Permit Flow	Effluent Flow	raw mg/L	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	raw	raw LBD	raw 30D MA	pri eff	% Pri	final	% Tot	final D.O.	30 min set test	MLSS	MLVSS	RAS (mgd)	RSS	Rain	Inf Temp	Hi	Low
				ADF	7-Day	30-Day																										
	09/30/18	4.92	1.24	2.91	2.639	2.292	4.20	2.91		-	3028.1						-	3402.6						660			1.16		0.00	67	7.3	6.9
Oct '18	10/01/18	6.55	1.26	2.87	2.740	2.317	4.20	2.87		-	3028.1					170.0	4069.086	3476.7	75	55.9%	1.0	99.4%	2.6	730			1.17		0.15	70	7.0	6.8
	10/02/18	5.21	0.87	8.92	3.669	2.546	4.20	8.92	119.0	8852.7	3513.5			5.0	95.8%		-	3476.7					2.4	715	1939	1579	1.16	5527	1.00	68	6.9	6.6
	10/03/18	5.80	1.91	3.59	3.824	2.595	4.20	3.59	82.5	2470.1	3433.2			6.7	91.9%	101.0	3024.001	3455.4			5.0	95.0%	2.4	555			1.16		0.01	68	6.8	6.6
	10/04/18	5.81	1.89	3.47	3.943	2.640	4.20	3.47	95.3	2758.0	3366.5	91	4.5%	6.8	92.9%		-	3455.4					2.7	635			1.17		0.00	69	6.9	6.6
	10/05/18	6.33	1.82	3.40	4.010	2.685	4.20	3.40		-	3366.5						-	3468.5					2.4	585			1.17		0.00	69	6.9	6.6
	10/06/18	5.71	1.68	3.27	4.061	2.724	4.20	3.27		-	3390.4						-	3468.5						610			1.21		0.00	67	7.4	7.1
	10/07/18	5.41	1.67	3.18	4.100	2.760	4.20	3.18		-	3390.4						-	3468.5						645			1.20		0.00	68	7.2	7.0
	10/08/18	5.13	1.38	3.07	4.129	2.795	4.20	3.07		-	3390.4					120.0	3072.456	3424.5	85	29.2%	9.0	92.5%		615			1.20		0.00	67	7.3	7.0
	10/09/18	5.51	1.38	3.02	3.286	2.827	4.20	3.02	148.0	3727.6	3416.4			7.0	95.3%		-	3424.5					2..7	470	1662	1421	1.21	4832	0.00	68	6.8	6.6
	10/10/18	5.25	1.39	3.07	3.211	2.854	4.20	3.07	203.0	5197.6	3543.6			5.2	97.4%	128.0	3277.286	3383.9			9.0	93.0%	2.5	405			1.28		0.00	70	6.9	6.6
	10/11/18	5.45	1.42	3.21	3.174	2.886	4.20	3.21	105.8	2832.4	3503.3	77.1	27.1%	10.0	90.5%		-	3383.9					2.6	405			1.32		1.58	69	6.9	6.7
	10/12/18	7.43	1.66	4.11	3.276	2.949	4.20	4.11		-	3566.2						-	3407.0					2.0	655			1.28		0.57	67	6.9	6.7
	10/13/18	6.67	2.87	4.22	3.411	3.012	4.20	4.22		-	3653.8						-	3407.0						600			1.33		0.13	66	7.5	7.1
	10/14/18	6.59	2.77	4.17	3.553	3.076	4.20	4.17		-	3653.8						-	3407.0						555			1.36		0.00	65	7.3	7.0
	10/15/18	6.54	2.72	4.13	3.704	3.141	4.20	4.13		-	3653.8					82.0	2824.424	3342.3	28	65.9%	2.0	97.6%	2.0	610			1.33		0.20	66	6.8	6.7
	10/16/18	8.44	2.63	4.01	3.846	3.200	4.20	4.01	96.0	3210.6	3619.7			4.0	95.8%		-	3342.3					3.0	600	1892	1589	1.30	6892	0.00	66	6.8	6.5
	10/17/18	5.64	2.15	3.85	3.957	3.256	4.20	3.85	76.7	2462.8	3537.1			14.4	81.2%	94.0	3018.246	3325.7			4.0	95.7%	2.8	500			1.32		0.00	66	6.8	6.4
	10/18/18	5.87	1.83	3.72	4.030	3.304	4.20	3.72	116.7	3620.6	3516.1			12.7	89.1%		-	3325.7					2.4	450			1.37		0.00	65	6.9	6.8
	10/19/18	5.75	2.00	3.54	3.949	3.348	4.20	3.54		-	3583.5						-	3353.2					2.2	490			1.44		0.02	66	6.9	6.8
	10/20/18	5.46	1.90	3.43	3.836	3.388	4.20	3.43		-	3668.0						-	3353.2						630			1.35		0.10	65	7.3	7.0
	10/21/18	10.00	1.73	3.33	3.716	3.422	4.20	3.33		-	3668.0						-	3353.2						630			1.08		0.02	63	7.4	7.0
	10/22/18	5.20	1.53	3.27	3.593	3.453	4.20	3.27		-	3668.0					101.0	2754.452	3286.7	54	46.5%	1.0	99.0%	2.3	295			1.19		0.00	65	7.0	6.8
	10/23/18	5.18	1.60	3.32	3.494	3.488	4.20	3.32	116.0	3211.9	3632.9			6.0	94.8%		-	3286.7					2.6	630	2343	1942	1.44	6880	0.12	65	6.7	6.7
	10/24/18	5.21	1.61	3.09	3.386	3.519	4.20	3.09	102.2	2633.8	3561.5			6.3	93.8%	114.0	2937.848	3166.7			2.0	98.2%	2.5	650			1.37		0.00	65	6.9	6.6
	10/25/18	4.71	1.30	2.99	3.281	3.538	4.20	2.99	104.2	2598.4	3476.1	59	43.4%	10.8	89.6%		-	3166.7					2.8	695			1.44		0.00	64	6.9	6.6
	10/26/18	6.05	1.35	2.91	3.191	3.552	4.20	2.91		-	3550.5						-	3166.7					2.8	715			1.32		0.00	64	6.9	6.6
	10/27/18	6.39	1.31	3.40	3.187	3.577	4.20	3.40		-	3631.4						-	3122.2						755			1.36		1.26	61	7.4	7.0
	10/28/18	5.56	2.12	3.60	3.226	3.599	4.20	3.60		-	3631.4						-	3122.2						650			1.35		0.00	62	7.4	7.1
	10/29/18	5.48	1.81	3.98	3.327	3.635	4.20	3.98		-	3631.4					87.0	2887.808	3096.2	47	46.0%	1.0	98.9%	3.0	590			1.35		0.21	64	6.8	6.8
	10/30/18	5.61	2.02	3.57	3.363	3.657	4.20	3.57	96.0	2858.3	3571.9			4.0	95.8%		-	3096.2					3.0	620	2405	1995	1.37	7586	0.00	64	6.8	6.7
	10/31/18	6.21	2.14	3.52	3.424	3.679	4.20	3.52	122.8	3605.0	3574.3			5.7	95.4%	113.0	3317.318	3012.6			1.0	99.1%	3.0	620			1.45		0.00	63	6.9	6.7
Nov '18	11/01/18	5.59	2.04	3.52	3.500	3.499	5.20	3.52	90.8	2665.6	3132.3	56.75	37.5%	4.8	94.7%		-	3012.6					3.4	730/510			1.45		0.00	64	6.9	6.6
	11/02/18	5.15	2.01	3.56	3.593	3.498	6.20	3.56		-	3183.3						-	3011.2					3.6	520/490			1.32		1.00	64	6.8	6.5
	11/03/18	6.44	1.98	3.99	3.677	3.515	7.20	3.99		-	3218.7						-	3011.2						620/560			1.33		0.23	63	7.4	6.8
	11/04/18	6.36	2.45	4.04	3.740	3.536	8.20	4.04		-	3218.7						-	3011.2						770/500			1.32		0.00	63	7.5	6.9
	11/05/18	5.78	2.32	4.02	3.746	3.561	9.20	4.02		-	3218.7					105	3520.314	3067.8	43	59.0%	4	96.2%	4.0	670/520			1.30		0.19	63	6.9	6.7
	11/06/18	6.93	2.66	4.42	3.867	3.603	10.20	4.42	72	2654.1	3175.3			5	93.1%		-	3067.8					3.4	660/500	2245	1888	1.29	8255	0.73	63	6.8	6.6
	11/07/18	7.29	3.44	4.86	4.059	3.662	11.20	4.86	67.5	2735.9	3143.9			9.5	85.9%	65	2634.606	3019.1			4	93.8%	3.3	500/440			1.65		0.00	64	6.9	6.8
	11/08/18	6.83	3.07	4.60	4.213	3.715	12.20	4.60	83.4	3199.6	3106.2	51	38.8%	9.9	88.1%		-	3019.1					4.2	240/250			2.13		0.00	63	6.9	6.7
	11/09/18	8.40	3.11	4.71	4.377	3.770	13.20	4.71		-	2945.3						-	2986.9					3.9	22			2.25		1.29	62	6.6	6.5
	11/10/18	8.70	5.04	6.49	4.734	3.879	14.20	6.49		-	2954.7						-	2986.9						185			2.31		0.82	61	7.2	6.5
	11/11/18	8.82	4.40	5.81	4.987	3.936	15.20	5.81		-	2954.7						-	2986.9						205			2.32		0.00	60	7.2	6.6
	11/12/18	7.67	3.45	5.34	5.176	3.973	16.20	5.34		-	2954.7					56	2493.994	2932.1	61	-8.9%	4	92.9%		260			2.36		0.00	60	7.2	6.6
	11/13/18	10.82	3.80	6.89	5.529	4.064	17.20	6.89		-	2954.7						-	2932.1					2.9	220/210	2666	2232	2.29	4644	1.31	61	6.8	6.6
	11/14/18	9.72	5.63	6.78	5.803	4.152	18.20	6.78		-	2954.7					43	2431.444	2888.4			4	90.7%	3.2	220/190			2.30		0.49	60	6.9	6.7
	11/15/18	8.55	5.05	6.21	6.033	4.225	19.20	6.21		-	2931.4						-	2888.4					3.3	215			2.31		0.11	60	6.8	6.7
	11/16/18	10.94	5.15	7.41	6.419	4.344	20.20	7.41		-	2978.3						-	2872.2					3.4	200			2.43		0.00	58	6.7	6.7
	11/17/18	10.15	5.67	7.29	6.533	4.463	21.20	7.29		-	2907.0						-	2872.2						215			2.36		0.00	58	7.3	6.9
	11/18/18	9.85	5.28	6.82	6.677	4.572	22.20	6.82		-	2907.0						-	2872.2						250			2.37		0.00	59	7.3	6.9
	11/19/18	9.88	5.20	6.44	6.834	4.673	23.20	6.44			2907.0						-	2872.2					3	235			2.35		0.02	60	6.8	6.7

Average		3.338			3484		3922		481	2957	2516	1.14	9702	59
Minimum Day		1.690			1195		1844							
Maximum Month (92nd %)		5.554		5.425	4711		5258							
Maximum Month (100th %)			7.0	13.4		5115		6297						
Maximum Day (98th %)		7.301			5849		6472							
Maximum Day (99th %)		8.190			6499		6785							
Maximum Day (100th %)		13.390			9991		7740							
Peak Hour (98th %)	10.687													
Peak Hour (99th %)	11.717													
Peak Hour (100th %)	16.771													
Maximum Month, BOD5			2.534			5115		6297						
	A1891			A1892		A547								

Section H
Equipment List and Usage

APPENDIX H - ENERGY EVALUATION, EQUIPMENT LIST										
Equipment Name	**Number of Units**	**Units Normally Online**	**HP**	**VFD?**	**Electrical Demand (kW)**	**Estimated Run Time (hours/day)**	**Days/Week**	**Hours/Year**	**kW-hrs/year**	**Cost/Year**
HEADWORKS										
Screw Pumps	2	1	40.00	No	37	24.0	7	10,920	407,152	$59,037
Mechanical Screens	2	1	2.00	Yes	1	1.0	7	364	543	$79
Screening Grinder	2	1	15.00	No	11	1.5	7	546	6,107	$886
Screening Compactor	2	1	10.00	no	7	1.5	7	546	4,072	$590
Influent Standby Pump - Centrifugal	1	1	60.00	Yes	45	0.5	1	26	1,163	$169
FLOW EQUALIZATION										
Mechanical Aerators	3	0	30.00	No	0	0.5	1	0	0	$0
Flow Equalization Pumps - centrifugal	2	1	25.00	1 constant, 1 VFD	19	0.5	1	26	485	$70
PC Mechanisms	2	0	0.50	No	0	0.0	0	0	0	$0
GRIT REMOVAL										
Grit Removal - chain and bucket system	2	2	0.75	No	1	0.5	7	273	229	$33
Grit Screw	1	1	1.00	No	1	0.5	7	182	136	$20
PRIMARY CLARIFIERS										
Primary Clarifier Mechanisms	2	2	1.00	No	1	24.0	7	13,104	14,657	$2,125
Primary Sludge Pumps	3	2	5.00	Yes	6	4.0	7	2,184	12,215	$1,771
Primary Scum Pumps	2	0	3.00	No	0	2.0	7	0	0	$0
Primary Scum Grinders	2	0	5.00	No	0	2.0	7	0	0	$0
Concentrated Scum Pumps	2	0	3.00	No	0	2.0	7	0	0	$0
AERATION										
PD Blowers	3	2	75.00	2 VFD, 1 constant	84	24.0	7	13,104	1,099,311	$159,400
SECONDARY CLARIFIERS										
Secondary Clarifier Mechanisms	2	2	1.00	No	1	24.0	7	13,104	14,657	$2,125
RAS Pumps - smaller - horizontal centrifugal non-clog	2	2	30.00	Yes	34	24.0	7	13,104	439,724	$63,760
RAS Sludge Pumps - larger - horizontal centrifugal non-clog	2	0	50.00	Yes	0	0.0	0	0	0	$0
WAS Pumps - horizontal centrifugal non-clog (GBT feed)	3	2	3.00	Yes	3	6.5	5	2,535	8,507	$1,233
PLANT WATER										
Plant Water Pumps	2	1	15.00	No	11	13.5	5	3,510	39,261	$5,693
SLUDGE HANDLING										
Gravity Belt Thickeners - WAS thickening	2	1	2.00	No	1	8.0	5	2,080	3,102	$450
Sludge Tank blowers	2	1	15.00	No	11	24.0	7	8,736	97,717	$14,169
Sludge Transfer Pumps - plunger	2	1	5.00	Yes	4	3.0	5	780	2,908	$422
BFP feed pumps - plunger	2	1	5.00	Yes	4	6.5	5	1,690	6,301	$914
Belt Filter Presses	2	1	3.00	No	2	8.0	5	2,080	4,653	$675
BFP wash water pumps	2	1	5.00	No	4	7.0	5	1,820	6,786	$984
Polymer Feed Pumps	5	3	0.33	No	1	6.5	5	5,070	3,777	$548
YARD PUMP STATION										
Pumps	2	0	5.00	No	0	0.0	0	0	0	$0
COMPOSTING										
Lime Bag Slitter	1	0	4.00	No	0	0.0	0	0	0	$0
Lime Screw Conveyor	1	0	0.75	No	0	0.0	0	0	0	$0
sludge cake feed pump	1	0	2.00	No	0	0.0	0	0	0	$0
Blowers	8	0	3.00	No	0	0.0	0	0	0	$0
Sludge Feed Unit	1	0	2.00	No	0	0.0	0	0	0	$0
Bulking Agent Feed Unit	1	0	2.00	No	0	0.0	0	0	0	$0
Mixer	1	0	15.00	No	0	0.0	0	0	0	$0
Conveyors	1	0	10.00	No	0	0.0	0	0	0	$0
ODOR CONTROL										
Preliminary Treatment - Odor Control Fan	2	0	10.00	No	0	0.0	0	0	0	$0
Primary Clarifier - fan	2	2	5.00	No	7	12.0	7	8,736	65,144	$9,446
Septage Receiving - fan	1	0	7.50	No	0	0.0	0	0	0	$0
Solids Handling - Odor control fan	2	1	10.00	No	7	24.0	7	8,736	65,144	$9,446
Solids Handling - Odor control fan	1	0	0.50	No	0	0.0	7	0	0	$0
Solids Handling Scrubber - Recirc Pump	1	0	5.00	No	0	0.0	0	0	0	$0
Composting - recirc pumps	2	0	5.00	No	0	0.0	0	0	0	$0
Composting - Odor control fan	3	0	10.00	No	0	0.0	0	0	0	$0
compost curing - fan	1	0	10.00	No	0	0.0	0	0	0	$0
Biofilter Fan	2	0	20.00	No	0	0.0	0	0	0	$0
Biofilter Fan	1	0	40.00	No	0	0.0	0	0	0	$0
Biofilter Fan	1	0	60.00	No	0	0.0	0	0	0	$0
Biofilter Fan	1	0	100.00	No	0	0.0	0	0	0	$0
TOTAL									2,303,752	$334,044

CSWMP
Comprehensive Stormwater Management Plan

Town of Somerset, MA

Water Resources Management Planning

August 2019

Comprehensive Stormwater Management Plan (CSWMP)

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Water Resources Management Planning

Town of Somerset, MA

COMPREHENSIVE STORMWATER MANAGEMENT PLAN (CSWMP)

Prepared by: BETA GROUP, INC.
Prepared for: Town of Somerset

August 2019

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EXECUTIVE SUMMARY

This Comprehensive Stormwater Management Plan (CSWMP) has been developed in collaboration with the Town of Somerset as a component of the Integrated Water Resources Management Plan. The purpose of the CSWMP is to evaluate and prioritize the most economical and environmentally beneficial means for addressing current and future stormwater needs. The recommendations of the CSWMP are intended to be assessed alongside those of wastewater and drinking water/water supply to create a simple and effective Capital Improvement Plan that weighs timeliness, coordination with other projects, regulatory concerns, environmental and public health concerns, community impacts, and budgetary constraints.

The scope of this effort is comprised of:

1. Assessment of the Stormwater System and identification of future needs.
2. Develop and Screen Alternatives
3. Evaluate and Rank Preferred Alternatives
4. Develop a Comprehensive Stormwater Management Plan (CSWMP)

1. <u>Assessment of Exiting Conditions and Identification of Future Needs</u>

Stormwater infrastructure and related needs were identified through discussions with the Town's Highway and Planning Departments and review of studies and reports. The results indicated flooding and problem areas due to lack of or undersized stormwater infrastructure, mainly culverts, which are often overwhelmed during large rain events and are in poor condition structurally. To better understand culvert structural and capacity concerns, BETA conducted a two-day, initial culvert inventory in October 2018, which identified several alternatives for inclusion in the list. Some capacity issues are related to overflow emergencies associated with the Somerset Reservoir dam and are also attributed to tidal restrictions and structures along the coastline are vulnerable to erosion and sea level rise. Particular areas of concern include:

- Almy Road and Riverside Ave Culverts over Buffington Brook
- Several culverts over Labor In Vain Brook (North Street, Whetstone Hill Rd, Route 138, Dublin Street, South Street)
- Lack of or undersized stormwater management infrastructure in Elm St and Buffinton Street

In addition to infrastructure needs, planning and environmental needs are a concern. The level of effort and associated cost to meet EPA's stormwater requirements under the 2016 MS4 General Permit are substantial and have been identified herein through an MS4 compliance assessment. The results have been incorporated into the Stormwater Management Program (SWMP) that will guide the Town's activities under the MS4 General Permit. The SWMP has been developed as part of the CSWMP planning effort to satisfy the year one requirements of the MS4 General Permit and to lay out the plan and tools for future compliance. The SWMP is comprised of four volumes and should be expanded on by the Town as they continue to fulfill the requirements of the MS4 General Permit. Volume 1 and 2 are included in this document as follows:

- SWMP Volume 1 – Stormwater Management Plan
- SWMP Volume 2 – Illicit Discharge Detection and Elimination (IDDE) Plan
- SWMP Volume 3 – Operations and Maintenance (O&M) Plan
- SWMP Volume 4 – Annual Reporting

2. Develop and Screen Alternatives

This section identifies and describes potential stormwater alternatives developed based on the assessment of exiting conditions and identification of future needs. A total of 35 candidate stormwater projects were identified as potential alternatives. Project descriptions and planning level capital costs have been estimated for each candidate project and initial evaluation and ranking of identified alternatives was completed using the Water Resource Management Planning document prepared by Mass DEP with consultation from Town staff. The ranking took into account various criteria for effectiveness in achieving sustainable and long-term water resource management improvements.

3. Ranking Alternatives and Recommendations

Since the objective of the CSWMP is to be used as one of the guidance documents in development of an Integrated Water Resource Management Plan (IWRMP), general rankings and implementation schedules were established and priorities may change within the IWRMP based on other priorities and opportunities. Ranked alternatives identified in the evaluation of preferred alternative were prioritized as a basis for a sustainable integrated plan with final prioritized recommendations are included in Table 5-1 of this document.

1.0 Assessment of Existing Infrastructure

An assessment of Somerset's existing stormwater infrastructure was conducted as part of the Integrated Water Resource Management Plan (IWRMP) to identify areas of critical concern. This included discussions with the Highway Department and Southeastern Regional Planning and Economic Development District (SRPEDD) as well as obtaining and reviewing Town geographic information system (GIS) mapping, previous drainage reports, Hazard Mitigation Plan, and other project and permit documents. Assessment of available system data is a critical component of the planning process as it provides the framework for investigation and design efforts for infrastructure improvement projects.

Mapping and Resource Information

On September 12, 2018, BETA met with Town officials to obtain available GIS data and discuss drainage reports and institutional knowledge of known drainage issues in Somerset. BETA discussed Somerset's stormwater and culvert needs with SRPEDD on January 2, 2019, and also received reports prepared by SRPEDD and Save the Bay documenting these issues and providing recommendations.

1.1.1 GIS Data

The original stormwater database includes locations of 2,460 catch basins, 404 curb inlets, 784 manholes, drainage channels, pipe inlets and outlets, and 232 outfalls obtained by GPS, mostly in 2007 and 2008. Attribute data such as structure size, shape, material, and condition are not included. Drainage pipes and connectivity are not included in the mapping. In the Notice of Intent (NOI) for coverage under the Small MS4 General Permit, dated September 2018, Environmental Partners identified 106 of the 232 outfalls for coverage under the permit based on a 100-foot distance from any waters of the United States. Updated outfall data, including updated MS4 designations, is included in the outfall screening report (Attachment 1). A map of the stormwater system is included in Volume 2 of the Stormwater Management Program (SWMP) Report (Attachment 3).

1.1.2 Previous Drainage Reports, Assessments, and Reference Materials

Final Report for the Labor In Vain River Continuity Project: Feasibility Assessment, Alternatives Analysis, and Ecosystem Assessment

A joint investigation of the Labor In Vain Brook was conducted by Horsley Witten Group and New England Environmental in 2005. The first part of the study evaluated potential alternatives to restore the salt marsh habitat in the Labor In Vain watershed, which had been reduced in size and fragmented by human activity. Horsley Witten modeled existing conditions and potential alternatives to increase tidal flushing based on culvert and tide data at three tidal restricting culverts. Measures implemented as a result of the modeling included replacement of the 24" corrugated metal pipe (CMP) culvert at the skating area parking lot with a 4'x4' box culvert in 2010. It also included the replacement of the South Street double 60" CMP culvert with a 14'x6.25' box culvert, with the contract awarded in October 2018.

The second part of the study involved a conceptual assessment of the non-tidal restricting culverts on the Labor In Vain Brook. Two major culverts, the Whetstone Hill Road and Route 138 culverts, were estimated to be undersized for a 2-year design storm assuming a 57 cfs controlled discharge from the Somerset Reservoir (typical during rainfall events). Horsley Witten's recommendations included replacing the double 30" reinforced concrete pipe (RCP) Whetstone Hill Road culvert with triple 40" pipes or a 6'x3' box culvert to convey the 10-year design storm or replacing the 42" RCP culvert at Route 138 with double 60" or an 8'x5' box culvert to convey the 25-year design storm. The Somerset Reservoir

Dam Hydraulic and Hydrologic Analysis Report, dated 2018 prepared by Pare Corporation, provides additional analysis related to these culverts.

Town of Somerset Natural Hazard Mitigation Plan

A draft Natural Hazard Mitigation Plan was prepared by GZA GeoEnvironmental in 2018 to meet Federal Emergency Management Agency (FEMA) requirements. The purpose of the plan was to lessen the impact of natural disasters on human life and property. The plan includes a list of natural hazard mitigation action items that were considered during the priority ranking process for potential alternatives in Section 3.

Information from Highway Department

The Highway Department provided historical knowledge of stormwater management challenges. A majority of the reported capacity problems involved drainage streams/channels that route stormwater runoff through the town and the associated culverts that convey the flow of these streams/channels under roadways and other developed areas.

Somerset Skating Marsh Restoration Project Documents

These documents relating to the Somerset Skating Marsh Restoration Project consist of a draft permit application dated October 2007 and construction specifications dated June 2009, both prepared by Horsley Witten. The project included replacing the tidal restricting culvert under the parking lot at the former skating area off of Dublin Street and installing an earthen berm to protect residences from flooding.

Coastal Adaptation for Flood Hazard Reduction and Water Quality Improvement in the Upper Narragansett Bay and Mount Hope Bay Watersheds

This report, prepared by Save the Bay in January 2013, summarizes qualitative findings based on observations and previous studies and recommends adaptive actions to sea level rise in order to protect the public from flood hazards and preserve habitat and water quality. The report provides an update on the status of culvert replacement and salt marsh restoration projects recommended by Horsley Witten and New England Environmental in their Final Report for the Labor In Vain River Continuity Project: Feasibility Assessment, Alternatives Analysis, and Ecosystem Assessment (2005) report.

