Dighton, MA Sewer Extension Feasibility Study Report

980 Washington Street, Suite 325
Dedham, MA 02026
800-426-4262

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

0232283.00
Town of Dighton, MA
March 2020

TABLE OF CONTENTS

TABLES

FIGURES

1. SUMMARY

The Town of Dighton, Massachusetts sits on the western bank of the Taunton River with a population of approximately 8,000 residents. Dighton has expressed the desire to boost economic development in the commercial district along the southern portion of Route 138 by replacing failing septic systems with an extended sewer network. Dighton's original sewered areas were built in North Dighton in the 1970s, establishing the first intermunicipal connections and subsequent agreement with the City of Taunton, Massachusetts. Dighton expanded their sewer network through the Somerset Avenue Sewer Expansion Project in 1992. The project established new sewer service from the Dighton and Taunton border in the Northeast corner of Dighton to the Dighton Elementary and Middle Schools on Route 138. This project included two pump stations; the Town Hall pump station and the Route 138 pump station. There was another expansion to this network in 1999 when the sewer expanded south to the Dighton Power Plant with gravity sewers and a pump station.

The proposed sewer expansion study area encompasses the southern portion of Dighton next to the Taunton River. The boundaries encompass the parcels on Route 138 and east to the river from Elm Street to Hart Street. The area is mostly residential with some commercially zoned parcels. The wastewater flows for the project area were calculated using TR-16 guidelines and a US Census value of 2.76 persons per parcel. This assumed an average daily flow of 220 gallons per day (gpd) per parcel. The boundaries of the sewersheds were defined with a focus on minimizing the total number of pump stations and using existing terrain as an advantage. The proposed sewer expansion includes the creation of three new sewersheds, each with its own pump station.

Sewershed 1 is defined as the main extension with new service on Route 138 (also named Somerset Avenue) from the intersection with Elm Street to the Segreganset River. This new sewershed and pump station also provide service to the existing sewer network on Route 138 from Dighton Middle and Elementary School to the access road for Dighton Power to eliminate community reliance on the existing Dighton Power Pump Station. Sewershed 2 covers the parcels from the Segreganset River to Muddy Cove Brook and covers the commercial district and residential areas around Route 138 and Main Street. Sewershed 3 encompasses a southern portion of Dighton around Pleasant Street and Park Avenue. The proposed pump stations were sized to account for flows from both their own sewershed and to account for flows from upstream pump stations. Implementation of all three sewersheds would add an average flow of 47,000 gpd to the Dighton sewer network with the total flow from the study are being 56,000 gpd including existing sewered parcels. Table 1-1 presents the sewersheds with flows, pump station specifications, sewer lengths, and costs. The total cost for all three watersheds is anticipated to be $21.2 MM.

Table 1-1: Sewershed Summary

Sewershed	Average Daily Flow (gpd)	Pump Station Specifications (Operating Flow / TDH / HP)	New Sewer Pipe Lengths (ft)			Costs
			Gravity	Force Main	Low Pressure	
1	3,300	215 gpm @ 91' TDH, 8 hp	1300	1500	0	$3.8 MM
2	29,300	170 gpm @ 32' TDH, 2 hp	2800	1100	0	$9.8 MM
3	14,100	120 gpm @ 20' TDH, 2 hp	1900	700	1700	$7.6 MM

The capacity of the existing sewers downstream of the proposed sewer extension project was evaluated and generally determined to be sized adequately for the new flow addition. The exception is a 400-foot stretch from Dighton Middle and Elementary School to the intersection of Center Street and Somerset Avenue that should be upgraded from an 8-inch to a 10-inch diameter to handle the projected flows from the extension area. Analysis shows that additional service will bring peak flows to 433 gpm, which brings existing 10-inch diameter pipes to the 75% full capacity. If is

additional development within the study area or downstream takes place, the 10-inch diameter pipes would likely need to be reevaluated for capacity. The existing pump stations may have enough capacity to properly service the additional flow from the study area, although the current observed 390 gpm capacity of the Town Hall Pump Station and nearly 500 gpm capacity of the Route 138 Pump Station need to be assessed against actual historical capacity usage to properly make this recommendation. If capacities are not adequate, new pumps at the existing stations may be needed.

Funding for the project may be available through the State Revolving Fund (SRF) Clean Water Loan program and the U.S. Department of Agriculture (USDA) Rural Development (RD) Water and Waste Disposal Loan & Grant Program. USDA/RD offers low to market rate loans with repayment schedules up to 40-years for communities with populations under 10,000. The Clean Water SRF offers low interest loans with loan terms up to 30 years. In addition, the SRF offers loan forgiveness based on a community's affordability tier - Dighton is currently ranked as a Tier 1 community and could receive 3.3% principal forgiveness on a clean water loan.

2. INTRODUCTION

The Town of Dighton has expressed the desire to boost economic development in the commercial district along the southern portion of Route 138 from Elm Street to Hart Street by extending the sewer network. This area represents the core of Dighton's business district and is currently serviced through failing septic systems. This has been viewed as deterrent to attracting and maintaining businesses. Additionally, Dighton has experienced failing septic systems within the Pleasant Street and Park Avenue area, located off Route 138 towards Somerset. This area is in proximity to the Taunton River and poses environmental and health concerns. The Town of Dighton has contracted Woodard & Curran to conduct a sewer extension feasibility study for the southern area of Route 138. This report details the evaluation completed and recommendations to improve sewage collection in the define project area.