Assessment of Land Use Activities and Non-point Source Pollution for the Taunton River Watershed

This report was prepared by the Southeastern Regional Planning and Economic Development District (SRPEDD) in December 2004. The report evaluates existing culvert capacities along the Labor In Vain Brook.

Geographic Roadway Runoff Inventory Program (GRRIP) 6 Taunton River Watershed Pilot Project

This report was prepared by SRPEDD in 2010-2011. The report evaluates integration of biodiversity and infrastructure considerations to prioritize transportation projects for the Labor In Vain Brook and Riverside Avenue at Buffington Brook.

Somerset Reservoir Updated Dam Emergency Action Plan

This emergency action plan, prepared by Pare Corporation and updated in May 2017, outlines the actions to be taken if conditions indicate potential dam failure.

<u>Somerset Reservoir Dam Hydraulic and Hydrologic Analysis Report</u>

This report, prepared by Pare Corporation and dated January 2018, presents the results of a hydraulic and hydrologic analysis of the Somerset Reservoir Dam, including modeling for various storm events. This report shows that for the 100-year ½ Probable Maximum Flood (PMF) the dam overtops and would require emergency evacuation of the dam inundation areas due to potential dam failure. At the same time culverts and roadways needed for evacuation would be over capacity and potentially flooded.

FIELD INVESTIGATIONS

1.1.3 OUTFALL SCREENING:

BETA performed five days of dry-weather outfall screening as part of the CSWMP for the MS4 Illicit Discharge Detection and Elimination (IDDE) Program. Using Town GIS data as reference, each outfall was assessed and data was collected including outfall size, shape, material, condition, and discharge. Designations of watershed, assumed owner, and assumed MS4 applicability were assigned based on location. BETA located and screened 133 assumed Town-owned outfalls, including 17 that were not included in the original data. Further investigation is recommended for the 19 outfalls where indicators of potential non-stormwater discharge were observed. BETA's outfall screening report is included as Attachment 1 and recommendations are included in the IDDE Program Report, located in the SWMP (Attachment 3).

1.1.4 CULVERT INVENTORY

BETA conducted a two-day culvert investigation in October 2018 to better understand the issues raised by the Highway Department and previous drainage studies. The investigation also assisted with identifying potential structural or capacity improvement projects included in Sections 3 through 5 of this CSWMP. Culverts were mapped based on apparent stream crossings according to current mapping data. For the purpose of this investigation, any structure conveying a stream underground or under a roadway was considered a culvert. The investigation was not a structural inspection and did not include every culvert in Somerset. Culvert mapping should be merged with original Town data.

A culvert inventory is included as Attachment 2. The inventory includes photographs, data collected for shape, material, and approximate size, and general notes. The inventory also provides recommendations for either structural inspection or replacement based upon previous reports and BETA's observations.

Most of the 39 culverts inventoried are reinforced concrete pipe and box culverts. At least five of the culverts (C-20, 26, 34, 35, 40) could be classified by MassDOT as small bridges (10-20' span) for funding purposes.

Receiving Waters and the Natural Environment

Somerset is located south of Dighton and east of Swansea on a peninsula in Mount Hope Bay within Narragansett Bay. Somerset is bounded on the east by the Taunton River. The Lee River forms a portion of its western border. Several of the water bodies in and surrounding Somerset are impaired, which is of particular concern due to Somerset's beaches and fishing activities.

1.1.5 Impairments and Waterbodies

As stated in the federal Clean Water Act (CWA), impaired waters are "rivers, lakes, or streams that do not meet one or more water-quality standards and are considered too polluted for their intended uses". Total maximum daily load (TMDL) is a calculation of the maximum amount of a pollutant that a waterbody can accept and still meet the state's Water Quality Standards for public health and healthy ecosystems. The CWA requires all states to identify waterbodies that do not meet state standards and develop TMDLs. If available data or information indicates that at least one designated use is not being supported or is threatened, and a TMDL is needed, the waterbody is designated as Category 5.

The Massachusetts Year 2016 Integrated List of Waters designates most of Somerset's receiving waterbodies as Category 5 waters with impairments or TMDLs for bacteria and in some cases nitrogen among other things. Broad Cove and the Somerset Reservoir are designated as Category 4A, indicating that they have a TMDL in place and were not assessed to need any others. These listings have been compiled in Table 1-1. Figure 1-2 shows Somerset's impaired waters, their impairments, and the areas of the Town tributary to each. Impaired waterbodies are designated with an asterisk in the following list of major waterbodies located in Town:

Taunton River*

The Taunton River is a 37-mile-long river that originates at the confluence of the Town and Matfield Rivers in Bridgewater, MA. The river borders the communities of Bridgewater, Halifax, Middleborough, Raynham, Taunton, Berkley, Dighton, Somerset, Freetown, and Fall River and discharges to Mount Hope Bay, the northern portion of Narragansett Bay. Fifty-six of Somerset's outfalls are located along the Taunton River.

According to the Taunton River Watershed Alliance, the greatest water quality concern associated with the Taunton River is elevated levels of nitrogen. Wastewater treatment plant effluent and stormwater runoff containing fertilizers or animal waste contribute to nitrogen loading in the Taunton River. In addition, the Taunton River is listed as a Category 5 impaired waterbody on the Massachusetts Year 2016 Integrated List of Waters with a TMDL for fecal coliform.

Lee River*

The Lee River, also known as Lees River or Lee's River, is a 3-mile-long river located between Somerset and Swansea that discharges to Mount Hope Bay. Four of Somerset's stormwater outfalls are located along the Lee River. The river is listed as a Category 5 impaired waterbody on the Massachusetts Year 2016 Integrated List of Waters with a TMDL for Fecal Coliform and impairment for total nitrogen.

Mount Hope Bay*

Mount Hope Bay, located at the mouth of the Taunton River, forms the northern portion of Narragansett Bay. The Mount Hope Bay is listed as a Category 5 impaired waterbody on the Massachusetts Year 2016 Integrated List of Waters with a TMDL for enterococcus and fecal coliform and impairment for nitrogen.

BROAD COVE*

Broad Cove is located at the northern border of Somerset, mostly within the neighboring town of Dighton. The cove's entrance is located on the Taunton River. Broad Cove is designated as a Category 4a impaired waterbody on the Massachusetts Year 2016 Integrated List of Waters with a TMDL for fecal coliform.

SOMERSET RESERVOIR*

The Somerset Reservoir is one source of the Town of Somerset's water supply. It is located in the northern area of Somerset near the Dighton border. The northern segment of the Labor In Vain Brook flows into the Somerset Reservoir. The reservoir discharges at a controlled rate to the southern segment of the Labor In Vain Brook. The Massachusetts Year 2016 Integrated List of Waters designates the Somerset Reservoir as Category 4A with a TMDL for mercury in fish tissue.

LABOR IN VAIN BROOK

The Labor In Vain Brook originates from wetlands in the town of Dighton to the north and supplies the Somerset Reservoir. This portion of the brook north of the reservoir also serves as the dam's emergency spillway. From the reservoir, the brook continues in a southerly direction through a salt marsh and discharges to the Taunton River near the intersection of South Street and Dublin Street. 1-The brook is conveyed by a number of culverts that were the subject of a joint study by Horsley Witten and New England Environmental in 2005. The brook is reported to back up and occasionally overtop the road during storm events. In addition, culverts along the lower portion of the brook are known to be tidally restricting, affecting approximately 28 acres of salt marsh habitat.

BUFFINGTON BROOK

The Buffington Brook originates from wetlands in Swansea and enters the Town of Somerset near the intersection of Almy Road and New Hampshire Avenue. The brook flows in a southerly direction and is conveyed by numerous roadway crossings and several longer culverts that total more than 1600 feet in length. The Riverside Avenue culvert is located at the discharge point of the brook to the Taunton River. The GRRIP6 report indicates that the eastern side of this culvert is completely submerged at high tide, which may contribute to drainage capacity issues identified by the Highway Department along Buffinton Street.

BREEDS COVE

Breeds Cove is an inlet of the Taunton River located at the discharge point of Breeds Brook. Breeds Cove is included as segment MA62-04 of the Taunton River.

Table 1-1: Town of Somerset Waterbodies and Impairments

ID	Waterbody Name	Watershed Name	Category	Pollutants causing impairment	TMDL
MA61-01	Lee River	Mount Hope Bay (Shore)	5	Fecal Coliform Nutrient/Eutrophication Biological Indicators	38905
MA61-02	Lee River	Mount Hope Bay (Shore)	5	Chlorophyll-a Fecal Coliform Nitrogen (Total) Oxygen, Dissolved	38906 WQLW
MA61-06	Mount Hope Bay	Mount Hope Bay (Shore)	5	Chlorophyll-a Enterococcus Fecal Coliform Fishes Bioassessments Nitrogen (Total) Temperature, Water	38908 38908 WQLW
MA61-07	Mount Hope Bay	Mount Hope Bay (Shore)	5	Chlorophyll-a Enterococcus Fecal Coliform Fishes Bioassessments Nitrogen (Total) Oxygen, Dissolved Temperature, Water	38909 38909 WQLW
MA62-03	Taunton River	Taunton	5	Fecal Coliform Oxygen, Dissolved	40310
MA62-04	Taunton River	Taunton	5	Enterococcus Fecal Coliform Fishes Bioassessments Oxygen, Dissolved	40310
MA62-50	Broad Cove	Taunton	4A	Fecal Coliform	40309
MA62174	Somerset Reservoir	Taunton	4A	Mercury in Fish Tissue	33880

NOTE: Based on Massachusetts Year 2016 Integrated List of Waters

NOTE: Certain Pollutants (in BOLD) result in TMDL or Water Quality Limited Waterbodies (WQLW) requirements defined in Appendix H & F of the Permit.

1.1.6 Stressed Basins

The Stressed Basins in Massachusetts Report, prepared by the Massachusetts Water Resources Commission in 2001, presents a list of three criteria for classifying river basins as stressed:

- Quantity: A significant reduction in key low and high streamflow statistics indicates a stressed basin under the quantity criterion. A hydrologic budget may be developed to determine a system's net water loss or gain. No such study is known to have been conducted in any of Somerset's basins.
- Quality: Degraded water quality, defined as water in a stream or waterbody that does not meet surface water quality standards, is the second criterion indicating basin stress. As designated Category 5 waters on the Massachusetts Year 2016 Integrated List of Waters, the Taunton River, Lee River, and Mount Hope Bay are considered to have degraded water quality.
- Habitat Factors: The Stressed Basins in Massachusetts report defines a degraded habitat as "a river reach in which key habitat factors… necessary to sustain a biologically diverse community are degraded." Examples of habitat factors include water temperature, quality, cover, substrate, and accessibility. The Stressed Basins in Massachusetts Report recommended evaluating available fishery data to determine whether a basin can be classified as stressed under the habitat factors criterion. No such study is known to have been conducted in any of Somerset's basins.

Neither the Taunton River basin nor the Narragansett Bay/Mount Hope Bay basin has been classified by the Water Resources Commission due to an insufficiency of available data. However, the 2001 Stressed Basins in Massachusetts Report indicates that available data may be used to evaluate basins on a case by case basis and that meeting one or more of the above criteria would indicate stress. Since the Taunton River and Mount Hope Bay are impaired waterbodies, these basins meet the water quality criterion and may therefore be considered stressed basins.

1.1.7 Potential Stormwater Pollutant Loading Areas

Past and present industrial land uses, common along the Lee River, Taunton River and Mount Hope Bay in Somerset, are inclined to be generators of significant nonpoint source pollution through inadvertent release of oil and/or hazardous waste into the ground. These contaminates migrate over time to waterbodies and are very difficult to clean up if they are not immediately addressed.

Figure 1-1 identifies the MassDEP Tier Classified oil and/or hazardous material disposal sites (Tier Classified Chapter 21E sites), Underground Storage Tanks, Activity and Use Limitation (AUL) sites and Superfund sites. Tier Classified Chapter 21E sites mapped are only a subset of release sites as some have not been reported and others have been reported but not classified. These are sites that have been identified and classified by MassDEP to require a release clean-up. AUL sites are those where a cleanup from an oil and/or hazardous material release has been conducted however contamination has remained at the location and some activities and uses may not be legally allowed on that property. Superfund sites are regulated at the federal level with active NPL (National Priorities List) sites considered the most hazardous waste sites in the nation and posing serious health and environmental risks. Somerset does not have any active NPL sites. Figure 1-1 identifies one active Non-NPL Superfund Sites which means it is not on the NPL but may still pose some health risks to the surrounding community indicating that some cleanup action may still be required.

Areas of particular concern for high pollutant loading potential include:

Former Brayton Point Power Station Site (1 Brayton Road)

The Brayton Point Power Station was a 1,493-megawatt coal-fired power plant decommissioned in 2017. This 307-acre site is a Superfund site with four AULs. In addition, the site has had a historically industrial land use and has a large impervious area and an underground storage tank, further increasing pollutant potential.

Former Montaup Power Plant Site (1606 Riverside Avenue)

The Montaup Power Plant, located at 1606 Riverside Avenue, was decommissioned in 2010. This historically industrial 38-acre site is largely impervious. Three AULs are located on or within the vicinity of the site.

Former Somerset Landfill Site

The Somerset Landfill, located off Brayton Point Road, was an unlined landfill for municipal solid waste that was active from 1957 to 1984 and capped in 2008. Though landfill capping does limit water infiltration and contaminant migration, an unlined landfill still has the potential to generate runoff with high pollutant loading.

Route 6 Commercial Corridor

An area of commercial development approximately one mile in length is located on MA-6, which runs east-west across the southern portion of Somerset. The developed area contains numerous shopping plazas and other businesses with extensive impervious parking areas. In addition to large impervious areas, this commercial corridor contains five underground storage tanks.

Additional Identified Stormwater Needs

The following are stormwater infrastructure and related needs identified through discussions with the Town's Highway and Planning Departments. Additional requirements related to the MS4 Stormwater Management Program are covered in Section 2.

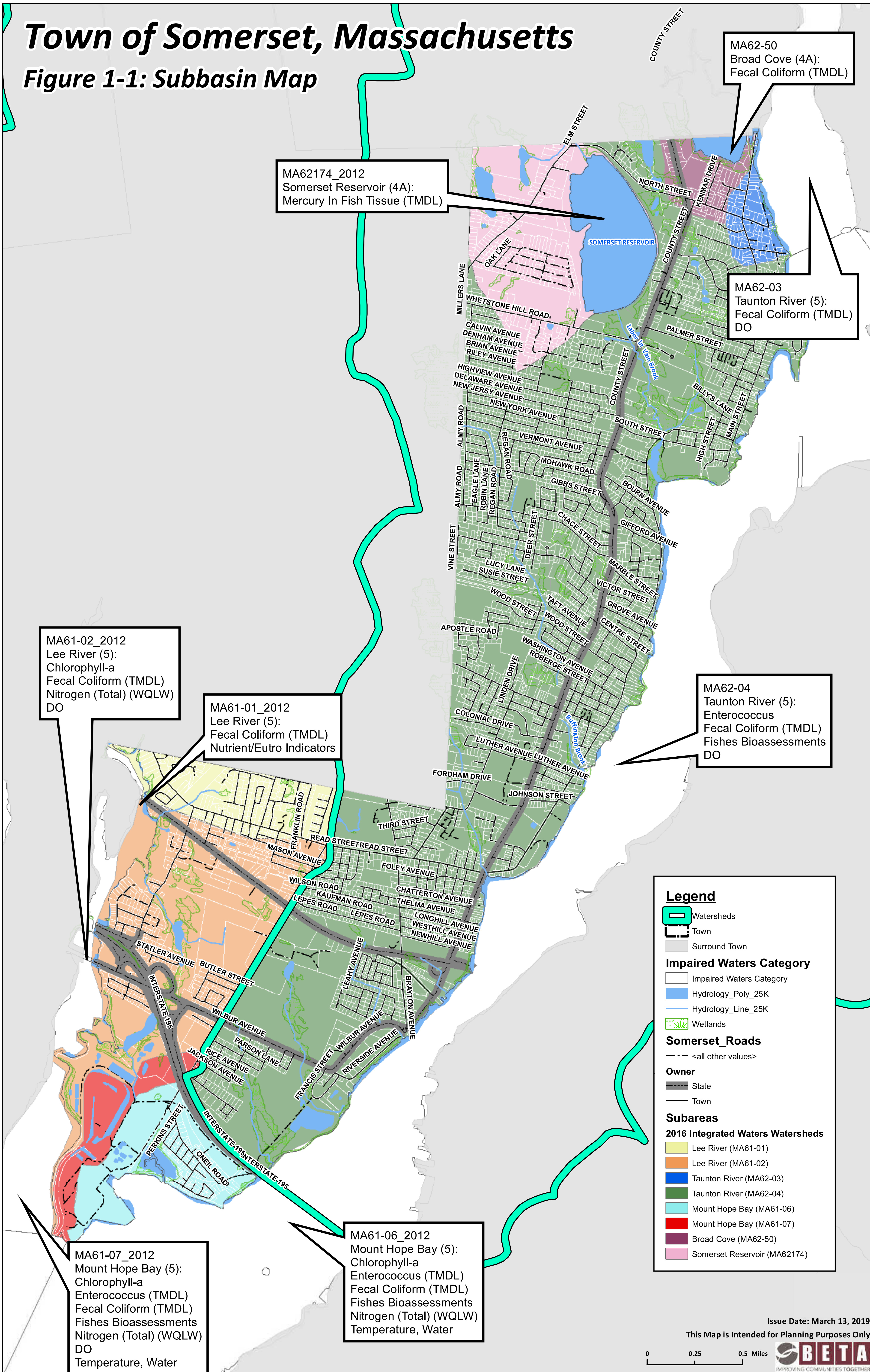
1.1.8 Data Accuracy, Completeness, and Organization

- Drainage channel layer coincides with MassGIS stream layer in places
- Many catch basins, swales, and other structures are mislabeled as outfalls
- Duplicate outfall points exist for a single outfall in some cases
- Many outfall points are located where no stormwater structure exists
- Until pipes are mapped, it will remain unclear whether some assumed culvert outlets are in fact outfalls
- Town record plans are not labeled and organized in an accessible way

1.1.9 Flooding and Problem Areas

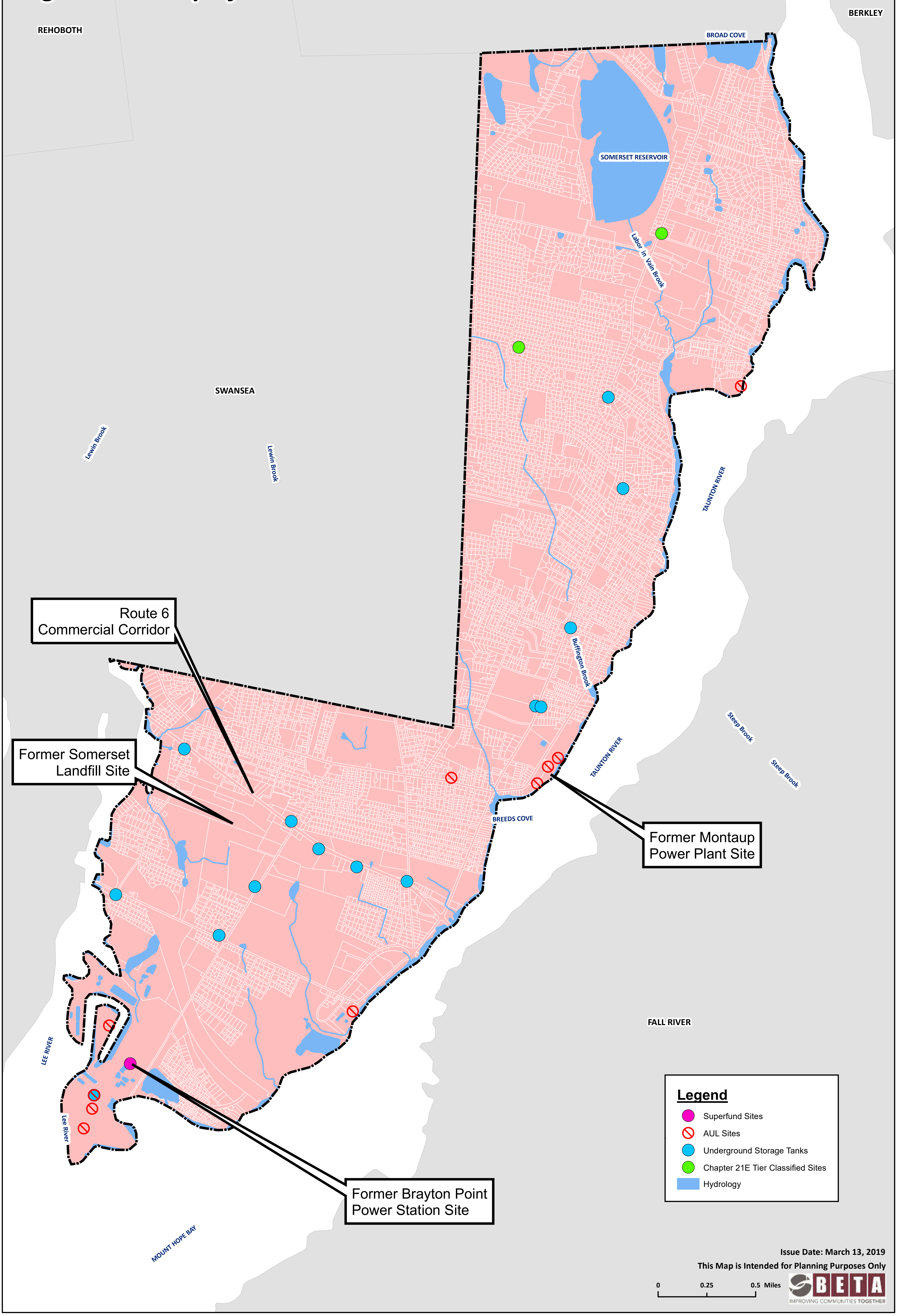
The Town has identified the following problem areas, which have been incorporated into potential alternatives in Section 3:

- Almy Road culvert over Buffington Brook needs to be replaced. BETA observed this culvert to have several issues, including high water, cracked concrete headwalls, and separation of pipes from the headwalls.
- Dublin Street culvert over Labor In Vain Brook needs to be replaced. Horsley Witten Group (HW) and New England Environmental (NEE) identified this culvert as undersized and tidal restricting in 2005.
- South Street culvert over Labor In Vain Brook needs to be replaced. HW and NEE identified this culvert as undersized and tidal restricting in 2005.
- North Street culvert over Labor In Vain Brook overtops during extreme rain events. Pare Corporation confirmed in 2018 that as a reservoir emergency spillway to protect the dam and it is undersized and in poor condition.
- Whetstone Hill Road culvert over Labor In Vain Brook overtops during extreme rain events when the dam drain valve is open. HW and NEE confirmed in 2005 that this culvert is undersized.
- Route 138 culvert over Labor In Vain Brook overtops during extreme rain events and release of the reservoir. HW and NEE confirmed in 2005 that this culvert is undersized.
- Water Department driveway culvert over Labor In Vain Brook is very small and overtops during extreme rain events and release of the reservoir.
- Riverside Avenue at culvert over Buffington Brook has sinkholes in road indicating potential issues with the culvert. Save The Bay identified this culvert as undersized and the area to be vulnerable to erosion and sea level rise in 2013.
- Elm Street lacks stormwater management infrastructure.
- Buffinton Street from Swansea town line to Route 138 has drainage capacity issues.


Town of Somerset, Massachusetts
Figure 1-1: Subbasin Map
MA62-50
Broad Cove (4A):
Fecal Coliform (TMDL)
MA62174_2012
Somerset Reservoir (4A):
Mercury In Fish Tissue (TMDL)
MA62-03
Taunton River (5):
Fecal Coliform (TMDL)
DO
MA61-02_2012
Lee River (5):
Chlorophyll-a
Fecal Coliform (TMDL)
Nitrogen (Total) (WQLW)
DO
MA61-01_2012
Lee River (5):
Fecal Coliform (TMDL)
Nutrient/Eutro Indicators
MA62-04
Taunton River (5):
Enterococcus
Fecal Coliform (TMDL)
Fishes Bioassessments
DO
MA61-07_2012
Mount Hope Bay (5):
Chlorophyll-a
Enterococcus (TMDL)
Fecal Coliform (TMDL)
Fishes Bioassessments
Nitrogen (Total) (WQLW)
DO
Temperature, Water
MA61-06_2012
Mount Hope Bay (5):
Chlorophyll-a
Enterococcus (TMDL)
Fecal Coliform (TMDL)
Fishes Bioassessments
Nitrogen (Total) (WQLW)
Temperature, Water
SOMERSET RESERVOIR
COUNTY STREET
ELM STREET
NORTH STREET
KENMAR DRIVE
OAK LANE
MILLERS LANE
WHETSTONE HILL ROAD
CALVIN AVENUE
DENHAM AVENUE
BRIAN AVENUE
RILEY AVENUE
HIGHVIEW AVENUE
DELAWARE AVENUE
NEW JERSY AVENUE
NEW YORK AVENUE
PALMER STREET
Labor In Vain Brook
BILLY'S LANE
MAIN STREET
HIGH STREET
SOUTH STREET
ALMY ROAD
REGAN ROAD
VERMONT AVENUE
MOHAWK ROAD
EAGLE LANE
ROBIN LANE
GIBBS STREET
BOURN AVENUE
CHACE STREET
GIFFORD AVENUE
DEER STREET
VINE STREET
LUCY LANE
SUSIE STREET
MARBLE STREET
VICTOR STREET
WOOD STREET
TAFT AVENUE
GROVE AVENUE
CENTRE STREET
APOSTLE ROAD
WASHINGTON AVENUE
ROBERGE STREET
LINDEN DRIVE
COLONIAL DRIVE
Buttingfold Brook
LUTHER AVENUE
FORDHAM DRIVE
JOHNSON STREET
FRANKLIN ROAD
THIRD STREET
READ STREET
MASON AVENUE
FOLEY AVENUE
WILSON ROAD
KAUFMAN ROAD
CHATTERTON AVENUE
LEPES ROAD
THELMA AVENUE
LONGHILL AVENUE
WESTHILL AVENUE
NEWHILL AVENUE
STATLER AVENUE
BUTLER STREET
LEAHY AVENUE
BRAYTON AVENUE
INTERSTATE 195
WILBUR AVENUE
PARSON LANE
RICE AVENUE
JACKSON AVENUE
RIVERSIDE AVENUE
FRANCIS STREET
PERKINS STREET
ONEIL ROAD
INTERSTATE-195
Legend
Watersheds
Town
Surround Town
Impaired Waters Category
Impaired Waters Category
Hydrology_Poly_25K
Hydrology_Line_25K
Wetlands
Somerset_Roads
<all other values>
Owner
State
Town
Subareas
2016 Integrated Waters Watersheds
Lee River (MA61-01)
Lee River (MA61-02)
Taunton River (MA62-03)
Taunton River (MA62-04)
Mount Hope Bay (MA61-06)
Mount Hope Bay (MA61-07)
Broad Cove (MA62-50)
Somerset Reservoir (MA62174)
Issue Date: March 13, 2019
This Map is Intended for Planning Purposes Only
0
0.25
0.5 Miles
BETA
IMPROVING COMMUNITIES TOGETHER

Town of Somerset, Massachusetts

Figure 1-2: Map of Environmental Concern



2.0 ASSESSMENT OF MS4 STORMWATER MANAGEMENT PROGRAM

The IWRMP project included an assessment of Somerset's compliance with the requirements of the 2016 General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) in Massachusetts. This assessment includes obtaining and reviewing the existing 2003 Stormwater Management Plan, MS4 gap analysis, and Notice of Intent (NOI) submitted to EPA, as well as facilitating discussions with the Highway Department and other Town officials. It provides a summary of the MS4 compliance status and identification of areas of critical concern. The assessment also includes a summary of the progress in meeting each of the Permit's minimum control measures (MCM) prior to commencement of the IWRMP project and outlines a plan for ongoing compliance. The complete Stormwater Management Program (SWMP) is included as Attachment 3.