Dighton expanded their sewer network through the Somerset Avenue Sewer Expansion Project in 1992. This project provided sewer service to the East portion of Dighton adjacent to the Taunton River along Route 138. It included two pump stations that extend from the Dighton and Taunton border in the Northeast corner of town to the Dighton Middle and Elementary School on Route 138. Dighton further expanded their Route 138 (Somerset Avenue) sewer network in 1999 with additional service extending from Dighton Middle and Elementary School to Dighton Power. In 1973, Dighton signed an intermunicipal agreement (IMA) with Taunton to send on average no more than 0.61 million gallons per day (MGD) and a sustained peak flow not exceeding 1,100 gpm. Dighton has been working with Taunton on a revised agreement that has not been officially renewed. Dighton currently sends 0.15 MGD on average and is potentially looking to lower the agreement to 0.21 MGD.

Per request of Dighton, an alternative IMA with Somerset was examined to receive flows from the proposed sewer expansion. Woodard & Curran and Dighton met with Somerset on November 4th, 2019 to discuss this potential agreement. In this meeting, it was discussed that the Somerset Wastewater Treatment Plant (WWTP) will be undergoing more than $70 million in capital improvements independent of additional contributions from Dighton. If Dighton were to develop an IMA with Somerset, Dighton would be responsible for helping fund the proposed capital improvements projects. In addition, upgrades for pump stations and gravity sewers near the Dighton town line to the WWTP would be required to accommodate the extra flow contributed by Dighton. Due to the large amount of funds required to pursue an IMA with Somerset, it was decided to eliminate Somerset as an alternative. Renewing and revising the existing intermunicipal agreement with Taunton is the recommended approach for Dighton's expanded sewer flows.

3. CURRENT CONDITIONS ASSESSMENT

3.1 Demographic, Population, and Land Use Data

The demographic, population and land use data were used for assessing predicted sewer flows in the project area. According to the United States Census, the Town of Dighton has a population of 8,000 people with 2.76 persons per household. There was a 11.3 percent population growth from 2010 to 2018. Table 3-1 shows the current land use data from Dighton per parcel.

Table 3-1: Town of Dighton Parcels by Land Use

Land Use	Number of Parcels	Land Use Codes
Mixed Use with Residential	59	013, 016, 107, 018, 031, 041
Residential	3200	101, 102, 103, 104, 105, 106, 109, 111, 130, 131, 132
Commercial	71	All 300 Series
Industrial	29	400, 423, 424, 430, 440, 441, 442, 450, 451
Forests	5	601
Agricultural	40	712, 713, 716, 717, 718, 719, 720
Recreational	19	801, 803, 805
Tax Exempt	252	All 900 Series
TOTAL PARCELS: 3675		

3.2 Existing Sewer Network

The existing sewer network in Dighton was constructed in 1992 as part of the Somerset Avenue Sewer Expansion project. The expansion project connected new sewers to the North Dighton area around Lincoln Avenue and Tremont Street while also adding a new network along Route 138 down to the Dighton Middle School. The network along Route 138 is made up of gravity sewers, ranging from 8 to 12 inches in diameter and two pump stations to convey flow from low points in the system. The Route 138 network underwent a small expansion in 1999 to service the area to Dighton Power and included the construction of a third pump station to the network.

The three pump stations in the network include the Route 138, Town Hall and Dighton Power pump stations. The Route 138 pump station is located at the border of Taunton along the Three Mile River and conveys all of Dighton's wastewater flow in the network to Taunton. The Town Hall pump station is located intermediately at a low point in the

system and conveys flow uphill towards the Route 138 pump station. The Town Hall pump station was upgraded in 2005 with new pumps, sensors, and wet well cleaning. The third pump station is located at Dighton Power and conveys wastewater uphill to a manhole just outside of the Dighton Middle and Elementary School. Table 32 summarizes the specifications of the pump stations.

Table 3-2: Municipally Owned Stations

Name	Type	Year Constructed	Number of Pumps	Design & Observed Capacities	Force Main Size	Generator
Route 138 Pump Station	Wet pit / dry pit	1992	2	350 gpm @ 130' TDH 500 gpm @ 127' TDH	6 in	Yes
Town Hall Pump Station	Wet pit / dry pit	1992	2	270 gpm @ 40' TDH 390 gpm @ 37' TDH	6 in	Yes
Dighton Power Pump Station	Suction Lift	1999	2	120 gpm 80 gpm	4 in	-

3.3 Study Area Boundaries

The study area encompasses the southern portion of Dighton adjacent to the Taunton River. The boundaries of the area extend from the river to Dighton Power on Route 138 (also named Somerset Avenue). This includes the include parcels from the 1999 sewer expansion to eliminate community reliance on the Dighton Power Pump Station. The newly serviced parcels in the sewer expansion area are made up of commercial and lightly industrially zoned district of Dighton, though the majority of the area is primarily zoned for residential use. There are 215 newly serviced parcels in the proposed sewer expansion area to total 254 parcels in the entire study area. Table 3-3 presents the number of parcels per zoning code within the expansion area.