MS4 COMPLIANCE STATUS

The entire Town of Somerset is within a classified urban area and is therefore subject to the 2016 General Permits for Stormwater Discharges from Small MS4s in Massachusetts, hereinafter referred to as the Permit. To meet permit requirements of the 2003 MS4 permit (MS4-2003), the Town developed an NOI and Stormwater Management Plan and has submitted annual reports to the EPA detailing compliance and progress with stormwater management activities. The Permit, which became effective July 1, 2018, includes new or expanded requirements that will demand considerably more time, effort, and resources for the Town to remain compliant. Compliance will require coordination with several Town departments including but not limited to Highway, Planning, Conservation, Board of Health, and Facilities.

The Permit requires updating the existing SWMP. The new SWMP (Attachment 3) includes written procedures, schedules and best management practices (BMPs) to meet the requirements listed in Appendix B of the Permit as well as outlined in the Somerset MS4 Permit Compliance Schedule (Figure 2-1).

MS4 REFERENCE DOCUMENTS

The following documents were reviewed as part of the evaluation process:

<u>2003 Stormwater Management Plan</u>

A Stormwater Management Plan was prepared by Weston & Sampson in July 2003 to comply with the MS4 permit regulations. This document was reviewed and used as a basis for the new SWMP.

<u>MS4 Permit Gap Analysis</u>
A letter report prepared by Environmental Partners and dated March 20, 2017 provided results of the Town's MS4 gap analysis including a draft schedule of tasks and estimated budgets to maintain compliance with the 2016 MS4 permit requirements.

<u>MS4 Notice of Intent</u>

The NOI for Coverage under the Small MS4 General Permit was prepared by Environmental Partners and dated September 2018.

Six Minimum Control Measures Status

The Permit requires compliance with six MCMs. BETA reviewed and identified the Town's current status and plans for compliance for each:

2.1.1 Public Education and Outreach – MCM 1

Current Status: Public education and outreach is provided sporadically by various boards in Town including the Conservation Commission, Board of Health and Planning Board. The Town displays stormwater posters, plans and signs in public venues and broadcasts stormwater messaging via local access cable TV. The Town is in the process of redesigning its webpage to include stormwater updates.

The NOI submitted for the Permit coverage identified eleven best management practices (BMPs) for education and outreach messages to be distributed over the five-year permit term including various brochures/pamphlets, webpage content and/or social media messages and school curricula/programs.

Plan for Compliance: The SWMP includes BMPs to address specific requirements over the permit term including:

- Distribute at least two educational messages within the 5 year permit term to each of the following four audiences: (1) Residents, (2) Businesses, Institutions, and Commercial Facilities, (3) Developers/Construction, and (4) Industrial Facilities
- For Bacteria TMDL, annually distribute pet waste control information to residents when they apply for or renew a pet license and provide information regarding proper septic system maintenance to private septic system owners in catchments that discharge to waters impaired for bacteria.
- For Nitrogen Impairment, annually distribute education and outreach messages to Residents and Businesses, Institutions, and Commercial Facilities audiences regarding specific nitrogen related topics as follows: proper disposal of leaf litter in fall, proper use and disposal of grass clippings, use of slow release fertilizers in spring and proper management of pet waste in summer.

2.1.2 Public Involvement and Participation – MCM 2

Current Status: The Town continues to host cleanup days including the "Clean the Bay" cleanup of the Taunton and Lee rivers as well as the Town Community Cleanup Day in June, which includes household hazardous waste collection. The Town has also completed catch basin stenciling.

Plan for Compliance: The SWMP includes plans to allow public participation in evaluating and commenting on the SWMP including posting the new SWMP on the Town's website.

2.1.3 Illicit Discharge Detection and Elimination Program – MCM 3

Current Status:

- Authority: As required under the MS4-2003 permit, the Town unanimously approved the illicit discharge bylaw with the Planning Board identified as the authorized enforcement agent at the December 10, 2012 Town meeting.
- Mapping: Since the 2003 Permit the Town has also mapped the outfalls, catch basins, manholes and ditches that make up the MS4.
- Dry weather outfall screening: Dry weather outfall screening was conducted in the fall of 2018 and the report is included as Attachment 1.

Plan for Compliance: A written illicit discharge detection and elimination (IDDE) program has been developed and is included as Volume 2 of the SWMP (Attachment 3). This document identifies the Town official responsible for implementing the program and designates responsibilities and procedures for outfall screening, dry weather and wet weather sampling, and classification and prioritization of outfalls and interconnections. It also includes procedures for catchment investigations and illicit source detection and elimination. Annual IDDE training is required as part of the program.

The Town needs to map the storm drain pipes for connectivity in order to develop catchment delineations and carry out the IDDE field program. The Town should begin its catchment investigations within the first two years of the permit term. Dry weather sampling of all MS4 outfalls flowing during screening (except Problem and Excluded outfalls) should be completed by permit year 3. The 2016 MS4 permit has additional requirements related to IDDE for water quality impairments of Bacteria and Pathogen TMDLs to the Lee River and Taunton River. This includes an automatic designation of High Priority for the outfalls tributary to these rivers in the implementation of the IDDE program. The following are IDDE requirements that Town will need to begin within 2 years of the effective date of the permit (June 30, 2020):

- Update storm sewer system mapping – including pipe connectivity and catchment delineations, update catchment rankings
- Implement catchment investigations – including dry weather sampling as discussed in the IDDE program report located in Attachment 3, beginning with the Problem and High Priority designated catchments
- Conduct wet weather screening and sampling and catchment investigations

2.1.4 Construction Site Stormwater Runoff Control – MCM 4

Current Status: Town subdivision regulations require an erosion control plan, construction management plan, and environmental impact reviews. The Planning Board is responsible for determining the adequacy of the erosion/sediment control plan for each site. Current practice includes site inspection by the Planning Board, Conservation Commission, or their representative professional engineer as needed during construction. This procedure does not address the MS4-2003 permit requirement that an ordinance or other regulatory mechanism require the implementation of sediment and erosion controls for all projects that disturb greater than or equal to one acre.

Plan for Compliance: The Town needs to review and update the Town Bylaws to reflect the 2003 permit requirements and the new 2016 permit requirements for any construction site where construction activities result in land disturbance greater than or equal to one acre. It is recommended that the Town develop stormwater bylaws and regulations concurrently to address Permit requirements so that regulations can easily be updated throughout the Permit term. The following activities to meet the requirements of the MCM are to be completed and implemented within one (1) year of the effective date of the permit (June 30, 2019):

- Create written procedures for site inspections and enforcement procedures for erosion and sediment control measures
- Create written procedures for site plan review and begin implementation
- Adopt requirements to control wastes, including, but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes

2.1.5 Post Construction Stormwater Management (New & Redevelopments) - MCM 5

Current Status: The current Town bylaws and regulations do not completely satisfy the 2003 permit that required development, implementation and enforcement of a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre (including projects that are less than one acre that are part of a larger common plan of development that discharge into the MS4). The 2003 permit requires the Town to develop and implement strategies which include a combination of structural and/or nonstructural BMPs appropriate for the community; an ordinance or regulatory mechanism to address post-construction runoff and a requirement for adequate long-term operation and maintenance of BMPs. Currently the Planning Board regulates development in the Town through the subdivision regulations, special permit bylaws and zoning bylaws which contain some language addressing post-construction stormwater management but not to the extent required by the Permit. Post-construction site review to ensure site drainage is working as shown on approved plans is completed by the Planning Board, Conservation Commission, Highway Department or their representative professional engineer and upon subdivision acceptance the Town is responsible for operation and maintenance of new public drainage infrastructure.

Compliance Strategy: The Town needs to review and update the Town Bylaws to reflect the 2003 permit requirements and the new 2016 permit requirements, specifically for any new development and redevelopment projects that disturb greater than or equal to one acre. New 2016 permit requirements include specific provisions for water quality impairments such as requirements for new development and redevelopment stormwater management BMPs to be optimized for nitrogen removal. It is recommended that the Town incorporate updates to its stormwater bylaws and regulations concurrently to address the MS4 requirements so that regular reviews and updates can be performed more easily throughout the permit term.

The following activities to meet the requirements of this MCM for new and redevelopment projects are to be completed and implemented within 4 years of the effective Permit date (June 30, 2022):

- Create procedures for submission of as-built drawings and to ensure long term operation and maintenance.
- Identify at least 5 Town-owned properties that could be modified or retrofitted with BMPs to reduce impervious areas and update this list annually. An inventory of Town-owned parcels and an evaluation for use as potential mitigation offsets for BMP retrofit sites are included in Section 2.1.6.
- Develop a report assessing existing local regulations to determine the feasibility of making low impact development techniques and green infrastructure practices allowable when appropriate site conditions exist.
- Develop a report assessing requirements that affect the creation of impervious cover. The assessment will help determine if changes to design standards for streets and parking lots can be modified to support low impact design options.

2.1.6 Good Housekeeping - MCM 6

Current Status: The Highway Department is responsible for pollution prevention and good housekeeping for municipal operations. The Town does not currently have a formal operations and maintenance plan for Town owned property and infrastructure; however, they do have routine practices including: cleaning all catch basins (approx. 2,200) annually, street sweeping of all streets at least once per year, elimination of sand from winter road maintenance operations, and maintenance of trash barrels at multiple open public spaces to reduce litter and stormwater pollution. The Highway Department is limited in its ability to perform operations and maintenance activities because of continued staff reductions. Currently the Department has half the staff it did in 2004/2005. At that time there were twenty employees, which was adequate to perform the work required. Under existing conditions the Town has adequate equipment (catch basin cleaning truck, street sweeper and new dump trucks) but not enough staff to use it. Private vendors are used to assist with winter road maintenance.

There is no available inventory of Town-owned structural BMPs and the Highway department has not maintained Town-owned stormwater basins or streams for about fifteen years due to concerns from the Conservation Commission. There is a need to develop this inventory and work with the Conservation Commission on a maintenance plan to comply with the MS4 operations and maintenance component of the 2016 permit and to prevent capacity issues and flooding within the Town's drainage system.

The Highway Department has a Spill Prevention, Countermeasures, and Control (SPCC) Plan for their facility which includes an on-site oil/water separator that is cleaned and inspected annually; however, there is no Stormwater Pollution Prevention Plan (SWPPP) for the Highway Department facility and transfer station. There is no formal municipal employee training program in place to address stormwater runoff issues.

Table 2-1 includes an inventory of Town-owned parcels and facilities that will need to be considered for operations and maintenance requirements of the 2016 MS4 permit. Figure 2-2 shows Town-owned parcels and identifies those with good soils for infiltration (NRCS hydraulic soil group rating of A or B) indicating they have the potential to be used as mitigation offsets, structural BMP retrofit sites or should otherwise be considered for stormwater management practices. These parcels will need to be examined further to determine whether structural BMPs currently exist on the site and if not, generally which BMP or LID technique might be appropriate for the particular site location and land use.

Plan for Compliance: The Permit has a number of BMP requirements related to good housekeeping of municipal operations and Town-owned facilities including requirements for addressing nitrogen impairments in the Lee River. The following activities to meet the requirements of this MCM for Good Housekeeping are to be completed and implemented within two years of the effective Permit date (June 30, 2020):

- Create written operations and maintenance (O&M) procedures including all permit requirements for parks and open spaces, buildings and facilities, and vehicles and equipment. Incorporate additional measures for nitrogen impairment including: establishing requirements for use of slow release fertilizers and establishing procedures to properly manage grass cuttings and leaf litter on Town property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces.
- Inventory all Town-owned parks and open spaces, buildings and facilities, and vehicles and equipment. Table 2-1 includes a basis for this inventory.
- Establish and implement a program for routine maintenance, repair and rehabilitation of MS4 infrastructure
- Create a SWPPP for the Highway Department and Transfer Station facilities.
- Increase street sweeping frequency of all Town-owned streets and parking lots subject to Permit part 2.3.7.a.iii.(3) to a minimum of two times per year, once in the spring (following winter activities such as sanding) and at least once in the fall (Sept 1 – Dec 1; following leaf fall).

2.1.7 Nitrogen Source Identification Report

The 2016 MS4 Permit requires that within four years of the permit effective date (June 30, 2022) the Town complete a Nitrogen Source Identification Report for the MS4 area draining to waters with Nitrogen impairment (Mount Hope Bay & Lee River), shown in Figure 1-2. The plan is to be submitted in the Year 4 annual report and implemented thereafter. The details of this report are discussed in the SWMP (Attachment 3).

SWMP Overview

Each MS4 community must develop a Stormwater Management Plan (SWMP) that will guide its activities under the General Permit. The SWMP (Attachment 3) was developed by the Town to protect water quality and reduce the discharge of pollutants from the Town's storm sewer system to the maximum extent practicable.

IDDE Program Overview

The Illicit Discharge Detection and Elimination (IDDE) Program has been developed by the Town to address the IDDE program requirements of the 2016 MS4 permit. The objective of the IDDE program is to systematically locate and eliminate sources of non-stormwater discharges to the municipal separate storm sewer system and implement procedures to prevent such discharges. The IDDE plan is included in the SWMP (Attachment 3).

Table 2-1: Inventory of Town Owned Parcels

PARKS & OPEN SPACE		
Facility Name	Location	Amenities
State Park with Beach	6 Massasoit Street	Green Space & Beach
Ripley Street Parcel	90 Ripley St & 180 Carey St	Green Space, Beach & Wetlands
Utilities Shed	Angus St	Green Space
Open Field	499 O'Neil Road	Green Space
Fox Hill Cove Island	Island in Fox Hill Cove	Wetlands
Edward J O'Neill Memorial Park	59 Brayton Point Rd	Green Space, Baseball Field, Parking Lot & Court
Wilbur Ave @ Brayton Pt Rd	800-300 Wilbur St	Wetlands, Forest & Green Space
Brayton Cemetery	288 Caroline Ave	Green Space & Cemetery
Small Patches of Trees	Various Locations	Wetlands, Green Space & Trees
Leahy Ave Park	111 Leahy Ave	Green Space, Playground, Court & Benches
Riverside Ave Cemetery	701 Riverside Ave	Greenspace & Headstones
Undeveloped parcel @ Slade Ferry Redevelopment	700 Riverside Ave	Wetlands, Forest & Green Space
Slades Ferry Ave Park	87 Slades Ferry Ave	Benches, Walking path & Flagpoles
Route 6 Commercial Corridor	436 Rte 6	Wetlands, Forest & Green Space
Slade Cemetery	1 Arrunda Ave	Greenspace, Headstones & Trees
Chace Preserve	Riverside Ave & Luther Ave	Forest & Wetlands
Gibbs Cemetery	90 Buffinton St	Greenspace, Headstones & Trees
Linden St Forest	90 Linden Drive	Forest & Wetlands
Memorial Park Area	3002 Riverside Dr	Benches, Walking path & Flagpoles
Hathaway-Chace Cemetery	2403 County Street	Greenspace, Headstones & Trees
Pierce Playground & Beach	289 South Street	Parking Area, Playground, Green Space, Trees, Baseball Field, 2 Courts, Beach & Small Building
Ashton Fields	90 Olympic Road	3 Baseball Fields, Gravel Parking Areas, Forest & Wetlands
The Creek & Surrounding Forest	Btwn County St & High St	Wetlands, River, Forest & Green Space
Village Waterfront Park	345 Main St	Green Space, Trees & Beach
Palmer St Cemetery	35 Palmer St	Greenspace, Headstones & Trees
Somerset Water Treatment Plant	3249 County St	Buildings, Parking Areas, Green Space & Trees
Somerset Reservoir	Off Lynch Ave	Water, Green Space & Trees
St Patrick's Cemetery Forest	Btwn Palmer St & Yankee Peddler Dr	Forest & Wetlands
Pilot Dr Forest	Btwn Pilot Dr & Seacrest St	Forest & Wetlands
Mallard Point	75 Pilot Dr	Forest & Beach
County St Forest	At the end of Compos St	Forest & Wetlands
Quirk Mello Conservation Area	Off Lynch Ave	Forest & Green Space
Broad Cove Forest & Wetlands	Btwn County St & Pleasant St	Forest, Wetlands & Green Space
Elm Street Acres	West of Elm St	Forest & Wetlands

Table 2-1: Inventory of Town Owned Parcels (cont.)

BUILDINGS & FACILITIES		
Facility Name	Location	Description
Utilities Shed	19 Angus St	Green Space & Small Building
Park & Ride Lot	1750 Wilbur Ave	Parking lot
South Somerset Fire Station	654 Brayton Point Rd	Fire Station
Somerset Water Pollution Control	116 Walker St	Buildings, Treatment Tanks & Facilities
Wilbur Elementary School	816 Brayton Point Rd	Green Space, Gravel Playground, Building & Parking
Somerset Highway Dept & Transfer Station	1263 Brayton Point Rd	Garage, Buildings, Trailers, Parking Lot & Waste
Utilities Shed	500 Lees River Ave	Building, Green space & Dumpster
Slades Ferry Ave Park & Ride	87 Slades Ferry Ave	Parking lot
Louis Colon American Vets	659 Brayton Ave	Building & Parking lot
Eugene Murphy Village	Read St & Brayton Pt Rd	Parking, Housing & green space
Somerset Housing Authority	75 Kennedy Terrace	Some Green Space, Housing & Parking
South Elementary School	700 Read Street	5 Baseball Fields, 3 Buildings, Paved areas, Playground & Green Space
Somerset Middle School	1141 Brayton Ave	Several Multi-Purpose Fields, 3 Buildings, Paved Areas & Green Space
Somerset Berkley Regional High School	625 County Street	6 Tennis Courts, 6 Grass Fields, Turf Field & Track, Buildings & 2 Parking Areas
Somerset Police Department	465 County Street	2 Buildings, Multiple Parking Areas & Green Space
Somerset Recreation Department/Permits Office	140 Wood St	3 Basketball Courts, Baseball Field, Buildings & Parking Areas
American Legion	55 Roosevelt Ave	Building & Parking Area
Somerset Town Clerk/Council on Aging	115 Wood Street	Building & Parking Areas
Somerset Public Library	1464 County St	Building, Parking Area & Green Space
Old Town Hall	1458 County St	Building, Parking Area & Green Space
Chace Street Elementary School	538 Chace St	Baseball Field, Building Complex, Green Space & Parking Area
Somerset Historical Society	274 High St	2 Baseball Fields, Basketball Court, Building, Parking Area & Green Space
Somerset Nursery	3256 County St	Trees, Green Space, Green Houses, Buildings & Fields
Somerset Access TV	274 Main St	Parking Area, Playground, Green Space, Buildings & Docks
North Elementary School	580 Whitestone Hill Rd	Several Fields, Parking, Green space, building & Playground

Figure 2-1: Town of Upton MS4 Permit Compliance Schedule

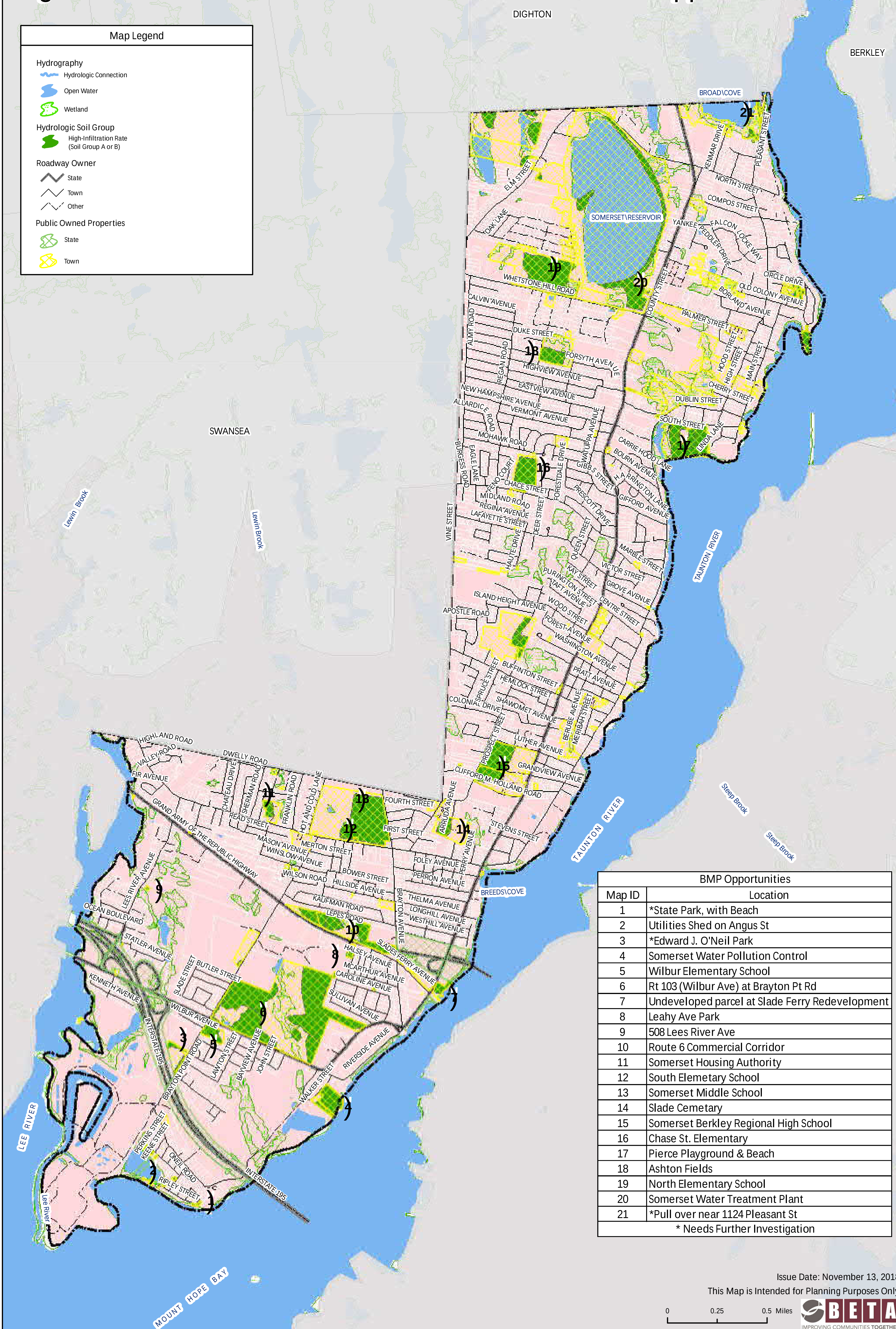
CM	Task	Date Required	Complete During/By Year (Yr 1 is July 2018- June 2019)									
			1	2	3	4	5	6	7	8	9	10
	Notice of Intent (NOI)	9/30/2018										
	Stormwater Management Plan - SWMP (update/develop)	6/30/2019										
	SWMP update	Annually										
MINIMUM CONTROL MEASURES												
1	Public Education and Outreach Messages											
	Residents - 2 messages*	By yr 5, min. 1 year apart										
	Businesses & Institutions- 2 messages*	By yr 5, min. 1 year apart										
	Developers - 2 messages	By yr 5, min. 1 year apart										
	Industrial Facilities - 2 messages	By yr 5, min. 1 year apart										
2	Public Involvement and Participation											
	Public Review of SWMP & Annual Report	Annually										
	Opportunities for Public Participation	Annually										
3	Illicit Discharge Detection & Eliminiation (IDDE)*											
	Sanitary Sewer Overflows Inventory	6/30/2019										
	System Mapping - Phase 1, inc. catchment delineations	6/30/2020										
	System Mapping - Phase 2	Update Annually										
	Written IDDE Program	6/30/2019										
	Outfall/Interconnects Inventory & Initial Catchment Ranki	6/30/2019										
	Outfall/Interconnects Catchment Ranking Updates	Update Annually										
	Dry Weather Screening & Sampling	By yr 3 & every 5 yrs										
	Catchment Investigations Procedures	12/30/2019										
	Catchment Investigations Problem Outfalls	6/30/2025										
	Catchment Investigations All Outfalls	6/30/2028										
	Wet Weather Sampling	part of catchment invest.										
	Illicit Discharge Elimination (Locate & Remove)	60 Days from source ID										
	Confirmatory Dry Weather Screening	1 yr after removal										
	Training	annually										
4	Construction Site Runoff Control											
	Construction Site Inspections & Enforcement Proceedures	6/30/2019										
	Site Plan Review Procedures	6/30/2019										
	Requirement for Construction Site Erosion Controls	6/30/2019										
	Construction Site Waste Control Requirements	6/30/2019										
5	New Development and Redevelopment											
	Update Regulations - Retention/Treatment	6/30/2020										
	Assess Street Design & Parking Guidelines	6/30/2022										
	Assess Regulations to allow Green Infrastructure	6/30/2022										
	Locate 5 Properties for Impervious Area Reduction	6/30/2022										
6	Good Housekeeping											
	Winter Road Maintenance Procedures	6/30/2019										
	O&M, SWPPP & Infrastructure Program	6/30/2020										
	Training for O&M and SWPPP Program Activities	Regularly/As Needed										
	Catchbasin Cleaning Schedule	6/30/2019										
	Catchbasin Cleaning	when 50% full										
	Street Sweeping*	Spring (& Fall for Nitrogen)										
	Inspections for SWPPP	Quarterly										
	Inspection of Structural BMPs	Annually										
	Maintenance of Structural BMPs	as needed										
Nitrogen Source Identification Report												
	Report											
	Evaluate Properties for BMP retrofits, provide plan & schedule											
	Implement Plan											
Annual Reports		by 9/30 annually										

*Supplement requirements for Bacteria TMDL to Lee River, Mount Hope Bay, Taunton River, Broad Cove and Nitrogen Impairment to Mount Hope Bay and Lee River

Due 6/30/2019
Complete
Future Year Task

Town of Somerset, Massachusetts

Figure 2-2: Town-Owned Parcels with Potential BMP Opportunities



BMP Opportunities

Map ID	Location
1	*State Park, with Beach
2	Utilities Shed on Angus St
3	*Edward J. O'Neil Park
4	Somerset Water Pollution Control
5	Wilbur Elementary School
6	Rt 103 (Wilbur Ave) at Brayton Pt Rd
7	Undeveloped parcel at Slade Ferry Redevelopment
8	Leahy Ave Park
9	508 Lees River Ave
10	Route 6 Commercial Corridor
11	Somerset Housing Authority
12	South Elemetary School
13	Somerset Middle School
14	Slade Cemetary
15	Somerset Berkley Regional High School
16	Chase St. Elementary
17	Pierce Playground & Beach
18	Ashton Fields
19	North Elementary School
20	Somerset Water Treatment Plant
21	*Pull over near 1124 Pleasant St

* Needs Further Investigation

3.0 Development & Screening of Alternatives

This section identifies and describes potential stormwater alternatives developed based on meetings with and information provided the Town, previous reports, and BETA's field investigations. Each addresses one or more of the following items:

- MS4 requirement fulfillment
- Water quality improvements
- Human health benefits
- Flooding alleviation
- Hydraulic capacity improvements
- Site condition improvements
- Operations and maintenance benefits
- Natural Hazard Mitigation Plan action item fulfillment

Alternatives are further discussed and assigned a priority ranking in Section 4.

Potential Alternatives

A total of 35 candidate stormwater projects were identified as potential alternatives. Each was classified into one of three categories and designated as "C", "E", or "O", respectively:

- Capital Projects – Construction projects
- Evaluation Projects and Programs – Studies and nonstructural measures
- Operations Projects and Programs – Operations and maintenance programs

Planning level capital costs have been estimated for each candidate project and are presented in 2018 dollars. The estimated costs include permitting, design, construction, and contingencies. The costs do not include construction escalation, land acquisition, easements, and inflation. The estimated costs can be used for project selection, feasibility determination, concept assessment, and preliminary budget approval. Candidate stormwater projects are outlined in Table 3-1.

Stormwater Capital Projects

Elm Street Stormwater Infrastructure Construction (SW-C1)

The Highway Department has identified Elm Street as an area where stormwater facilities are needed and none currently exist. This project includes design and construction of new stormwater infrastructure.

Almy Road Culvert Replacement (SW-C2)

The Almy Road culvert, south of the intersection of Almy Road and New Hampshire Avenue, conveys Buffington Brook. During field investigation, BETA observed the existing culvert's two 48" corrugated metal pipes and concrete headwall to be in poor condition. The Town has identified the bridge as requiring replacement and submitted an application to the Municipal Small Bridge Program for funding.

Riverside Avenue Culvert (North of Intersection with Luther Ave) Short-Term Repair (SW-C3)

The Riverside Avenue culvert, north of the intersection with Luther Avenue, is the last structure conveying Buffington Brook before its confluence with the Taunton River. The existing structure consists of a double 72" RCP culvert with a concrete headwall. The Highway Department has identified the culvert as a problem area with sinkholes in the roadway. The Geographic Roadway Runoff Inventory Program (GRRIP) 6 Report by Southeastern Regional Planning and Economic Development District (SRPEDD) noted channelization and erosion problems on the western side of the culvert. During site visits in October and November 2018, BETA observed evidence of past undercutting on the western side of the culvert and signs of collapse on the eastern headwall. This project includes performing immediate repairs to the culvert to address any short-term structural needs.

Riverside Avenue Culvert (North of Intersection with Luther Ave) Long-Term Repair (SW-C4)

The Highway Department and the GRRIP 6 Report by SRPEDD have noted sinkholes in the roadway at the Riverside Avenue culvert, located north of the intersection with Luther Avenue. This project includes culvert repair or complete culvert replacement to address its long-term structural needs.

Buffington Brook Culvert Improvements (SW-C5)

The Highway Department has identified Buffinton Street from the Swansea town line to the intersection with Route 138 as an area of limited drain capacity, possibly due to hydraulic capacity issues associated with Buffington Brook. The brook is conveyed by 14 bridges and culverts, including four longer underground structures having a combined length believed to exceed 1600 feet. The project will follow inspection of all structures conveying Buffington Brook as well as a capacity evaluation to identify causes of surcharge in the system. This project includes repairing and replacing structurally deficient structures in addition to resizing structures as necessary to address hydraulic capacity concerns not noted in other projects.

Additional Culvert Improvements from Condition and Capacity Analysis (SW-E2, SW-E3) (SW-C6)

A list of high-priority culverts recommended for inspection was created following a culvert inventory conducted in October 2018 as explained in the description for SW-E3. As-needed repair or replacement of structures conveying Buffington Brook is included under SW-C3 through SW-C5. This project, SW-C6, includes the repair or replacement of structures other than those conveying Buffington Brook as needed following their inspection, including at least three additional culverts on Warren Street and Gay Street not identified in the inventory.

Whetstone Hill Road Culvert Resizing (SW-C7)

The Somerset Reservoir discharges to the Labor In Vain Brook through sluice gates used to regulate the reservoir level. According to Horsley Witten in their 2005 report, during emergency releases to protect the dam, the discharge rate can be as high as 147 cfs, but is typically 57 cfs during rainfall events. Downstream of the reservoir, the brook is conveyed by the Whetstone Hill Road culvert and the Route 138 culvert, sequentially. Horsley Witten reported these two culverts to have a combined capacity of 87 cfs, which they estimated to be inadequate for a 2-year storm assuming a 57 cfs discharge from the reservoir. The 2004 report by CEI also indicated all culverts downstream of the reservoir to be undersized. Emergency releases to protect the dam will overtop Whetstone Hill culvert on Rt 138 culvert jeopardizing the roadways and emergency evacuations.

The existing Whetstone Hill Road culvert is a double 30” reinforced concrete pipe culvert. Horsley Witten recommended replacing the culvert with a triple 42” reinforced concrete pipe culvert or a 6’ wide by 3’ high concrete box culvert to convey runoff from a 10-year design storm, or a 10’ wide by 4.5’ high box culvert or equivalent to meet the Massachusetts River and Stream Crossing Standards: Technical Guidelines and provide a greater hydraulic capacity. This project consists of design and construction of a replacement culvert.

Route 138 Culvert (downstream of Whestone Hill Road) Resizing (SW-C8)

Route 138 crosses the Labor In Vain Brook approximately 300 feet downstream of the Whetstone Hill Road culvert. Between the two culverts, the brook is joined by a small tributary from wetlands near Rosewood Road. This culvert is directly downstream of the Whetstone Hill Road Culvert and would similarly be subject to emergency releases to protect the dam jeopardizing the roadways and emergency evacuations along Route 138. Horsley Witten in their 2005 report identified the Route 138 culvert as undersized, often submerged even during low-flow conditions, and consisting of a single reinforced concrete pipe culvert having an irregular shape and an estimated nominal diameter of 42” to 48”. The culvert was fully submerged and could not be located during BETA’s culvert inventory in October 2018. Assuming a 57 cfs discharge from the Somerset Reservoir, Horsley Witten calculated the existing Whetstone Hill Road and Route 138 culverts to be inadequate for a 2-year storm with their current combined capacity estimated at 87 cfs. A double 60” pipe culvert or an 8’ wide by 5’ high concrete box culvert would meet the 25-year storm design recommended as a minimum by Horsley Witten, but a 12’ wide by 5’ high box culvert or equivalent would be required to meet the Massachusetts River and Stream Crossing Standards: Technical Guidelines.

New England Environmental (NEE) in their 2005 Feasibility Assessment, Alternatives Analysis, and Ecosystem Assessment Final Report for the Labor In Vain Brook also reported the culvert to be undersized at an estimated diameter of 60”. NEE recommended replacing the culvert with a single 66” or double 48” corrugated metal pipe culvert in order to convey flow resulting from a 10-year storm or a 25-year storm, respectively. This project consists of design and construction of a replacement culvert.

Dublin Street Culvert Resizing (SW-C9)

The Dublin Street culvert, near the intersection with South Street, conveys the Labor In Vain Brook. The Highway Department has identified the culvert as requiring replacement. NEE in their 2005 report identified the culvert to be 102" and undersized, restricting tidal flow. NEE recommended replacing the culvert with a 15' wide by 6' high concrete box culvert or a 40' span bridge once the existing culvert's service life has ended. HW in their 2005 report presented the replacement of the Dublin Street culvert with a 15' wide by 6' high concrete box culvert as an intermediate cost, intermediate-benefit option and the replacement of both the Dublin Street and South Street structures with 40' span bridges as a high-cost, high benefit option. The benefit of increasing tidal flow by increasing culvert capacity would be an increase in tidal flood area and improved mixing of the Labor In Vain Brook, the Taunton River, and the Marsh.

South Street Culvert Resizing (SW-10)

The South Street culvert, just south of the Dublin Street culvert, is the structure closest to the confluence of the Labor In Vain Brook and the Taunton River. The existing structure is a double 60" corrugated metal pipe culvert, approximately 40 feet in length. NEE identified the culvert as undersized, restricting tidal flow, and recommended resizing the existing culvert once its service life has ended. HW presented the replacement of both the South Street and Dublin Street culverts with 40' span bridges as a high-cost, high-benefit option, and predicted that resizing the South Street culvert alone would provide minimal capacity benefits. This project includes replacement of the existing culvert with a 14' by 6.25' concrete box culvert and is currently in procurement.

Adding/Retrofitting Stormwater Management Facilities (SW-C11)

In their 2005 report, Horsley Witten identified an increase in land development within the watershed tributary to the Whetstone Hill Road and Route 138 culverts as a cause of increased runoff volume, contributing to capacity issues at both culverts. HW identified five opportunities to add stormwater management facilities, such as detention basins, near Whetstone Hill Road in order to mitigate capacity issues and improve water quality.

System-Wide Stormwater Upgrades (SW-C12)

This project includes upgrading the Town's existing stormwater system at a more local level to address various needs such as flooding, water quality, safety, and maintenance issues.

Illicit Connection Removal (SW-C13)

This project includes prioritization and removal of illicit connections if identified during the IDDE Program.

North Street Culvert Resizing (SW-C14)

The North Street culvert, located north of the Somerset Reservoir near the intersection with Elm Street, is a double 36" RCP culvert conveying the Labor In Vain Brook and plays a key role in regulating the Somerset Reservoir level. Depending on the relative water levels north and south of the culvert, the North Street culvert conveys water either toward or away from the reservoir. When the water level to the north is sufficiently elevated, flow is split: the culvert conveys some flow south through the culvert to the reservoir inlet; an earthen swale north of North Street conveys the rest in an easterly direction toward Broad Cove and the Route 138 culvert in Dighton, bypassing the reservoir. When the water level to the south is elevated, the culvert acts as an auxiliary spillway that conveys water northward, away from the reservoir to prevent the dam from overtopping and failing.

As the Somerset Reservoir Dam is classified as a Large size, Class I (High) hazard potential structure, state regulations require the spillway design flood for the site to be one half of the probable maximum flood. Pare Corporation in their 2018 dam analysis ran three modeling scenarios: 24-hour 100-year storm, one-half probable maximum flood with a starting reservoir elevation of normal pool, and one-half probable maximum flood with a starting reservoir elevation one foot below normal pool. Pare determined that the dam would overtop in the last two scenarios requiring emergency evacuation of the inundation areas and failure of the dam. All three scenarios would result in Elm Street and North Street overtopping for a combined length of several hundred feet.

This project includes design and construction associated with the resizing of the North Street culvert in order to accommodate the spillway design flood as required by state regulations. This project should be considered in conjunction with resizing of other Labor In Vain culverts and redesign of the dam spillway.

BMP Installations Town Projects (SW-C15)

A list of Town-owned properties where BETA recommends installation of structural BMPs to manage stormwater runoff is included in Section 2.1.6. This project encompasses design and installation of recommended structural BMPs at each of these locations.

Stormwater Evaluation Projects

MS4 Requirements (SW-E1)

The Town submitted an NOI for coverage under the Permit which allows it to discharge stormwater from its MS4 into surface waters in accordance with conditions and requirements included in the Permit. The Permit requires the Town to develop and implement a Stormwater Management Program (SWMP) that addresses six minimum control measures for pollution prevention. The SWMP was created as part of this CSWMP and is included as Attachment 3.

Some of the activities in the SWMP are presented and described as stand-alone projects within this section of the CSWMP. They are activities that integrate with other projects to address larger needs that are not isolated to Permit requirements. The remaining Permit-specific tasks, which make up this project, include that are not included as their own project in the integrated plan are compiled into this project. These tasks include:

- Public education and outreach
- Public involvement and participation
- Dry weather field investigation, screening & sampling
- Wet weather field investigation, screening & sampling
- Catchment investigation
- Training
- Construction site runoff control (regulations)
- Post-construction management in new and re-development (regulations)
- Inventory/priority rank LID retrofits on Town-owned property
- Inventory Town facilities and develop MS4 facilities O&M Plan
- Develop written O&M plan for MS4
- Highway garage SWPPP
- Develop street design & parking guidelines
- LID assessment
- Inventory & ranking Town-owned BMP retrofits
- Nitrogen source ID report
- Quarterly SWPPP and annual BMP inspection and maintenance
- Annual updates of SWMP, IDDE plan and other MS4 documents
- Annual reporting

For additional details on the permit requirements see the MS4 compliance strategy included in Section 2.1.5.

Buffington Brook Capacity Analysis (SW-E2)

Buffington Brook originates from wetlands in Swansea and enters the Town of Somerset near the intersection of Almy Road and New Hampshire Avenue. The brook is conveyed by numerous culverts and underground drainage pipes or structures and discharges to the Taunton River near the intersection of Riverside Avenue and Luther Avenue. The Highway Department has identified Buffinton Street from the Swansea town line to the intersection of Route 138 as an area of limited drain capacity, possibly due to drain capacity issues or surcharge downstream. The project includes capacity evaluation to identify causes of surcharge in the system.

Culvert Condition Analysis (SW-E3)

BETA investigated 39 culverts in October 2018 and provided a culvert inventory, included as Attachment 2. The inventory contains photos, size, shape, and observed condition data, and recommendations of either replacement or structural inspection for each. Culverts recommended for replacement are those identified by the Highway Department or previous reports as requiring replacement based on structural or capacity concerns. Culverts that were not recommended for replacement were recommended for structural inspection. A structural inspection prioritization of either High or Low was assigned based upon the following categories:

- Location: Culverts conveying Buffington Brook were designated High priority
- Material: Generally, corrugated metal pipe (CMP) culverts were designated High priority
- Accessibility: Culverts that could not be accessed during BETA's investigation were designated High priority

See Table 1-1 of the culvert inventory for inspection prioritization. Additional structures not included in the inventory (Warren Street and Gay Street) should be added to the inventory and assigned an inspection priority when identified. This project includes a structural inspection of all high-priority culverts to identify candidates for repair or replacement.

Salt Marsh Sewer Investigation (SW-E4)

Approximately 2,600 feet of sanitary sewer crosses the western portion of the salt marsh in the Labor In Vain watershed. NEE in their 2005 report indicated that topography of the area had been altered as a result of the sewer construction, potentially inhibiting the flow of runoff from the west and tidal flushing from the east. The report also stated that fill associated with the sewer construction was the probable source of invasive plant species Phragmites australis in the area, and indicated that Somerset's Conservation Commission had expressed the possibility of relocating the sewer main in the future. Should the sewer main be removed from the marsh, NEE recommended replacing all fill with materials similar to the native soil, regrading land to its original topography, and installing native salt marsh plant species.

Catch Basin Maintenance Program Development (SW-E5)

This project includes developing a predictive catch basin cleaning program, as required in the MS4 permit. The development of a standardized catch basin, storm drain and structural BMP inspection program should include inspections, cleaning operations, and maintenance operations of storm water system components.

The predictive cleaning program will be driven by the following data:

- Predictive factors such as surface conditions, tree cover, topography etc.
- Catch basin cleaning history.
- Quantity and quality of debris removed.
- Cleaning schedule.

The program should predict the optimal time interval between catch basin cleanings resulting in reduced cleaning frequency for catch basins that do not accumulate substantial amounts of debris and increased cleaning frequency for catch basins that frequently accumulate large quantities of debris. In addition, the path of catch basin cleaning crews can be aided with GIS tools.

Development of the predictive catch basin cleaning program will allow the Town to maximize credits available for stormwater discharge MS4 permit requirements.

Coastal Resilience Evaluation (SW-E6)

Action Item #9 in the Natural Hazard Mitigation Plan includes development of a Coastal Structures Master Plan that includes an evaluation of coastal structures (e.g. seawalls, bulkheads, revetments) and identifies structures that may need improvement. The 2013 report by Save the Bay indicates that coastal properties and salt marshes in the Taunton River Watershed are vulnerable to sea level rise.

Outfall Tidegate Evaluation (SW-E7)

This program includes evaluating coastal outfalls as candidates for installation of backflow prevention devices such as check valves to address Action 11 of the Town's Natural Hazard Mitigation Plan. The program may be combined with an evaluation of seawalls and other coastal structures to address Actions 2 and 9 and promote coastal resilience.

STORMWATER OPERATIONS IMPROVEMENTS

GIS Updates (SW-O1)

The Town's stormwater mapping currently consists of catch basin, manhole, outfall, culvert, and swale locations collected via GPS between 2006 and 2012. Data for these features is limited, including only basic information such as structure type, structure owner, and date of data collection. During dry-weather outfall screening, it appeared that many outfall data points had been misidentified during initial data collection. No GIS data currently exists for pipes.

SW-01 includes updating stormwater GIS data in accordance with MS4 requirements. This includes an initial update to include additional available information and annual updates to drainage system through the use of data collected from field investigations and previous records. Data collection will include pipe connectivity, material, and size as well as manhole condition and rim and invert elevation. In addition, SW-01 includes establishment of subcatchment areas to meet MS4 requirements.

Data Management (SW-O2)

The Town recognizes the importance of effectively managing and sharing information to integrate Town departments and systems. This program includes organizing and maintaining Town record information and implementing measures to improve the usability of existing and new information.

Catch Basin Maintenance Program (SW-O3)

This project includes developing a predictive catch basin cleaning program. The development of a standardized catch basin, storm drain and structural BMP inspection program should include inspections, cleaning operations, and maintenance operations of storm water system components.

The predictive cleaning program will be driven by the following data:

- Predictive factors such as surface conditions, tree cover, topography etc.
- Catch basin cleaning history.
- Quantity and quality of debris removed.
- Cleaning schedule.

The program should predict the optimal time interval between catch basin cleanings resulting in reduced cleaning frequency for catch basins that do not accumulate substantial amounts of debris and increased cleaning frequency for catch basins that frequently accumulate large quantities of debris. In addition, the path of catch basin cleaning crews can be aided with GIS tools.

Development of the predictive catch basin cleaning program will allow the Town to maximize credits available for stormwater discharge MS4 permit requirements.

Stream, Swale & Drainage Channel Maintenance (SW-O4)

The Highway Department, HW, and NEE have identified hydraulic capacity issues associated with the Labor In Vain Brook and Buffington Brook. It is recommended to implement a stream maintenance program incorporating trash, debris, and sediment removal to improve system-wide hydraulic capacity. In addition to flood mitigation, a stream maintenance program should also incorporate vegetation management, which would help reestablish native wetland species and facilitate culvert inspection by improving access to overgrown areas.

Outfall Maintenance (SW-O5)

This program includes locating, inspecting, cleaning, dredging, and screening Town-owned outfalls and interconnections based on records and field investigation. Outfalls should be kept clean and in working order for the stormwater system to function properly. Outfall screenings should be carried out in fall, spring, and after severe storms to check for silting, debris, erosion, settlement and misalignment so that all problems can be addressed immediately.

Outfalls located during BETA's dry-weather outfall screening in November 2018 are mapped, listed, and discussed in the outfall screening report (Attachment 1).

Structural BMP Maintenance (SW-O6)

Structural BMPs manage and treat stormwater runoff. This program includes routine inspection and maintenance in accordance with Permit requirements to ensure BMPs are operating properly.

Pipe Cleaning & CCTV Inspection (SW-O7)

Pipe cleaning optimizes stormwater system performance and reduces the amount of pollutants, trash, and debris both in the system and in receiving waters. Typical actions include jetting, vacuuming, and remote CCTV camera inspection; however, budget, equipment, and staffing constraints should be taken into consideration when selecting the most effective method for site conditions.

Stormwater system waste removed during cleaning operations should be acceptable quality for typical municipal solid waste landfills. However, a testing program should be planned as part of the cleaning. Suspicious cleaning waste material should be tested and disposed of accordingly. Maintenance personnel should keep a log of the amount of sediment collected from each pipe segment and the removal date.

Street Sweeping (SW-O8)

Street sweeping removes debris before it can enter the stormwater system, which reduces pollutant loading to receiving waterbodies and reduces the likelihood of flooding during heavy rain events due to sediment build-up and blockages. The effectiveness of pollutant removal through a street sweeping program is directly related to the frequency of sweeping and the type of sweeper used. Vacuum sweepers are generally more effective than mechanical (brush or broom) sweepers because they are able to pick up fine-grained particles in addition to sand, gravel and debris. This program includes yearly street sweeping of all areas and twice-yearly sweeping in areas tributary to receiving water bodies having a total maximum daily load (TMDL) for nitrogen in accordance with Permit requirements.

Salt Marsh Management (SW-O9)

NEE in their 2005 report noted the prevalence of Phragmites australis in the salt marsh within the Labor in Vain watershed and recommended working to eradicate it and replace it with native species. NEE also recommended implementing a vegetation monitoring program, such as Monitoring Salt Marsh Vegetation (2001), developed by the Cape Cod National Seashore's Long-term Coastal Ecosystem Monitoring Program. NEE also noted salt marsh encroachment by several abutting properties and recommended the Conservation Committee review and enforce existing wetlands permits. This project is also noted in the Save the Bay Coastal Adaptation for Flood Hazard Reduction and Water Quality Improvement in the Upper Narragansett Bay and Mount Hope Bay Watersheds (2013) report.

This project includes establishing and maintaining a salt marsh management program, encompassing vegetation monitoring and wetland permit review, to promote coastal resilience.

Staffing Increase (SW-O10)

Since 2005, the number of people employed by the Highway Department has decreased from 20 to 10. Increasing the number of employees would grant the Highway Department more opportunities to perform preventative maintenance work, which reduces the need to react to emergency situations. An increased greater Highway Department staff would also be able to perform more services in house that are currently subcontracted out to third parties, such as winter plowing and new stormwater maintenance activities.

On-Call Contractor (SW-O11)

Place a contractor or contractors on the Town's "on-call" list for stormwater system repair on an as-needed basis.

Miscellaneous Stormwater Report (SW-O12)

Track program progress and prepare required reports and updates.