Table 3-3: Sewer Expansion Area Parcels by Zoning

Land Use	Number of Parcels	Percent of Total Parcels
Residential	224	88%
Commercial	27	11%
Industrial	3	1%
TOTAL PARCELS: 254		

4. FUTURE CONDITIONS ASSESSMENT

4.1 Forecast of Wastewater Flows and Loads

The Town of Dighton is not seeking further residential development within the proposed sewer expansion area but does expect to enrich the area's commercial economy. It is expected that there will be no land use changes in the proposed sewer extension area. The planning period for this project is 50 years.

Wastewater flows for the proposed sewer expansion area were calculated by using two different models to provide a means of ground truthing the predicted flows. The first model (Model 1) used the assumption that the average daily per capita flow would be 80 gpd. This value was based off of the TR-16 guidelines that state daily per capita wastewater flows should be no less than 70 gpd. The 80 gpd/capita was multiplied by the average person per parcel in Dighton of 2.76 to obtain an average daily wastewater flow of 220 gpd per parcel.

The second model is used as a comparative tool to the TR-16 guidelines using historical water usage data gathered from Dighton and two different methods to determine future water usage. In the first version of the model (Model 2A), the water usage by each parcel was divided by the number of parcels to result in an average wastewater flow of 137 gpd/parcel. The subsequent method (Model 2B) used separate wastewater flows based on the parcel zoning status. The three zoning groups considered were residential, commercial, and industrial. The sum of the flows per zone were then divided by the number of parcels per zone to obtain average wastewater flow per parcel. It is important to note that historic water usage was available for only 34 parcels, where 24 were residential, 9 were commercial, and 1 was industrial. This method resulted in wastewater flows of 150, 115, and 30 gpd/parcel respectively. In order to account for possible infiltration and inflow other use conditions, peaking factors were used to represent flows from 90% to 200%. Table 4-1 shows the results of Models 2A and 2B.

Table 4-1: Model 2 Flow Per Parcel Results

Water Usage	Model 2A	Model 2B		
		Residential	Commercial	Industrial
90%	127	135	103	27
100% (Average Daily)	**137**	**150**	**115**	**30**
150%	205	225	172	45
175%	240	263	200	53
200%	275	300	230	60

Due to the small number of parcels available for the Models 2A and 2B, the Model 1 result of 220 gpd per parcel was used deemed the preferred method for calculating the predicted wastewater flows in the sewer expansion study area. Model 1 also accounts for future capacity and economic development of the commercial parcels in the expansion area sewer system as well as an allowance for infiltration and inflow. Model 2 does, however, provide a good comparative baseline to ensure that the assumptions made in Model 1 cover actual water and sewer usage in Dighton.

5. SEWER DEVELOPMENT AND DESIGN

5.1 Sewershed Boundary Development

The proposed sewershed boundaries were designed with a focus on servicing the defined study area along Route 138 and minimizing the total number of pump stations required to connect to the existing sewer system. The proposed sewer development is intended to continue service along Route 138 and the riverside communities to the east. The proposed sewer networks are viewed as being relatively easy to construct, with challenges only arising in two force main stream crossings and sewer excavation in proximity to the river. The southern-most section of the study area around Pleasant Street is in the flood plain of the Taunton River, so there are concerns with excavation, dewatering, and long-term infiltration due to frequent flooding that occurs. Flood proof low pressure sewer systems are recommended to address these concerns.

The proposed sewer expansion has three sewersheds. Figure 5-1 depicts the sewer expansion study area with each sewershed highlighted and corresponding pump stations. Sewershed 1 runs along Somerset Avenue from the access road to Dighton Power to the Segreganset River and connects to the existing system at the manhole in front of the Dighton Middle and Elementary School (yellow). This sewershed also includes parcels in the 1999 Somerset Avenue expansion that extended sewer service from Dighton Middle and Elementary School to the access road of Dighton Power. Incorporating parcels from the previous expansion area will eliminate community reliance on the Dighton Power Pump Station, with Dighton Power being the only parcel serviced by the old pump station. Sewershed 2 covers the parcels from the Segreganset River to Muddy Cove Brook and covers the commercial district and residential areas around Route 138 and Main Street (green). Sewershed 3 encompasses the southern portion of Dighton near Pleasant Street and Park Avenue (blue). Gravity sewers with corresponding pump stations are proposed for each of the sewersheds. Sewershed 3 The use of low pressure sewers are recommended in sewershed 3 to account for excavation challenges, anticipated infiltration and inflow and flooding in the Park Avenue area. Parcels ownership, wetlands and other easements are also identified on the figure.