Water Resources Management Planning

Town of Somerset, MA

Table 3-1
Potential Alternatives

Comprehensive Stormwater Management Plan (CSWMP)

CAPITAL CONSTRUCTION PROJECTS

Project ID	Alternatives (Not Prioritized)	Planning Cost		Concurrent Project	Addressing							Notes
		Capital	Ongoing (annual)		MS4	Water Quality	Human Health	Flooding Issue	Capacity Improvement	Condition Improvement	O&M Benefit	
SW-C1	Elm Street Stormwater Infrastructure Construction	$1,500,000		Utility or Road Improvements, SW-C12				+	+	+		
SW-C2	Almy Road Culvert Replacement	$500,000								+		Addresses Haz Mit Action #7
SW-C3	Riverside Avenue Culvert Short-Term Repair	$50,000										Addresses Haz Mit Action #7
SW-C4	Riverside Avenue Culvert Long-Term Repair	$750,000										Addresses Haz Mit Action #7
SW-C5	Buffington Brook Culvert Improvements	$2,000,000		Utility or Road Improvements				+	+		+	Addresses Haz Mit Action #7
SW-C6	Other Culvert Improvements (From SW-E2 and SW-E3)	$1,500,000		Utility or Road Improvements				+	+	+	+	Addresses Haz Mit Action #7
SW-C7	Whetstone Hill Road Culvert Resizing	$500,000		Dam Spillway			+	+	+	+	+	Addresses Haz Mit Action #7
SW-C8	Route 138 Culvert Resizing	$500,000		Dam Spillway				+	+	+		Addresses Haz Mit Action #7
SW-C9	Dublin Street Culvert Resizing	$750,000							+	+		Addresses Haz Mit Action #7
SW-C10	South Street Culvert Resizing	$600,000							+	+		Addresses Haz Mit Action #7
SW-C11	Adding/Retrofitting Stormwater Management Facilities		$10,000	Utility/Road/Site Improvements	+	+						
SW-C12	System-Wide Stormwater Upgrades		$20,000	Utility or Road Improvements		+		+			+	
SW-C13	Illicit Connection Removal		$20,000		+	+	+					
SW-C14	North Street Culvert Resizing	$500,000		Dam Spillway		+	+	+	+			
SW-C15	BMP Installations Town Properties	$50,000		Site Improvements	+	+						
	CAPITAL IMPROVEMENT TOTAL:	**$9,200,000**	**$50,000**									

EVALUATIONS AND OTHER PROJECTS/PROGRAMS

Project ID	Alternatives (Not Prioritized)	Planning Cost		Concurrent Project	Addressing							Notes
		Capital	Ongoing (annual)		MS4	Water Quality	Human Health	Flooding Issue	Capacity Improvement	Condition Improvement	O&M Benefit	
SW-E1	MS4 Requirements	$65,000	$20,000		+	+	+					Addresses Haz Mit Action #16
SW-E2	Buffington Brook Capacity Analysis	$40,000						+	+			Addresses Haz Mit Action #7
SW-E3	Culvert Condition Analysis	$30,000						+		+		Addresses Haz Mit Action #7
SW-E4	Salt Marsh Sewer Investigation	$15,000				+				+		
SW-E5	Catch Basin Maintenance Program Development	$5,000			+	+						
SW-E6	Coastal Resilience Evaluation	$25,000		SW-E7				+				Addresses Haz Mit Action #9
SW-E7	Outfall Backflow Evaluation	$20,000		SW-E6				+				Addresses Haz Mit Action #11
	EVALUATIONS TOTAL:	**$200,000**	**$20,000**									

OPERATION PROJECTS/PROGRAMS

Project ID	Alternatives (Not Prioritized)	Planning Cost		Concurrent Project	Addressing							Notes
		Capital	Ongoing (annual)		MS4	Water Quality	Human Health	Flooding Issue	Capacity Improvement	Condition Improvement	O&M Benefit	
SW-O1	GIS updates (MS4)	$80,000	$5,000		+						+	Addresses Haz Mit Action #15
SW-O2	Data Management	$50,000	$10,000	Other Data Management Needs	+						+	
SW-O3	Catch Basin Maintenance Program		$20,000		+	+		+	+	+		
SW-O4	Stream, Swale & Drainage Channel Maintenance		$10,000		+	+		+	+			
SW-O5	Outfall Maintenance		$10,000									
SW-O6	Structural BMP Maintenance		$5,000		+	+		+	+	+		
SW-O7	Pipe Cleaning & TV Inspection		$20,000					+	+			
SW-O8	Street Sweeping		$20,000		+	+		+	+			
SW-O9	Salt Marsh Management		$5,000			+				+		Addresses Haz Mit Action #2, 9, 17
SW-O10	Staffing Increase		$100,000	Other Department Needs							+	
SW-O11	On-Call Contractor		$40,000	Other Department Needs							+	
SW-O12	Misc. Stormwater Reporting		$10,000	SW-E1	+						+	
	OPERATION TOTAL:	**$130,000**	**$255,000**									

TOTAL ALL STORMWATER PROJECTS:	**$9,530,000**	**$325,000**

4.0 Evaluate Preferred Alternatives

Evaluation and Ranking Framework

Initial evaluation and ranking of identified alternatives were based on guidelines from the Water Resource Management Planning document prepared by Mass DEP. The evaluation method includes a process for selecting alternatives and proposing general implementation schedules. The goal of this evaluation is to take potential alternatives described in Section 3 and rank them by effectiveness in achieving sustainable and long-term water resource management improvements. Since the objective of the CSWMP is to be used as one of the guidance documents in development of an Integrated Water Resource Management Plan (IWRMP), general rankings and implementation schedules were applied as priorities may change within the IWRMP based on other priorities and opportunities.

Recommendations and Ranking of Preferred Stormwater Alternatives

Criteria for identifying, evaluating, and prioritizing alternatives include the following:

No Action/Fix it First Approach

The fix-it-first approach includes continued use of existing facilities while optimizing performance by repair or upgrade, improving operation and maintenance, increasing water conservation, or implementing best management practices in comparison to use to failure with subsequent replacement.

Environmental Benefit

This evaluation includes all of the environmental impacts and benefits of each alternative including direct and indirect benefits and impacts, construction, and operational impacts, and benefits to the natural water cycle, water quality, and public health.

Impacts to Sensitive Environmental Receptors

Impacts on sensitive environmental receptors include impacts on drinking water sources, beaches and recreational areas, rare and endangered species, surface water bodies, wetland resources, floodplains, vernal pools, agricultural lands, shellfish beds, and areas of critical environmental concern.

Cost Effectiveness

Cost-effectiveness evaluation considers the cost of providing initial excess capacity compared with the present worth of deferred costs as well as the uncertainties involved in projecting long-term needs.

Institutional Arrangements

This criterion evaluates the Town's ability to obtain the required permits and enter into any necessary institutional arrangements such as intermunicipal agreements or purchase and sale agreements.

Financial Arrangements

This criterion evaluates the Town's ability to obtain the required funding whether generated by the Town or outside grants/loans and enter into any necessary arrangements to secure project funding.

Regulatory/Mandated Action

Permit compliance criteria address compliance with NPDES Wastewater Discharge Permit(s), NPDES MS4 Permit, and/or other permits.

Other Constraints

Practical or political concerns affecting project schedule or implementation.

Climate Change Adaptability

Climate change adaptability criteria were created to address projected impacts of climate change relative to higher intensity rainfall, sea level rise and/or storm surge regarding protection or resiliency.

The criteria performance description defines the extent to which an alternative meets each assessment criterion. Scoring scales of -2 to 2 were developed for each criterion with the worst estimated potential performance was given a score of -2 and the best possible performance was given a score of 2. Positive scores stand for positive impacts, negative scores stand for adverse impacts, and zero scores stand for neutral impacts. The criteria performance and scoring were based on the following system:

- +2 Points: Project significantly improves receiving water quality as a result of higher quality discharges.
- +1 Points: Project moderately improves receiving water quality as a result of higher quality discharges.
- 0 Points: Project minimally improves (or no change in) receiving water quality as a result of higher quality discharges OR not applicable.
- -1 Points: Project creates a moderate setback in receiving water quality.
- -2 Points: Project creates a significant setback in receiving water quality.

The criteria performance description defines the extent to which an alternative meets each assessment criterion. Scoring scales of -2 to 2 were developed for each criterion with the worst estimated potential performance was given a score of -2 and the best possible performance was given a score of 2. Positive scores stand for positive impacts, negative scores stand for adverse impacts, and zero scores stand for neutral impacts. The criteria performance and scoring were based on the following system:

- +2 Points: Town significantly benefits from the selected criteria.
- +1 Points: Town moderately benefits from the selected criteria.
- 0 Points: Town minimally (or no change in) benefits from the selected criteria.
- -1 Points: Town incurs a moderate setback from the selected criteria.
- -2 Points: Town incurs a significant setback from the selected criteria.

After each alternative received the final score, they were compared to the rest of the alternatives' final scores and ranked from highest final score to lowest final score. The ranked list completed in this section serves as a basis to develop the IWRMP along with a proposed implementation schedule to determine the best and most affordable alternative implementation scenario for the capital projects list.

Table 4-1 shows stormwater candidate projects scoring based on the DEP Water Resource Management Planning criteria.

Table 4-1
Alternatives Ranking
MassDEP Water Resource Management Planning Criteria

Project ID	Candidate Projects (Not Prioritized)	Parameters									Total Score	Notes
		Fix it First/ No Action	Environmental Benefit	Impacts to Environmental Receptors	Cost Effectiveness	Institutional Arrangements	Financial Arrangements	Regulatory/ Mandated	Climate Change Adaptability	Health/ Safety		
SW-O5	Outfall Maintenance	1	2	2	2			2	2		11	
SW-E5	Catch Basin Maintenance Program Development	1	2	2	2			2	1		10	
SW-O3	Catch Basin Maintenance Program	1	2	2	2			2	1		10	
SW-C13	Illicit Connection Removal	1	2	2	2			2			9	
SW-O6	Structural BMP Maintenance	1	2	2	2			2			9	
SW-O8	Street Sweeping		2	2	2			2			8	Mandatory
SW-E2	Buffington Brook Capacity Analysis	1	1	1	2				2		7	Preceeds SW-C3, SW-C4, SW-C5
SW-O7	Pipe Cleaning & TV Inspection	2	1		2			1		1	7	Coordinate with SW-E1
SW-C11	Adding/Retrofitting Stormwater Management Facilities		2	2				2			6	
SW-E3	Culvert Condition Analysis	2			2				2		6	Preceeds all culvert projects
SW-O1	GIS updates (MS4)	1			2			2	1		6	
SW-O2	Data Management	1			2			2	1		6	
SW-C3	Riverside Avenue Culvert (N of Luther) Short-Term Repair	2			2	-1	-1		2	2	6	
SW-C12	System-Wide Stormwater Upgrades		2	2			-1		2		5	
SW-O9	Salt Marsh Management		2	2					1		5	
SW-O10	Staffing Increase	2	1		2						5	Related to Several Projects
SW-O4	Stream, Swale & Drainage Channel Maintenance	1	2	2	1	-1					5	
SW-C2	Almy Road Culvert Replacement					-1	2		2	2	5	
SW-C1	Elm Street Stormwater Infrastructure Construction		1	1					2		4	
SW-E1	MS4 Requirements			2				2			4	
SW-E6	Coastal Resilience Evaluation	2							2		4	Coordinate with SW-E2
SW-E7	Outfall Tidegate Evaluation	2							2		4	
SW-C7	Whetstone Hill Road Culvert Resizing								2	2	4	
SW-C8	Route 138 Culvert (Downstream of Whetstone Hill Rd) Resizing								2	2	4	
SW-C14	North Street Culvert Resizing								2	2	4	
SW-C5	Buffington Brook Culvert Improvements	2		1			-2		2		3	
SW-C15	BMP Installations Town Properties							2	1		3	
SW-C9	Dublin Street Culvert Resizing								2		2	
SW-C10	South Street Culvert Resizing								2		2	
SW-E4	Salt Marsh Sewer Investigation		1	1							2	
SW-O12	Misc. Stormwater Reporting							2			2	
SW-C6	Additional Culvert Improvements from Condition and Capacity Analysis (SW-E2, SW-E3)						-1		2		1	
SW-O11	On-Call Contractor	2			-1						1	
SW-C4	Riverside Avenue Culvert (N of Luther) Long-Term Repair						-2		2		0	

5.0 RECOMMENDED PLAN

Since the objective of the CSWMP is to be used as one of the guidance documents in development of an Integrated Water Resource Management Plan (IWRMP), general rankings and implementation schedules were established and priorities may change within the IWRMP based on other priorities and opportunities. Ranked alternatives identified in Section 4 were prioritized as a basis for a sustainable integrated plan.

Priority development is based on reflection and coordination of results and outcomes from Section 4 and includes ranking adjustments, such as regulatory mandated deadlines and projects, that must be completed to facilitate other projects. Final prioritized recommendations are included in Table 5-1.

Table 5-1
Priority Alternatives Ranking

Rank	Project ID	Project Name	Capital Cost	Ongoing Cost	Recommended Year to Begin	Related Projects	Potential Funding	Notes	Responsible Department
1	SW-E1	MS4 Requirements (Year 1)	$15,000		FY2019		Utility Fees, CZM: CPR, 604b & 319		Hwy
2	SW-O5	Outfall Maintenance		$10,000	FY2020	SW-O10			Most of these fall under Hwy, unless otherwise stated.
3	SW-O8	Street Sweeping		$20,000	FY2020				Hwy
4	SW-O1	GIS updates (MS4)	$80,000	$5,000	FY2020		HMP		Hwy
5	SW-E5	Catch Basin Maintenance Program Development	$5,000		FY2020		Utility Fees		Hwy
6	SW-C10	South Street Culvert Resizing	$600,000		FY2019			This project is currently under construction	Hwy
7	SW-C3	Riverside Avenue Culvert (north of Intersection with Luther Ave) Short-Term Repair	$50,000		FY2020		HMP		Hwy
8	SW-O3	Catch Basin Maintenance Program		$20,000	FY2020	SW-O10			Hwy
9	SW-C2	Almy Road Culvert Replacement	$500,000				HMP, DOT Small Bridge	This was just recently awarded, under small bridge grant	Hwy
10	SW-E3	Culvert Condition Analysis	$30,000		FY2021		HMP, FEMA PDM		Hwy
11	SW-E1	MS4 Requirements (Sampling, Catchment Invest.)	$50,000	$20,000	FY2021			Total Cost Over 3 Years	All Dept
12	SW-C13	Illicit Connection Removal (est)		$20,000	FY2021	SW-O11	Utility Fees	Estimate Until Complete	Planning Bd
13	SW-E2	Buffington Brook Capacity Analysis	$40,000				HMP, FEMA PDM		Hwy
14	SW-O10	Staffing Increase		$100,000		SW-O4, SW-O7, SW-O9, SW-O5, SW-O3, SW-O6, SW-O2	Utility Fees		Admin
15	SW-O6	Structural BMP Maintenance		$5,000		SW-O10			Hwy
16	SW-O2	Data Management	$50,000	$10,000		SW-O10	Other Department Needs	Assuming all departments that are involved	All Dept
17	SW-O4	Stream, Swale & Drainage Channel Maintenance		$10,000		SW-O10			Hwy
18	SW-O7	Pipe Cleaning & TV Inspection		$20,000		SW-O10, SW-E1			Hwy/Sewer
19	SW-O9	Salt Marsh Management		$5,000		SW-O10	HMP, National Coastal Wetlands Conservation, Taunton Wild & Scenic, Taunton Watershed Alliance, Narragansett Bay Esturay program, EPA, EEOEA	Conservation	Conservation
20	SW-C15	BMP Installations Town Properties	$50,000				Utility Fees, CZM: CPR, 604b & 319	Total Cost Over 5 Years	All Dept
21	SW-C11	Adding/Retrofitting Stormwater Mgmt. Facilities		$10,000				Coordinate with Other Projects	All Dept
22	SW-C14	North Street Culvert Resizing	$500,000			Dam Compliance	MVP	Dam failure vulnerability	Water/Sewer, Hw
23	SW-C8	Route 138 Culvert (downstream of Whetstone Hill Road) Resizing	$500,000			DOT Road Work	HMP, DOT	Dam emergency release capacity issue	Water/Sewer, Hwy
24	SW-C7	Whetstone Hill Road Culvert Resizing	$500,000				HMP/MVP	Dam emergency release capacity issue	Water/Sewer, Hwy
25	SW-E6	Coastal Resilience Evaluation	$25,000				HMP, Coastal Resilience Grant, MVP, CZM, EPA	We have applied for MVP	Hwy/Planner
26	SW-E7	Outfall Tidegate Evaluation	$20,000				HMP/MVP, Coastal Resilience Grant	We have applied for MVP	Hwy/Planner (assist)
27	SW-C4	Riverside Avenue Culvert (north of Intersection with Luther Ave) Long-Term Repair	$750,000				HMP, DOT Small Bridge, Culvert Replacement Grant		Hwy/DOT/Con
28	SW-C5	Buffington Brook Culvert Improvements	$2,000,000			SW-E2	HMP		Hwy/Conservation
29	SW-C1	Elm Street Stormwater Infrastructure Construction	$1,500,000				HMP/MVP, Ch 90	Coordinate with Other Projects	Hwy
30	SW-C9	Dublin Street Culvert Resizing	$750,000			SW-C10	HMP/MVP	New sleeve installed	Hwy
31	SW-C6	Additional Culvert Improvements from Condition and Capacity Analysis (SW-E2, SW-E3)	$1,500,000			SW-E2, SW-E3	HMP, Culvert Replacement Grant		Hwy
32	SW-E4	Salt Marsh Sewer Investigation	$15,000						Conservation/Sewer
33	SW-C12	System-Wide Stormwater Upgrades		$20,000			Ch 90	Coordinate with Other Projects	All Dept
34	SW-O11	On-Call Contractor		$40,000		SW-C13			
35	SW-O12	Misc. Stormwater Reporting		$10,000	FY2019	SW-E1	Utility Fee		
	TOTAL COSTS:		$9,530,000	$325,000					

6.0 References

The following references were used in assessment of existing infrastructure:

1. Massachusetts Department of Environmental Protection. (2018, February). Inactive & closed landfills & dumping grounds. Retrieved from https://www.mass.gov/files/documents/2018/02/06/inactlf_0.pdf
2. Massachusetts Water Resources Commission. (2001, December 13). Stressed basins in Massachusetts. Retrieved from https://www.mass.gov/files/documents/2017/11/29/stressed-basins%20%281%29.pdf
3. Taunton River Watershed Alliance. Retrieved November 2, 2018, from http://savethetaunton.org/

Attachment 1

- Dry Weather Outfall Screening Report

Somerset, MA

Water Resources Management Planning

January 2019

Dry Weather Outfall Screening Report

BETA
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Water Resources Management Planning

Somerset, MA

OUTFALL SCREENING REPORT

Prepared by: BETA GROUP, INC.
Prepared for: Town of Somerset

January 2019

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1.0 INTRODUCTION

In November 2018, BETA Group conducted five days of dry-weather outfall screening in the Town of Somerset in accordance with MS4 requirements. BETA located outfalls using a tablet with global positioning system (GPS) capabilities and the Town's existing geographic information system (GIS) mapping data, which included point ID, geographic coordinates, and outfall owner. BETA assigned a new, unique structure ID to each outfall point in the database. Where possible, the structure ID was assigned based upon the original point ID; new structure IDs were assigned in the case of repeated point IDs belonging to multiple outfall points.

Screening included recording the following characteristics: land use; receiving land or water type; pipe size, shape, and material; outfall type, material, and condition; and discharge quantity and quality. Discharge quality assessment included checking for stressed vegetation, staining, odor, color, turbidity, floatables, and oil sheen, all of which are indicators of potential non-stormwater discharges. Scouring, algae growth, sediment buildup, and any other observations were recorded as well. Some outfalls were observed to be buried or otherwise not accessible during screening. Where possible, upstream structures were opened to obtain flow and pipe data for buried or inaccessible outfalls.

2.0 OUTFALL DATA

BETA located and inspected 133 assumed Town-owned outfalls and designated 122 as MS4 and 11 as non-MS4. A map showing the locations of assumed Town-owned outfalls, including the 133 confirmed and 20 unconfirmed outfalls, is included in **Appendix A**. Confirmed outfall data is presented in tabular form in **Appendix B** and in report form with photos in **Appendix C**. Discussion of outfall data is located in the Illicit Discharge Detection and Elimination (IDDE) Program, Section 2.3 of the Comprehensive Stormwater Management Plan (CSWMP).

The Town's original stormwater database contains 232 outfall points collected via GPS between the years 2006 and 2012. As discussed in the following sections, the original list of outfall points includes 117 of the 133 assumed Town-owned outfalls located and inspected during screening in addition to assumed state-owned outfalls, unconfirmed outfalls that could not be located or accessed during screening, and outfalls that are assumed not to exist based on BETA's field observations.

2.1 UNCONFIRMED OUTFALLS

Of the 232 outfall points in the Town's original database, 21 could not be located and/or accessed during screening but are assumed to exist. These 21 unconfirmed outfall points are listed in **Appendix D** and include 20 assumed-Town owned outfalls and one assumed state-owned outfall. The assumed Town-owned outfall map in **Appendix A** includes 133 confirmed and 20 unconfirmed outfalls. Future stormwater mapping is recommended to identify which of the unconfirmed outfalls exist.

2.2 MISIDENTIFIED OUTFALLS

The 232 outfall points in the Town's original database include 117 confirmed and 21 unconfirmed outfall points. The remaining 94 outfall points appear to have been mislabeled during initial data collection and are assumed not to exist. BETA observed a non-outfall stormwater structure, such as a culvert, catch basin, inlet, or paved swale, located at the geographic coordinates of many of these outfall points and reclassified them as such. A table of misidentified outfall points and the correct structure type, if applicable, is shown in **Appendix E**.

2.3 Assumed Ownership of Outfalls

Each outfall point in the Town's original data includes a designation of Town or state ownership or lacks an ownership designation. BETA assigned an assumed ownership designation to the outfalls lacking an ownership designation, including 17 newly mapped outfalls, based on proximity to state roads: any located within 30 feet of a state road were assumed state-owned and any located more than 30 feet from a state road were assumed Town-owned. It should be noted that an assumed Town ownership designation may have been assigned to privately owned outfalls, since no differentiation was made between Town and private ownership. 133 confirmed outfalls and 20 unconfirmed outfalls were assumed Town-owned, for a total of 153 assumed Town-owned outfalls.

No outfalls lacking an ownership designation were located within 30 feet of a state road, so an assumed designation of state-owned was not assigned to any additional outfalls. Three outfall (OF) points had a state ownership designation in the original database:

- OF-469: Not located or screened; unconfirmed outfall
- OF-678: Does not exist; based on location, outfall point appears to refer to an inlet
- OF-712: 18" RCP outfall with a moderate flow not exhibiting any potential non-stormwater discharge indicators

2.4 MS4 Outfalls

BETA assigned an MS4 designation to the 153 assumed Town-owned outfalls as shown in **Table 2-1**. **Appendix B** presents outfall data in tabular form for the 122 MS4 and 11 non-MS4 assumed Town-owned outfalls located during screening.

Table 2-1: MS4 Designation of Assumed Town-Owned Outfalls

	# of Confirmed Outfalls	# of Unconfirmed Outfalls	Total
MS4 Outfalls	122	17	139
Non-MS4 Outfalls	11	3	14
Total	133	20	153

MS4 outfalls were observed or conservatively assumed to discharge to a waterbody or wetland, either directly or via a swale. Of the 20 assumed Town-owned outfall points, those located within 100 feet of a waterbody or wetland were designated MS4. Outfalls that were observed to discharge to land were assigned a non-MS4 designation, as were unconfirmed outfall points located more than 100 feet from a waterbody or wetland. Based on new information, BETA's MS4 designation is an update from that used in the MS4 Notice of Intent (NOI), which indicates that 106 of the 232 original outfall points were assigned an MS4 designation based on location within 100 feet of waters of the United States. The list of MS4 outfalls may be updated further following more extensive system mapping and location of unconfirmed outfalls.

2.5 Outfalls with Potential Non-Stormwater Discharges

Outfall screening included observations for stressed vegetation, staining, odor, color, turbidity, floatables, and oil sheen. These indicators are used to help locate non-stormwater discharges, including illicit sewer connections and sources of industrial or commercial pollutants. Further investigation of outfalls exhibiting these indicators is recommended in order to determine the sources of these discharges and remove illicit connections from the stormwater system; see Appendix B of the SWMP for the IDDE Program Report.

Outfalls exhibiting one or more indicators of potential non-stormwater discharges are shown in **Table 2-2**.