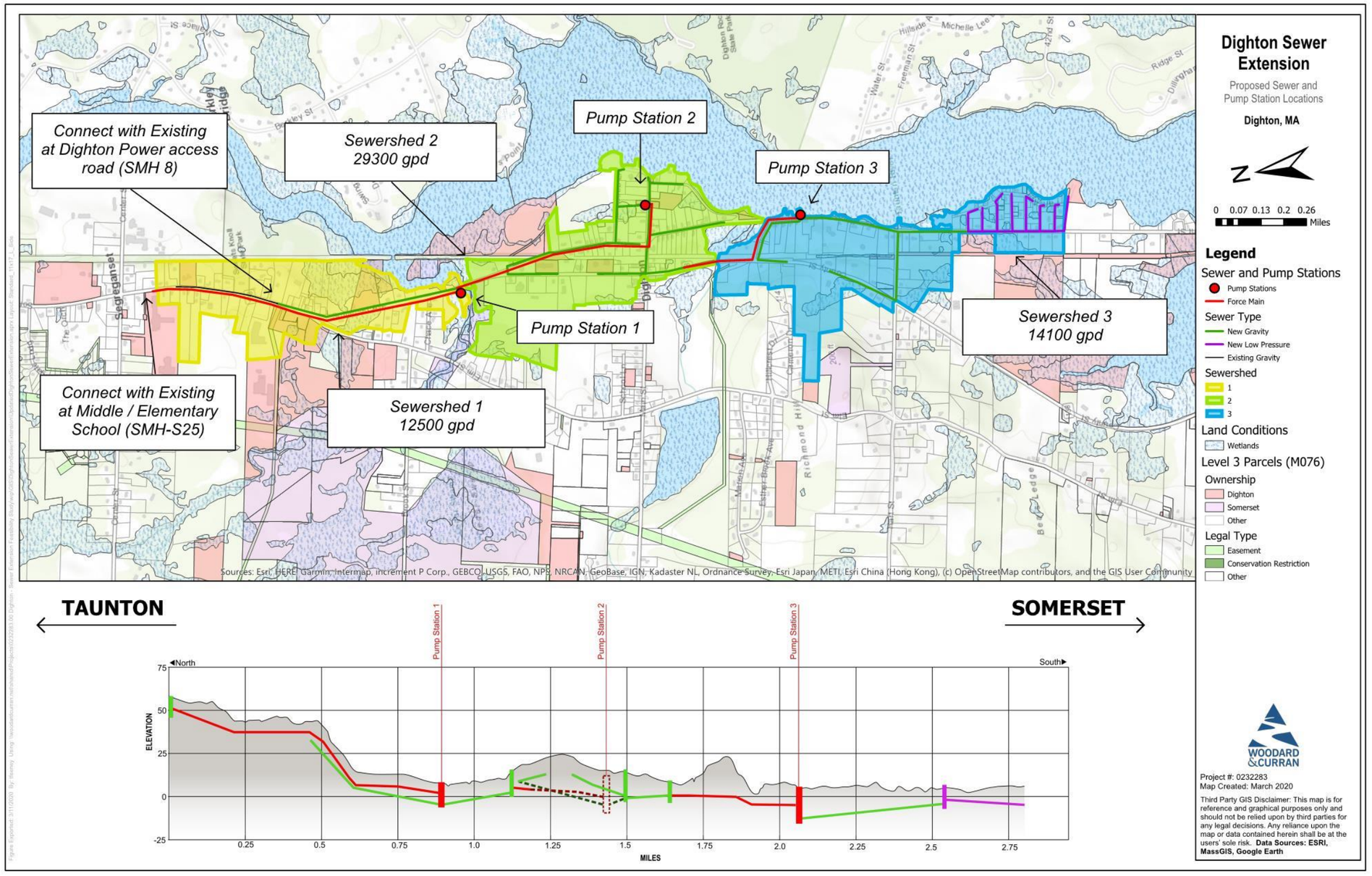

Figure 5-1: Dighton Sewer Expansion Map

5.2 Sewershed Flow Rates and Capacities

As developed in Section 3.3, each parcel in the study area was assumed to have a flow of 220 gpd. The flows were calculated by multiplying the number of serviced parcels per sewershed by a flow of 220 gpd. Sewershed 2 has the largest number of parcels to service with its parcel count twice as high Sewershed 3 and 1. Table 5-1 presents each sewershed, the number of parcels it services, and the expected flows using all three models. All the models account for infiltration and inflow as well as more active commercial areas. The assumption for this report will be to use the highest model to be conservative and use 55,400 gpd as the average daily contribution from this extension. When excluding the existing sewered network, this method yields an additional 47,000 gpd to the Dighton sewer system. It is worth noting that with the additional 47,000 gpd, Dighton is below the 0.21 mgd limit outlined by the draft intermunicipal agreement with Taunton. This additional flow increases the average daily flow to 0.2 mgd. Using a 5.6 peaking factor from the Merrimack Curve, the peak hourly flow from Dighton may reach as high as 770 gpm, which is still under the peak instantaneous flow allowance of 1,100 gpm from the original 1973 intermunicipal agreement.

Table 5-1: Flows by Sewershed

Sewershed	Number of Parcels	Model 1 Flow (gpd)	Model 2A Flow 150% Flow (gpd)	Model 2B 150% Flow (gpd)
Sewershed 1	55	12,100	11,700	12,200
Sewershed 2	133	29,300	27,300	28,600
Sewershed 3	64	14,100	13,100	14,400
Total	**215**	**55,400**	**52,100**	**55,200**

There are a few industrial zones near Sewershed 2 that are not included in the study: the parcel with Muddy Cove Pond and a lot North of Muddy Cove Brook. The Muddy Cove Pond parcel has a large dam and the pond, as well as unlikely to be able to be sewered to meet the sewer installed on Route 138, so it is assumed that this will not be able to be developed for sewer usage. The Muddy Cove Brook parcel is a former superfund site with excavation restrictions, so it is also assumed that it will not be developed for sewer usage.

5.3 Sewers and Pump Stations

The proposed gravity sewers are anticipated to be 8-inch diameter piping, which are the minimum diameters recommended for sewer development to prevent clogging and buildup. This provides adequate sizing based on the projected flows for the sewershed areas. Low-pressure sewers will likely range from 1-1/4 to 4 inches in diameter piping. Force mains will be 4 inches for the proposed pump stations. The sewer depth will vary from 5 to 25 feet below grade depending on existing terrain. Table 5-2 summarizes the proposed length of sewer pipe per sewershed.

Table 5-2: Sewershed Sewer Lengths

Sewershed	Total Sewer Lengths by Type (ft)		
	8" Gravity	4" Force Main	Low Pressure
Sewershed 1	900	1500	0
Sewershed 2	2800	1000	0
Sewershed 3	1900	700	1700
Total	**6000**	**3200**	**1700**

The pump station locations were selected based on anticipated ease of land acquisition and minimizing wetlands disturbance. Pump Station 1 (in Sewershed 1) is proposed to the north the Segreganset River on Somerset Avenue on a privately owned, undeveloped parcel. Pump Station 2 is proposed on town land across from a playground on Main Street. The land is currently used as overflow parking for the park across the street but is discouraged for pedestrian safety reasons. Pump Station 3 is next to the Taunton River on Pleasant Street on an undeveloped manmade peninsula.

Due to the sewersheds being sequenced linearly, pump stations will often be pumping flows from outside of their sewershed. Pump Station 1 has the most flow because it pumps the flow of the entire sewer expansion area as well as the flow from the 1999 Somerset Avenue sewer expansion project. Pump Stations 2 receives the flow from Sewersheds 2 and Sewershed 3 via Pump Station 3. Pump Station 3 has much less flow to handle due to the area having less parcels and having no other contributing sewersheds.

Each pump station is proposed to be a duplex submersible station with simple on and off controls and exterior mounted control cabinets. The stations will be designed to have a maximum sewage holding time of 30 minutes with 2 to 4 starts per hour under average flow conditions per TR-16 guidelines. Peak hourly flow was calculated with a peaking factor of 5.6 per the Merrimack Curve. Table 5-3 presents the expected pump requirements for each of the proposed pump stations.

Table 5-3: Pump Station Requirements

Pump Station	Peak Hour Flow (gpm)	Design Capacity (gpm)	TDH (ft)	Horsepower (hp)
1	215	215	91	8
2	170	170	32	2
3	55	120	20	2

The pump size was selected to match the peak hourly flow from the sewersheds. The pumps would need to be rated for continuous duty if the pump capacity matches the peak hourly flow. Pump Station 3 is rated higher than the peak hourly flow in order to keep minimum force main velocities above 3 feet per second (fps) in the minimum recommended force main size of 4 inches. This minimum velocity is recommended by TR-16 to prevent solids deposition in the force main. In order maintain the minimum velocity in the force main, the pump must be sized at a minimum of 120 gpm.

5.4 Connection to Existing Systems and Downstream Upgrades

The flows from the proposed expansion area would be conveyed through Pump Station 1 with a proposed connection at the existing Dighton sewer system next to the Dighton Middle and Elementary School. The flow then travels downstream to the Town Hall pump station and subsequent Route 138 pump station. Sewershed 1 will also service roadside parcels from the 1999 Somerset Avenue expansion by connecting to the existing system at the access road on Somerset Avenue next to the Dighton Power access road. The existing sewer line that continues to from Route 138 to Dighton Power will be plugged at the Somerset Avenue connection, and the Dighton Power Pump Station will continue to service only Dighton Power.

5.4.1 Downstream Gravity Sewers

In order to determine if existing downstream gravity infrastructure has the capacity to serve the sewer expansion area, flow calculations were performed to estimate the flows downstream of the discharge point of Pump Station 1. Middle Schools were assumed to contribute 20 gpd per person and Elementary Schools were assumed to contribute 10 gpd per person based on Title V, the State Environmental Code for Massachusetts. The Dighton Middle and Elementary Schools have approximately 500 students, teachers, administrators, and other employees each. Using the 5.6 peaking factor, the peak hourly contribution from the schools is 40 gpm for the Middle School and 20 gpm for the Elementary School for a combined peak hourly flow of 60 gpm. The Dighton schools tie into the end of the 8-inch service line, so it must be accounted for in the capacity evaluation of the 8-inch and 10-inch pipes. Based on information collected from the Dighton Power and Bristol County Agricultural High School was gathered from, Dighton Power contributes 80 to 120 gpm through a pump station, and the high school contributes 25 gpm through a small grinder pump. The capacity calculations use a value of 120 gpm from the pump station at Dighton Power to allow for a conservative approach in sizing. The previous assumption of parcels contributing 220 gpd and a peaking factor of 5.6 were used in these calculations as well. Minimum slopes were obtained from the as built drawings and used to determine the gravity sewer pipe capacity at 75% full. Table 5-4 presents the capacity for gravity sewer pipes at 75% full.

Table 5-4: Existing Sewer Capacities

Pipe Size	Minimum Slope	Total Pipe Capacity 75% Full (gpm)
8”	0.004	275
10”	0.003	430
12”	0.0025	640

The existing 8-inch gravity pipe that runs from SMH-S25 to SMH-S23 is 400 feet in length and would have contributing flows from the Dighton Middle and Elementary School, proposed Pump Station 1, Dighton Power, and a few surrounding parcels. The peak hourly flows contributing to this section of pipe are anticipated to be around 400 gpm and would surcharge the existing 8-inch pipe. It is recommended this segment of sewer pipe be upsized to 10-inch diameter pipe to accommodate additional flows. Figure 5-2 shows the 8-inch diameter pipe recommended for upsizing.