Table 2-2: Outfalls Exhibiting Potential Non-Stormwater Indicators

Structure ID	Watershed	Road Name	Indicator
OF-0	Taunton	Lepes Road	Suds
OF-208	Taunton	Riverside Avenue	Odor, oil sheen
OF-240	Mount Hope Bay	Off Road	Suds
OF-245	Mount Hope Bay	Off Road	Suds
OF-254	Mount Hope Bay	Off Road	Oil sheen
OF-268	Taunton	Regan Road	Turbidity
OF-275	Taunton	Off Road	Staining
OF-285	Taunton	Ranger Road	Oil sheen
OF-1083	Taunton	Leahy Avenue	Suds
OF-1273	Taunton	Riverside Avenue	Suds, staining, turbidity
OF-1535	Mount Hope Bay	Waldorf Street	Oil sheen
OF-1618	Mount Hope Bay	Enterprise Drive	Suds
OF-2080	Mount Hope Bay	Read Street	Staining
OF-2737	Taunton	East County Street	Suds
OF-2879	Taunton	Kenmar Drive	Turbidity, oil sheen
OF-3329	Taunton	Off Road	Suds, odor
OF-3340	Taunton	Off Road	Oil sheen
OF-3358	Mount Hope Bay	GAR Highway	Oil sheen
OF-3360	Mount Hope Bay	Off Road	Suds, brown flow, turbidity

3.0 RECOMMENDATIONS

BETA recommends the following actions:

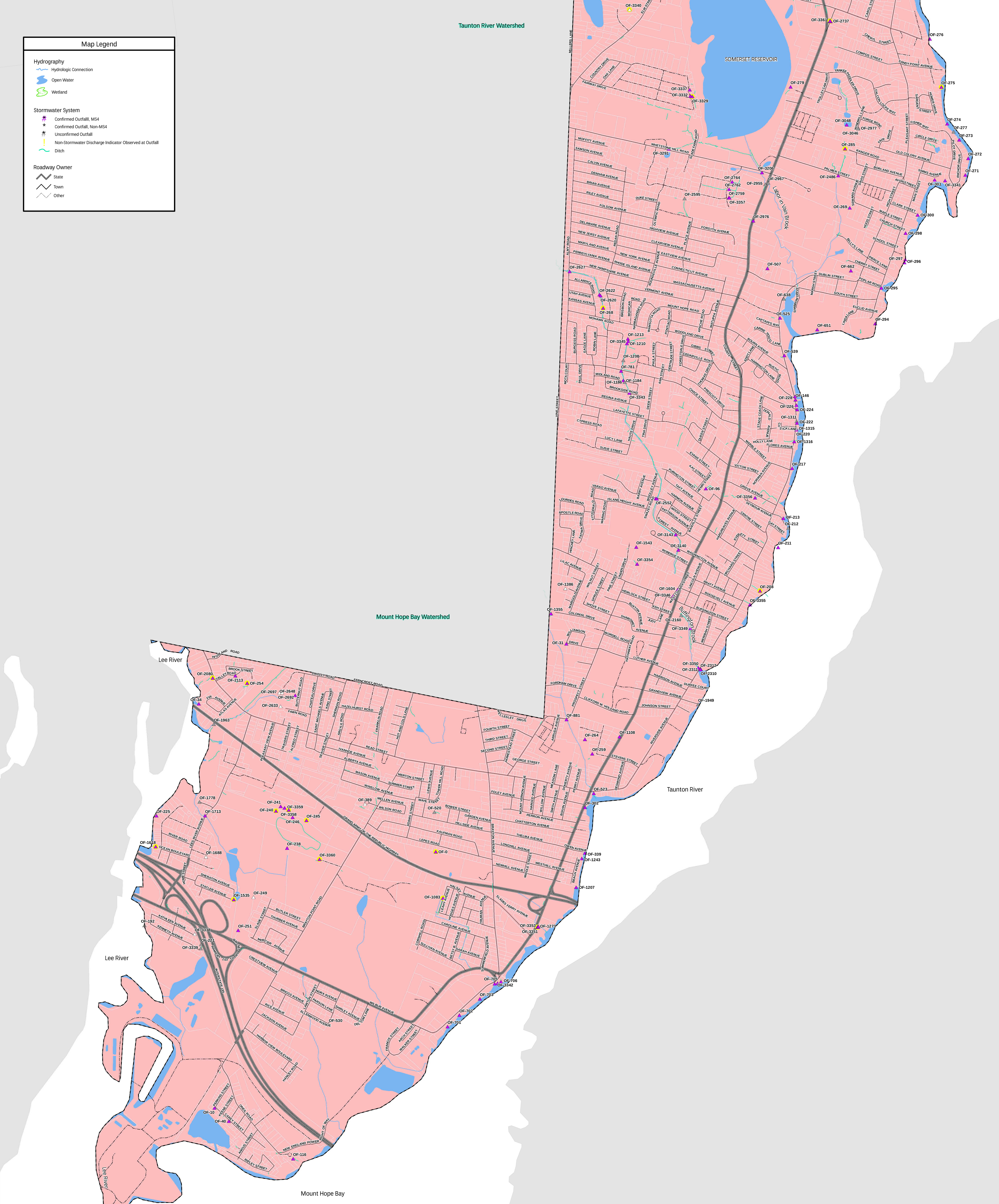
- Compliance with mapping requirements of the MS4 permit
- Uncovering buried outfalls
- Screening of previously missed outfalls located/accessed during mapping, including verification of MS4 designation, in accordance with MS4 permit
- Verification of assumed outfall ownership designation
- Compliance with sampling requirements of the MS4 permit

APPENDIX A

- **Assumed Town-Owned Outfall Map**

Town of Somerset, Massachusetts

Assumed Town-Owned Outfall Map



Issue Date: January 2, 2019

This Map is Intended for Planning Purposes Only

BETA IMPROVING COMMUNITIES TOGETHER

APPENDIX B

- **Assumed Town-Owned MS4 Outfalls**
- **Assumed Town-Owned Non-MS4 Outfalls**

Town of Somerset, Massachusetts

Outfall Inspection Program - Assumed Town-Owned MS4 Outfalls Sorted By Street With Inspection Data

Total - 122

	Inspection Date	Use	Pipe Material	Pipe Size	Pipe Shape	Outfall Structure	Outfall Material	Outfall Condition	Outfall Issues	Flow To	Flow Amount	Flow Clarity	Flow Color	Odor	Sediment	Scouring	Algae Growth	Stressed Vegetation	Staining	Floatables	Oil Sheen
ALLARDICE ROAD																					
OF-2622	11/8/2018	Residential	RCP	12	Round	Pipe end	RCP	Fair	None	Stream	Moderate	Clear	Clear	No	No	No	No	No	No	No	No
ALMY ROAD																					
OF-2627	11/8/2018	Residential	RCP	8	Round	Headwall	Concrete	Good	None	Stream	None	NA	NA	No	Yes	No	No	No	No	No	No
ANCHOR DRIVE																					
OF-271	11/5/2018	Residential	RCP	12	Round	Pipe end	RCP	Fair	Damaged	River	None	NA	NA	No	No	No	No	No	No	No	No
OF-272	11/5/2018	Residential	RCP	12	Round	Pipe end	RCP	Good	None	River	None	NA	NA	No	No	No	No	No	No	No	No
OF-273	11/5/2018	Residential	RCP	24	Round	Pipe end	RCP	Good	None	River	Moderate	Clear	Clear	No	No	No	No	No	No	No	No
BEACH AVENUE																					
OF-1207	11/9/2018	Residential	RCP	48	Round	Headwall	Concrete	Good	None	River	Moderate	Clear	Red	No	No	No	No	No	No	No	No
OF-1243	11/9/2018	Residential	CMP	15	Round	Headwall	Concrete	Good	None	River	None	NA	NA	No	No	No	No	No	No	No	No
BROOKSIDE ROAD																					
OF-3343	11/8/2018	Residential	RCP	12	Round	Pipe end	RCP	Good	None	Stream	None	NA	NA	No	No	No	No	No	No	No	No
BUFFINTON STREET																					
OF-3347	11/8/2018	Commercial	RCP	12	Round	Headwall	Stone	Fair	Damaged	Stream	Moderate	Clear	Clear	No	No	No	No	No	No	No	No
OF-3348	11/8/2018	Commercial	VC	12	Round	Headwall	Stone	Fair	Damaged	Stream	None	NA	NA	No	No	No	No	No	No	No	No
BUTTERNUT ROAD																					
OF-2648	11/9/2018	Residential	CMP	36	Round	Headwall	Stone	Fair	None	Stream	Moderate	Clear	Clear	No	No	No	No	No	No	No	No
CAREY STREET																					
OF-10	11/9/2018	Residential	HDPE	12	Round	Flared end	HDPE	Good	None	Stream	Trickle	Clear	Clear	No	Yes	No	No	No	No	No	No
OF-40	11/12/2018	Residential	RCP	15	Round	Headwall	Stone	Good	None	Land	Trickle	Clear	Clear	No	No	No	No	No	No	No	No
CHACE STREET																					
OF-781	11/8/2018	Residential	RCP	24	Round	Pipe end	RCP	Fair	None	Stream	Substantial	Clear	Red	No	No	No	No	No	No	No	No
CHERRY STREET																					
OF-662	11/5/2018	Residential	HDPE	12	Round	Pipe end	HDPE	Good	None	Wetland	None	NA	NA	No	No	Yes	No	No	No	No	No
CLARK STREET																					
OF-300	11/5/2018	Residential	RCP	15	Round	Headwall	Stone	Fair	Damaged	River	None	NA	NA	No	No	Yes	No	No	No	No	No
COLONIAL DRIVE																					
OF-1355	11/9/2018	Residential	RCP	15	Round	Pipe end	RCP	Fair	None	Stream	None	NA	NA	No	No	No	No	No	No	No	No
COUNTY STREET																					
OF-1108	11/12/2018	Commercial	RCP	15	Round	Flared end	RCP	Good	None	Land	None	NA	NA	No	Yes	No	No	No	No	No	No
OF-2976	11/15/2018	Mixed	RCP	15	Round	Headwall	Concrete	Good	Minor blockage	Land	None	NA	NA	No	Yes	No	No	No	No	No	No
EAST COUNTY STREET																					
OF-2737	11/20/2018	Residential	CMP	24	Round	Headwall	Stone	Poor	Suds, corroded invert	Land	Moderate	Clear	Clear	No	No	No	No	No	No	Suds	No
OF-3361	11/20/2018	Residential	RCP	8	Round	Headwall	Stone	Good	None	Land	None	NA	NA	No	No	No	No	No	No	No	No
ENTERPRISE DRIVE																					
OF-1618	11/9/2018	Residential	VC, RCP	12	Round	Pipe end	VC, RCP	Fair	Suds, damaged	River	Trickle	Clear	Clear	No	No	Yes	No	No	No	Suds	No
FENO COURT																					
OF-1210	11/8/2018	Residential	PVC	10	Round	Pipe end	PVC	Good	None	Stream	None	NA	NA	No	No	No	No	No	No	No	No
OF-1213	11/8/2018	Residential	CMP	48	Round	Headwall	Stone	Fair	None	Stream	Substantial	Clear	Red	No	No	No	No	No	No	No	No
OF-3345	11/8/2018	Residential	RCP	15	Round	Pipe end	RCP	Good	Debris	Stream	Trickle	Clear	Clear	No	No	No	No	No	No	No	No
FOREST AVENUE																					
OF-3143	11/8/2018	Residential	RCP	24	Round	Headwall	Stone	Fair	None	Stream	Trickle	Clear	Clear	No	No	No	No	No	No	No	No
GAR HIGHWAY																					
OF-34	11/9/2018	Residential	Unknown		Unknown	Headwall	Concrete	Fair	Fully submerged, some cracking	River	Moderate	Clear	Reddish	No	No	No	No	No	No	No	No
OF-3358	11/15/2018	Commercial	HDPE	12	Round	Flared end	RCP	Fair	Oil sheen	Stream	None	NA	NA	No	No	No	Yes	No	No	No	Yes
GROVE AVENUE																					
OF-3356	11/12/2018	Residential	CMP	36	Round	Pipe end	CMP	Fair	None	Swale	Moderate	Clear	Red	No	No	No	No	No	No	No	No
HAWTHORN STREET																					

	Inspection Date	Use	Pipe Material	Pipe Size	Pipe Shape	Outfall Structure	Outfall Material	Outfall Condition	Outfall Issues	Flow To	Flow Amount	Flow Clarity	Flow Color	Odor	Sediment	Scouring	Algae Growth	Stressed Vegetation	Staining	Floatables	Oil Sheen
OF-3349	11/8/2018	Residential	RCP	18	Round	Headwall	Stone	Good	None	Stream	Moderate	Clear	Clear	No	No	No	No	No	No	No	No
HENRI STREET																					
OF-96	11/15/2018	Residential	CMP	24	Round	Headwall	Stone	Fair	None	Swale	Trickle	Clear	Red	No	No	No	No	No	No	No	No
KENMAR DRIVE																					
OF-2879	11/5/2018	Residential	Unknown	0	Unknown	Unknown	Unknown	Unknown	Buried structure, turbidity, oil sheen	Wetland	Trickle	Cloudy	Clear	No	Yes	No	No	No	No	No	Yes
LEAHY AVENUE																					
OF-1083	11/9/2018	Residential	CMP	30	Round	Headwall	Stone	Fair	Suds	Stream	Moderate	Clear	Clear	No	No	No	No	No	No	Suds	No
LEES RIVER AVENUE																					
OF-1713	11/9/2018	Residential	RCP	18	Round	Pipe end	RCP	Fair	Debris	Stream	Moderate	Clear	Red	No	Yes	No	Yes	No	No	No	No
LEPES ROAD																					
OF-0	11/9/2018	Residential	RCP	18	Round	Headwall	Stone	Good	Suds	Stream	Moderate	Clear	Clear	No	No	No	Yes	No	No	No	No
LINDA LANE																					
OF-651	11/8/2018	Open Space	PVC	12	Round	Headwall	Stone	Good	None	River	None	NA	NA	No	No	No	No	No	No	No	No
LINDEN DRIVE																					
OF-3354	11/12/2018	Residential	HDPE	18	Round	Flared end	HDPE	Good	None	Wetland	None	NA	NA	No	Yes	No	No	No	No	No	No
MAIN STREET																					
OF-294	11/5/2018	Industrial	RCP	12	Round	Flared end	RCP	Good	None	River	None	NA	NA	No	Yes	No	No	No	No	No	No
OF-295	11/5/2018	Residential	RCP	24	Round	Headwall	Stone	Good	None	River	None	NA	NA	No	No	Yes	No	No	No	No	No
OF-298	11/5/2018	Residential	RCP	18	Round	Flared end	RCP	Fair	Damaged	River	None	NA	NA	No	No	No	No	No	No	No	No
MAPLE STREET																					
OF-269	11/15/2018	Residential	PVC	12	Round	Pipe end	PVC	Good	None	Land	None	NA	NA	No	No	No	No	No	No	No	No
MIDLAND ROAD																					
OF-1184	11/8/2018	Residential	RCP	18	Round	Pipe end	RCP	Fair	None	Stream	Trickle	Clear	Clear	No	No	No	No	No	No	No	No
NORTH STREET																					
OF-276	11/5/2018	Residential	RCP	15	Round	Pipe end	RCP	Fair	None	River	Drip	Clear	Clear	No	No	No	No	No	No	No	No
OFF ROAD																					
OF-116	11/12/2018	Residential	Lined HDPE	18	Round	Flared end	Lined HDPE	Fair	Damaged	River	None	NA	NA	No	No	No	Yes	No	No	No	No
OF-225	11/9/2018	Residential	RCP	12	Flaired	Flared end	RCP	Fair	Cracking	River	Trickle	Clear	Clear	No	No	No	Yes	No	No	No	No
OF-238	11/9/2018	Open Space	CMP	12	Round	Flared end	Metal	Good	None	Land	Drip	Clear	Clear	No	No	No	No	No	No	No	No
OF-240	11/15/2018	Open Space	HDPE	12	Round	Flared end	HDPE	Good	Suds	Stream	Trickle	Clear	Clear	No	No	No	Yes	No	No	Suds	No
OF-241	11/15/2018	Commercial	Unknown	0	Round	Pipe end	Unknown	Poor	Covered in concrete	Stream	None	NA	NA	No	No	No	No	No	No	No	No
OF-245	11/15/2018	Open Space	RCP	24	Round	Flared end	RCP	Good	Suds	Stream	Moderate	Clear	Clear	No	No	No	Yes	No	No	Suds	No
OF-246	11/15/2018	Open Space	CMP	12	Round	Flared end	CMP	Good	None	Stream	None	NA	NA	No	No	No	No	No	No	No	No
OF-254	11/12/2018	Residential	HDPE	12	Round	Flared end	HDPE	Good	Oil sheen	Det. basin	None	NA	NA	No	No	No	No	No	No	No	Yes
OF-259	11/12/2018	Mixed	RCP	15	Round	Wingwall	Concrete	Good	None	Wetland	Moderate	Clear	Clear	No	No	No	No	No	No	No	No
OF-264	11/12/2018	Residential	RCP	15	Round	Wingwall	Concrete	Good	None	Wetland	Drip	Clear	Clear	No	No	Yes	No	No	No	No	No
OF-274	11/5/2018	Residential	RCP	36	Round	Pipe end	RCP	Good	None	River	Moderate	Clear	Clear	No	No	No	No	No	No	No	No
OF-275	11/5/2018	Residential	RCP	15	Round	Flared end	RCP	Good	Staining	River	None	NA	NA	No	No	Yes	Yes	No	Yes	No	No
OF-279	11/5/2018	Residential	RCP	15	Round	Flared end	RCP	Good	Major blockage	Land	None	NA	NA	No	Yes	No	No	No	No	No	No
OF-296	11/5/2018	Open Space	CI	15	Round	Pipe end	CI	Good	None	River	None	NA	NA	No	No	No	No	No	No	No	No
OF-297	11/5/2018	Open Space	CI	15	Round	Pipe end	CI	Good	None	River	None	NA	NA	No	No	No	No	No	No	No	No
OF-516	11/5/2018	Residential	RCP	18	Round	Headwall	Concrete	Good	None	Wetland	None	NA	NA	No	Yes	No	No	No	No	No	No
OF-1543	11/12/2018	Open Space	CMP	24	Round	Headwall	Stone	Fair	Headwall collapsing	Wetland	Moderate	Clear	Clear	No	Yes	No	No	No	No	No	No
OF-2759	11/15/2018	Residential	RCP	24	Round	Wingwall	Concrete	Good	None	Swale	Moderate	Clear	Clear	No	No	Yes	No	No	No	No	No
OF-2762	11/15/2018	Residential	RCP	15	Round	Wingwall	Concrete	Good	None	Swale	Trickle	Clear	Clear	No	No	No	No	No	No	No	No
OF-2764	11/15/2018	Residential	RCP	24	Round	Wingwall	Concrete	Good	Minor blockage	Swale	Trickle	Clear	Clear	No	No	No	No	No	No	No	No
OF-3329	11/15/2018	Residential	RCP	12	Round	Flared end	RCP	Good	Suds, odor	Land	Substantial	Clear	Clear	Sulfur	No	No	Yes	No	No	Suds	No
OF-3332	11/15/2018	Residential	RCP	12	Round	Flared end	RCP	Good	None	Land	None	NA	NA	No	No	No	No	No	No	No	No
OF-3337	11/15/2018	Residential	RCP	12	Round	Flared end	RCP	Good	None	Land	None	NA	NA	No	No	No	No	No	No	No	No
OF-3357	11/15/2018	Residential	RCP	18	Round	Wingwall	Concrete	Good	Obstructed by vegetation	Swale	None	NA	NA	No	Yes	No	No	No	No	No	No
OF-3359	11/15/2018	Commercial	HDPE	24	Round	Flared end	HDPE	Good	None	Stream	Moderate	Clear	Clear	No	No	No	Yes	No	No	No	No
OF-3360	11/15/2018	Commercial	RCP	48	Round	Pipe end	RCP	Good	Suds, brown flow, turbidity	Stream	Substantial	Opaque	Brown	No	No	No	No	No	No	Suds	No
OWEN AVENUE																					

	Inspection Date	Use	Pipe Material	Pipe Size	Pipe Shape	Outfall Structure	Outfall Material	Outfall Condition	Outfall Issues	Flow To	Flow Amount	Flow Clarity	Flow Color	Odor	Sediment	Scouring	Algae Growth	Stressed Vegetation	Staining	Floatables	Oil Sheen
OF-339	11/9/2018	Residential	RCP	24	Round	Pipe end	RCP	Good	None	River	Moderate	Clear	Clear	No	No	No	No	No	No	No	No
PALMER STREET																					
OF-2486	11/12/2018	Residential	RCP	18	Round	Unknown	RCP	Poor	Damaged, fully submerged	Stream	Unknown	NA	NA	No	No	No	No	No	No	No	No
PILOT DRIVE																					
OF-3341	11/5/2018	Residential	RCP	12	Round	Pipe end	RCP	Fair	Damaged	River	Drip	Clear	Clear	No	No	Yes	No	No	No	No	No
PROSPECT STREET																					
OF-881	11/9/2018	Residential	CMP	96	Round	Flared end	CMP	Good	None	Stream	Substantial	Clear	Reddish	No	No	No	No	No	No	No	No
RANGER ROAD																					
OF-285	11/5/2018	Residential	RCP	15	Round	Pipe end	RCP	Unknown	Fully submerged, oil sheen	Wetland	None	NA	NA	No	No	Yes	No	No	No	No	Yes
READ STREET																					
OF-2080	11/12/2018	Residential	RCP	60	Round	Wingwall	Concrete	Good	Staining	Swale	Substantial	Clear	Clear	No	No	No	No	No	Yes	No	No
REGAN ROAD																					
OF-268	11/8/2018	Residential	CMP	12	Round	Pipe end	CMP	Fair	Beginning to rust out, turbidity	Stream	Moderate	Cloudy	Clear	No	No	No	No	No	No	No	No
OF-2620	11/8/2018	Residential	RCP	18	Round	Pipe end	RCP	Good	None	Stream	Moderate	Clear	Clear	No	No	No	Yes	No	No	No	No
RIVERSIDE AVENUE																					
OF-146	11/8/2018	Residential	PVC	8	Round	Pipe end	PVC	Good	None	River	Trickle	Clear	Clear	No	No	No	Yes	No	No	No	No
OF-208	11/12/2018	Residential	RCP	18	Round	Pipe end	RCP	Fair	Fully submerged, odor, oil sheen	River	Unknown	NA	NA	Sulfur	No	No	No	No	No	No	Yes
OF-211	11/15/2018	Residential	HDPE	12	Round	Pipe end	HDPE	Good	None	River	Moderate	Clear	Clear	No	No	No	No	No	No	No	No
OF-217	11/8/2018	Residential	RCP	36	Round	Headwall	Stone	Good	None	River	Substantial	Clear	Clear	No	No	No	No	No	No	No	No
OF-220	11/8/2018	Residential	RCP	12	Round	Pipe end	RCP	Good	None	River	Moderate	Clear	Clear	No	No	No	No	No	No	No	No
OF-222	11/8/2018	Residential	RCP	18	Round	Pipe end	RCP	Unknown	Buried structure, debris	River	Moderate	Clear	Clear	No	Yes	No	No	No	No	No	No
OF-224	11/8/2018	Residential	VC	12	Round	Pipe end	VC	Unknown	Major blockage	River	Moderate	Clear	Clear	No	Yes	No	No	No	No	No	No
OF-226	11/8/2018	Residential	RCP	12	Round	Headwall	Stone	Fair	None	River	Trickle	Clear	Clear	No	No	No	No	No	No	No	No
OF-228	11/8/2018	Residential	Stone	24	Irregular	Headwall	Stone	Good	None	River	Moderate	Clear	Clear	No	No	No	No	No	No	No	No
OF-302	11/8/2018	Residential	HDPE	12	Round	Headwall	Concrete	Good	None	Stream	None	NA	NA	No	Yes	No	No	No	No	No	No
OF-523	11/8/2018	Mixed	Concrete	96	Box	Box culvert	Concrete	Good	None	Stream	Substantial	Clear	Red	No	No	No	No	No	No	No	No
OF-525	11/5/2018	Residential	RCP	24	Round	Pipe end	RCP	Good	None	River	None	NA	NA	No	No	No	No	No	No	No	No
OF-539	11/5/2018	Residential	RCP	24	Round	Headwall	Stone	Good	None	River	Substantial	Clear	Clear	No	No	Yes	No	No	No	No	No
OF-701	11/9/2018	Industrial	HDPE	12	Round	Pipe end	HDPE	Fair	None	River	Moderate	Clear	Clear	No	No	No	Yes	No	No	No	No
OF-702	11/9/2018	Industrial	RCP	12	Round	Pipe end	Concrete	Good	None	River	None	NA	NA	No	No	Yes	No	No	No	No	No
OF-703	11/9/2018	Commercial	RCP	24	Round	Pipe end	RCP	Fair	None	River	Moderate	Clear	Clear	No	No	No	Yes	No	No	No	No
OF-705	11/9/2018	Mixed	VC	12	Round	Headwall	Concrete	Fair	None	River	None	NA	NA	No	No	No	No	No	No	No	No
OF-706	11/9/2018	Residential	RCP	18	Round	Pipe end	RCP	Good	None	River	Moderate	Clear	Clear	No	No	No	No	No	No	No	No
OF-1273	11/9/2018	Commercial	RCP	24	Round	Flared end	RCP	Good	Suds, staining, turbidity	River	Trickle	Cloudy	Red	No	No	No	No	No	Yes	Suds	No
OF-1316	11/8/2018	Residential	Unknown	0	Unknown	Headwall	Stone	Poor	Buried structure, possibly collapsed	River	Trickle	Clear	Clear	No	Yes	No	No	No	No	No	No
OF-2310	11/8/2018	Residential	RCP	12	Round	Headwall	Stone	Good	None	Stream	None	NA	NA	No	No	No	No	No	No	No	No
OF-2311	11/8/2018	Residential	CI	6	Round	Headwall	Stone	Good	None	Stream	None	NA	NA	No	No	No	No	No	No	No	No
OF-2312	11/8/2018	Residential	RCP	15	Round	Headwall	Stone	Poor	Headwall collapse, pipe joint separating	Stream	None	NA	NA	No	No	No	No	No	No	No	No
OF-3342	11/9/2018	Residential	Stone	0	Irregular	Headwall	Stone	Fair	None	River	Moderate	Clear	Reddish	No	No	No	No	No	No	No	No
OF-3350	11/8/2018	Residential	CMP	24	Round	Pipe end	CMP	Poor	Rusting out	Stream	None	NA	NA	No	No	No	No	No	No	No	No
OF-3351	11/9/2018	Commercial	VC	18	Round	Headwall	Concrete	Fair	None	River	Moderate	Clear	Clear	No	No	Yes	Yes	No	No	No	No
OF-3352	11/9/2018	Commercial	VC	10	Round	Headwall	Concrete	Fair	None	River	None	NA	NA	No	No	No	No	No	No	No	No
OF-3353	11/9/2018	Commercial	RCP	15	Round	Flared end	RCP	Good	None	River	None	NA	NA	No	Yes	No	No	No	No	No	No
OF-3355	11/12/2018	Residential	RCP	18	Round	Headwall	Stone	Fair	Minor blockage	River	None	NA	NA	No	Yes	No	No	No	No	No	No
SIMMS AVENUE																					
OF-301	11/5/2018	Residential	CMP	15	Round	Pipe end	CMP	Poor	Ground collapse	River	None	NA	NA	No	Yes	Yes	No	No	No	No	No
SOUTH STREET																					
OF-507	11/15/2018	Residential	HDPE	12	Round	Flared end	HDPE	Good	None	Land	None	NA	NA	No	No	No	No	No	No	No	No
VALLEY ROAD																					
OF-2113	11/12/2018	Residential	RCP	36	Round	Headwall	Stone	Good	None	Stream	Substantial	Clear	Clear	No	No	No	No	No	No	No	No
WALDORF STREET																					
OF-1535	11/9/2018	Residential	RCP	0	Round	Pipe end	Concrete	Fair	Major blockage, fully submerged, oil sheen	Wetland	None	NA	NA	No	Yes	No	No	No	No	No	Yes
WARREN STREET																					