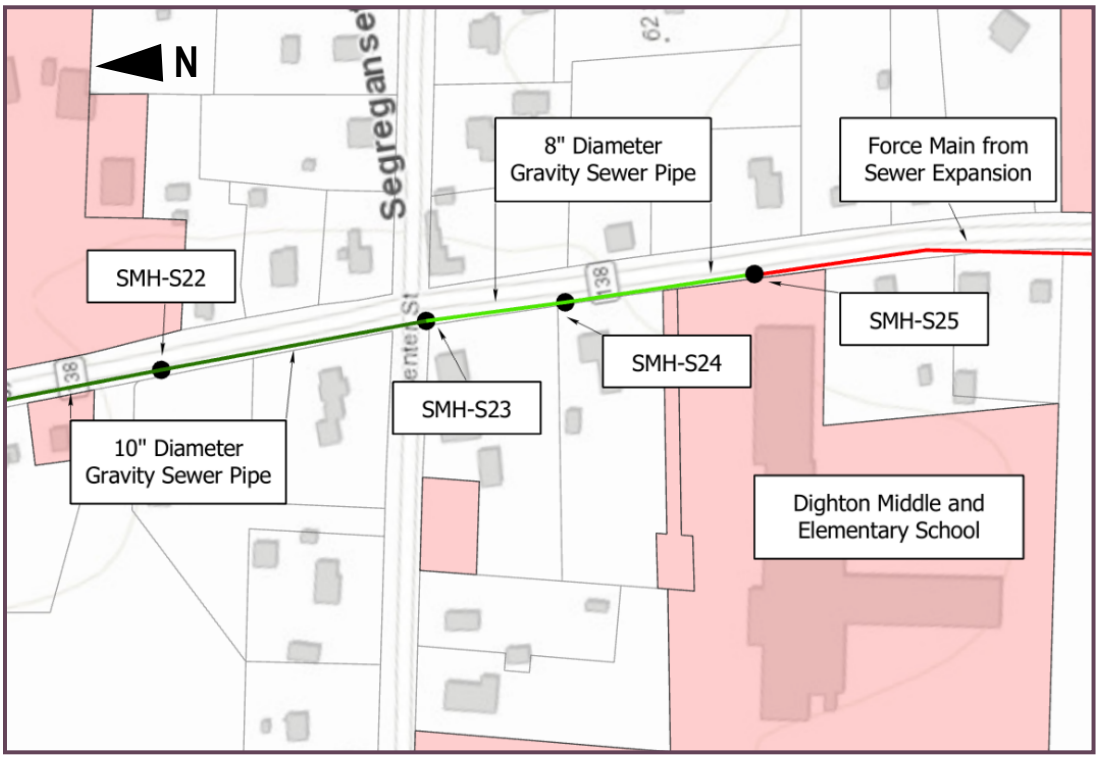

Figure 5-2: Dighton 8-inch Sewer Service Line

The existing downstream piping from SMH-S23 to the Town Hall pump station is sized as 10-inch diameter pipe. With the proposed 10 additional parcels feeding into this service line and contribution of Bristol Country Agricultural High School, the peak hourly flow is projected to increase to 430 gpm. While this flow fills the 75% full capacity of a 10-inch diameter pipe, a conservative approach was used in the predicted flow calculation. A 10-inch diameter pipe should be sufficient to carry the proposed additional flows at this location. The existing gravity sewer piping from the Town Hall pump station to the Route 138 pump station is all 12-inch diameter pipe. The contributing parcels and an upgraded Town Hall pump station create a new peak hourly flow of 450 gpm, which is well under the 600 gpm capacity. This section of pipe provides adequate capacity for the additional flows from the sewer extension area.

5.4.2 Downstream Pump Station Capacities

In addition to the sewers, the downstream pump stations were evaluated for available capacity. The existing Town Hall pump station was designed to operate at 270 gpm with an observed operating capacity is 390 gpm. The Route 138 pump station is currently rated for 350 gpm with an observed operating capacity is 500 gpm. If the pump station were to be used as designed, with a duty and spare pump, then the pumps would need to be sized to operate at the peak hourly flow of 430 gpm and 450 gpm respectively. The Route 138 Pump Station has enough capacity to handle the increase in flow. The Town Hall Pump Station will likely require a capacity increase, which may consist of replacing the pumps or increasing the diameter of the pump impellers. Based upon record drawings, both wet wells have a capacity of about 1900 gallons between the lead pump on and off elevations. The average daily flow to each pump station is less than 70 gpm with the proposed additional flows from the expansion area. This results in the wet well filling about every 27 minutes which means the pumps will start 2 to 3 times an hour on average, which is within TR-16 guidelines. A single pump will need to run continuously to accommodate peak flows and maintain proper wet well levels. The 6-inch force mains exiting the pump stations can handle flows up to 700 gpm and appears to be adequate for the flow addition at the Town Hall pump station. The Route 138 pump station shares a force main with a nearby private business, so the peak hourly flow from this business needs to be known to determine if there is enough capacity in the force main for additional flows. It may be beneficial to split the force main to mitigate both capacity issues as well as operational

and ownership complexities. A closer study into operational pump station capacity is needed to determine if the pump stations need upgrades.