	Inspection Date	Use	Pipe Material	Pipe Size	Pipe Shape	Outfall Structure	Outfall Material	Outfall Condition	Outfall Issues	Flow To	Flow Amount	Flow Clarity	Flow Color	Odor	Sediment	Scouring	Algae Growth	Stressed Vegetation	Staining	Floatables	Oil Sheen
OF-213	11/8/2018	Residential	RCP	24	Round	Headwall	Stone	Good	None	River	Substantial	Clear	Clear	No	No	Yes	No	No	No	No	No
WASHINGTON AVENUE																					
OF-3140	11/8/2018	Residential	RCP	15	Round	Pipe end	RCP	Good	None	Stream	None	NA	NA	No	No	No	No	No	No	No	No
WEST COUNTY STREET																					
OF-1604	11/8/2018	Commercial	VC	12	Round	Headwall	Stone	Fair	Damaged	Stream	None	NA	NA	No	No	No	No	No	No	No	No
OF-1607	11/8/2018	Commercial	RCP	12	Round	Headwall	Stone	Good	None	Stream	Trickle	Clear	Clear	No	Yes	No	No	No	No	No	No
OF-3346	11/8/2018	Commercial	RCP	12	Round	Pipe end	RCP	Good	None	Stream	None	NA	NA	No	No	No	No	No	No	No	No
WHETSTONE HILL ROAD																					
OF-3206	11/5/2018	Mixed	RCP	15	Round	Headwall	Stone	Good	Fully submerged	Stream	None	NA	NA	No	No	No	No	No	No	No	No
OF-3291	11/5/2018	Municipal	HDPE	24	Round	Flared end	HDPE	Good	None	Land	Unknown	NA	NA	No	No	No	No	No	No	No	No
WILBUR AVENUE																					
OF-251	11/9/2018	Open Space	RCP	24	Round	Pipe end	Concrete	Fair	Pipe end segment has fallen off rest of pipe	Wetland	Trickle	Clear	Clear	No	No	No	No	No	No	No	No
WILLIAMSON DRIVE																					
OF-31	11/12/2018	Residential	RCP	18	Round	Flared end	RCP	Good	None	Wetland	Trickle	Clear	Clear	No	No	No	No	No	No	No	No
WINDMILL LANE																					
OF-3048	11/5/2018	Residential	RCP	24	Round	Flared end	RCP	Good	None	Pond	None	NA	NA	No	No	No	No	No	No	No	No
WOOD STREET																					
OF-2552	11/8/2018	Residential	RCP	15	Round	Pipe end	RCP	Good	None	Stream	Moderate	Clear	Clear	No	No	No	No	No	No	No	No
OF-2553	11/8/2018	Residential	RCP	15	Round	Pipe end	RCP	Good	None	Stream	Moderate	Clear	Clear	No	No	No	No	No	No	No	No

Town of Somerset, Massachusetts

Outfall Inspection Program - Assumed Town-Owned Non-MS4 Outfalls Sorted By Street With Inspection Data

Total - 11

	Inspection Date	Use	Pipe Material	Pipe Size	Pipe Shape	Outfall Structure	Outfall Material	Outfall Condition	Outfall Issues	Flow To	Flow Amount	Flow Clarity	Flow Color	Odor	Sediment	Scouring	Algae Growth	Stressed Vegetation	Staining	Floatables	Oil Sheen
BROAD COVE STREET																					
OF-288	11/15/2018	Residential	RCP	18	Round	Flared end	RCP	Good	None	Det. basin	None	NA	NA	No	No	No	No	No	No	No	No
ELLENWOOD AVENUE																					
OF-530	11/12/2018	Municipal	Unknown	0	Unknown	Unknown	Unknown	Unknown	Buried structure	Land	Trickle	Clear	Clear	No	Yes	No	No	No	No	No	No
FAWN ROAD																					
OF-2633	11/9/2018	Residential	RCP	24	Round	Flared end	RCP	Good	None	Land	None	NA	NA	No	No	No	No	No	No	No	No
KATHLEEN AVENUE																					
OF-3338	11/12/2018	Residential	PVC	12	Round	Pipe end	PVC	Good	None	Land	None	NA	NA	No	Yes	No	No	No	No	No	No
OFF ROAD																					
OF-389	11/12/2018	Residential	HDPE	12	Round	Flared end	HDPE	Good	None	Det. basin	Trickle	Clear	Clear	No	No	No	No	No	No	No	No
OF-1688	11/12/2018	Residential	RCP	18	Round	Flared end	RCP	Good	None	Det. basin	None	NA	NA	No	No	No	No	No	No	No	No
OF-2692	11/9/2018	Residential	RCP	18	Round	Flared end	RCP	Good	None	Land	None	NA	NA	No	No	No	No	No	No	No	No
OF-2697	11/9/2018	Residential	RCP	24	Round	Flared end	RCP	Good	None	Land	None	NA	NA	No	No	No	No	No	No	No	No
OF-3340	11/5/2018	Residential	HDPE	18	Round	Flared end	HDPE	Good	Oil sheen	Det. basin	None	NA	NA	No	No	No	No	No	No	No	Yes
SLADE STREET																					
OF-249	11/12/2018	Residential	Unknown	0	Unknown	Flared end	RCP	Unknown	Fully submerged	Land	Trickle	Clear	Clear	No	No	No	No	No	No	No	No
TULIP AVENUE																					
OF-1386	11/12/2018	Residential	Unknown	0	Unknown	Unknown	Unknown	Unknown	Fully submerged, no access	Det. basin	Unknown	NA	NA	No	No	No	No	No	No	No	No

APPENDIX C

- **Outfall Inspections**

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-0		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	LEPES ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes
Outfall Issue:	Suds		
Inspection Notes:			

Outfall ID:	OF-10		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	CAREY STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	HDPE		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	HDPE	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	Yes	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-31		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/12/2018		
Street Name:	WILLIAMSON DRIVE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Wetland	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-34		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	GAR HIGHWAY		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:			
Pipe Shape:	Unknown		
Pipe Material:	Unknown		
Number of Pipes:	0		
Outfall Type:	Headwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Reddish
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes
Outfall Issue:	Fully submerged, some cracking		
Inspection Notes:	Outfall completely submerged, flow visible		

Outfall ID:	OF-40
Watershed:	MT HOPE BAY
MS4:	Yes
Inspection Date:	11/12/2018
Street Name:	CAREY STREET
Assumed Owner:	Town
Use:	Residential
Pipe Size:	15
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Headwall

Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Land	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue:	None
Inspection Notes:	Swampy Land

Outfall ID:	OF-96
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/15/2018
Street Name:	HENRI STREET
Assumed Owner:	Town
Use:	Residential
Pipe Size:	24
Pipe Shape:	Round
Pipe Material:	CMP
Number of Pipes:	1
Outfall Type:	Headwall

Outfall Material:	Stone	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	Swale	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Red
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue:	None
Inspection Notes:	Outfall may be culvert outlet

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-116		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/12/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	Lined HDPE		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	Lined HDPE	Staining:	No
Outfall Condition:	Fair	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Damaged

Inspection Notes:

Outfall ID:	OF-146		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	8		
Pipe Shape:	Round		
Pipe Material:	PVC		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	PVC	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-208		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/12/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	NA
Discharging To:	River	Discharging:	
Sediment Accumulation	No	Discharge Amount:	Unknown
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	Yes
Algae Growth:	No	Odor:	Sulfur
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: Fully submerged, odor, oil sheen

Inspection Notes:

Outfall ID:	OF-211		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	HDPE		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	HDPE	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-213		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	WARREN STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Substantial
Scouring:	Yes	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-217		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	36		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Substantial
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-220
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/8/2018
Street Name:	RIVERSIDE AVENUE
Assumed Owner:	Town
Use:	Residential
Pipe Size:	12
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Outfall ID:	OF-222
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/8/2018
Street Name:	RIVERSIDE AVENUE
Assumed Owner:	Town
Use:	Residential
Pipe Size:	18
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Unknown	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	Yes	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Buried structure, debris

Inspection Notes: Size approximate

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-224		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	VC		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	VC	Staining:	No
Outfall Condition:	Unknown	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	Yes	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	Major blockage		
Inspection Notes:	Size approximate		

Outfall ID:	OF-225		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Flaired		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	Cracking		
Inspection Notes:			

Outfall ID:	OF-226
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/8/2018
Street Name:	RIVERSIDE AVENUE
Assumed Owner:	Town
Use:	Residential
Pipe Size:	12
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Headwall

Outfall Material:	Stone	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	

Outfall ID:	OF-228
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/8/2018
Street Name:	RIVERSIDE AVENUE
Assumed Owner:	Town
Use:	Residential
Pipe Size:	24
Pipe Shape:	Irregular
Pipe Material:	Stone
Number of Pipes:	1
Outfall Type:	Headwall

Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-238		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Open Space		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	CMP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	Metal	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Land	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Drip
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes: Swampy land

Outfall ID:	OF-240		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Open Space		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	HDPE		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	HDPE	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	Suds	Oil Sheen:	No
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Suds

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-241		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Commercial		
Pipe Size:	0		
Pipe Shape:	Round		
Pipe Material:	Unknown		
Number of Pipes:	0		
Outfall Type:	Pipe end		
Outfall Material:	Unknown	Staining:	No
Outfall Condition:	Poor	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Covered in concrete

Inspection Notes:

Outfall ID:	OF-245		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Open Space		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	Suds	Oil Sheen:	No
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Suds

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-246		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Open Space		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	CMP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	CMP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:	No access, heavy thorn overgrowth		

Outfall ID:	OF-249		
Watershed:	MT HOPE BAY		
MS4:	No		
Inspection Date:	11/12/2018		
Street Name:	SLADE STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	0		
Pipe Shape:	Unknown		
Pipe Material:	Unknown		
Number of Pipes:			
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Unknown	Turbidity:	No
Discharging To:	Land	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes
Outfall Issue:	Fully submerged		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-251		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	WILBUR AVENUE		
Assumed Owner:	Town		
Use:	Open Space		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	Wetland	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	Pipe end segment has fallen off rest of pipe		
Inspection Notes:			

Outfall ID:	OF-254		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/12/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	HDPE		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	HDPE	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Detention basin	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	Yes
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	Oil sheen		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-259		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/12/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Mixed		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Wingwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Wetland	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-264		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/12/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Wingwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Wetland	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Drip
Scouring:	Yes	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-268		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	REGAN ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	CMP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	CMP	Staining:	No
Outfall Condition:	Fair	Turbidity:	Yes
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	Beginning to rust out, turbidity		
Inspection Notes:			

Outfall ID:	OF-269		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	MAPLE STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	PVC		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	PVC	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Land	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-271		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	ANCHOR DRIVE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	Damaged		
Inspection Notes:			

Outfall ID:	OF-272		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	ANCHOR DRIVE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-273
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/5/2018
Street Name:	ANCHOR DRIVE
Assumed Owner:	Town
Use:	Residential
Pipe Size:	24
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	

Outfall ID:	OF-274
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/5/2018
Street Name:	OFF ROAD
Assumed Owner:	Town
Use:	Residential
Pipe Size:	36
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-275		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	Yes
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	Yes	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	Staining		
Inspection Notes:	Swale downstream of outfall deteriorated		

Outfall ID:	OF-276		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	NORTH STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Drip
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-279
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/5/2018
Street Name:	OFF ROAD
Assumed Owner:	Town
Use:	Residential
Pipe Size:	15
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Flared end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Land	Discharging:	No
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Major blockage

Inspection Notes: Swampy land

Outfall ID:	OF-285
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/5/2018
Street Name:	RANGER ROAD
Assumed Owner:	Town
Use:	Residential
Pipe Size:	15
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Unknown	Turbidity:	NA
Discharging To:	Wetland	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	Yes	Discharge Color:	NA
Floatables	No	Oil Sheen:	Yes
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: Fully submerged, oil sheen

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-288		
Watershed:	TAUNTON		
MS4:	No		
Inspection Date:	11/15/2018		
Street Name:	BROAD COVE STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Detention basin	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:	Size approximate		

Outfall ID:	OF-294		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	MAIN STREET		
Assumed Owner:	Town		
Use:	Industrial		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-295		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	MAIN STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	Yes	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Outfall ID:	OF-296		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Open Space		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	CI		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	CI	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes: Check valve at pipe end

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-297		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Open Space		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	CI		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	CI	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes: Missing check valve

Outfall ID:	OF-298		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	MAIN STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Damaged

Inspection Notes:

Outfall ID:	OF-300
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/5/2018
Street Name:	CLARK STREET
Assumed Owner:	Town
Use:	Residential
Pipe Size:	15
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Headwall

Outfall Material:	Stone	Staining:	No
Outfall Condition:	Fair	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	Yes	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	Damaged
Inspection Notes:	

Outfall ID:	OF-301
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/5/2018
Street Name:	SIMMS AVENUE
Assumed Owner:	Town
Use:	Residential
Pipe Size:	15
Pipe Shape:	Round
Pipe Material:	CMP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	CMP	Staining:	No
Outfall Condition:	Poor	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	Yes	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	Ground collapse
Inspection Notes:	

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-302		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	HDPE		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-339		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	OWEN AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-389		
Watershed:	MT HOPE BAY		
MS4:	No		
Inspection Date:	11/12/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	HDPE		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	HDPE	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Detention basin	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:	Discharges to assumed detention basin		

Outfall ID:	OF-507		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	SOUTH STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	HDPE		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	HDPE	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Land	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-516
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/5/2018
Street Name:	OFF ROAD
Assumed Owner:	Town
Use:	Residential
Pipe Size:	18
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Headwall

Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Wetland	Discharging:	No
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	

Outfall ID:	OF-523
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/8/2018
Street Name:	RIVERSIDE AVENUE
Assumed Owner:	Town
Use:	Mixed
Pipe Size:	96
Pipe Shape:	Box
Pipe Material:	Concrete
Number of Pipes:	1
Outfall Type:	Box culvert

Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Substantial
Scouring:	No	Discharge Color:	Red
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue:	None
Inspection Notes:	May be culvert outlet. Size 96" by 48"

Outfall ID:	OF-525		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: None

Inspection Notes:

Outfall ID:	OF-530		
Watershed:	TAUNTON		
MS4:	No		
Inspection Date:	11/12/2018		
Street Name:	ELLENWOOD AVENUE		
Assumed Owner:	Town		
Use:	Municipal		
Pipe Size:	0		
Pipe Shape:	Unknown		
Pipe Material:	Unknown		
Number of Pipes:	0		
Outfall Type:	Unknown		
Outfall Material:	Unknown	Staining:	No
Outfall Condition:	Unknown	Turbidity:	No
Discharging To:	Land	Discharging:	Yes
Sediment Accumulation	Yes	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Buried structure

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-539		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Substantial
Scouring:	Yes	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-651		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	LINDA LANE		
Assumed Owner:	Town		
Use:	Open Space		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	PVC		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:	Tree growing on outfall		

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-662
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/5/2018
Street Name:	CHERRY STREET
Assumed Owner:	Town
Use:	Residential
Pipe Size:	12
Pipe Shape:	Round
Pipe Material:	HDPE
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	HDPE	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Wetland	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	Yes	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	

Outfall ID:	OF-701
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/9/2018
Street Name:	RIVERSIDE AVENUE
Assumed Owner:	Town
Use:	Industrial
Pipe Size:	12
Pipe Shape:	Round
Pipe Material:	HDPE
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	HDPE	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-702		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Industrial		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	River	Discharging:	
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	Yes	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Outfall ID:	OF-703		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Commercial		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-705
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/9/2018
Street Name:	RIVERSIDE AVENUE
Assumed Owner:	Town
Use:	Mixed
Pipe Size:	12
Pipe Shape:	Round
Pipe Material:	VC
Number of Pipes:	1
Outfall Type:	Headwall

Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Fair	Turbidity:	NA
Discharging To:	River	Discharging:	
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	

Outfall ID:	OF-706
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/9/2018
Street Name:	RIVERSIDE AVENUE
Assumed Owner:	Town
Use:	Residential
Pipe Size:	18
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-781		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	CHACE STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Substantial
Scouring:	No	Discharge Color:	Red
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: None

Inspection Notes:

Outfall ID:	OF-881		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	PROSPECT STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	96		
Pipe Shape:	Round		
Pipe Material:	CMP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	CMP	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Substantial
Scouring:	No	Discharge Color:	Reddish tinge
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: None

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-1083		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	LEAHY AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	30		
Pipe Shape:	Round		
Pipe Material:	CMP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	Suds	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	Suds		
Inspection Notes:			

Outfall ID:	OF-1108		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/12/2018		
Street Name:	COUNTY STREET		
Assumed Owner:	Town		
Use:	Commercial		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Land	Discharging:	No
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:	Flows to paved swale		

Outfall ID:	OF-1184		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	MIDLAND ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:	No access		

Outfall ID:	OF-1207		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	BEACH AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	48		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Red
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-1210		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	FENO COURT		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	10		
Pipe Shape:	Round		
Pipe Material:	PVC		
Number of Pipes:	2		
Outfall Type:	Pipe end		
Outfall Material:	PVC	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes: No access

Outfall ID:	OF-1213		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	FENO COURT		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	48		
Pipe Shape:	Round		
Pipe Material:	CMP		
Number of Pipes:	2		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Substantial
Scouring:	No	Discharge Color:	Red
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: None

Inspection Notes: Outfall may be culvert outlet

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-1243		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	BEACH AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	CMP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	River	Discharging:	
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: None

Inspection Notes:

Outfall ID:	OF-1273		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Commercial		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	Yes
Outfall Condition:	Good	Turbidity:	Yes
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Red
Floatables	Suds	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Suds, staining, turbidity

Inspection Notes:

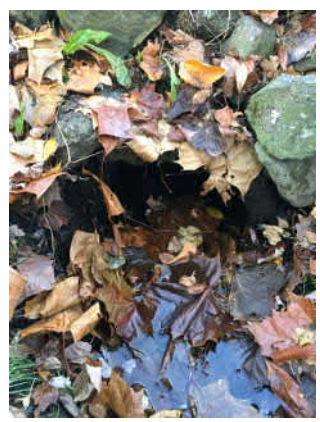
Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-1316		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	0		
Pipe Shape:	Unknown		
Pipe Material:	Unknown		
Number of Pipes:	0		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Poor	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	Yes	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: Buried structure, possibly collapsed

Inspection Notes: Resident says pipe collapsed during road construct



Outfall ID:	OF-1355		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	COLONIAL DRIVE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	NA
Discharging To:	Stream	Discharging:	
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: None

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-1386
Watershed:	TAUNTON
MS4:	No
Inspection Date:	11/12/2018
Street Name:	TULIP AVENUE
Assumed Owner:	Town
Use:	Residential
Pipe Size:	0
Pipe Shape:	Unknown
Pipe Material:	Unknown
Number of Pipes:	
Outfall Type:	Unknown

Outfall Material:	Unknown	Staining:	No
Outfall Condition:	Unknown	Turbidity:	NA
Discharging To:	Detention basin	Discharging:	
Sediment Accumulation	No	Discharge Amount:	Unknown
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: Fully submerged, no access

Inspection Notes: Discharges to assumed detention basin

Outfall ID:	OF-1535
Watershed:	MT HOPE BAY
MS4:	Yes
Inspection Date:	11/9/2018
Street Name:	WALDORF STREET
Assumed Owner:	Town
Use:	Residential
Pipe Size:	0
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Fair	Turbidity:	NA
Discharging To:	Wetland	Discharging:	
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	Yes
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: Major blockage, fully submerged, oil sheen

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-1543		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/12/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Open Space		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	CMP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	Wetland	Discharging:	Yes
Sediment Accumulation	Yes	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: Headwall collapsing

Inspection Notes:

Outfall ID:	OF-1604		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	WEST COUNTY STREET		
Assumed Owner:	Town		
Use:	Commercial		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	VC		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Fair	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Damaged

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-1607
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/8/2018
Street Name:	WEST COUNTY STREET
Assumed Owner:	Town
Use:	Commercial
Pipe Size:	12
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Headwall

Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	Yes	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	Plants growing in pipe

Outfall ID:	OF-1618
Watershed:	MT HOPE BAY
MS4:	Yes
Inspection Date:	11/9/2018
Street Name:	ENTERPRISE DRIVE
Assumed Owner:	Town
Use:	Residential
Pipe Size:	12
Pipe Shape:	Round
Pipe Material:	VC, RCP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	VC, RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	Yes	Discharge Color:	Clear
Floatables	Suds	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	Suds, damaged
Inspection Notes:	

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-1688		
Watershed:	MT HOPE BAY		
MS4:	No		
Inspection Date:	11/12/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Detention basin	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes: No access

Outfall ID:	OF-1713		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	LEES RIVER AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	Yes	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Red
Floatables	No	Oil Sheen:	No
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Debris

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-2080		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/12/2018		
Street Name:	READ STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	60		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Wingwall		
Outfall Material:	Concrete	Staining:	Yes
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Swale	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Substantial
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes
Outfall Issue:	Staining		
Inspection Notes:			

Outfall ID:	OF-2113		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/12/2018		
Street Name:	VALLEY ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	36		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Substantial
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes
Outfall Issue:	None		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-2310		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-2311		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	6		
Pipe Shape:	Round		
Pipe Material:	CI		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-2312
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/8/2018
Street Name:	RIVERSIDE AVENUE
Assumed Owner:	Town
Use:	Residential
Pipe Size:	15
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Headwall

Outfall Material:	Stone	Staining:	No
Outfall Condition:	Poor	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Headwall collapse, pipe joint separating

Inspection Notes:

Outfall ID:	OF-2486
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/12/2018
Street Name:	PALMER STREET
Assumed Owner:	Town
Use:	Residential
Pipe Size:	18
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Unknown

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Poor	Turbidity:	NA
Discharging To:	Stream	Discharging:	
Sediment Accumulation	No	Discharge Amount:	Unknown
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: Damaged, fully submerged

Inspection Notes:

Outfall ID:	OF-2552
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/8/2018
Street Name:	WOOD STREET
Assumed Owner:	Town
Use:	Residential
Pipe Size:	15
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	

Outfall ID:	OF-2553
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/8/2018
Street Name:	WOOD STREET
Assumed Owner:	Town
Use:	Residential
Pipe Size:	15
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end

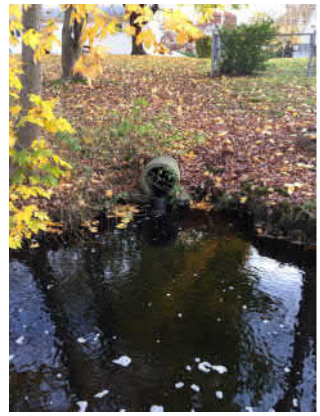
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-2620
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/8/2018
Street Name:	REGAN ROAD
Assumed Owner:	Town
Use:	Residential
Pipe Size:	18
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end



Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Outfall ID:	OF-2622
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/8/2018
Street Name:	ALLARDICE ROAD
Assumed Owner:	Town
Use:	Residential
Pipe Size:	12
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-2627		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	ALMY ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	8		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:	Plants growing in pipe		

Outfall ID:	OF-2633		
Watershed:	MT HOPE BAY		
MS4:	No		
Inspection Date:	11/9/2018		
Street Name:	FAWN ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Land	Discharging:	
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-2648		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	BUTTERNUT ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	36		
Pipe Shape:	Round		
Pipe Material:	CMP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-2692		
Watershed:	MT HOPE BAY		
MS4:	No		
Inspection Date:	11/9/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Land	Discharging:	
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-2697		
Watershed:	MT HOPE BAY		
MS4:	No		
Inspection Date:	11/9/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Land	Discharging:	
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-2737		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/20/2018		
Street Name:	EAST COUNTY STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	CMP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Poor	Turbidity:	No
Discharging To:	Land	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	Suds	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	Suds, corroded invert		
Inspection Notes:	Swampy land		

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-2759		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Wingwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Swale	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	Yes	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Outfall ID:	OF-2762		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Wingwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Swale	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-2764		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Wingwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Swale	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Minor blockage

Inspection Notes:

Outfall ID:	OF-2879		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	KENMAR DRIVE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	0		
Pipe Shape:	Unknown		
Pipe Material:	Unknown		
Number of Pipes:			
Outfall Type:	Unknown		
Outfall Material:	Unknown	Staining:	No
Outfall Condition:	Unknown	Turbidity:	No
Discharging To:	Wetland	Discharging:	Yes
Sediment Accumulation	Yes	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	Yes
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: Buried structure, turbidity, oil sheen

Inspection Notes: Buried structure

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-2976		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	COUNTY STREET		
Assumed Owner:	Town		
Use:	Mixed		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Land	Discharging:	No
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	Minor blockage		
Inspection Notes:			

Outfall ID:	OF-3048		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	WINDMILL LANE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Pond	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes
Outfall Issue:	None		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-3140		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	WASHINGTON AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: None

Inspection Notes:

Outfall ID:	OF-3143		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	FOREST AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-3206		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	WHETSTONE HILL ROAD		
Assumed Owner:	Town		
Use:	Mixed		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes
Outfall Issue:	Fully submerged		
Inspection Notes:	Submerged, size approximate		

Outfall ID:	OF-3291		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/5/2018		
Street Name:	WHETSTONE HILL ROAD		
Assumed Owner:	Town		
Use:	Municipal		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	HDPE		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	HDPE	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Land	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	Unknown
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:	Swampy land		

Outfall ID:	OF-3329
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/15/2018
Street Name:	OFF ROAD
Assumed Owner:	Town
Use:	Residential
Pipe Size:	12
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Flared end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Land	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Substantial
Scouring:	No	Discharge Color:	Clear
Floatables	Suds	Oil Sheen:	No
Algae Growth:	Yes	Odor:	Sulfur
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Suds, odor

Inspection Notes: Swampy land

Outfall ID:	OF-3332
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/15/2018
Street Name:	OFF ROAD
Assumed Owner:	Town
Use:	Residential
Pipe Size:	12
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Flared end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Land	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes: Swampy land

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-3337		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Land	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: None

Inspection Notes: Swampy land

Outfall ID:	OF-3338		
Watershed:	MT HOPE BAY		
MS4:	No		
Inspection Date:	11/12/2018		
Street Name:	KATHLEEN AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	PVC		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	PVC	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Land	Discharging:	No
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Outfall ID:	OF-3340
Watershed:	TAUNTON
MS4:	No
Inspection Date:	11/5/2018
Street Name:	OFF ROAD
Assumed Owner:	Town
Use:	Residential
Pipe Size:	18
Pipe Shape:	Round
Pipe Material:	HDPE
Number of Pipes:	1
Outfall Type:	Flared end

Outfall Material:	HDPE	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Detention basin	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	Yes
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Oil sheen

Inspection Notes: Oil sheen in detention basin

Outfall ID:	OF-3341
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/5/2018
Street Name:	PILOT DRIVE
Assumed Owner:	Town
Use:	Residential
Pipe Size:	12
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Drip
Scouring:	Yes	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Damaged

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-3342		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	0		
Pipe Shape:	Irregular		
Pipe Material:	Stone		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Reddish
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes

Outfall Issue: None

Inspection Notes: Pipe size:36x48. Downstream of culvert?

Outfall ID:	OF-3343		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	BROOKSIDE ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-3345
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/8/2018
Street Name:	FENO COURT
Assumed Owner:	Town
Use:	Residential
Pipe Size:	15
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Trickle
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	Debris
Inspection Notes:	

Outfall ID:	OF-3346
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/8/2018
Street Name:	WEST COUNTY STREET
Assumed Owner:	Town
Use:	Commercial
Pipe Size:	12
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Pipe end

Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	

Outfall ID:	OF-3347		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	BUFFINTON STREET		
Assumed Owner:	Town		
Use:	Commercial		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	Damaged		
Inspection Notes:			

Outfall ID:	OF-3348		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	BUFFINTON STREET		
Assumed Owner:	Town		
Use:	Commercial		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	VC		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Fair	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	Damaged		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-3349		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	HAWTHORN STREET		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Outfall ID:	OF-3350		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/8/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	CMP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	CMP	Staining:	No
Outfall Condition:	Poor	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Rusting out

Inspection Notes:

Outfall ID:	OF-3351		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Commercial		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	VC		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	River	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	Yes	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-3352		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Commercial		
Pipe Size:	10		
Pipe Shape:	Round		
Pipe Material:	VC		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Fair	Turbidity:	NA
Discharging To:	River	Discharging:	
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-3353		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/9/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Commercial		
Pipe Size:	15		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	River	Discharging:	
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Outfall ID:	OF-3354		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/12/2018		
Street Name:	LINDEN DRIVE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	HDPE		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	HDPE	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Wetland	Discharging:	No
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	None		
Inspection Notes:			

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-3355		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/12/2018		
Street Name:	RIVERSIDE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Headwall		
Outfall Material:	Stone	Staining:	No
Outfall Condition:	Fair	Turbidity:	NA
Discharging To:	River	Discharging:	No
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No
Outfall Issue:	Minor blockage		
Inspection Notes:			

Outfall ID:	OF-3356		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/12/2018		
Street Name:	GROVE AVENUE		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	36		
Pipe Shape:	Round		
Pipe Material:	CMP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	CMP	Staining:	No
Outfall Condition:	Fair	Turbidity:	No
Discharging To:	Swale	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Red
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	Yes
Outfall Issue:	None		
Inspection Notes:	Outfall may be culvert outlet		

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-3357		
Watershed:	TAUNTON		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Residential		
Pipe Size:	18		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Wingwall		
Outfall Material:	Concrete	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Swale	Discharging:	No
Sediment Accumulation	Yes	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Obstructed by vegetation

Inspection Notes:

Outfall ID:	OF-3358		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	GAR HIGHWAY		
Assumed Owner:	Town		
Use:	Commercial		
Pipe Size:	12		
Pipe Shape:	Round		
Pipe Material:	HDPE		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Fair	Turbidity:	NA
Discharging To:	Stream	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	Yes
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Oil sheen

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-3359		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Commercial		
Pipe Size:	24		
Pipe Shape:	Round		
Pipe Material:	HDPE		
Number of Pipes:	1		
Outfall Type:	Flared end		
Outfall Material:	HDPE	Staining:	No
Outfall Condition:	Good	Turbidity:	No
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Moderate
Scouring:	No	Discharge Color:	Clear
Floatables	No	Oil Sheen:	No
Algae Growth:	Yes	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: None

Inspection Notes:

Outfall ID:	OF-3360		
Watershed:	MT HOPE BAY		
MS4:	Yes		
Inspection Date:	11/15/2018		
Street Name:	OFF ROAD		
Assumed Owner:	Town		
Use:	Commercial		
Pipe Size:	48		
Pipe Shape:	Round		
Pipe Material:	RCP		
Number of Pipes:	1		
Outfall Type:	Pipe end		
Outfall Material:	RCP	Staining:	No
Outfall Condition:	Good	Turbidity:	Yes
Discharging To:	Stream	Discharging:	Yes
Sediment Accumulation	No	Discharge Amount:	Substantial
Scouring:	No	Discharge Color:	Brown
Floatables	Suds	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue: Suds, brown flow, turbidity

Inspection Notes:

Town of Somerset, Massachusetts

Stormwater Mapping - Outfall Inspections

Outfall ID:	OF-3361
Watershed:	TAUNTON
MS4:	Yes
Inspection Date:	11/20/2018
Street Name:	EAST COUNTY STREET
Assumed Owner:	Town
Use:	Residential
Pipe Size:	8
Pipe Shape:	Round
Pipe Material:	RCP
Number of Pipes:	1
Outfall Type:	Headwall

Outfall Material:	Stone	Staining:	No
Outfall Condition:	Good	Turbidity:	NA
Discharging To:	Land	Discharging:	No
Sediment Accumulation	No	Discharge Amount:	None
Scouring:	No	Discharge Color:	NA
Floatables	No	Oil Sheen:	No
Algae Growth:	No	Odor:	No
Stressed Vegetation:	No	Structure Under Water:	No

Outfall Issue:	None
Inspection Notes:	Swampy land

APPENDIX D

- **Unconfirmed Outfalls**

Structure ID	Notes
OF-192	Could not locate; possibly under vegetation
OF-212	Could not locate
OF-221	Could not locate
OF-277	Could not locate
OF-1186	Could not locate
OF-1208	Could not locate; possibly under leaf pile
OF-1311	Could not locate; possibly buried
OF-1315	Could not locate; possibly buried
OF-1778	Could not locate; possibly under yard debris
OF-1949	Could not locate
OF-1963	No access; heavy thorn overgrowth
OF-2160	Could not locate
OF-2595	Could not locate; possibly fenced in
OF-2955	Could not locate; possibly submerged
OF-2967	Could not locate; possibly submerged
OF-2977	Could not locate
OF-3046	Could not locate
OF-3339	Could not locate
OF-469	Could not locate; possibly buried
OF-520	Could not locate
OF-638	Could not locate; possibly buried

APPENDIX E

- **Misidentified Outfalls**

Structure ID	Notes
OF-192	Could not locate; possibly under vegetation
OF-212	Could not locate
OF-221	Could not locate
OF-277	Could not locate
OF-1186	Could not locate
OF-1208	Could not locate; possibly under leaf pile
OF-1311	Could not locate; possibly buried
OF-1315	Could not locate; possibly buried
OF-1778	Could not locate; possibly under yard debris
OF-1949	Could not locate
OF-1963	No access; heavy thorn overgrowth
OF-2160	Could not locate
OF-2595	Could not locate; possibly fenced in
OF-2955	Could not locate; possibly submerged
OF-2967	Could not locate; possibly submerged
OF-2977	Could not locate
OF-3046	Could not locate
OF-3339	Could not locate
OF-469	Could not locate; possibly buried
OF-520	Could not locate
OF-638	Could not locate; possibly buried

Attachment 2

- Culvert Inventory

Town of Somerset, MA

Water Resources Management Planning

March 2019

Culvert Inventory

BETA
315 Norwood Park South
2nd Floor
Norwood, Massachusetts 02062
781.255.1982
www.BETA-Inc.com

Water Resources Management Planning

Town of Somerset, MA

CULVERT INVENTORY

Prepared by: BETA GROUP, INC.
Prepared for: Town of Somerset

March 2019

CULVERT INVENTORY

BETA conducted a two-day culvert investigation in October 2018 in the Town of Somerset. The purpose of the investigation was to better understand capacity issues raised by the Highway Department and previous drainage studies and to create a culvert inventory that would assist with identifying potential structural or capacity improvement projects. Potential projects are described and assigned a priority ranking in the Comprehensive Stormwater Management Plan.

Culvert data collected during the investigation includes shape, material, approximate size, and general observations. It should be noted that the culvert investigation did not include a structural inspection. The culvert inventory includes 39 culverts, largely reinforced concrete pipe and box culverts. At least five of the culverts (C-20, 26, 34, 35, 40) could be classified by MassDOT as small bridges (10-20' span) for funding purposes. Figure 1-1 of this culvert inventory identifies locations of culverts included in BETA's investigation. Table 1-1 summarizes the findings of the investigation. Inspection photos are included in Table 1-2.

In addition to summarizing the inventoried culverts, Table 1-1 provides recommendations of either replacement or structural inspection for each. Culverts recommended for replacement are those identified by the Highway Department or previous reports as requiring replacement based on structural or capacity concerns. Culverts that were not recommended for replacement were recommended for structural inspection. A structural inspection prioritization of either High or Low was assigned based upon the following categories:

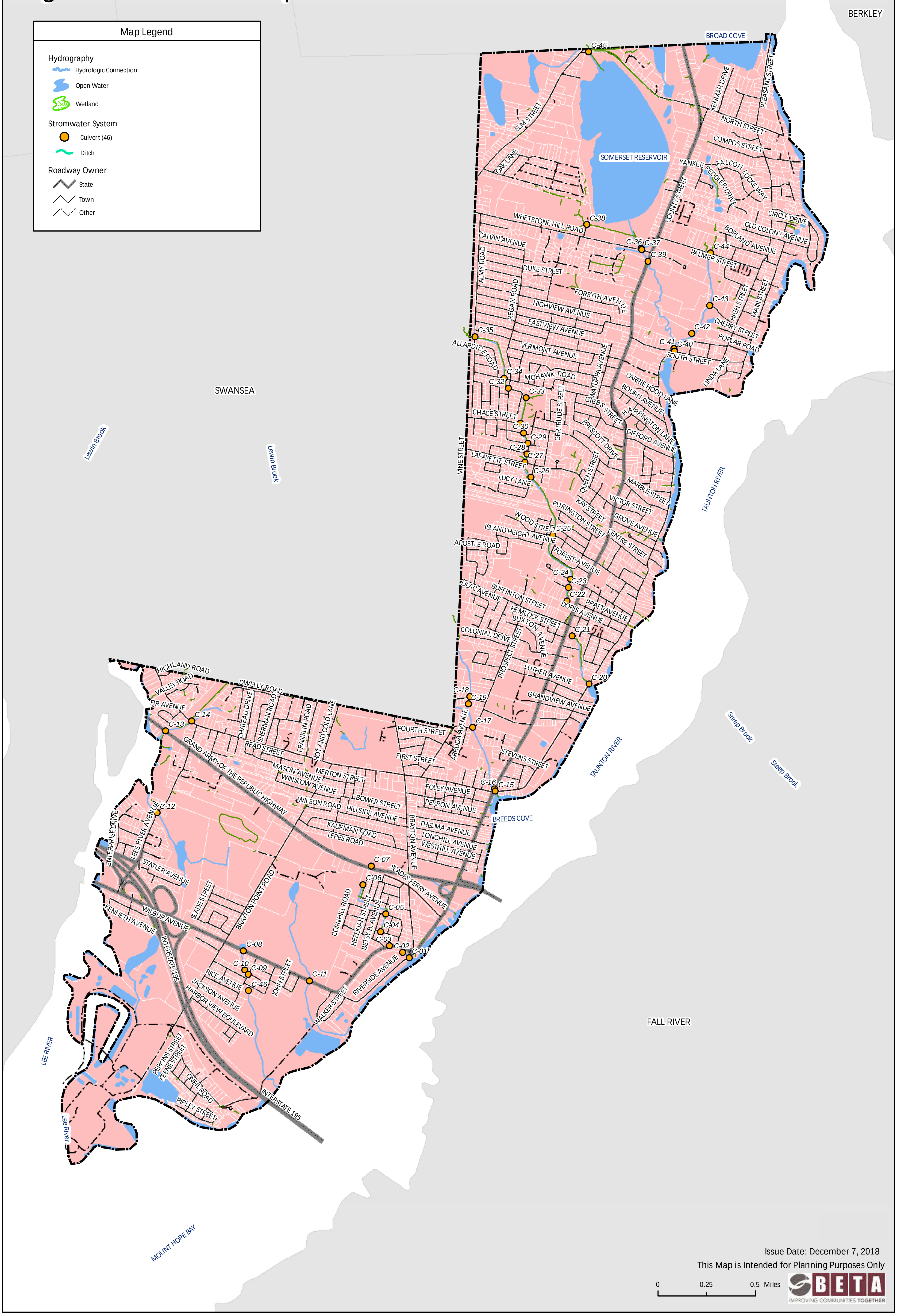
- Location: Culverts conveying Buffington Brook were designated High priority
- Material: Generally, corrugated metal pipe (CMP) culverts were designated High priority
- Accessibility: Culverts that could not be accessed during BETA's investigation were designated High priority

For the purpose of this investigation, any structure conveying a stream underground or under a roadway was considered a culvert. The inlet and outlet points of culverts longer than a simple road crossing are inventoried individually and assigned separate IDs. These points are identified with (I) for inlet and (O) for outlet and those belonging to a single culvert are grouped together in Table 1-1.

Culverts included in this inventory were identified based on apparent stream crossings according to current mapping data. Not every culvert in Somerset was included in the inventory. Three culverts on Warren Street and Gay Street were identified after the investigation was conducted and should be added to the inventory. Culvert mapping should be merged with Town GIS data.

Town of Somerset, Massachusetts

Figure 1-1: Culvert Map



Issue Date: December 7, 2018

This Map is Intended for Planning Purposes Only

Table 1-1
Culvert Inventory and Recommendations

Structure ID	Street Name	Stream Conveyed	Culvert Characteristics	Comments	Potential Small Bridge Program Candidate	Recommended Actions
C-01	Riverside Ave	Unamed	42" RCP		No	Inspection (low priority)
C-03 (I) C-02 (O)	Route 103	Unamed	54" x 20" RC box 42" RCP		No	Inspection (low priority)
C-04	Sarah Ave	Unamed	32" RCP	Moderate roadway cracks and sags	No	Inspection (low priority)
C-05 (O)	Caroline Ave	Unamed	24" RCP	Moderate roadway cracks	No	Inspection (low priority)
C-07 (I) C-06 (O)	Route 6/Leahy Ave	Unamed	24" RCP 32" CMP		No	Inspection (low priority)
C-08	Route 103	Unamed	30" x 10" RC box		No	Inspection (low priority)
C-09 C-46	Lawton St	Unamed	32" CMP 36" RCP	Minor roadway cracks; MS4 discharges into pipe	No	Inspection (low priority)
C-10	Driveway on Lawton Street	Unamed	24" RCP	Minor driveway cracks	No	Inspection (low priority)
C-11	Route 103	Unnamed	Unknown	Inaccessible, overgrown	[size unknown]	Inspection (high priority)
C-12	Lees River Ave	Unnamed	CMP inlet, 2 outlets in stone headwall	Sizes unknown, minor roadway cracks	[size unknown]	Inspection (high priority)
C-13 (I)	Route 6	Unnamed	Approx. 42" RCP		No	Inspection (low priority)
C-14	Read St	Unnamed	Unknown	Inaccessible, overgrown	[size unknown]	Inspection (high priority); enforce National Grid vegetation plan?

(I) = Inlet, (O) = Outlet

Table 1-1
Culvert Inventory and Recommendations

Structure ID	Street Name	Stream Conveyed	Culvert Characteristics	Comments	Potential Small Bridge Program Candidate	Recommended Actions
C-16 (I) C-15 (O)	Route 138/Riverside Ave	Breeds	84" x 60" RC box 96" x 48" RC box		No	Inspection (low priority)
C-17 (O)	Prospect St	Breeds	96" CMP flared end		No	Inspection (high priority)
C-18 (I) C-19 (O)	Fordham Dr	Breeds	Unknown	Inaccessible	No	Inspection (high priority)
C-20	Riverside Ave	Buffington	Double 72" RCP	Deteriorated headwall; sinkholes in road (Highway Dept.); submerged at high tide (GRRIP6)	Yes	Inspection (high priority); capacity analysis
C-21 (O)	Buffinton St & Route 138	Buffington	Double 48" RCP		No	Inspection (high priority); capacity analysis
C-22 (I)	Buffinton St & Route 138	Buffington	144" x 48" box		No	Inspection (high priority); capacity analysis
C-23	Roberge St	Buffington	72" x 84" RC box	Dirt road with metal plate	No	Inspection (high priority); capacity analysis
C-24	Washington Ave	Buffington	72" x 64" RC box	Moderate roadway cracks	No	Inspection (high priority); capacity analysis
C-25	Wood St	Buffington	72" x 60" RC box		No	Inspection (high priority); capacity analysis
C-26	Haute Dr	Buffington	18'-0" x 4'-0" RC bridge		Yes	Inspection (high priority); capacity analysis

Table 1-1
Culvert Inventory and Recommendations

Structure ID	Street Name	Stream Conveyed	Culvert Characteristics	Comments	Potential Small Bridge Program Candidate	Recommended Actions
C-27	Lafayette St	Buffington	72" x 60" RC box		No	Inspection (high priority); capacity analysis
C-29 (I) C-28 (O)	Brookside Rd/Regina Ave	Buffington	72" x 60" RC box	Minor roadway cracks	No	Inspection (high priority); capacity analysis
C-30	Midland Rd	Buffington	84" x 60" RC box		No	Inspection (high priority); capacity analysis
C-31	Chace St	Buffington	72" x 60" RC box		No	Inspection (high priority); capacity analysis
C-32 (I) C-33 (O)	Regan Rd/Feno Ct	Buffington	Double 54" RCP Double 48" CMP	High water at outlet	No	Inspection (high priority); capacity
C-34	Mohawk Rd	Buffington	Double 48" CMP	Pipe bottoms rusted out, minor road cracks	Yes	Inspection (high priority); capacity analysis
C-35	Almy Rd	Buffington	Double 48" CMP	Deteriorated, high water, minor roadway cracks and sags; Needs replacing (Highway Dept.)	Yes, applied	Replacement
C-36	Water Dept. driveway	Labor In Vain	Double flattened 36" x 24" CMP	High water	No	Inspection (high priority); capacity analysis
C-37	Whetstone Hill Rd	Labor In Vain	Double 30" RCP	Recommended for upsizing (HW 2005); minor roadway cracks	No	Replacement
C-38	Unnamed, not in service	Tributary to Labor In Vain	36" CMP		No	Inspection (low priority)

(I) = Inlet, (O) = Outlet

Table 1-1
Culvert Inventory and Recommendations

Structure ID	Street Name	Stream Conveyed	Culvert Characteristics	Comments	Potential Small Bridge Program Candidate	Recommended Actions
C-39	County St (Rte 138)	Labor In Vain	Approx. 42"-48" RCP	Debris, submerged, not located; recommended for upsizing (HW 2005)	No	Replacement
C-40	South St	Labor In Vain	Double 60" CMP	Deteriorated concrete and pipes; recommended for upsizing (HW 2005); bid to upsize awarded in 2018	Yes	Replacement
C-41	Dublin St	Labor In Vain	102" CMP	Deteriorated concrete on headwalls; recommended for upsizing (HW 2005); needs replacing (Highway Dept.)	No	Replacement
C-42	Skating area parking lot	Labor In Vain	48" x 48" RC box	Upsized in 2010	No	Inspection (low priority)
C-43	Billy's Lane	Labor In Vain	Unstructured stone	Unpaved access road	No	Inspection (low priority)
C-44	Palmer St	Labor In Vain	36" x 58" CMPA	Undersized, minor road cracks	No	Inspection (high priority)
C-45	North St	Labor In Vain	Double 36" RCP	Undersized emergency dam spillway (Pare)	No	Inspection (high priority)
-	Warren St	Unnamed	Unknown	Not Inspected	[size unknown]	Inspection (high priority)
-	Gay St	Unnamed	Unknown	Not Inspected	[size unknown]	Inspection (high priority)
-	Warren St / Gay St	Unnamed	Unknown	Not Inspected	[size unknown]	Inspection (high priority)

Table 1-2: Culvert Photos

C-01: Riverside Ave

C-03: Route 103

C-02: Route 103

C-04: Sarah Ave

C-05: Caroline Ave

C-07: Route 6

Table 1-2: Culvert Photos (cont.)


C-06: Leahy Ave


C-08: Route 103


C-09: Lawton St

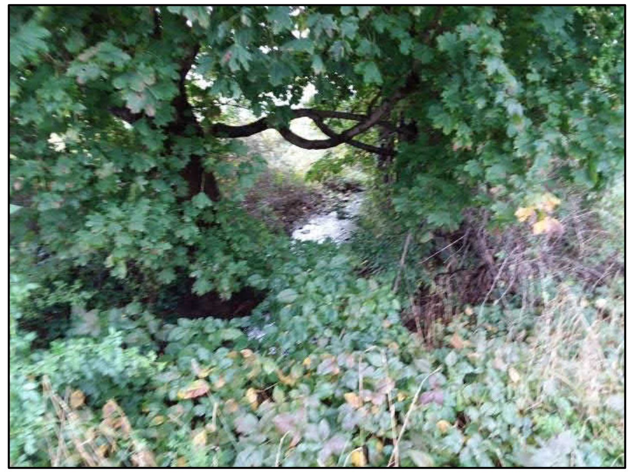

C-46: Lawton St


C-12: Lees River Ave – Upstream


C-12: Lees River Ave – Downstream

Table 1-2: Culvert Photos (cont.)


C-13: Route 6


C-14: Read St


C-16: Route 138


C-15: Riverside Ave


C-17: Prospect St

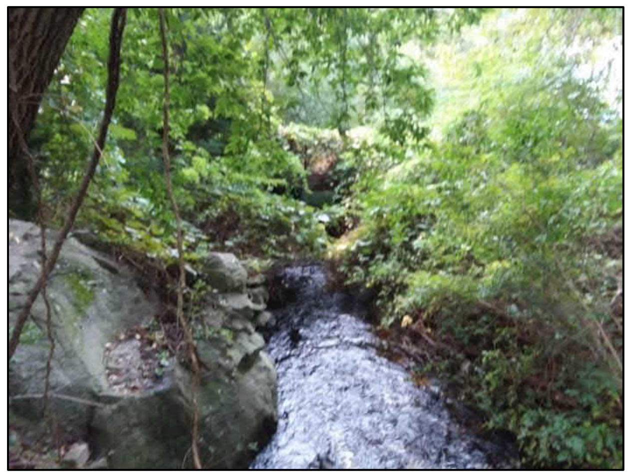

C-18: Fordham St

Table 1-2: Culvert Photos (cont.)


C-20: Riverside Ave


C-21: Dunkin' Donuts @ Buffinton St & Route 138


C-22: Post office @ Buffinton St & Route 138


C-23: Roberge St


C-24: Washington Ave


C-25: Wood St

Table 1-2: Culvert Photos (cont.)


C-26: Haute Dr


C-27: Lafayette St


C-29: Brookside Rd


C-28: Regina Ave


C-30: Midland Rd


C-31: Chace St

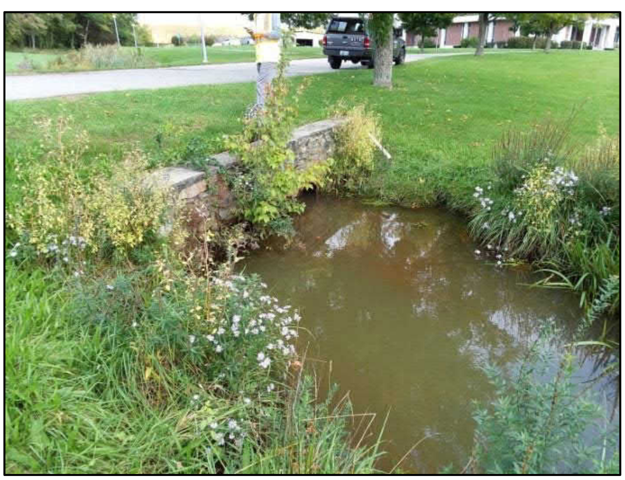
Table 1-2: Culvert Photos (cont.)

C-32: Regan Rd

C-33: Feno Ct

C-34: Mohawk Rd

C-35: Almy Rd



C-36: Water Dept. @ Whetstone Hill Road

C-37: Whetstone Hill Rd

Table 1-2: Culvert Photos (cont.)


C-38: Unnamed road off Whetstone Hill Rd


C-39: Route 138


C-40: South St


C-41: Dublin St


C-42: Former skating area @ Dublin St


C-43: Billy's Ln

Table 1-2: Culvert Photos (cont.)


C-44: Palmer St


C-45: North St

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