There are three downstream developments that may impact sewer pipe capacity: Stonegate Landing (existing low pressure sewer), Strawberry Fields (proposed development), and Country Hill Road (failing septic, may transition to sewer). Independent studies of the downstream network would need to be performed in order to understand the effect these developments may have on the future capacity of this sewer network and any further needs to upsize sewer sizes or pump station capacities.

6. PROJECT COSTS AND FUNDING

6.1 Project Cost

The proposed sewersheds were designed so that they can be built in phases to match funding availability. If built in phases, they would need to be built in sequential order (1 to 3). Table 6-1 shows the overall anticipated cost of each sewershed assuming typical construction, design, and land acquisition costs. The total anticipated cost of all three sewersheds is $21.2 million.

Table 6-1: Sewershed Costs

Sewershed	Cost
Sewershed 1	$ 3.8 MM
Sewershed 2	$ 9.8 MM
Sewershed 3	$ 7.6 MM
Total	**$ 21.2 MM**

The costs were developed based on previous costs of similar work. The pump stations were estimated based on the usage of a simple duplex submersible pump station with exterior mounted control panels. Gravity, force main, and low pressure sewers were priced by the linear foot assuming normal excavation conditions and typical depths of 5 to 25 feet. An average of 150 feet of 6-inch sewer lateral piping was carried in the estimate for each parcel. It is assumed 4-foot diameter manholes are installed approximately every 300 feet for connection of 8-inch diameter pipe. Five foot diameter manholes are anticipated at sharp bends or junctions of more than two pipes. Engineering design, contractor overhead, bonds and insurance, and project contingency are also included in the estimated cost.

6.2 Project Funding Sources

Raising the capital to fund public infrastructure projects, such as sewer extension projects, can be handled in a number of different ways including bonding, grants, low-interest loans, and betterments. Grant and low-interest loan programs are often used to mitigate the financial impacts to users. The following information describes potential funding available for planning, design and/or construction of the sewer extension project. Several agencies have been identified as potential funding sources, these include traditional wastewater funding sources and programs that encourage and support economic development.

6.2.1 MassDEP Clean Water State Revolving Fund Loan

The Massachusetts Clean Water State Revolving Fund (CWSRF) loan programs provide low-interest loans to finance community sewer projects, both publicly and privately owned. Projects are selected annually using a priority ranking system called the Intended Use Plan (IUP). IUP ranking is based upon protection of the public health and improved compliance together with affordability. For FY2020, MassDEP had approximately $400-450 million available to finance clean water projects.

Timeline (annual process for FY2021 Intended Use Plan)**:**

- Project Evaluation Forms (PEFs) due mid-August 2020
- Intended Use Plan issued in January 2021
- Local Borrowing Authorization by end of June 2021
- SRF Application for Financial Assistance due mid-October 2021

Table 6-2: Loan Terms

Loan Type	Permanent Financing	Interim Financing
Standard SRF Loan	2% (20 years) 2.4% - 2.9% (30 years)	0%
Housing Choice Loan Rate*	1.5% (20 years)	0%
Nutrient Enrichment Reduction Loan	0%	0%
Maximum Term	30 years	3 years
Administrative Fee	0.15%	0%
Loan Origination Fee	$5.50 per $1,000	$0

(for projects on FY2020 Intended Use Plan)

Table 6-3: Principal Forgiveness

Tier*	Clean Water % PF
I	3.3%
II	6.6%
III	9.9%

(*percentage of principal forgiven at permanent financing*)

6.2.2 Department of Agriculture (USDA) Rural Development (RD) Water & Waste Disposal Loan & Grant Program

The U.S. Department of Agriculture (USDA) Rural Development (RD) administers the Water & Waste Disposal Loan & Grant Program to provide funding for sanitary sewerage disposal to households and businesses in eligible rural areas. Eligible applicants are state and local governmental entities in rural areas and towns with populations of 10,000 or less. Long-term, low-interest loans are available up to a 40-year payback period, based on the useful life of the facilities financed. Interest rates are fixed, and based on the need for the project, and the median household income of the area to be served. Interest rates for the 1st Quarter of FY 2020, effective January 1, 2020 to March 31, 2020 range from 1.625% to 2.75%.

6.2.3 Economic Development Administration (EDA) Public Works Program

The U.S. Economic Development Administration's (EDA) Public Works Program provides funding to help distressed communities build, design, or engineer critical infrastructure and facilities that will help implement regional development strategies and advance bottom-up economic development goals to promote regional prosperity. Eligible projects shall

build, design, or engineer sewer infrastructure and facilities that will help implement regional development strategies and advance bottom-up economic development goals to promote regional prosperity in distressed communities.

Investments made through the Public Works program must be aligned with a current CEDS or EDA-accepted regional economic development strategy and clearly lead to the creation or retention of long-term high-quality jobs.

Grant awards typically range from $600,000 to $3 million and the average award is approximately $1.4 million. Generally, the amount awarded by the Public Works Program is 50% of the total project cost. However, depending on the economic needs of the region in which the project is located, the EDA may award up to 80% of the total project cost.

6.2.4 Massachusetts Department of Housing & Community Development: Community Development Block Grant Program (CDBG)

The Community Development Block Grant Program (CDBG) provides competitive grants designed to help towns meet a broad range of community development needs primarily for low- and moderate-income people. Study, analysis and planning of any eligible activity including engineering and design which might lead to a wastewater application is considered an eligible project to receive funding through this program. In addition, extending or replacing sewer mains also considered an eligible project to receive funding through this program. Grant awards range from $100,000 to $800,000 for capital projects and $10,000 for planning/design projects. Eligibility is based on the medium household income of the community or specific sections (blocks) of the community.

6.2.5 MassWorks Infrastructure Program

The MassWorks Infrastructure Program provides competitive grants for public infrastructure projects that support and accelerate housing production, spur private development, and create jobs throughout the Commonwealth. The program places particular emphasis on the production of multi-family housing in appropriately located walkable, mixed-use districts that result in direct and immediate job creation, and/or that support economic development in weak or distressed areas. Eligible applicants include cities, towns, and other public agencies with a charter that enables them to apply for and accept state grants on behalf of the municipality. Eligible projects include the design, construction, building, land acquisition, rehabilitation, repair and other improvements to publicly-owned infrastructure including, but not limited to, sewers, utility extensions, streets, roads, curb-cuts, parking, water treatment systems, telecommunications systems, transit improvements, public parks and spaces within urban renewal districts, pedestrian and bicycle ways.

In alignment with the Sustainable Development Principles, and ensuring that program funds are invested in projects that meet state priorities, the 2019 grants will seek to allocate funds as follows:

- 50% or more of the total funding in support of developments that contain a mix of residential and commercial uses, with a residential unit density of at least four units to the acre;
- 50% of more of the total funding be to support projects that are regionally significant and consistent with regional land use and/or development plans;
- 50% or more of the total funding be in support of development in Gateway Cities;
- 67% or more of the total funding be in support of transit-oriented developments (i.e., located within a half mile of a transit station (defined as a subway or rail station, or a bus stop serving as the convergence of two or more fixed bus routes that serve commuters);
- 80% or more of the total funding in support of developments that are re-using previously developed sites; and
- 100% of the funding that is committed in support of housing (or mixed use including residential) be in support of developments with a residential unit density of at least four units to the acre.

In addition, bonus points may be given to:

- Massachusetts Designated Housing Choice Communities;
- Communities that have implemented economic development best practices through the Community Compact program; and/or
- Communities that are proposing a project that will benefit from an Opportunity Zone Fund investment.

7. SUMMARY AND CONCLUSIONS

7.1 Conclusion

The Town of Dighton has expressed interest in a sewer expansion into the southern area of Route 138 to help boost economic development of commercial areas and protect the sensitive environmental systems near the Taunton River. It is recommended that Dighton treat these additional flows through a renewed intermunicipal agreement with the Town of Taunton rather than develop an additional agreement with the Town of Somerset.

The proposed sewer expansion area includes three different sewersheds. Sewershed 1 is identified as the main sewer extension and encompasses much of the commercial area in the proposed expansion area. It has the smallest contributing flow of 12,100 gpd but has the largest sized pump station due to pumping through-flow from sewersheds 2 and 3. Sewershed 2 covers the commercial district along Route 138 and other parcels surrounding the eastern end of Main Street and has the largest contributing flow of 29,100 gpd. Flows in Sewershed 2 come from a mixture of residential, commercial, and light industrial parcels. Sewershed 3 is the only area with low pressure sewers due to relatively flat terrain and proximity to the river. It has a contributing flow of 14,100 gpd. The pump stations are interconnected, so station 2 pumps the flow from station 3, and Pump Station 1 pumps the flow from stations 2 and 3. The sewersheds can be built three separate phases in sequential order if desired to ease the financial burden of the expansion. The total cost of the three sewersheds is $21.2 million. The expansion down Route 138 is anticipated to benefit commercial districts in Dighton. By providing sewer service to the eastern most parcels in sewersheds 2 and 3, Dighton can address failing septic system from leeching into the environment and local waterways, including the Taunton River.

The expanded area can connect with the existing Dighton sewer network at SMH-S25 in front of the Dighton Middle and Elementary School as well as at SMH-8 to receive flow from the 1999 expansion project. The 8-inch diameter gravity sewer main that receives the flow from the two Dighton schools, Dighton Power, a few nearby parcels, and proposed Pump Station 1 will need to be upsized to a 10-inch diameter pipe to accommodate the additional flows from the expansion area. All other downstream gravity sewers through Dighton and Taunton are expected to be adequately sized. If there is further development within Dighton, additional studies may be required to reassess these sewer capacities. The downstream Town Hall pump station will likely need a capacity upgrade either in the form of a new impeller trim or pump upgrade. The Route 138 pump station appears to be adequately sized but should be verified based on current operating condition.

Funding for the project may be available through the State Revolving Fund (SRF) Clean Water Loan program and the U.S. Department of Agriculture (USDA) Rural Development (RD) Water and Waste Disposal Loan & Grant Program. USDA/RD offers low to market rate loans with repayment schedules up to 40-years for communities with populations under 10,000. The Clean Water SRF offers low interest loans with loan terms up to 30 years. In addition, the SRF offers loan forgiveness based on a community's affordability tier - Dighton is currently ranked as a Tier 1 community and could receive 3.3% principal forgiveness on a clean water loan.

WOODARD &CURRAN

woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS