CITY OF BATH, MAINE

Fiscal Sustainability Plan

OCTOBER 2023

Municipal Water Pollution Control Facility and Collection System Fiscal Sustainability Plan

WRIGHT-PIERCE
Engineering a Better Environment

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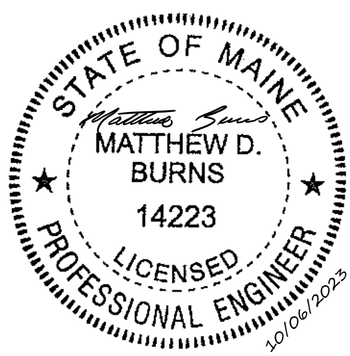
City of Bath, Maine

October 2023



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Section 1 Executive Summary

1.1 Purpose

The purpose of this report is to document City of Bath's Municipal Water Pollution Control Facility (WPCF) and Wastewater Collection System Fiscal Sustainability Plan (FSP). The study includes an inventory of critical wastewater treatment and collection system assets (Section 3), the City's approach to determining asset criticality (Section 4), a cost-effective funding plan to proactively fund the repair, rehabilitation or replacement of the most critical assets (Section 5), and potential capital funding sources (Section 6). The FSP will provide a framework to help the City proactively manage its wastewater assets over the next 20 years.

1.2 Asset Inventory

Wastewater collection and treatment system assets were identified through record drawings, available GIS data, operation and maintenance records, and site visits to the WPCF and pump stations. Collection system assets were previously inventoried by the City of Bath as part of its ongoing sewer system inspection and maintenance program and were supplemented by data requested from a third party CCTV and pipe inspection company for additional collection system inspection records. Detailed asset inventories of the water pollution control facility, pump stations, and sewer collection system can be found in Appendix A.

1.3 Criticality Analysis

Key asset performance criteria were selected with input from the City to help determine relative asset criticality. The performance criteria are grouped into two broad categories, Likelihood of failure (LoF) criteria and consequences of failure (CoF) criteria. The specific criteria that go into the LoF and CoF scores differed between the collection system assets and the pump station / WPCF assets because different information is available for pipes vs. equipment and structures. The LoF and CoF criteria were each assigned a weighting factor to align with the City's level of service goals. Table 1-1 summarizes the selected performance criteria and weighting factors for the criticality analysis.

Table 1-1 Selected Criticality Analysis Performance Criteria

Risk Scoring Category	Criteria		Relative Weight	
			Pump Stations & WPCF	Collection System*
LoF Criteria	Age	Remaining Useful Life	50%	50%
	Condition	Relative Condition of Existing Asset	50%	25%
		Pipe Construction Material	-	25%
CoF Criteria	Economic Costs	Operational Significance/Size	11.1%	33%
		Redundancy	11.1%	-
		Availability of Spare Parts	11.1%	-
	Social Costs	Waterfront Properties	11.1%	11.1%
		Important Local Users	11.1%	11.1%
		Beaches	11.1%	11.1%
	Environmental Costs	Critical Plant/Animal Habitat	16.7%	16.7%
		Wetlands & Waterbodies	16.7%	16.7%

*In some cases, the relative weighting was adjusted to account for missing data. These adjustments and other assumptions are summarized in Section 4.

The LoF and CoF performance criteria scores were multiplied by the corresponding weighting factors and then the LoF and CoF scores for each asset were multiplied to determine the total criticality score. The priority thresholds for the criticality scores are detailed in Section 4. Asset renewal timetables were developed based on priority and the feasibility of completing the renewal work affordably within the timetable. The full criticality analysis tables for the Pump Stations, WPCF, and collection system assets can be seen in Appendix B.

1.4 Recommended Capital Improvement Plan

Wright-Pierce evaluated the priority ranking scores and renewal alternatives for the WPCF, pump stations and collection system assets. Recommended renewal projects with planning-level project cost estimates were developed for the most critical assets. In most circumstances, determining whether asset repair/rehabilitation is cost-effective in comparison to complete in-kind replacement requires consideration of:

- Up-front capital cost of installing a new asset
- Annual operation and maintenance (O&M) costs
- Asset salvage value
- Expected remaining useful life of the asset after rehabilitation
- Expected useful life of a new asset

For the purposes of this study, the recommended capital improvement projects conservatively assumed complete in-kind replacement of the assets unless additional project specific information was available to suggest repair/rehabilitation was feasible and reasonably likely. The City is encouraged to review rehabilitation options versus complete replacement on a case-by-case basis as each asset is considered for renewal to determine the most cost-effective approach at that time. The project costs presented in Tables 1-2, 1-3 and 1-4 below are planning-level estimates for in-kind replacement of the critical WPCF, pump station, and sewer collection system assets, respectively.

Replacement in kind of critical assets have been grouped into capital improvement projects. The recommended capital improvement projects are grouped for convenience of construction activities and generally grouped by either unit process or building. The FSP scope did not include evaluating alternative treatment/collection technologies (for example changing the treatment process for the plant or recommending a different pump technology for a pump station), increasing asset redundancy, or expanding system capacity. Information from other capital planning efforts including the 2022 City of Bath Combined Sewer Overflow Master Plan, 2022 Climate Adaptation Plan and current projects was considered in developing capital improvement projects, where applicable.

The project costs in Table 1-2, Table 1-3, and Table 1-4 represent the summary capital improvement project costs for the WPCF, pump stations, and collection system. A summary table of all project costs broken down on an annual basis can be found in Appendix C. The project cost estimates in the summary tables below are considered American Association of Cost Engineers (AACE) Class 4 estimates and have been prepared based on limited available project details at this preliminary planning stage. The expected accuracy of AACE Class 4 cost estimates may range from -30% to +50%. The project cost information presented herein is in current dollars and is based on the Engineering News-Record (ENR) Index 13175 (December 2022). Many factors arise during the design (e.g., the owner selected features and amenities, code issues, etc.) that cannot be definitively identified and estimated at this time. Standard planning-level multiplication factors have been applied to the cost estimates to account for additional construction project costs including field surveys, engineering, construction management, contingencies, and inflation. Refer to Section 5 for more information on cost estimate factors used in the analysis. The City is encouraged to explore all available funding options discussed in Section 6, Potential Capital Funding Sources.

Table 1-2 Water Pollution Control Facility Capital Improvement Plan

Project Name/Description	Recommended Implementation Timeframe	Recommended Implementation Timeframe	Preliminary Project Cost Estimate (Future
WPCF Project 1: Sludge Tank Mixing Upgrade	0-5 years	2024	$526,000
WPCF Project 2: Headworks Upgrade	0-5 years	2025	$2,631,000
WPCF Project 3: Primary Clarifier Upgrade	0-5 years	2024	$1,282,000
WPCF Project 4: Generator Upgrade	0-5 years	2026	$821,000
WPCF Project 5: Plant Water System Upgrade	5-10 years	2027	$594,000
WPCF Project 6: Sludge Pumping Upgrade	5-10 years	2029	$2,050,000
WPCF Project 7: Secondary Clarifier and Site Piping Upgrade	5-10 years	2031	$2,489,000
WPCF Project 8: Aeration Tanks Upgrade	5-10 years	2030	$2,025,000
WPCF Project 9: Disinfection System Upgrade	5-10 years	2030	$153,000
WPCF Project 10: Pump and Blower Building Electrical Upgrade	0-5 years	2026	$2,563,000
WPCF Project 11: Boiler and Domestic Water Upgrade	5-10 years	2031	$629,000
WPCF Project 12: Operations Building Electrical Upgrade	10-15 years	2033	$1,181,000
WPCF Project 13: Administration Building Upgrade	10-15 years	2035	$2,245,000
WPCF Project 14: Operations Building Upgrade	10-15 years	2037	$873,000
WPCF Project 15: Pump and Blower Building Upgrade	10-15 years	2037	$581,000
TOTAL	$20,643,000		

*Preliminary Project Cost Estimates developed using ENR 13175 (December 2022) and adjusted for 3% annual inflation to target completion date.

Table 1-3 Pump Station Capital Improvement Plan

Project Name/Description	Recommended Implementation Timeframe	Recommended Implementation Timeframe	Preliminary Project Cost Estimate (Future Dollars)
PS Project 1: Harward Street Upgrade	0-5 years	2025	$2,438,000
PS Project 2: Hunt Street Upgrade	0-5 years	2024	$6,530,000
PS Project 3: Commercial Street Upgrade	0-5 years	2025	$3,443,000
PS Project 4: Farrin Place Upgrade	0-5 years	2027	$953,000
Asset-Specific Project A-1: Front Street	0-5 years	2023	$75,000
Asset-Specific Project A-2: Wing Farm	0-5 years	2023	$165,000
Asset Specific Project A-3: Riverview Road	0-5 years	2023	$9,000
PS Project 5: Rose Street Upgrade	5-10 years	2030	$1,109,000
PS Project 6: Communications Upgrade	5-10 years	2024	$265,000
PS Project 7: Aegis Drive Electrical Relocation	5-10 years	2029	$490,000
PS Project 8: Pleasant Street Upgrade	10-15 years	2035	$1,630,000
TOTAL	$17,107,000		

*Preliminary Project Cost Estimates developed using ENR 13175 (December 2022) and adjusted for 3% annual inflation to target completion date.

Table 1-4 Collection System Capital Improvement Plan

Project Name/Description	Recommended Implementation Timeframe	Recommende d Implementatio n Timeframe	Preliminary Project Cost Estimate (Future Dollars)
CS Project 1: Harward Interceptor	0-5 years	2025	$4,827,000
CS Project 2: CCTV of South End	0-5 years	2023	$45,000
CS Project 3: Cross Country Interceptor Replacement	0-5 years	2025	$5,360,000
CS Project 4: Commercial Street Force Main Replacement	0-5 years	2023	$4,240,000
CS Project 5: Middle and Commercial Relining	5-10 years	2028	$720,000
CS Project 6: Bowery Street Relining	5-10 years	2030	$690,000
CS Project 7: Pleasant Avenue Force Main Replacement	10-15 years	2033	$1,580,000
TOTAL	$17,462,000		

*Preliminary Project Cost Estimates developed using ENR 13175 (December 2022) and adjusted for 3% annual inflation to target completion date.

2

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Section 2 Introduction

2.1 Purpose

The City of Bath (the "City") received approval for $50,000 in State Revolving Fund (SRF) match grant from the Maine Department of Environmental Protection (Maine DEP) to create a Fiscal Sustainability Plan (FSP) for the City's wastewater collection and treatment system assets. The purpose of this report is to document the City of Bath's municipal wastewater system, including an inventory of critical collection system, pump station, and water pollution control facility (WPCF) assets, the City's approach to determining asset criticality, and a cost-effective funding plan to proactively fund repair, rehabilitation, or replacement of the most critical assets. The FSP will provide a framework to help the City proactively manage its wastewater assets over the short term (0-5 years), medium term (5-10 years), and long term (10-15 years), planning horizons. The City has retained Wright-Pierce to assist with preparing the FSP.

2.2 FSP Team

The FSP Team is the group of individuals who will be responsible for creating the framework of the City of Bath's fiscal sustainability program. This group consists of stakeholders who will have a direct impact on the direction of the fiscal sustainability program and will be responsible for the maintenance of the FSP over the planning period. The City's FSP Team consists of:

- City Public Works Director
- City WPCF Superintendent
- City WPCF and Pump Station operators and public works staff
- City financial and administrative support staff
- Consultant staff (as needed)

The City's FSP Team will be responsible for preparing the initial FSP and meeting periodically to update the FSP as needed during the planning period. This is intended to be a living document, that is updated from time to time as asset conditions, level of service goals and priorities change within the City.

2.3 Approach and Existing Information

The FSP study was based on readily available information for the existing WPCF, pump station, and collection system assets including:

- Existing wastewater system asset inventory data
- Existing electronic geographic information system (GIS) data and maps
- Available pipe inspection reports
- Existing record drawings
- Discussions with Public Works / WPCF personnel

2.4 Water and Energy Conservation Considerations

The City of Bath strives to be a community leader in sustainability and in 2022, the City created the Office of Sustainability and Environment. The City has consistently opted to make cost-effective water and energy efficiency improvements as City facilities are renewed or updated. The City has also actively pursued cost-effective water and energy conservation improvements when planning wastewater collection and treatment system asset renewal and replacement projects. Most of the City's water and energy conservation savings are realized through optimizing energy-intensive operational processes, and renewing unit process equipment with more energy-efficient units. The transport and treatment of extraneous groundwater and stormwater is minimized as aging sewer pipelines are renewed and the City implements projects that are identified in their 2022 Combined Sewer Overflow (CSO) Master Plan. This translates to energy and financial savings in the form of reduced pumping and treatment costs and improves the social and environmental health of the City by reducing CSO discharges.

The City will continue to carry out its WPCF and collection system capital improvement programs as part of the fiscal sustainability process, including reviewing and selecting the most energy-efficient process equipment and support systems, optimizing treatment processes for energy conservation, and renewing sewer collection system infrastructure in a phased approach to limit pumping and treating extraneous flows, while still meeting customer needs and regulatory requirements.

3

Section 3 Asset Inventory and Initial Assessment

The below section includes an inventory of the City's wastewater assets and a discussion of visual observations and recommendations from various site visits. Wright-Pierce staff completed a site visit to the City of Bath WPCF and 13 wastewater pump stations on May 8-11th, 2022. In addition, the City has additional projects in various stages of design and construction that Wright-Pierce is working on or recently worked on, which allowed for additional site visits throughout the project.

The condition assessment data for the collection system assets were collected from available drawings and records of recent upgrades to the system, provided by the City and translated to the City's geographic information system (GIS) database, which Wright-Pierce had access to. As discussed in Section 3.2.3, the NASSCO condition assessment ratings during sewer inspections were used to determine the condition of the collection system assets. Where the NASSCO condition assessment information for sewers was not available, the expected remaining useful life and materials of construction were used to help determine the relative asset criticality scoring.

3.1 Asset Inventory

Appendix A of this report includes an inventory of the WPCF, pump station, and collection system assets generated from the information obtained during site visits and available City records. The asset inventory includes information on the asset identification, asset type or use, manufacturer, model number, material, system grouping, installation date, electrical information, expected useful life, and remaining useful life, where applicable.

3.2 Condition Assessments

Visual inspections were carried out during the site visits that resulted in assessment scores applied to each of the City's WPCF and pump station assets. Observations at the WPCF and pump stations were made by Wright-Pierce engineers in the following engineering disciplines:

- Architectural
- Structural
- Process
- Mechanical/HVAC/Plumbing
- Instrumentation
- Electrical

The collection system condition assessments were obtained by reviewing available manhole and pipe inspection and closed-circuit TV (CCTV) data, where available. The City's internal pipe inspection program data was also reviewed and combined with all available external data and record drawings of major interceptors and critical pipelines, as identified by the City.

This condition assessment, the FSP recommendations, and the project costs are planning level in nature and the effort put into these was commensurate with the scope of the FSP. The condition assessment informed the recommended projects discussed in Section 4 of the FSP. The visual observations have been organized by building (or process) in the following paragraphs for the WPCF and pump stations.

3.2.1 Water Pollution Control Facility Condition Assessment

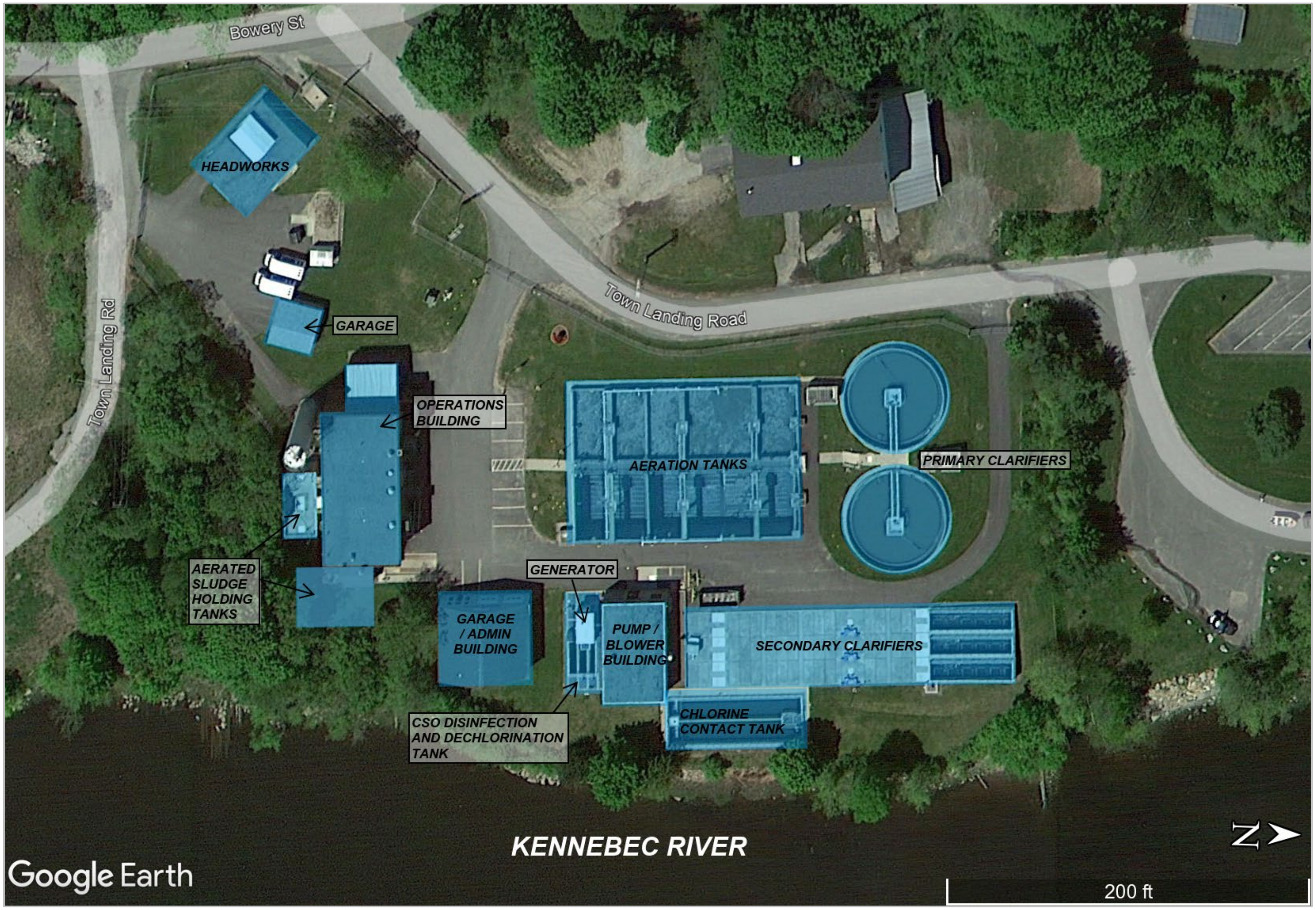
3.2.1.1 WPCF Background Information

The City owns and operates a municipal WPCF at 1 Town Landing Road. The WPCF was constructed in 1971 and updated and expanded over the course of three partial upgrades in 1993, 1997, and 2019. The WPCF was designed to provide secondary treatment for an average daily flow of 3.5 MGD and a maximum daily flow of 7.0 MGD. The plant discharges secondary treated wastewater to the Kennebec River, adjacent to the property.

The City of Bath is a combined sewer overflow (CSO) community, and while the current annual average flow to the WPCF is 1.90 MGD, the facility receives peak hour flows up to 18.85 MGD. Secondary treated flows are discharged through Outfall #001A located at the Chlorine Contact Tank. Flows in excess of 7.0 MGD receive primary treatment and disinfection and are discharged through Outfall #002A at the CSO Disinfection Tank. Both flows are then blended in a manhole downstream of both tanks and discharged through a 36-inch pipe (Outfall #002B) into the Kennebec River, a Class SB waterway in Bath. The effluent discharge must meet minimum effluent discharge quality requirements contained in the City's MEPDES permit #ME0100021.

The WPCF is an activated sludge plant with mechanical screening, vortex grit removal, primary clarification, activated sludge treatment, secondary clarification, and effluent disinfection and dechlorination. Secondary solids are stored in aerated sludge storage tanks until dewatered by rotary screw presses and trucked to the City's landfill using a roll-off truck and dumpster. The most recent upgrade finished construction in 2019 and included upgrades to the aeration tanks, secondary clarifiers, disinfection system, and sludge handling and dewatering improvements. An overview of the WPCF can be seen in Figure 3-1, below.

Figure 3-1 WPCF Overview



The following paragraphs describes the observed conditions and recommended improvements for the major unit processes and equipment at the WPCF.

3.2.1.2 Preliminary Treatment

Raw wastewater is pumped to the WPCF via Commercial Street, Harward Street, Farrin Place, and Front Street Pump Stations. There is also a gravity sewer that collects flow from a small sewershed directly upstream of the WPCF that is not pumped. The influent sewer pipe discharges flow into an influent channel equipped with a mechanical bar screen. If the mechanical screen fails to operate, wastewater will overtop a gate and flow into a bypass channel and through a manual bar rack. The mechanical bar screen and manual bar rack have not been upgraded since they were originally installed in 1997. The influent channel slide gates were installed in 1997 and nearing the end of their useful life. Screenings collected by the mechanical bar screen are discharged directly into a roll off container for disposal at the City's landfill.

After screening, flow enters the vortex grit chamber for grit removal. The grit tank mixer was replaced by City staff in 2020. Separated grit is drawn from the grit chamber by a single recessed impeller grit pump located in the Lower Pump Room. While the pump is original to the 1997 upgrade, the pump impeller was replaced in 2018. The pump is typically operated in continuous mode. Grit is pumped to a new cyclone and classifier for dewatering installed as part of the 2019 upgrade. The grit piping in the Headworks was installed in 1997 and is in very poor condition. Dewatered grit is discharged into the same roll off container as the screenings for landfill disposal.

A new influent flow meter was installed on the influent pipe between the Headworks Building and the Primary Clarifier Flow Splitter No. 1 as part of the 2019 upgrade. Influent flow ranges from a minimum hour flow of 0.7 MGD to a peak hour flow of 18.85 MGD.

3.2.1.3 Primary Treatment

Wastewater flows by gravity from the Headworks to Flow Distribution Structure No. 1, a two-way splitting structure that directs flow to Primary Clarifiers No. 1 and No. 2. The circular primary clarifiers were originally final clarifiers installed in 1971. The sidewalls were raised, and the tanks were converted to primary clarifiers as part of the 1997 upgrade with new plow-and-rake style sludge and scum collection mechanisms. The primary clarifier mechanisms are at the end of their useful life and the primary clarifier structures are in need of concrete resurfacing in areas. City staff also noted issues with freezing around the launders and would like to evaluate covers to be installed on the primary clarifiers.

3.2.1.4 Aeration Tanks

After primary treatment, wastewater flows converge in Flow Distribution Structure No. 2, a two-way splitting structure that directs flows to Aeration Tanks No. 1 and No. 2. Each tank, which consists of two zones, facilitates suspended growth of activated sludge. Each zone has the capability to receive both primary effluent and return activated sludge (RAS) that is collected and pumped from the secondary clarifiers. Each tank is 125 ft by 42 ft by approximately 15 ft deep. Resurfacing of the concrete in the aeration tanks was included in the 2019 upgrade.

Both tanks are equipped with fine bubble diffusers, which were replaced during the 2019 Upgrade. Three positive displacement dual-lobe blowers that were installed as part of the 1997 upgrade provide air to the fine bubble diffusers. The blowers are manually activated, typically run one at a time at minimum speed, and are rotated seasonally for even wear. The blowers are nearing the end of their useful life. Two dissolved oxygen (DO) probes were also installed as part of the 2019 upgrade to provide monitoring capabilities through SCADA to allow operators to optimize the process based on real-time measurements however no automated control of oxygen in the activated sludge tanks exists.

The City typically only has one train online at any given time and the offline tank is utilized as a peak flow storage tank to reduce CSO discharges. Plant staff have fabricated weirs to allow overflow into the offline tank during flows greater than 5.0 MGD. Any primary effluent that spills over to the offline tank during a storm event is pumped back to the headworks after the storm event. The gates between the aeration tanks are in good condition. The City would like to add automation of the gates through SCADA as part of a future upgrade.

3.2.1.5 Secondary Clarifiers

Following aeration, wastewater flows to Flow Distribution Structure No. 3, a three-way splitting structure that directs flows to Secondary Clarifiers No. 1, 2, and 3 for settling and removal of activated sludge. The rectangular secondary clarifiers were constructed as part of the 1997 upgrade and are equipped with chain and flight sludge and scum removal mechanisms. Replacement of the clarifier mechanism drives was completed as part of the 2019 upgrade. Rectangular secondary clarifiers were selected for the Bath WPCF as they allow for more clarifier area on a tight site than circular clarifiers.

3.2.1.6 Disinfection and Dechlorination

Secondary clarifier effluent flows through a chlorine contact tank where it gets disinfected with sodium hypochlorite. Flow then enters a dechlorination structure where it is dechlorinated with sodium bisulfite. Effluent wastewater flows over a fixed weir into an effluent metering structure where the flow rate is recorded. Similarly, when high flows into the WPCF trigger the CSO bypass system, CSO bypass flow travels through a CSO disinfection and dechlorination tank where sodium hypochlorite is injected at the front end of the tank and sodium bisulfite is injected at the back end of the tank and mechanically mixed. The secondary effluent chlorination and dechlorination tank mixers, as well as the CSO chlorination and dechlorination mixers are past the end of their useful life and the City is beginning to see issues with the mixers. Structural repairs and concrete resurfacing are also needed on the chlorine contact tank influent chamber and dechlorination tank.

As part of the 2019 upgrade, two new 5,000-gallon bulk storage tanks were installed, one for sodium hypochlorite and one for sodium bisulfite. Additionally, four new chemical feed peristaltic pumps were provided for disinfection and dechlorination of the plant effluent, as well as four new chemical feed peristaltic pumps for the CSO Bypass disinfection system. The new equipment and instruments were integrated into the Chemical Control Panel and SCADA.

3.2.1.7 Sludge Handling and Dewatering

Primary sludge and primary scum are pumped from the primary clarifiers directly to Sludge Holding Tanks No. 1 and 2 and stored separately from waste activated sludge (WAS). Scum collected from the secondary clarifiers is directed into a manhole and then flows by gravity into the Secondary Scum Well. Activated sludge collected in the secondary clarifiers is either recycled back to the aeration tanks as RAS or wasted for disposal (WAS) into Sludge Holding Tank No. 3, which is a new aerated sludge storage tank constructed as part of the 2019 upgrade. Four new pumps were installed as part of the 2019 upgrade to blend primary sludge and WAS in the pipeline prior to the new sludge thickening and dewatering equipment. The sludge aeration system consists of three positive displacement blowers (one new as part of 2019 upgrade) and fine bubble diffuser systems in each tank. The two sludge holding tank blowers and fine bubble diffuser systems in Sludge Holding Tanks No. 1 and 2 were installed in 1997 and are at the end of their useful life. The City is having issues keeping sludge mixed in the two older tanks and would like to match the Tideflex system that was installed in the new Sludge Holding Tank No. 3 as part of the 2019 upgrade. Additionally, City staff have observed the slide gate replaced in kind as part of the 2019 upgrade between Sludge Holding Tank No. 1 and 2 is too small and would like it replaced with a larger gate.

As part of the 2019 upgrade, the existing belt filter presses were demolished and two new flocculation tanks, rotary screw thickeners, and rotary screw presses were installed for sludge thickening and dewatering. Two new polymer make-down systems were provided to condition the sludge prior to dewatering. Shaftless screw conveyors were also provided to convey sludge from the screw presses to the Sludge Loading Area where dewatered sludge fills a dedicated sludge roll-off truck and dumpster.

3.2.1.8 Process Support Systems

Electrical System: The Electrical Room in the Pump and Blower Building contains the motor control centers (MCCs), transformers, power panels, and control panels for much of the process equipment in the Pump and Blower Building. The electrical equipment was installed in 1997 and it is nearing the end of its useful life and should be included as part of a future upgrade.

A new Electrical Room was installed in the Operations Building as part of the 2019 upgrade, and new electrical components were installed such as MCCs and control panels for new process equipment. There are still several lighting panels and transformers that were installed in 1971 and 1997 that are at and beyond the end of their useful life.

Standby Emergency Power: The WPCF is equipped with an outdoor 250kW diesel standby power generator and automatic transfer switch (ATS) that was installed in 1997. The generator and ATS are nearing the end of their useful life and should be included as part of a future upgrade.

Plant Water: The plant water system for the WPCF provides recycled treated effluent to select process equipment and distributes non-potable recycled process water to other locations around the site. The plant water system was installed in 1997 and is housed in the Pump Room of the Pump and Blower Building. The skid-mounted system consists of a plant water skid, three plant water pumps, and local controls. The plant water pumps and piping and valves throughout the facility and yard are nearing the end of their useful life and should be included as part of a future upgrade.

Boiler System: The WPCF boiler and fuel oil tank were installed in 1971 and is beyond its expected useful life. Hot water piping that was installed in 1997 throughout the Operations Building and Pump and Blower Building is also at the end of its useful life and should be replaced. As part of the 2019 upgrade, the hot water circulator pumps were replaced in the Mechanical Room of the Operations Building.

SCADA: The WPCF's SCADA system was substantially upgraded as part of the 2019 Upgrade.

3.2.1.9 WPCF Civil/Site

WPCF Site: The plant water hydrants were installed in 1997 and are nearing the end of their useful life. City staff noted the hydrants are not in great condition and should be replaced as part of a future upgrade.

City staff noted poor drainage around the Headworks Building. The area surrounding the Headworks should be re-graded such that drainage issues are no longer a concern.

Administration Building: The Administration Building houses the administrative offices and does not contain any process equipment. The Operations Building houses other admin spaces such as a breakroom located adjacent to the sludge pumping area and locker room adjacent the dewatering equipment. The City has discussed renovating the Administration Building to allow for inclusion of spaces such as a breakroom and locker spaces separate from process equipment. Replacement of the Administration Building roof, as well as interior and exterior doors and windows, will be required in the near future.

Operations Building: City staff have noted the dedicated laboratory space in the Operations Building is too small to complete daily lab tasks. An extension of laboratory space should be evaluated as part of a future upgrade. Replacement of the Operations Building roof, repointing of veneer, and replacement of interior and exterior doors and windows will be required in the near future.

Pump and Blower Building: The Pump and Building contains unit heaters and exhaust fans throughout that were not replaced as part of the 2019 upgrade. This mechanical equipment is nearing the end of its useful life and should be replaced as part of a future upgrade. Replacement of the Pump and Blower Building roof, repointing of veneer, and replacement of interior and exterior doors will be required in the near future.

3.2.2 Pump Station Condition Assessment

The City of Bath's sewer collection system has 26 wastewater pumping stations that convey wastewater to the City of Bath WPCF. Of these, 15 wastewater pumping stations are publicly owned and operated by the City of Bath. Appendix A includes a GIS-based map of the City of Bath's municipal wastewater pump stations and sewer system, including the private pump stations throughout the City. Two of the publicly owned stations, Cemetery Garage and McMann Field, are very small package pump stations that only receive flow from the Maple Grove Cemetery Utility Building and the bathrooms at McMann Track & Field complex, respectively. These pump stations are maintained by separate departments of the City instead of the Public Works Department. These stations are not included in the report. Therefore, the remaining 13 publicly-owned and operated stations were analyzed.

A summary of the pump station assets as well as the observed conditions and recommended improvements are summarized in subsequent sections below.

3.2.2.1 Aegis Drive

Pump Station ID	Aegis Drive Pump Station
Physical Address	176 Congress Avenue, Bath, Maine 04530
Pump Type	Submersible
Pump Manufacturer	Goulds
No. of Pumps	2
Motor Size	5 HP
Year Constructed	1985
Connection to Utility Power	Overhead
Emergency Power Source	None
Instrumentation & Communications	Pressure Transducer. Alarms work sporadically
VFD	No

Additional Notes

- Pumps into Harward Street Pump Station drainage area
- Valve vault is the larger of the two structures and has two hatches on top.
- Bypass/cleanout located within valve vault
- Pump station is owned by the City, but the controls are housed in a building (pictured above) that is owned by the adjacent housing development. The City has a key to access controls as necessary.
- Given the possibility that the building ownership may change, the City would like to move the electrical equipment and control panel to an outside panel that they own and can access.
- Alarms work sporadically so it is recommended to upgrade communications to be more reliable.

3.2.2.2 Bridge Street

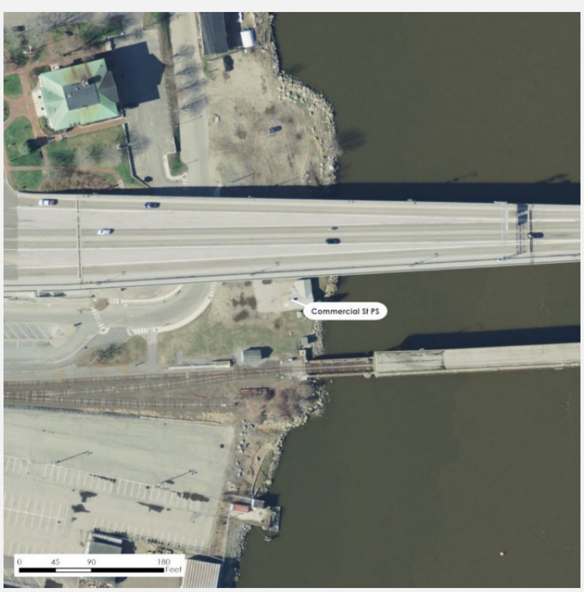
Pump Station ID	Bridge Street Pump Station
Physical Address	40 High Street, Bath, Maine 04530
Pump Type	Suction Lift
Pump Manufacturer	Gorman Rupp T4
No. of Pumps	2
Motor Size	20 HP
Year Constructed	1969, Upgraded in 2017
Connection to Utility Power	Underground from adjacent utility pole, ~20 ft away
Emergency Power Source	Standby Automatic Generator Cummins 60KW diesel (new 2020)
Instrumentation & Communications	Pressure Transducer & Floats. Unreliable radio alarming system.
VFD	No

Additional Notes

- Pumps into Hunt Street Pump Station drainage area
- Wetwell with package suction lift pump station enclosure and separate controls and electrical enclosure
- Bypass assembly present
- Recently upgraded in 2017.
- During typical operation, this station sees low flows and the City is considering adding City water to increase flows and keep water from stagnating.
- Alarms work sporadically, so it is recommended to upgrade communications to be more reliable.

3.2.2.3 Commercial Street

Pump Station ID	Commercial Street Pump Station
Physical Address	15 Commercial Street, Bath, Maine 04530
Pump Type	Extended Shaft Centrifugal
Pump Manufacturer	Fairbanks Morse
No. of Pumps	4
Motor Size	Jockey Pumps: 40 HP, 40 HP Duty Pumps: 200 HP, 200 HP
Year Constructed	1969, Upgraded in 2002
Connection to Utility Power	Underground
Emergency Power Source	Standby Automatic Generator Cummins 250KW Diesel
Instrumentation & Communications	Milltronics Ultrasonic and Alarms. Reliable radio signal.
VFD	Yes



Additional Notes

- Pumps to WPCF
- Largest pump station for flows, taking on flows from Pleasant Street and Hyde Park (which additionally include flows from 5 other pump stations).
- Licensed CSO No. 005 associated with pump station located in the center of Washington Street in SMH-1376
- Neither local flooding nor ponding have been observed, but debris from the river can be seen on the bank nearby
- Force main is a 4,800-feet long ductile iron pipe installed in 1969 with no known isolation valves.
- Record drawings indicate that a force main bypass/cleanout is located at the station, but it has not been located and is not accessible to operations staff.
- There are no lifting cables to remove the large pumps for maintenance

- Seal water is leaking from the pump casings
- There is significant rust on the pipe flanges, some of the valves are beginning to fail, and the process piping has reached the end of its expected useful life.
- The original wet well link seals are in poor condition. Past attempts to fill leaks with structural foam disrupted process operations because foam entered the pipe and clogged a pump.
- VFDs have failed in the past and have reached the end of their expected useful life.
- There are structural defects within the wet well, CMU blocking, concrete equipment pads, and pipe supports that require rehabilitation.
- Instrumentation and electrical controls are obsolete.
- High priority for an upgrade due to comprehensive problems and risks associated with climate change (summarized in 2022 Climate Adaptation Plan).

3.2.2.4 Farrin Place

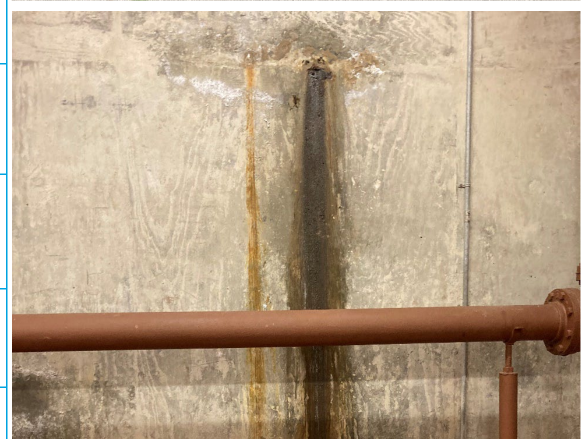
Pump Station ID	Farrin Place Pump Station
Physical Address	1 Harkness Lane, Bath, Maine 04530
Pump Type	Suction Lift
Pump Manufacturer	Gorman Rupp T6
No. of Pumps	2
Motor Size	30 HP
Year Constructed	1969, Upgraded circa 1995
Connection to Utility Power	Overhead
Emergency Power Source	Standby Diesel Generator Olympian 60KW
Instrumentation & Communications	Milltronics Ultrasonic and Floats. Unreliable radio alarming system
VFD	Yes

Additional Notes

- Pumps to WPCF
- Poor access to pump station. During rain events there is significant erosion of gravel access road and driveway. Gravel builds up in front of pump station door.
- SSO in the vicinity of the pump station observed during rain events, coming from manholes upstream of the station
- 1995 upgrade drawings and records not available
- There is a pig launch installed inside the station
- Electrical Equipment and VFDs have passed their expected useful life
- Pumps do not achieve rated capacity, even though the force main was cleaned in 2022.

3.2.2.5 Front Street

Pump Station ID	Front Street Pump Station
Physical Address	458 Front Street, Bath, Maine 04530
Pump Type	Suction Lift (flooded)
Pump Manufacturer	Gorman Rupp T4
No. of Pumps	2
Motor Size	10 HP
Year Constructed	2003, Upgrade Pumps and FM with Commercial Upgrade
Connection to Utility Power	Underground from utility pole on road, ~20ft away
Emergency Power Source	Standby Automatic Generator Cummins 60KW (3PH) Diesel
Instrumentation & Communications	Milltronics Ultrasonic and Alarms
VFD	Yes



Additional Notes

- Pumps to WPCF
- Very deep station (3 stories, wetwell located ~30 feet below-grade)
- Sporadic staining was observed on the pump room walls, indicating that wastewater was seeping through the concrete wall from the adjacent wetwell. Similar staining observed on the link seals surrounding the pump intake piping.
- No force main bypass/cleanout located at the station
- The VFDs have reached the end of their expected useful life.

3.2.2.6 Harward Street

Pump Station ID	Harward Street Pump Station
Physical Address	1438 Washington Street, Bath, Maine 04530
Pump Type	Vertical Centrifugal Single-stage, Non-clog
Pump Manufacturer	Fairbanks Morse
No. of Pumps	3
Motor Size	60HP (lead), 100HP (lag), 100 HP (lag)
Year Constructed	1969, Upgraded in 1997
Connection to Utility Power	Underground
Emergency Power Source	Standby Automatic Diesel Generator Cummins 250KW – 1997 upgrade
Instrumentation & Communications	Ultrasonic Milltronics. Alarms work poorly
VFD	Yes

Additional Notes

- Pumps to WPCF
- CSO discharge (license No. 008) and SSOs in the drainage collection area
- Station does not run at maximum capacity during storm events due to capacity limitations in upstream main interceptor line.
- If this station was run at 100% during a rain event, the WPCF would likely be overwhelmed. In addition, if all the flow made it to the station, the force main may need to be upsized and a fourth pump may be needed to handle peak flows.
- Bypass assembly present on site, some large trees nearby
- Valves are specialty fiberglass material, which does not have adequate replacement parts locally. Cracking observed on process piping.

- The original wet well link seals are in poor condition and leak into the drywell. City periodically applies sealant, but new link seals are needed long-term.
- Bar rack is undersized and inefficient during wet weather events, leading to rags clogging pumps.
- High priority for an upgrade due to comprehensive problems in sewershed (summarized in 2022 CSO Master Plan) and risks associated with climate change (summarized in 2022 Climate Adaptation Plan).

3.2.2.7 Hunt Street

Pump Station ID	Hunt Street Pump Station
Physical Address	174 Washington Street, Bath, Maine 04530
Pump Type	Flooded Suction Centrifugal
Pump Manufacturer	Fairbanks Morse
No. of Pumps	2
Motor Size	40 HP
Year Constructed	1969- no significant upgrades since
Connection to Utility Power	Underground from adjacent utility pole, ~20' away
Emergency Power Source	Portable Generator Receptacle
Instrumentation & Communications	Milltronics Ultrasonic and Alarms. Outdated Motor Control Center
VFD	Yes

Additional Notes

- Takes on flow from 2 other pump stations (Riverview and Bridge)
- Pumps to the Rose Street Pump Station
- SSOs nearby from three SMHs located in Washington St.
- Concerns regarding wall penetration link seals leaking because of age of station
- Concerns regarding outdated motor control center panel and electrical obsolete equipment that cannot be replaced
- High priority upgrade for the City due to age of station.
- Backup generator needed at station.
- High priority for an upgrade due to comprehensive problems and risks associated with CSO and SSOs (summarized in 2022 CSO Master Plan) and climate change (summarized in 2022 Climate Adaptation Plan).

3.2.2.8 Hyde Park

Pump Station ID	Hyde Park Pump Station
Physical Address	1 Drayton Road, Bath, Maine 04530
Pump Type	Suction Lift
Pump Manufacturer	Gorman Rupp T4
No. of Pumps	2
Motor Size	30 HP
Year Constructed	Original construction date unknown, upgraded in 1999, Last pump upgrade in 2010
Connection to Utility Power	Underground
Emergency Power Source	Standby Automatic Diesel Generator Cummins 60 KW
Instrumentation & Communications	Milltronics Ultrasonic and Alarms. Reliable radio communication
VFD	Yes

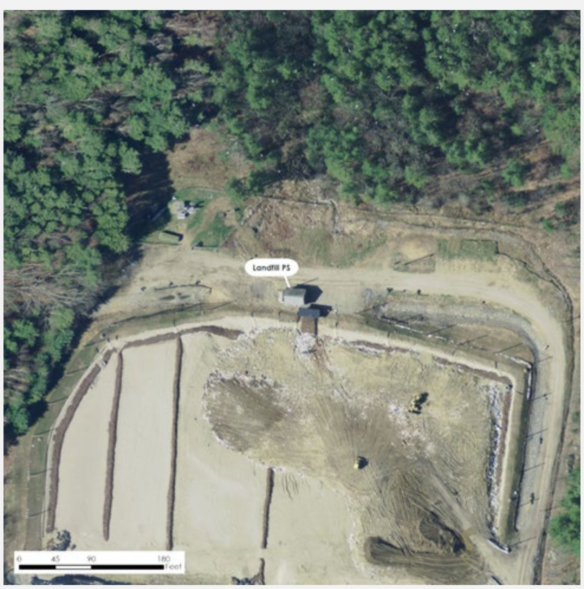
Additional Notes

- Pumps to Commercial Street Pump Station. Cross-connection valves allows station to pump to Harward Street Pump Station, although this is not the normal mode of operation.
- Takes flows from Wing Farm pump station
- Located in a residential and commercial area that has a lot of fats oils and grease build up in the wetwell.
- There is a pic launch inside the station
- Louver draws in cold air during the winter that isn't tempered; station gets visibly icy inside. Longer term, City is interested in putting the generator outside so it isn't drawing in as much cold air in the winter.

3.2.2.9 Landfill

	Landfill Pump Station
Physical Address	Detritus Drive, Bath, Maine 04350
Pump Type	Submersible / Submersible
Pump Manufacturer	Liberty LSG202M / Sligo Series 3
No. of Pumps	2 / 2
Motor Size	2 HP / 10 HP
Year Constructed	2017 / 2017
Connection to Utility Power	Overhead
Emergency Power Source	Portable Generator Receptacles
Instrumentation & Communications	Pressure Transducers. Unreliable alarms
VFD	Yes / Yes

*There are two pump locations at this site.



Additional Notes

- Two Liberty pumps located in the original wetwell pump leachate through the building into the leachate well located on the hill, also referred to as “sump”. Leachate well is pumped by two Sligo pumps to Harward Street Pump Station Drainage Area.
- Pump station is located to the north of the landfill. To the north of the pump station is an unnamed tributary of the Kennebec River
- Leachate from landfill cells I and II is collected through the leachate collection system and piped to the original wetwell through a series of manholes on the perimeter of the landfill.
- History of power outages and no way of knowing whether the station’s power has gone down unless manually checked by City staff.

3.2.2.10 Pleasant Avenue

Pump Station ID	Pleasant Avenue Pump Station
Physical Address	3 Castine Avenue, Bath, Maine 04530
Pump Type	Extended Shaft Centrifugal Pump
Pump Manufacturer	Fairbanks Morse
No. of Pumps	3
Motor Size	50 HP
Year Constructed	1969, Upgraded in 2009
Connection to Utility Power	Underground from nearby utility pole.
Emergency Power Source	Standby Automatic Diesel Generator Cummins 125KW (2009)
Instrumentation & Communications	Krohne Ultrasonic and Alarms. Reliable radio communication
VFD	Yes

Additional Notes

- Pumps to Commercial Street Pump Station drainage area
- Takes flow from Rose Street Pump Station, and tributary stations Hunt, Bridge, and Riverview
- Located next to CMP substation, which has routinely flooded. Substation currently undergoing upgrade to resolve the drainage, flooding, and accessibility issues
- If all three pumps are running when generator turns on, the voltage is too high and trips the circuit, rendering the generator inoperable
- Licensed CSO No. 004 associated with pump station
- The Krohne interface for the mag meter is difficult to operate and read.
- Surge protector is not working.

3.2.2.11 Riverview Road

Pump Station ID	Riverview Road Pump Station
Physical Address	30 Riverview Road, Bath, Maine 04530
Pump Type	Suction Lift
Pump Manufacturer	Gorman Rupp T4
No. of Pumps	2
Motor Size	15 HP
Year Constructed	1969, Upgraded in 2017
Connection to Utility Power	Underground
Emergency Power Source	Portable generator receptacle
Instrumentation & Communications	Pressure Transducers, radio communications obsolete
VFD	No

Additional Notes

- Pumps to Hunt Street Pump Station drainage area
- Wetwell in yard, pumps located in separate small brick building
- Bypass / cleanout present at the station
- Portable generator receptacle
- Adequate site access & no overhanging trees
- The abandoned tin can from the previous pump station is in bad shape and is located in the bottom of the building. Leaking oil or other petroleum product observed.
- Pig Launcher cannot be used in the winter because the pig launcher and valves are buried and freeze.

3.2.2.12 Rose Street

Pump Station ID	Rose Street Pump Station
Physical Address	331 Washington Street, Bath, Maine 04530
Pump Type	Flooded Suction Centrifugal
Pump Manufacturer	Fairbanks Morse
No. of Pumps	2
Motor Size	30 HP
Year Constructed	1969 both pumps and motor in 2006 New #1 pump and motor in 2013 New #2 pump and motor in 2016
Connection to Utility Power	Overhead
Emergency Power Source	Standby Automatic Diesel Generator Cummins 80KW (2007)
Instrumentation & Communications	Milltronics Ultrasonic and Alarms unreliable radio communications
VFD	Yes

Additional Notes

- Pumps to Pleasant Street Pump Station drainage area
- Takes on flows from Hunt Street Pump Station and tributary Bridge and Riverview pump stations
- Licensed CSO No. 003 associated with pump station
- Projects focusing on I/I removal in the south end of the system have reduced CSO volumes since 2018.
- Power outages a few times per year due to squirrels on the service line. CMP grid re-configured which seems to reduce the frequency of power outages
- Check valves are old and can no longer be purchased.
- Electrical equipment is obsolete and spare parts are only available on Ebay.
- Drain lines at the suction end of the pump are in very poor condition.
- The link seals between the wet well and the valve vault are in poor shape.

3.2.2.13 Wing Farm

Pump Station ID	Wing Farm Pump Station
Physical Address	2 Wing Farm, Bath, Maine 04530
Pump Type	Suction Lift
Pump Manufacturer	Gorman Rupp T3
No. of Pumps	2
Motor Size	7.5 HP
Year Constructed	1999
Connection to Utility Power	Overhead
Emergency Power Source	Standby Automatic Generator 25 KW
Instrumentation & Communications	Pressure Transducer, Alarms
VFD	No

Additional Notes

- Pumps to Hyde Park Pump Station drainage area
- Low lying area surrounded by trees and wetlands
- Bypass / cleanout present at the station
- Instrumentation level elements in stilling well (accessed via SMH outside) get clogged up and are difficult to replace.
- Electrical equipment including the control panel, PLC, electrical enclosures and the automatic transfer switch are either at the end of their expected useful life or are obsolete
- Small station - not having major issues.

3.2.3 Collection System Condition Assessment

The sewer collection system serves approximately 2,900 residences, 240 commercial properties, and 50 governmental properties in the City of Bath, as well as Bath Iron Works. Wastewater is conveyed to the City's WPCF by about 39 miles of collection sewers and interceptors and 5 miles of sewer force main. Like many communities during the early to mid-1900s, the City designed their system to convey sanitary wastewater and stormwater within the same collection system and discharged untreated into the Kennebec River. In the early 1970s, the City constructed a number of pump stations throughout the City and a central WPCF. However, due to the nature of the original collection system, many CSO discharge points remained in place to allow relief points within the system when flows in excess of system capacity occurred. Beginning in the early 1980s, the City began to separate portions of the collection system into separate sanitary and stormwater systems. The City has made significant strides in reducing the overall pollution load discharged to the Kennebec River as a result of CSO reduction. Currently, there are only four active CSOs in the sanitary sewer system:

- CSO 003 - Rose Street Pump Station
- CSO 004 - Pleasant Avenue Pump Station
- CSO 005 - Commercial Street Pump Station
- CSO 008 - Harward Street Pump Station

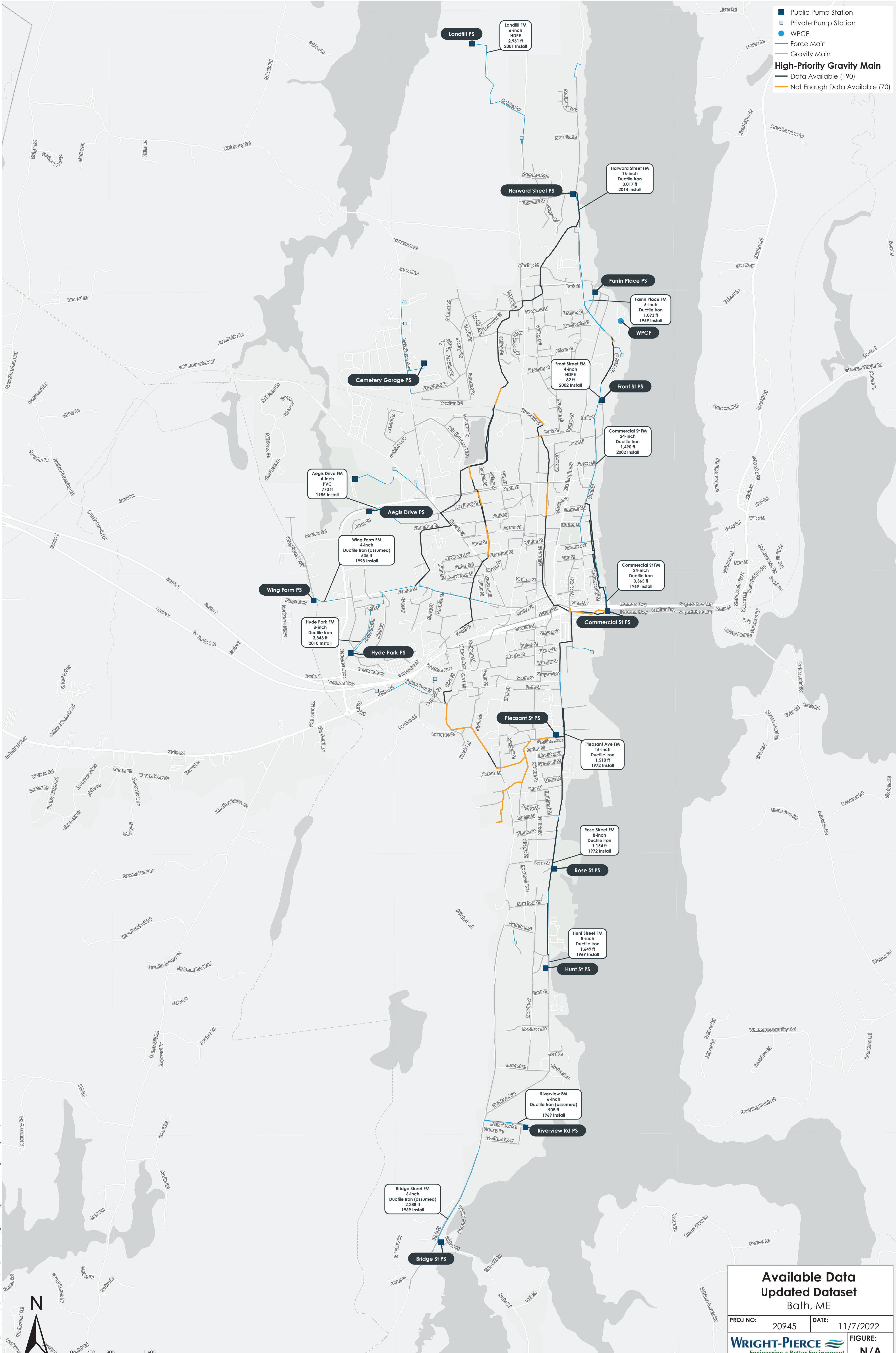
There are a number of catch basins that are still tied into the sanitary sewer system. This report will not discuss stormwater infrastructure assets that are connected to the sanitary sewer. For more information about the combined collection system, refer to the 2022 CSO Master Plan, which provides a full description of ongoing efforts to further reduce the stormwater and wastewater collection systems' connectivity and mitigate CSOs and SSOs.

The Bath Wastewater Department staff currently work in conjunction with a contracted third-party sewer inspection service company to complete routine cleaning, inspecting, and condition assessment of the City's sewer system. Closed-circuit television (CCTV) camera equipment is used to inspect the sewer infrastructure and National Association of Sewer Service Companies (NASSCO) published industry standards are used for assessing the condition of sewer pipes. The NASSCO condition assessment system includes assigning specific numeric values or codes to observed pipe and manhole maintenance items or defects. The standardized scoring or coding of defects using a consistent inspection approach allows for a more objective comparison of the condition and management of sewer system assets. The City also has an ongoing pipe relining and replacement program and an active manhole rehabilitation program to improve sewer longevity and reduce I/I into the system.

To be efficient within the limited FSP scope, the City and FSP team identified high priority pipes throughout the City that would be the focus of the collection system condition assessment. These pipes were primarily larger (>12" diameter) interceptor sewers that convey the majority of the wastewater to the pump stations throughout the system. There were 260 pipe segments identified as high priority, which had a total length of approximately 41,000 linear feet and made up 5.24% of the total system, by length. The City of Bath's approach of identifying high priority areas to focus on within the report allowed a deeper analysis to be performed on the portions of the collection system that are most critical to include in relation to financial planning, since they are the largest sewer lines in the system and, in many cases, are some of the oldest pipelines. Many were installed during the major expansion of the sewer collection system in the 1970s, and could be nearing the end of their expected useful life. The critical pipes identified throughout the City can be seen in Appendix B.

The available NASSCO condition assessment rating information from the City's third-party sewer inspection service company was used to help determine the critical pipe sewer asset criticality. Where NASSCO condition assessment information for specific sewer segments was not available other information including the installation date, diameter, and materials of construction were used to help determine the relative asset criticality. This information was obtained from a third party CCTV and pipe inspection consultant, the City's GIS database, available record drawings, or assumptions based on adjacent pipes and historical information.

Figure 3-2 below shows the City's high priority sewer system pipe segments with color coding to indicate whether there was available information to determine criticality or not enough data to ascertain the condition criticality. Initially, there were only 43 of the 260 pipe segments that had enough information to complete the analysis. Once the database was updated to include a deeper review of record drawings, assumptions based on adjacent pipes, and historical information, the pipe segments that had enough information grew to 190 out of the 260 pipes. Please refer to Appendix B for the risk assessment for the collection system.



Public Pump Station
Private Pump Station
WPCF
Force Main
Gravity Main
High-Priority Gravity Main
Data Available (190)
Not Enough Data Available (70)
Landfill PS
Landfill FM
6-inch
HDPE
2,961 ft
2001 Install
Harward Street PS
Harward Street FM
16-inch
Ductile Iron
3,017 ft
2014 Install
Farrin Place PS
Farrin Place FM
6-inch
Ductile Iron
1,093 ft
1969 Install
WPCF
Cemetery Garage PS
Front Street FM
4-inch
HDPE
82 ft
2002 Install
Front St PS
Commercial St FM
24-inch
Ductile Iron
1,490 ft
2002 Install
Aegis Drive FM
4-inch
PVC
770 ft
1985 Install
Aegis Drive PS
Wing Farm FM
4-inch
Ductile Iron (assumed)
535 ft
1998 Install
Commercial St FM
24-inch
Ductile Iron
3,365 ft
1969 Install
Wing Farm PS
Commercial St PS
Hyde Park FM
8-inch
Ductile Iron
3,843 ft
2010 Install
Hyde Park PS
Pleasant St PS
Pleasant Ave FM
16-inch
Ductile Iron
1,510 ft
1972 Install
Rose Street FM
8-inch
Ductile Iron
1,154 ft
1972 Install
Rose St PS
Hunt Street FM
8-inch
Ductile Iron
1,649 ft
1969 Install
Hunt St PS
Riverview FM
6-inch
Ductile Iron (assumed)
908 ft
1969 Install
Riverview Rd PS
Bridge Street FM
6-inch
Ductile Iron (assumed)
2,288 ft
1969 Install
Bridge St PS
N
0 400 800 1,600
Feet
Available Data
Updated Dataset
Bath, ME
PROJ NO: 20945
DATE: 11/7/2022
WRIGHT-PIERCE
Engineering a Better Environment
FIGURE: N/A

4

WRIGHT-PIERCE
Engineering a Better Environment

Section 4 Risk Assessment and Alternatives Analysis

4.1 Analysis Criteria

The FSP study included risk-based assessments of the City’s WPCF, pump stations, and sewer collection system assets. These assessments were performed by assigning risk-based criticality scores to each asset and ranking the assets by this score for relative comparison. The highest scoring WPCF, pump stations and collection system assets from the criticality rankings helped inform the recommended capital improvements discussion in Section 5. The following paragraphs describe the risk assessment approaches for the WPCF, pump stations and sewer collection system, followed by the results of the corresponding asset criticality rankings.

Key performance criteria were selected by the FSP Team to determine criticality. The performance criteria are grouped into two broad categories, likelihood of failure (LoF) criteria and consequences of failure (CoF) criteria.

4.1.1 Likelihood of Failure (LoF) Criteria

The following criteria were used to assign likelihood of failure scores to each of the City's wastewater assets based on available records and the results of the visual condition assessments during the WPCF site visits.

4.1.1.1 Age; Remaining Useful Life

As an asset ages, it deteriorates, thereby increasing its risk of failure. Remaining useful life (RUL) can be used as an indicator of an asset's likelihood of failure. Remaining useful life is the difference between the asset's expected useful life and the amount of time it has been in service. The expected useful life is the period during which the asset is expected to perform as intended. RUL was calculated as follows:

RUL = Expected useful life - (current year - installation year)

Table 4-1 below provides a summary of the average expected useful lifespans of mechanical systems, equipment, and materials typical of wastewater treatment systems. These values were used within the analysis unless explicitly adjusted based on City feedback. The values presented in the table are for planning purposes only and are based on best professional judgement and equipment manufacturer data where applicable and available, but in no way guarantees the useful lives of the particular assets. The actual useful lives of equipment and materials are variable and depend on many factors that cannot be completely accounted for within this study. In addition, the expected useful lifespans presented assume that the assets are adequately maintained and/or operated to prevent premature failure.

Table 4-1 Typical Expected Useful Lifespans

Group	Asset	Expected Useful Lifespan
Collection System Piping	Gravity Sewer	50 years
	Force Main	50 years
Process/Mechanical Equipment	Pumps/Blowers	25 years
	Piping	40 years
	Clarifier Mechanisms	30 years
	Mechanical Mixers	20 years
	Mechanical Grit Separators/Classifiers	20 years
	Mechanical Step Screens	20 years
	Dewatering Equipment	20 years
	Fine Bubble Diffusers	10 years
	Coarse Bubble Diffusers	20 years
	Chemical Feed Pumps	15 years
	Dewatering Equipment	20 years
	Slide Gates	30 years
	Ancillary Process	20 years
Architectural	Buildings, roof, windows, doors, veneer	60 years
Structural	Concrete Structures	60 years
HVAC/Plumbing	HVAC Systems	15 years
Electrical	Motor Control Centers	35 years
	Lighting	20 years
	Generator & Transfer Switches	35 years
	Transformers	25 years
	Variable Frequency Drives (VFDs)	12 years
	Portable Generator Systems	15 years
Control System	I&C/SCADA Systems	15 years
	Control Panels	20 years
	Instrumentation	15 years

4.1.1.2 Condition

The condition of an asset is related to its age, but it can also be affected by:

- The initial quality of the asset materials
- Conditions of environmental exposure
- Whether the asset was initially installed properly
- Whether the asset is being appropriately used as intended
- Frequency of maintenance activities
- Frequency of asset use

The rate of asset deterioration can accelerate due to the above factors, leading to a shorter useful life than expected. Therefore, the relative condition was also used to help establish each asset's likelihood of failure. The relative conditions of the City's WPCF and pump station assets were based on the results of the condition assessments performed by Wright-Pierce staff on May 10-11, 2022, with input from Wastewater Department staff.

The relative conditions of the City's collection system assets were based on available information from either the City's third-party sewer system cleaning and inspection services contractor or the City's records (GIS, as-built drawing sets). If available, relative condition scores were based on NASSCO PACP pipe condition assessment ratings information. Of the 263 critical pipes, only 43 of them had NASSCO PACP ratings, so other information was required to supplement this data and complete the analysis. If NASSCO PACP condition assessments were not available or if the City had not inspected the pipes themselves, the expected useful life, material of construction, and diameter were used as a proxy for the condition. Pipe segments with constructed materials that have a longer lifetime (PVC, HDPE, or some Iron pipes) were assumed to be in better condition than the pipe segments that had materials that are known to degrade faster (AC, VCP, or Clay pipes). These materials and the size of the pipe factor into the likelihood that a pipe has experienced damage and were tied into the condition rating for the LoF score.

4.1.1.3 Collection System Missing Data Assumptions

There were also pipe segments that had significant missing information. For these pipes, additional assumptions were made to fill in gaps of knowledge. These assumptions are listed below:

- If information was not available on the City's GIS database or from CCTV and inspection data, available as-built drawings were reviewed, and the information was assumed to be accurate.
- If information was available for the upstream and downstream pipe segments, the same data (material, diameter, and/or installation date) was applied to the missing pipe segment.
- If the installation date was missing but inspection data including a PACP rating was present, the age and remaining useful life were ignored and the PACP condition rating was used as the sole CoF scoring criteria. This allowed for pipes that were old but recently inspected to still be included in the analysis.
- If the only missing piece of information required to complete the analysis was the pipe material, an assumption of the material based on the age of installation was included. This allows for the pipe materials to be grouped into two broad material classes that are representative of the durability of materials in different instillation timeframes. Before 1990, many pipes were constructed from asbestos cement, clay or other materials that did not have as long of an expected service life as more modern PVC or HDPE materials. The older pipe materials have a poorly rated score in comparison to newer pipe materials. For that reason, the following assumptions were included:
    - Pre-1990: Asbestos Cement (AC) pipe
    - Post-1990: PVC pipe

It is recommended that the City continue its ongoing sewer inspection and condition assessment program and use this information to confirm the criticality scores for sewer segments for which NASSCO condition assessment rating information was not readily available at the time of the preparation of this FSP. Table 4-2 below summarizes the composite likelihood of failure criteria numerical ratings.

Table 4-2 Likelihood of Failure Scoring

LoF Composite Criteria	Weight	5 Inoperable	4 Poor	3 Fair	2 Good	1 New
Remaining Useful Life (RUL)	50%	<20% RUL Nearing the end of expected useful life in the short-term or already exceeded expected useful life. Frequent maintenance and/or imminent failure expected.	20-40% RUL Approaching the end of the remaining expected useful life within the near- to mid-term. Maintenance frequency is expected to increase in the near-term and failure risk increasing.	41-60% RUL Around the midpoint of expected remaining useful life. Maintenance frequency and failure risk are expected to increase over the second half of the expected useful life.	61-80% RUL Asset still has a significant expected remaining useful life. Slightly more frequent maintenance and failure risk expected, but still considered low. Wear parts may need to be replaced.	>80% RUL An asset is new or relatively new. Minimal maintenance and failure risk expected.
Relative Condition	50%* 25%**	Major defects, does not function properly. Replacement, overhaul, or corrective maintenance required.	Has had overhaul or frequent corrective maintenance, operational attention required frequently, wear components may need replacement, excessive deterioration/corrosion visible, functions poorly, not adequate for all duty conditions, or excessive expense to operate/maintain.	Maintenance is more frequent than average, no early overhaul, wear components may need replacement, minor leaks and/or corrosion, major components fully functional, may experience infrequent performance issues	Normal maintenance required, little to no vibration, leakage, or corrosion/ deterioration of major components, fully functional, may experience very infrequent performance issues or require attention to ensure operation.	New or like-new asset, little to no vibration, leakage, or corrosion/deterioration , fully functional, efficiency near design levels.
Material	0%* (25%**)	Vitrified Clay Pipe Clay Pipe Clay Tile Pipe	Asbestos Cement Pipe	Reinforced Concrete Pipe	Cast Iron Ductile Iron	High Density Polyethylene (HDPE) Polyvinyl Chloride (PVC) Lined Pipe Polypropylene Pipe

*Weighting for WPCF and Pump Station assets.

**Weighting for collection system assets. As mentioned above, some assumptions for missing data alter these weighting factors in select cases.

4.1.2 Consequence of Failure (CoF) Criteria

The following criteria were used to assign CoF scores to each of the City's WPCF, pump station, and collection system assets based on available records and the results of the visual condition assessments during WPCF and pump station site visits by Wright-Pierce staff.

4.1.2.1 Economic Costs

The economic costs of asset failure are the direct and indirect economic losses due to asset failure. Economic considerations can include costs related to loss of system functionality, size/complexity, availability, specialized labor for installation, and location/accessibility.

Operational significance, availability of spare parts, and redundancy were considered for generating the economic cost portion of the composite CoF scores. The economic cost scores for the sewer system assets were based on the pipe size as an indicator for cost and ease of replacement.

4.1.2.2 Social Costs

The social consequences of asset failure are the direct impacts to the community that uses the wastewater assets as well as the indirect impacts to the surrounding geographic region that benefits from proper collection and disposal of wastewater generated in Bath. These "costs" are measured in terms of loss of sewer service, risks to health and public safety, and loss of public image and/or quality of life in Bath and the surrounding region.

Social costs considered for generating the composite CoF score included proximity to waterfront properties and beaches and service to local users.

4.1.2.3 Environmental Costs

The environmental consequence of failure represents the ecological impacts resulting from asset failure. Environmental costs include contaminated soil, groundwater, and surface water bodies. Environmental contamination can also lead to indirect social and economic costs in the form of fines and penalties from regulatory agencies, an outbreak of illnesses/injuries due to drinking water contamination, economic losses for businesses, decreased local property values, and loss of enjoyment of recreation activities in or around the water.

Proximity to critical plant and animal habitat, wetlands, and water bodies were used to generate the composite CoF scores.

Table 4-3 below summarizes the composite CoF criteria numerical ratings for the WPCF, pump station, and collection system assets.

Table 4-3 Consequence of Failure Scoring

CoF Composite Criteria	Weight	5	4	3	2	1
		Very High	High	Moderate	Low	Very Low
Economic Cost	33%	Critical to overall system function, the component is obsolete/no spare parts are available, no redundancy.	Critical to major system components, long lead time for replacement and/or spare parts, Limited ability, or high cost to provide temporary redundancy.	Important to overall system function, relatively short lead time for a replacement or spare parts, partial redundancy available, or low cost to provide temporary redundancy.	Important to some major system components, replacement, or spare parts locally available, partial or full redundancy available or low cost to provide temporary redundancy.	Minor to system function, replacement or spare parts on-hand, full redundancy available.
Social Cost	33%	Major risk to waterfront properties and beaches, loss of service to critical emergency services.	Significant risk to waterfront properties and beaches, loss of service to major commercial districts.	Moderate risk to waterfront properties and beaches, loss of service to mixed-use residential/commercial zones.	Low risk to waterfront properties and beaches, loss of service to residential zones only.	No impact on waterfront properties or beaches, loss of service to residential zones only.
Environmental Cost	33%	Major risk to critical plant/animal habitat, wetlands, and/or water bodies.	Significant risk to critical plant/animal habitat, wetlands, and/or water bodies.	Moderate risk to critical plant/animal habitat, wetlands, and/or water bodies.	Low risk to critical plant/animal habitat, wetlands, and/or water bodies.	Minor to no risk to critical plant/animal habitat, wetlands, and/or water bodies.

4.1.3 Weighting Factors

The LoF and CoF criteria were each assigned a weighting factor to align with the City's level of service goals. The performance criteria scores are multiplied by the corresponding weighting factors and then summed to determine the criticality score. For example, if an asset has a remaining useful life (RUL) score of 4 and a weighting factor of 50%, the weighted RUL score will be 50% of 4, or 2. The relative weighting factors give the City the flexibility to adjust the relative importance of the performance criteria independently of the scores in each category. Table 4-4 summarizes the weighting factors for the selected performance criteria.

Table 4-4 Performance Criteria Weighting Factors

Risk Scoring Category	Criteria		Relative Weight	
			Pump Stations & WPCF	Collection System*
LoF Criteria	Age	Remaining Useful Life	50%	50%
	Condition	Relative Condition of Existing Asset	50%	25%
		Pipe Construction Material	-	25%
CoF Criteria	Economic Costs	Operational Significance/Size	11.1%	33%
		Redundancy	11.1%	-
		Availability of Spare Parts	11.1%	-
	Social Costs	Waterfront Properties	11.1%	11.1%
		Important Local Users	11.1%	11.1%
		Beaches	11.1%	11.1%
	Environmental Costs	Critical Plant/Animal Habitat	16.7%	16.7%
		Wetlands & Waterbodies	16.7%	16.7%

*In some cases, the relative weighting was adjusted to account for missing data.

The weighted LoF and CoF performance criteria scores were summed to determine the total LoF and CoF scores. The LoF and CoF scores were multiplied together to arrive at the criticality score for each asset. The criticality scores were then ranked highest to lowest so that asset renewal priority could be established.

Appendix A includes the complete risk analysis tables with criticality scores for the WPCF, pump station, and high priority sewer collection system assets.

4.2 Asset Priority

The intent of a risk-based priority ranking system for wastewater system assets is to identify the groups of assets that may require capital investment or certain maintenance activities to lower the risk score. The priority rankings of the City's assets are presented in terms of overall asset risk score ranking, and then summarized in terms of assigned renewal priority class (short-term, medium-term, long-term). The assigned renewal priority classes were used to inform the recommended renewal timelines for each asset. Table 4-5 presents the recommended asset renewal timelines based on priority class.

Table 4-5 Asset Renewal Timelines

Asset Priority Class	Renewal Timeline
Short-Term	0 to 5 years
Medium-Term	5 to 10 years
Long-Term	10 to 15 years

The asset priority class was determined based on the overall risk score and grouping of similar assets (for example, all RAS pumps, instead of individual pumps) into recommend projects that corresponded to the above renewal timelines. In general, the highest-ranking overall risk scores were identified within the 0-5 year renewal timeline. Assets with lower priority ranking scores were considered for inclusion in larger capital improvement projects on a case-by-case basis to provide economies of scale in the recommended capital improvements. Project renewal timelines were also reviewed to be in alignment with previously recommended 2021 Climate Adaptation Plan and 2022 Combined Sewer Overflow Masterplan projects and reviewed with the City for input and comment.

The project criticality scores were calculated separately for the WPCF, pump station, and collection system assets and do not directly compare to each other. For example, it is not appropriate to compare the criticality score of one of the pumps at Harward Street Pump Station to one of the pumps at the WPCF. Similarly, a score of 19.43 for one of the pump station assets does not mean that it is in worse shape than one of the WPCF assets with a score of 14.99 because the two criticality scores are not comparable across asset classes.

4.2.1 Water Pollution Control Facility

Table 4-6 summarizes the ranking of the top 10 WPCF assets by the overall risk score. These assets represent those with the combined greatest risk of failure and the consequences to the City and surrounding community if they were to fail.

The following list omits lower cost, ancillary equipment such as link seals, lighting panels, and transformers that received a criticality score within the top 10 criticality score and includes only the more important and higher cost equipment with the highest criticality ratings. A full list of the WPCF asset priority ranking by risk score is included in Appendix B.

Table 4-6 Highest Risk Water Pollution Control Facility Assets

Rank	Equipment / Asset	Criticality Score
1	Sludge Tank Mixing System (SHT-1, 2 only)	14.99
2	Standby Generator	13.88
3	Mechanical Bar Screen	13.88
4	Primary Clarifier Mechanisms	13.88
5	Primary Clarifier Drives	13.88
6	Aeration Tank Blowers	13.49
7	Chlorination/Dechlorination Mixers	13.49
8	Headworks and Grit Piping and Valves	13.49
9	Effluent Well Pumps	13.49
10	Sludge Holding Tank No. 1 and 2 Blowers	13.49

4.2.2 Pump Stations

Table 4-7 summarizes the ranking of the top 10 Pump Station assets by the overall risk score. These assets represent those with the combined greatest risk of failure and the consequences to the City and surrounding community if they were to fail. A full list of the Pump Station asset priority ranking by risk score is included in Appendix B.

Table 4-7 Highest Risk Pump Station Assets

Rank	Pump Station	Equipment / Asset	Criticality Score
1	Harward Street	Process Piping & Valves	19.43
2	Harward Street	Electrical Equipment & Enclosures	18.87
3	Harward Street	Link Seals	18.32
4	Harward Street	Pumps	17.76
5	Harward Street	Instrumentation	16.48
6	Commercial Street	Process Piping & Valves	16.37
7	Commercial Street	VFDs	16.37
8	Rose Street	Process Piping & Valves	16.10
9	Rose Street	Electrical Equipment & Enclosures	16.10
10	Rose Street	VFDs	16.10

4.2.3 Collection System

The following Figure 4-1 represents the highest risk collection system assets, based on total risk score of each pipe segment. The colors correspond to the risk score, with the highest risk pipe segments shown in red progressing to the lowest risk scores shown in green. A full list of the high priority collection system asset priority ranking, by pipe segment risk score is included in Appendix B.

Public Pump Station
Private Pump Station
WPCF
Force Main
Gravity Main
Priority Ranking
1 / 2
3
4
5
Not Enough Data
Not Evaluated
Landfill PS
Harward Street PS
Farrin Place PS
WPCF
Cemetery Garage PS
Front St PS
McMann Field PS
Aegis Drive PS
Wing Farm PS
Hyde Park PS
Commercial St PS
Rose St PS
Hunt St PS
Riverview Rd PS
Bridge St PS
N
0 400 800 1,600
Feet
Total Risk
Bath, ME
PROJ NO: 20945
DATE: 11/7/2022
WRIGHT-PIERCE
Engineering a Better Environment
FIGURE: N/A

5

WRIGHT-PIERCE
Engineering a Better Environment

Section 5 Recommended Fiscal Sustainability Plan

Wright-Pierce evaluated the criticality ranking scores that were developed during the analysis and generated a recommended fiscal sustainability plan for the City to use to prioritize projects over the next 15+ years. The projects were developed across the asset categories (WPCF, pump stations, and collection system). In lieu of suggesting projects on an individual asset by asset basis, Wright-Pierce grouped together assets that were in need of rehabilitation or upgrades into holistic projects that would be cost effective for the City of Bath. For example, if there were a number of assets that need replacement that were similar in nature (same unit process, same pump station, etc.), those were grouped into one renewal project. This means that some of the assets with the highest ranking criticality scores are often grouped in the same project as assets with lesser criticality scores. This also means that assets with lesser scores (for example a score indicating a long-term project timeframe of 10-15 years) will be included in projects with a quicker timeframe (like a short term 0-5 year project timeframe) because it makes sense to update all the assets in an area within one project.

The following sections include descriptions of the projects that are recommended for the short term (0-5 years), medium term (5-10 years), and long-term (10-15 years) planning horizons for the WPCF, pump stations, and collection system. Projects that might be required after 15 years were not developed because those assets were considered ‘low criticality’ and are expected to still be in good condition for many years, making it difficult to predict what projects will be required first. The asset inventories and risk analysis included in Appendix B include all assets and can be used to track the status of the assets with lower criticality scores. The City is encouraged to monitor the condition of these assets over the next 10 years, and if renewal of these assets is warranted within the 15 to 20-year timeframe, the capital improvement plans for the WPCF and pump stations should be updated.

Wright-Pierce also developed planning-level project cost estimates for the projects described within the 0-15 year planning horizon. Factored AACE International Class 4 conceptual-level cost estimates, commonly used for establishing preliminary project budgets, were developed for the recommended WPCF and pump station capital improvement projects and recommended sewer asset renewal program budgets. The estimates have been prepared based on limited available project details at this preliminary planning stage, and subsequently, the expected accuracy of the estimated project costs may range from -30% to +50%. Current fluctuating economic conditions, supply chain issues, and long-term construction industry labor shortages also affect the accuracy of projecting these costs. The project cost information presented herein is in current dollars and is based on the Engineering News-Record (ENR) 13175 (December 2022). Many factors arise during the final design (e.g., the owner selected features and amenities, code issues, etc.) that cannot be definitively identified and estimated at this time. Standard planning-level multiplication factors have been applied to the cost estimates to account for additional construction project costs including field surveys, engineering, construction management, contingencies, and inflation. The estimates include the items below, with multiplication factor percentages that were used on most projects. In some cases, the multiplication factors were adjusted based on project-specific information.

- General Contractor Overhead & Profit of 10% of the construction costs completed by the general contractor.
- General Contractor markup on sub-contractors of 5.0%.
- Bonds and Insurance at 1.5%.
- Contractor General Condition to account for indirect construction costs and temporary facilities of 10%.
- A contingency during design of 20% to account for items and details unknown at this time.
- Construction cost inflation to midpoint of construction using a 3% annual inflation rate.
- A construction contingency of 5% to account for change orders during the construction phase.

- A Technical Services allotment of 25% to account for engineering costs on projects. This accounts for full technical services of design, bidding, construction administration, and resident project representative (RPR) services. For many projects, the City will be able to handle some of these items in-house, but the full amount is represented here for budgeting purposes in case all services are required.
- Material testing allowance of 0.75% if subsurface excavation is expected.
- Legal/administrative allowance of 2% of project cost to account for bond counsel, legal review of contract documents, etc.
- Financing allowance of 2% for interim interest on reimbursement requests for some funding agencies.

The following sections describe the selected capital improvement projects recommended within the next 15 years and the associated project costs. For the purposes of calculating inflation, project costs are associated with specific completion years. The sections also describe the suggested implementation timeframes for the City's WPCF, pump station, and collection system assets. This schedule (and the assumed completion years) can be adjusted based on the City's needs and ability to acquire adequate funding and financing options for the projects. The summary implementation schedule, with costs that project inflation to the target completion year, is included in Section 4.10. A summary table of all the projects in one table can be found in Appendix C.

In general, the projects summarized below have been grouped such that work would take place in a confined area as opposed to combining smaller upgrades across the WPCF site. In some cases, the projects could be grouped together into fewer, larger projects, as that is more economical. To be conservative in terms of cost, and because it is unknown which projects would be grouped together this far in advance, the projects have been kept smaller to specific areas of the site.

Additionally, the projects have been assigned a target completion year as summarized under each project description below. However, these projects do not necessarily need to happen at the designated time and could occur anytime within the 5-year planning window.

5.1 Short Term WPCF Renewal Projects

The following projects are recommended for implementation during the 0-5 year timeframe.

5.1.1 WPCF PROJECT 1: Sludge Tank Mixing System Upgrade

WPCF Project 1 Scope: This recommended project will replace the sludge mixing equipment in Sludge Holding Tanks No. 1 and 2, the blowers that provide air to the sludge mixing equipment, and associated components as outlined below.

Process:

- Replacement of sludge mixing system equipment in Sludge Holding Tank No. 1 and 2
- Replacement of two sludge tank blowers (SLTB-1, 2)
- Replacement of slide gate between Sludge Holding Tank No. 1 and 2 with larger gate

Structural:

- Replacement of toe plates and guards on Sludge Holding Tank No. 1 and 2

Electrical:

- Installation and integration of VFDs for new sludge tank blowers (SLTB-1, 2)

A planning level cost of **$526,000** has been included, corresponding to an estimated construction start date of 2024.

5.1.2 WPCF PROJECT 2: Headworks Comprehensive Upgrade

WPCF Project 2 Scope: This project includes a comprehensive upgrade of the entire Headworks Building.

Civil:

- Re-grading around building to restore site drainage

Architectural:

- Replacement of roof/skylight
- Replacement of failing CMU
- Replacement of corroded doors and hardware
- Cleaning and dampproofing of veneer
- Separation of Upper Pump Room from Electrical Room to meet space classification ratings

Structural:

- Repair of exposed aggregate in concrete influent channel
- Repair of concrete throughout
- Replacement of corroded pipe supports

Process:

- Replacement of link seals in Lower Pump Room
- Replacement of mechanical bar screen with new, and new wash press
- Replacement of process piping and valves throughout
- Replacement of grit piping and valves
- Replacement of influent channel slide gates
- Replacement of manually cleaned bar rack
- Removal of chemical storage tanks and curbing

Mechanical:

- Replacement of hot water piping
- Replacement of louvers and dampers in Headworks
- Replacement of sump pump
- Replacement of unit heaters in Headworks Room
- Replacement of exhaust fan in Headworks Room
- Removal of potable eyewash station
- Replacement of unit heaters in Lower Pump Room
- Replacement of exhaust fan in Upper Pump Room

Instrumentation:

- Replacement of gas detection system
- Replacement of control panel

Electrical:

- Evaluation of removal of fire alarm – To be confirmed with Authority Having Jurisdiction (AHJ) (not included in cost estimate at this time).
- Replacement of transformer
- Replacement of MCC-3E
- Replacement of lighting panel
- Replacement of lighting throughout with LED lighting

A planning level cost of **$2,631,000** has been included, corresponding to an estimated construction start date of 2025.

5.1.3 WPCF PROJECT 3: Primary Clarifier Upgrade

WPCF Project 3 Scope: This project includes replacement of the primary clarifier mechanisms and drives, as well as associated structural and electrical work in both primary clarifiers. This project also includes replacement of the secondary effluent chlorination and dechlorination tank mixers, as the City noted they are in need of immediate replacement.

Process:

- Replacement of Primary Clarifier No. 1 and 2 mechanisms and drives
- Evaluation of primary clarifier covers (not included in cost estimate at this time)
- Replacement of one secondary effluent chlorination tank mixer
- Replacement of one secondary effluent dechlorination tank mixer

Structural:

- Concrete crack repairs and resurfacing on Primary Clarifier No. 1 and 2 and stairs

Electrical:

- Replacement of lighting at Primary Clarifier No. 1 and 2
- Replacement of equipment disconnects at Primary Clarifier No. 1 and 2

A planning level cost of **$1,282,000** has been included, corresponding to an estimated construction start date of 2024.

5.1.4 WPCF PROJECT 4: Generator Upgrade

WPCF Project 4 Scope: This project includes replacement of the standby generator and automatic transfer switch (ATS) as outlined below.

- Replacement of 250 kW standby generator and enclosure with 350 kW generator and enclosure
- Replacement of ATS

A planning level cost of **$821,000** has been included, corresponding to an estimated construction start date of 2026.

5.1.5 WPCF Project 5: Plant Water System Upgrade

WPCF Project 5 Scope: This project includes replacement of the plant water system including pumps, piping, valves and hydrants.

Civil:

- Replacement of plant water hydrants
- Replacement of plant water piping and valves throughout the WPCF site

Process:

- Replacement of plant water pumps and controls

A planning level cost of **$594,000** has been included, corresponding to an estimated construction start date of 2027.

5.1.6 WPCF PROJECT 10: Pump and Blower Building Electrical Upgrade

WPCF Project 10 Scope: This project consists of various electrical upgrades in the Pump and Blower Building including replacement of MCCs, control panels, and lighting throughout as summarized below.

- Replacement of MCC-1E
- Replacement of MCC-1
- Replacement of MCC-1A
- Replacement of Power Distribution Panel (PDP-1)
- Replacement of Main Switchboard (SWBD-1)
- Replacement of transformer
- Replacement of two lighting panels in the Blower Room
- Replacement of lighting throughout the Pump and Blower Building with LED lighting

A planning level cost of **$2,563,000** has been included, corresponding to an estimated construction start date of 2026. As part of the development of the implementation schedule, the District indicated that this project, originally a medium term priority, should be moved to the immediate priority timeframe. It is therefore included in the short term time frame, but not re-named.

5.2 Short-Term Pump Station Renewal Projects

The following projects are recommended for implementation during the 0-5 year timeframe.

5.2.1 Asset-Specific Projects

In some cases, there were a few individual pump station assets that were identified to be in poor condition but were located at a pump station that was otherwise in good condition. In these scenarios, the pump station was not in need of a comprehensive upgrade or project, but the individual assets in poor condition should still be replaced. The following asset-specific projects summarize these replacements. These planning level costs have been assumed to occur in 2023, and therefore do not include an escalation for inflation.

5.2.1.1 Front Street

The Front Street assets that need to be replaced are the VFDs. The wet well also needs rehabilitation. The planning level cost for these updates is **$75,000.**

5.2.1.2 Wing Farm

The Wing Farm assets that need to be replaced are the instrumentation (level elements), control panel, PLC, electrical equipment and enclosures, and automatic transfer switch. The planning level cost for these updates is $165,000.

5.2.1.3 Riverview Road

The Riverview Road basement has the remnants of the older tin-can type pump station foundation. It appears that this structure is rusting and potentially leaking groundwater into the bottom of the tin-can. There also appears to be a shiny film of a petroleum product (or minerals from the groundwater) in the bottom of the abandoned tin-can. This part of the station needs to be rehabilitated to make sure that there is no water or other fluids leaking into the station. The planning level cost for this upgrade is $9,000.

5.2.2 PUMP STATION PROJECT 1: Harward Street Upgrade

PS Project 1 Scope: The Harward Street pump station upgrade will be a comprehensive upgrade to the process equipment and will incorporate climate resiliency components. The recommendation to upsize the pump station is described further in the CSO Master Plan as Harward Street CSO #008 Abatement Phase 2. In addition to the recommended updates in the CSO Master Plan, the majority of the station's assets will be replaced as part of this upgrade, with minor rehabilitation to the existing building. The project includes replacement of the process equipment and ancillary equipment as outlined below.

Process:

- Process piping & valves
- Pumps (one lead and two lag)
- Link Seals
- Addition of pig launcher
- The City indicated that screenings or a grinder may be necessary – this will need to be evaluated in more detail as part of design

Instrumentation:

- Control Panel & PLC
- Instrumentation

Electrical:

- Electrical Equipment & Enclosures
- Standby Automatic Generator
- E-Stop for pumps
- VFDs
- Lighting

Architectural:

- Roof and Door Replacement

Structural:

- Rehabilitation of Building
- Rehabilitation of Wet Well

- New Lift Hook
- Floodproofing of Building Entrances and Openings

Mechanical:
- Unit Heater
- Domestic Water System

A planning level project cost of **$2,438,000** has been included, corresponding to estimated construction start date of 2025.

5.2.3 PUMP STATION PROJECT 2: Hunt Street Upgrade

Pump Station Project 2 Scope: The Hunt Street pump station upgrade will be a comprehensive upgrade to the entire station and it will also re-route the force main to bypass Rose Street pump station. This recommendation to re-route the force main is described further in the CSO Master Plan as Rose Street CSO #003 CSO Abatement Phase 1. The costs presented below and within the CSO Master Plan are to extend the Hunt Street force main from the pump station to Corliss Street (bypassing the Rose Street pump station), upsize the gravity sewer interceptor from terminus SMH-898 to Pleasant Street Pump Station and to upgrade the Hunt Street pump station. The majority of the station's assets will be replaced as part of this upgrade, with minor rehabilitation of the existing building. The project includes replacement of the process equipment and ancillary equipment as outlined below.

Process:
- Process Piping & Valves
- Pumps (two)
- Link Seals
- Addition of Pig Launcher

Instrumentation:
- Control Panel & PLC
- Instrumentation

Electrical:
- Electrical Equipment & Enclosures
- Addition of Standby Automatic Generator
- VFDs
- Lighting

Structural:
- Rehabilitation of Building
- Rehabilitation of Wet Well
- Floodproofing of Building Entrances and Openings

Mechanical:
- Unit Heater
- Exhaust Fans
- Dampers

- Louvers

Force Main extension:

- 3200 LF of 12-inch force main
- 1900 LF of upsized 24-inch gravity sewer

A planning level project cost of **$6,530,000** has been included, corresponding to estimated construction start date of 2025.

5.2.4 PUMP STATION PROJECT 3: Commercial Street Upgrade

Pump Station Project 3 Scope: The Commercial Street pump station upgrade will be a comprehensive upgrade. The majority of the station's assets will be replaced as part of this upgrade, with minor rehabilitation of the existing building. The project includes replacement of the process equipment and ancillary equipment as outlined below.

Architectural:

- Roof Repairs
- Door Replacement

Process:

- Process Piping & Valves
- Pumps (two duty and two wet weather)
- Watertight Wet Well cover
- Link Seals
- Addition of Pig Launcher

Instrumentation:

- Control Panel & PLC
- Instrumentation (level elements)

Electrical:

- Electrical Equipment & Enclosures
- Lighting
- VFDs

Structural:

- Building Rehabilitation
- Install new monorail and hoist system
- Floodproofing of Building Entrances and Openings

A planning level cost of **$3,443,000** has been included, corresponding to an estimated construction start date of 2027.

5.2.5 PUMP STATION PROJECT 4: Farrin Place Upgrade

Pump Station Project 7 Scope: This project is a partial upgrade that includes replacement of the following process equipment and ancillary equipment as outlined below.

Architectural:
- Roof and Window Replacement

Process:
- Process Piping & Valves
- Pumps (two)

Instrumentation:
- Control Panel and PLC
- Instrumentation (level elements)

Electrical:
- Electrical Equipment & Enclosures
- VFDs

Structural:
- Replace Pipe Supports

A planning level cost of $953,000 has been included, corresponding to an estimated construction start date of 2027.

5.3 Short-Term Collection System Renewal Projects

The following projects are recommended for implementation during the 0-5 year timeframe.

5.3.1 COLLECTION SYSTEM PROJECT 1: Harward Interceptor Increase

Collection System Project 1 Scope: The Harward Interceptor project is to increase the capacity of the Harward Street Pump Station Interceptor and to improve the interceptor's condition and reduce SSO and CSO volumes by replacing the critical interceptor leading to the pump station. This corresponds to the project "Harward Street CSO: Alternative 2- Collection System Capacity Increase – Phases 2 and 3" from the CSO Master Plan from Section 8.5.4.2. Phase 2 is upsizing approximately 3,300 linear feet of the interceptor from SMH-56 to SMH-97 to a 36" line. The second phase is to upsize approximately 2,260 linear feet of the interceptor from SMH-97 further upstream to CSO-008 at SMH-1114. The CSO Master Plan envisioned completing these projects in two separate phases to see the impacts on SSO and CSO reduction. After additional hydraulic modeling, the City has indicated they intend to move forward with both phases as one project.

Planning level costs of $4,827,000 have been included, corresponding to an estimated construction start date of 2025.

5.3.2 COLLECTION SYSTEM PROJECT 2: CCTV of South End

WPCF Project 2 Scope: Within the FSP analysis, it was discovered that a large portion of the high priority sewer collection system pipes in the Southern part of the collection system were missing information and did not have any CCTV data. These pipes combined totaled approximately 5,000 linear feet and were larger diameter pipes that discharged into the Pleasant Street Pump Station. It is recommended that these pipes, from SMH-388 and SMH-945 to SMH-854 are inspected in the near term so that a condition assessment of the pipes can be completed.

A planning level cost of **$45,000** has been included, corresponding to an estimated construction start date of 2023.

5.3.3 COLLECTION SYSTEM PROJECT 3: Cross Country Interceptor Replacement

Collection System Project 3 Scope: The cross-country Interceptor replacement project is to replace approximately 3,500 linear feet of 18-inch sewer along the interceptor lines, beginning at SMH-810 Court Street and ending at SMH-520 on North Street. There are two large interceptor lines in this area, so the project will also replace approximately 2,400 linear feet of 15-inch sewer that is adjacent to the first line, from SMH-1585 on Academy Street to SMH-1158 on North Street. Another section of approximately 1600 LF of poorly rated 15 and 18-inch diameter pipe at SMH-448 on Sheridan to SMH-1519 on Lincoln Street will be included. The pipes in these areas are in poor condition and it is recommended that they are replaced within the next 5 years.

A planning level cost of **$5,360,000** has been included, corresponding to an estimated construction start date of 2026.

5.3.4 COLLECTION SYSTEM PROJECT 4: Commercial Street Force Main Replacement

Collection System Project 5 Scope: The Commercial Street force main replacement project will be to replace the lower portion of the Commercial Street Force Main, from the pump station to approximately Grove Street. The portion from Grove Street to the terminus SMH at Front Street was upgraded in 2002 as part of the bypass of the Front Street Pump Station, but the lower section has not been upgraded or rehabilitated since its installation in 1969 and has reached the end of its expected useful life. For the purposes of the cost estimate, it has been assumed that the project will replace the 24-inch diameter force main.

A planning level cost of **$4,240,000** has been included, corresponding to an estimated target construction start of 2024.

5.4 Medium-Term WPCF Renewal Projects

The following projects are recommended for implementation during the 5-10 year timeframe.

5.4.1 WPCF PROJECT 6: Sludge Pumping Upgrade

WPCF Project 6 Scope: This project includes replacement of primary sludge, waste sludge, and return sludge pumps and associated flow meters that are located in the Pump Room of the Pump and Blower Building.

Process:

- Replacement of link seals throughout Pump and Blower Building
- Replacement of primary sludge scum pump and controls
- Replacement of primary scum grinder and controls
- Replacement of two primary sludge pumps and controls
- Replacement of two primary sludge grinders and controls

- Replacement of primary sludge pump flow meter
- Replacement of waste sludge pump
- Replacement of waste sludge grinder and controls
- Replacement of waste sludge pump flow meter
- Replacement of three return sludge pumps
- Replacement of three return sludge flow meters
- Replacement of sludge piping and valves in Pump Room
- Replacement of tank drain pump
- Replacement of sump pump in Pump Room

Instrumentation:
- Integration of new equipment and controls
- Replacement of control panel (CP-1)

Electrical:
- Replacement of return sludge pump VFDs
- Replacement of tank drain pump VFDs

A planning level cost of $2,050,000 has been included, corresponding to an estimated target construction start of 2029.

5.4.2 WPCF PROJECT 7: Secondary Clarifiers and Site Piping Upgrade

WPCF Project 7 Scope: This project includes upgrades to the secondary clarifiers as summarized below.

Process:
- Replacement of Secondary Clarifier No. 1, 2, and 3 drive shafts
- Replacement of Secondary Clarifier No. 1, 2, and 3 scum troughs
- Replacement of link seals in Secondary Clarifier No. 1, 2, and 3
- Replacement of steel flap PRVs with duckbill valves
- Replacement of influent sewer, primary clarifier influent/effluent, aeration tank effluent, secondary clarifier effluent piping

Structural:
- Resurfacing of concrete walls in Secondary Clarifier No. 1, 2, and 3

A planning level cost of $2,489,000 has been included, corresponding to an estimated construction start date of 2031.

5.4.3 WPCF PROJECT 8: Aeration Tanks Upgrade

WPCF Project 8 Scope: This project includes replacement of the aeration tank blowers, automation of aeration tank slide gates, and various upgrades in the Pump and Blower Building.

Mechanical:
- Replacement of louvers and dampers throughout Pump and Blower Building
- Replacement of emergency eyewash station in Blower Room

Process:

- Replacement of three aeration tank blowers (ATB-1, 2, 3)
- Installation of 18 slide gates in aeration tanks
- Replacement of 18 electric actuators on the slide gates in the aeration tanks that connect to SCADA

A planning level cost of **$2,025,000** has been included, corresponding to an estimated construction start date of 2030.

5.4.4 WPCF PROJECT 9: Disinfection System Upgrade

WPCF Project 9 Scope: This project includes replacement of the chlorination and dechlorination mixers for secondary effluent and CSO bypass effluent, as well as structural upgrades to the chlorine contact tank and dechlorination tank as outlined below.

Process:

- Replacement of two CSO chlorination tank mixers
- Replacement of one CSO dechlorination tank mixer
- Replacement of CSO effluent flow meter
- Replacement of effluent flow meter

Structural:

- Resurfacing of concrete in Dechlorination Tank/Effluent Flow Metering Structure
- Resurfacing of interior launders in Chlorine Contact Tank
- Addition of toeplates at Chlorine Contact Tank Influent Chamber

A planning level cost of **$153,000** has been included, corresponding to an estimated construction start date of 2030.

5.4.5 WPCF PROJECT 11: Boiler and Domestic Water Upgrade

WPCF Project 11 Scope: This project includes replacement of boiler, fuel oil tank, and associated hot water piping as outlined below.

Process:

- Replacement of two effluent well pumps (EWP-1, 2)

Mechanical:

- Replacement of boiler
- Demolition of fuel oil tank
- Replacement of domestic water piping in Operations Building
- Replacement of domestic piping in Pump and Blower Building

Electrical:

- Upgrades to fire alarm system in Operations Building

A planning level cost of **$629,000** has been included, corresponding to an estimated construction start date of 2031.

5.5 Medium-Term Pump Station Renewal Projects

The following projects are recommended for implementation during the 5-10 year timeframe.

5.5.1 PUMP STATION PROJECT 5: Rose Street Upgrade

Pump Station Project 4 Scope: The Rose Street pump station upgrade will be a partial upgrade that also incorporates climate resiliency components. The project includes replacement of the process equipment and ancillary equipment as outlined below.

Architectural:

- Roof and Door Replacement

Process:

- Process Piping & Valves
- Pumps (smaller pumps to accommodate the reduced flowrate from the Hunt Street Pump Station Upgrade)
- Bypass Assembly
- Link Seals

Instrumentation:

- Control Panel & PLC
- Instrumentation (level elements)

Structural:

- Building Rehabilitation
- Wet Well Rehabilitation
- Floodproofing Building Entrances & Openings

Electrical:

- Lighting
- Electrical Equipment & Enclosures
- Automatic Transfer Switch

A planning level cost of $1,109,000 has been included, corresponding to an estimated construction start date of 2030.

5.5.2 PUMP STATION PROJECT 6: Communications Upgrades

Pump Station Project 5 Scope: The communications upgrade will occur across multiple pump stations with complete upgrades to the communications and alarms at each station. This will include new radio or cellular communications at each of the 13 pump stations and the WPCF to connect into the existing SCADA system. The project will also include modifications to the PLCs and control panels at each of the stations to accommodate remote communication.

A planning level cost of $265,000 has been included, corresponding to an estimated construction start date of 2024. This project is already in progress and is therefore included in the short term time frame in the implementation schedule, despite it being a medium-term priority.

5.5.3 PUMP STATION PROJECT 7: Aegis Drive Electrical Relocation Project

Pump Station Project 6 Scope: This project is a partial upgrade to the Aegis Drive pump station which includes replacement of the station's electrical equipment, lighting, instrumentation and process piping and valves. The project will move the equipment out of the non-City owned building that it is currently housed in. The project will also include the addition of an automatic transfer switch and portable generator receptable.

A planning level cost of **$490,000** has been included, corresponding to an estimated construction start date of 2029.

5.6 Medium-Term Collection System Renewal Projects

The following projects are recommended for implementation during the 5-10 year timeframe.

5.6.1 COLLECTION SYSTEM PROJECT 5: Middle and Commercial Relining

Collection System Project 4 Scope: The Middle and Commercial relining project is to reline approximately 2,900 linear feet of 15-inch sewer along the railroad tracks that are adjacent to Middle Street starting at SMH-595 and going to the Commercial Street pump station. The project will also reline approximately 1,500 linear feet of 18-inch sewer that runs from the corner of Washington and Union street starting at SMH-734 towards the bridge and School Street and finally down to the Commercial Street pump station. The pipe in these areas is in poor condition and it is recommended that they are relined within the next 5-10 years.

A planning level cost of **$720,000** has been included, corresponding to an estimated construction start date of 2028.

5.6.2 COLLECTION SYSTEM PROJECT 6: Bowery Street Relining

Collection System Project 6 Scope: The available data shows that the interceptor sewer that transmits the flow from Front Street and Commercial Street Pump Stations into the WPCF is reaching the end of its expected useful life. Because of its age, it likely will require rehabilitation soon. In addition, it collects flow from the largest pump station in the City and therefore needs to be reliable. It is recommended that an approximately 1,000 foot section of pipe from SMH-270 to SMH-212 on Bowery Street be re-lined within the next 5-10 years.

A planning level cost of **$690,000** has been included, corresponding to an estimated construction start date of 2030.

5.7 Long-Term WPCF Renewal Projects

The following projects are recommended for implementation during the 10-15 year timeframe.

5.7.1 WPCF PROJECT 12: Operations Building Electrical Upgrade

WPCF Project 12 Scope: This project includes electrical upgrades in the Operations Building, including replacement of lighting panels, transformers, and lighting throughout the Operations Building as outlined below.
Electrical:

- Replacement of MCC-2E
- Replacement of Lighting Panel (LP-RP-1)
- Replacement of Power Distribution Panel (PDP-L)
- Replacement of Transformer 5 (T-5)
- Replacement of Lighting Panel (LP-2N)

- Replacement of Lighting Panel (LP-RP-2)
- Replacement of Lighting Panel (LP-H)
- Replacement of Lighting Panel (LP-4)
- Replacement of Lighting Panel (LP-5)
- Replacement of Lighting Panel (LP-8)
- Replacement of Transformer 5 (T-5)
- Replacement of Transformer 6 (T-6)
- Replacement of Transformer 8 (T-8)
- Replacement of remaining non-LED lighting throughout Operations Building with LED lighting

A planning level cost of **$1,181,000** has been included, corresponding to an estimated construction start date of 2033.

5.7.2 WPCF PROJECT 13: Administration Building Upgrade

WPCF Project 13 Scope: This project includes architectural, mechanical, and electrical upgrades to the Administration Building as outlined below.

Architectural:
- Replacement of flooring
- Replacement of siding
- Replacement of roof
- 1,200 ft^2 addition/rehabilitation for dedicated office/admin spaces at Administration Building and/or Operations Building. Spaces will include:
    - Conference Room
    - Breakroom
    - Women's Bathroom/Shower
    - Men's Bathroom/Shower
    - Locker Room
- Replacement of interior/exterior doors
- Replacement of windows
- Painting of interior walls and ceiling

Mechanical:
- Replacement of domestic water heater
- Replacement of ductless split fan coil in Lobby
- Replacement of ductless split fan coil in Office 2
- Replacement of plumbing fixtures

Instrumentation:
- Upgrades to SCADA System
- Replacement of weather station console and accessories

Electrical:

- Replacement of panelboards and transformers
- Replacement of lighting throughout Administration Building with LED lighting
- Replacement of fire alarm system

A planning level cost of $2,245,000 has been included, corresponding to an estimated construction start date of 2035. The City noted that the preference would be to move this project to high priority if funds were available. Due to the high cost of other projects during that time period, this project is conservatively shown as starting in 2035.

5.7.3 WPCF PROJECT 14: Operations Building Upgrade

WPCF Project 14 Scope: This project includes architectural upgrades to the Operations Building, including increasing the size of the laboratory, rehabilitation of the upstairs bathroom/locker area, and other upgrades as summarized below.

Architectural:

- Increase size of laboratory so staff have sufficient room to conduct lab tests
- Replacement of interior/exterior doors
- Replacement of windows throughout (except in Laboratory – replaced in 2019)
- Replacement of roof
- Repoint veneer

Mechanical:

- HVAC upgrade of Breakroom
- Replacement of Convector in the Entryway

Process:

- Replacement of link seals throughout the Operations Building
- Replacement of flood level element

A planning level cost of $873,000 has been included, corresponding to an estimated construction start date of 2037.

5.7.4 WPCF PROJECT 15: Pump and Blower Building Upgrade

WPCF Project 15 Scope: This project includes architectural, mechanical, and electrical upgrades in the Pump and Blower Building as outlined below.

Architectural:

- Replacement of roof
- Repoint veneer
- Replacement of interior/exterior doors
- Painting of interior walls and ceiling

Mechanical:

- Replacement of two unit heaters in Blower Room
- Replacement of one electrical unit heater in Electrical Room
- Replacement of two exhaust fans in Blower Room
- Replacement of three unit heaters in Pump Room
- Replacement of exhaust fan on roof

A planning level cost of **$581,000** has been included, corresponding to an estimated target completion date of 2037.

5.8 Long-Term Pump Station Renewal Projects

The following projects are recommended for implementation during the 10-15 year timeframe.

5.8.1 PUMP STATION PROJECT 8: Pleasant Street Upgrade

Pump Station Project 8 Scope: This project is a partial upgrade that includes climate resiliency components and replacement of the following process equipment and ancillary equipment as outlined below.

Architectural:

- Masonry Repairs

Process:

- Process Piping & Valves
- Slide Gates
- Watertight Wet Well Cover
- Link Seals

Instrumentation:

- Control Panel & PLC
- Instrumentation (flow meter, level elements)

Electrical:

- Electrical Equipment & Enclosures
- Lighting
- VFDs

Structural:

- Rehabilitation of Building
- Floodproofing of Building Entrances and Openings

A planning level cost of **$1,630,000** has been included, corresponding to an estimated construction start date of 2035.

5.9 Long-Term Collection System Renewal Projects

The following projects are recommended for implementation during the 10-15 year timeframe.

5.9.1 COLLECTION SYSTEM PROJECT 7: Pleasant Avenue Force Main Replacement

Collection System Project 7 Scope: The Pleasant Avenue force main replacement project will rehabilitate and likely replace the entire Pleasant Avenue Force Main, since it has not been upgraded or rehabilitated since its installation in 1972 and has reached the end of its expected useful life. For the purposes of the cost estimate, it has been assumed that the project will replace the 16-inch diameter force main, but it is possible that it could be rehabilitated with only some sections being replaced fully.

A planning level cost of **$1,580,000** has been included, corresponding to an estimated construction start date of 2033.

5.10 Recommended Capital Improvement Plan

Table 5-4 in Appendix C summarizes the project design and construction cost for all the projects recommended at the WPCF, pump stations, and throughout the collection system over the 20-year planning horizon.

Table 5-1 summarizes the recommended capital improvement plan for the WPCF to include in the City's FSP.

Table 5-1 Water Pollution Control Facility Capital Improvement Plan

Project Name/Description	Estimated Project Cost	Recommended Implementation Timeframe
WPCF Project 1: Sludge Tank Mixing System Upgrade	$526,000	0-5 years
WPCF Project 2: Headworks Comprehensive Upgrade	$2,631,000	0-5 years
WPCF Project 3: Primary Clarifier Upgrade	$1,282,000	0-5 years
WPCF Project 4: Generator Upgrade	$821,000	0-5 years
WPCF Project 5: Plant Water System Upgrade	$594,000	0-5 years
WPCF Project 6: Sludge Pumping Upgrade	$2,050,000	5-10 years
WPCF Project 7: Secondary Clarifier and Site Piping Upgrade	$2,489,000	5-10 years
WPCF Project 8: Aeration Tank Upgrade	$2,025,000	5-10 years
WPCF Project 9: Disinfection System Upgrade	$153,000	5-10 years
WPCF Project 10: Pump and Blower Building Electrical Upgrade	$2,563,000	0-5 years
WPCF Project 11: Boiler and Domestic Water Upgrade	$629,000	5-10 years

Project Name/Description	Estimated Project Cost	Recommended Implementation Timeframe
WPCF Project 12: Operations Building Electrical Upgrade	$1,181,000	10-15 years
WPCF Project 13: Administration Building Upgrade	$2,245,000	10-15 years
WPCF Project 14: Operations Building Upgrade	$873,000	10-15 years
WPCF Project 15: Pump and Blower Building Upgrade	$581,000	10-15 years
SUM	**$20,643,000**	

Table 5-2 summarizes the recommended capital improvement plan for the City's pump stations to include in the FSP.

Table 5-2 Pump Station Capital Improvement Plan

Project Name/Description	Estimated Project Cost	Recommended Implementation Timeframe
PS Project 1: Harward Street Pump Station Upgrade	$2,438,000	0-5 years
PS Project 2: Hunt Street Pump Station, Force Main, Gravity Sewer Upgrade	$6,530,000	0-5 years
PS Project 3: Commercial Street Pump Station Upgrade	$3,443,000	0-5 years
PS Project 4: Farrin Place Upgrade	$953,000	0-5 years
Asset Specific Project 1: Front Street VFDs and Wetwell Rehab	$75,000	0-5 years
Asset Specific Project 2: Wing Farm Electrical & Instrumentation	$165,000	0-5 years
Asset Specific Project 3: Riverview Road "Tin-Can" Rehabilitation	$9,000	0-5 years
PS Project 5: Rose Street Pump Station Upgrade	$1,109,000	5-10 years
PS Project 6: Communications Upgrade	$265,000	0-5 years
PS Project 7: Aegis Drive Pump Station Upgrade	$490,000	5-10 years
PS Project 8: Pleasant Street Upgrade	$1,630,000	10-15 years
SUM	**$17,107,000**	

Table 5-3 summarizes the recommended capital improvement plan for the City's sewer collection system to include in the FSP.

Table 5-3 Collection System Capital Improvement Plan

Project Name/Description	Estimated Project Cost	Recommended Implementation Timeframe
CS Project 1: Harward Interceptor	$4,827,000	0-5 years
CS Project 2: CCTV of South End	$45,000	0-5 years
CS Project 3: Cross Country Interceptor Replacement	$5,360,000	0-5 years
CS Project 4: Commercial Street Force Main Replacement	$4,240,000	0-5 years
CS Project 5: Middle and Commercial Relining	$720,000	5-10 years
CS Project 6: Bowery Street Relining	$690,000	10-15 years
CS Project 7: Pleasant Avenue Force Main Replacement	$1,580,000	10-15 years
SUM	$17,462,000	

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Section 6 Potential Capital Funding Sources

6.1 Internal Reserves

The City has internal budget reserves to fund limited capital improvements. Aside from the use of grant funds to complete these capital improvements, reserves would be the preferred funding mechanism for the recommended FSP measures since using existing budget reserve funds does not require raising sewer user rates to cover the cost of capital improvements. Additionally, use of reserves does not require borrowing money and the resulting interest.

6.2 Local Revenue

For capital improvement projects that cannot completely be funded by existing budget reserves, the City could raise the revenues needed to cover costs by implementing a structured sewer user rate increase. Generated revenues could be used for low-cost operational or process modifications, and both minor and significant capital improvements. This would be a less desirable funding mechanism than using budgeted reserves because it would require increasing sewer user rates. For capital improvement projects that cannot be covered by budget reserves alone, the City could raise the revenues needed to cover costs by implementing a structured rate increase. Generated revenues from a structured rate increase, coupled with local financing through a commercial bank, could be used to fully fund major capital improvements. This funding approach would require increasing sewer user rates to cover the associated loan fees and annual debt service expense for local financing.

6.3 State and Federal Grant Funding

6.3.1 DEP Clean Water State Revolving Fund

The Maine DEP Clean Water State Revolving Fund (CWSRF) program provides low-interest loans with an opportunity for some principal forgiveness to local communities and quasi-municipal entities for wastewater infrastructure improvement projects. CWSRF loan principal and interest would need to be fully repaid over the term of the loan (typically 20 years or the expected life of the asset) less the amount the City qualified for in principal forgiveness. To be eligible for a CWSRF loan, the City would need to complete a funding request with Maine DEP usually in late January or early February of any given year and if successful in being selected for funding, complete a CWSRF loan application with the Maine Municipal Bond Bank and meet other CWSRF program requirements including an environmental impact review report and preliminary design report.

In the coming years, a significant increase in available CWSRF funding will be seen as a result of the 2021 Bipartisan Infrastructure Deal, which will allow for the EPA to distribute funding to States to be administered through the existing CWSRF programs. This portion of CWSRF funding will be administered as 49% grant and principal forgiveness loans, with the remaining 51% as low-interest loans.

6.3.2 Maine Community Development Block Grant (CDBG) Program

The Maine Department of Economic and Community Development (DECD) administers the CDBG program for the State of Maine. Grants are provided to municipalities and quasi-municipal entities for eligible capital improvement projects. The City has applied for and qualified for many CDBG funds in the past, including for wastewater related projects. The City could apply for a CDBG Public Infrastructure Grants (up to $990,000) to implement recommended FSP projects. CDBG funding would be preferable to CWSRF loan funding because grant funds would not need to be repaid. To be eligible for CDBG funds, the City would need to complete a grant application and other CDBG program requirements including an income survey, environmental review report and a preliminary engineering report. The City would be competing in a state-wide pool of applicants for limited grant funds. CDBG

Public Infrastructure Grant applications are only accepted every 2 years, with 2024 being the next year when applications will be accepted. If interested, the City should identify a project to fund with CDBG money and perform an income survey targeted in the area of the project, which would need to have a minimum of 51% low-moderate income users.

6.3.3 U.S. Department of Commerce's Economic Development Administration (EDA) Grant Program

The U.S. Economic Development Administration (EDA) also has a grant program for municipal infrastructure construction necessary to attract or increase commercial and/or industrial development. Grants of 50% of project cost, typically up to a maximum of $1,000,000, are available. One of the primary eligibility criteria is that the project must create or maintain employment opportunities in an economically disadvantaged area. Since it is unlikely that the recommended projects can be shown to create or maintain employment, securing EDA funds is unlikely although more research could be conducted on a project by project basis to see if the City would be eligible. Congressionally Directed Spending (CDS) and State and Tribal Assistance Grant (STAG)

Recently, Congressionally Directed Spending has been directed toward eligible projects throughout the country. The State and Tribal Assistance Grant (STAG) funding is an appropriations-based grant for states, tribal and local governments for a variety of water and wastewater infrastructure projects. This grant is administered by the Environmental Protection Agency. This grant requires strong support from City management, Maine DEP, and the congressional delegation. Grants of up to several million dollars have previously been awarded, although the typical grant award is $1,000,000 or less. The City should consider submitting an application and follow up with its federal congressional delegation on the possibility of funding.

6.3.4 USDA Grant/Loan Program

The U.S. Department of Agriculture (USDA) Rural Development (RD) offers Water & Waste Disposal Predevelopment Grants to eligible communities to assist with the initial planning and development of RD Water & Waste Disposal direct loans/grants. RD also offers Water & Waste Disposal direct loans/grants for sanitary sewage disposal, solid waste disposal and stormwater drainage projects. The City has qualified in the past for these funds and would likely qualify again for RD water & waste disposal loan and grant funding.

For RD funding, applicants are required to prepare an environmental review report and preliminary engineering report. The State of Maine's CDBG and CWSRF programs are willing to accept an environmental impact review report and preliminary engineering report prepared for RD funding to satisfy their requirements. Therefore, if the City intends to seek outside funding for the recommended asset-specific adaptation measures, it is recommended that an environmental impact review report and preliminary engineering report be prepared to RD standards to satisfy the preliminary requirements of all three funding programs.

6.3.5 Federal Emergency Management Agency (FEMA)

There are a number of grants through FEMA that are available for planning and construction projects to assist communities in implementation of hazard mitigation measures. FEMA Flood Mitigation Assistance (FMA) grants are available for planning and construction projects that reduce or eliminate the long-term risk of flood damage to structures insured under the National Flood Insurance Program (NFIP). FEMA Building Resilient Infrastructure and Communities (BRIC) grants are available to support communities as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. FEMA Hazard Mitigation Grant Program (HMGP) assists in implementing long-term hazard mitigation planning and projects following a presidential disaster declaration. The ongoing COVID-19 Pandemic has triggered this presidential declaration, allowing for funds to be released for this grant program. Both BRIC grants and HMGP can fund up to 75% of the project cost, requiring the City of Bath to provide 25% of the cost in non-federal funding. In some instances, the federally funded percentage could be as high as 90%. The non-federal funding can come from state or local government, an individual, construction labor, and in-kind services. During the FY 2022 grant cycle, the City was successful in receiving two FEMA BRIC grant awards.

To apply for the above FEMA grants, the City would be required to submit a project application to the State Hazard Mitigation Officer to then be forwarded on to the Regional FEMA office for review and approval. The hazard mitigation project would also be required to conform with the State and local Hazard Mitigation Plans to be eligible for FMA grants. Depending on the grant and available funds each year, the City could be competing for FMA grant funds within a national pool of applicants. FEMA funding would be preferable to CWSRF loan funding because grant funds would not need to be repaid. However, the application process for some FEMA grants is much longer and requires more effort.

6.3.6 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. Eligible borrowers include local, state, tribal, and federal government entities, partnerships and joint ventures, corporations and trusts and Clean Water and Drinking Water State Revolving Fund (SRF) programs. The WIFIA program can fund projects that are eligible for the Clean Water SRF including development phase activities such as planning, preliminary engineering, design, environmental review, revenue forecasting, and other pre-construction activities, construction, reconstruction, rehabilitation, and replacement work, acquisition of real property or an interest in real property, environmental mitigation, construction contingencies, and acquisition of equipment.

Although the design and construction costs of the recommended projects would be categorically eligible for federal WIFIA program funds, the WIFIA program can only fund up to 49% of project costs and requires a minimum project size of $5 million. In addition, typical SRF program requirements including an Environmental Review, Davis-Bacon wage rates and American Iron and Steel requirements would apply to WIFIA funding. Given these eligibility criteria and funding limitations, WIFIA program financing would not be a preferred funding source when compared to USDA Rural Development, CDBG and the Maine DEP CWSRF funding programs.

APPENDIX

WRIGHT-PIERCE
Engineering a Better Environment

A

Appendix A
WPCF Asset Inventory

City of Bath Fiscal Sustainability Plan - Collection System Asset List

WP ID	UpstreamDownstream_ID	Upstream Manhole	Downstream Manhole	Drainage Area	Use	Pipe Size	Pipe Material	Length (FT)	Installation Date
1052	MH389MH388	MH389	MH388	Castine	Combined	12		37	-
1054	MH388MH386	MH388	MH386	Castine	Combined	18		317	-
1055	MH385MH387	MH385	MH387	Castine	Combined	18		154	-
1056	MH386MH385	MH386	MH385	Castine	Combined			93	-
1058	MH391MH377	MH391	MH377	Castine	Sewer	12	PVC	171	1982
1059	MH377MH389	MH377	MH389	Castine	Sewer	12	PVC	237	1982
1063	MH1540MH951	MH1540	MH951	Castine	Combined	24	RCP	394	-
1090	MH387MH1253	MH387	MH1253	Castine	Combined	18	Clay	290	-
1092	MH1253MH1254	MH1253	MH1254	Castine	Combined	18	Clay	123	-
1093	MH1254MH1252	MH1254	MH1252	Castine	Combined	24	Clay	318	-
1094	MH1252MH1540	MH1252	MH1540	Castine	Combined	24		279	-
1103	MH435MH849	MH435	MH849	Castine	Combined	15		196	-
1112	MH427MH1496	MH427	MH1496	Castine	Combined	27		213	-
1120	MH430MH1497	MH430	MH1497	Castine	Combined	15	PVC	100	-
1140	MH848MH854	MH848	MH854	Castine	Combined	12	AC	221	1972
1142	MH854MH852	MH854	MH852	Castine	Combined	18	RCP	169	1972
1143	MH852MH849	MH852	MH849	Castine	Combined	18	RCP	35	1972
1144	MH849MH850	MH849	MH850	Castine	Combined	18	RCP	57	1972
1146	MH846MH854	MH846	MH854	Castine	Sewer	12	AC	129	1972
1150	MH858MH846	MH858	MH846	Castine	Sewer	12	AC	291	1972
1151	MH857MH855	MH857	MH855	Castine	Sewer	12	AC	202	1969
1156	MH860MH858	MH860	MH858	Castine	Sewer	12	AC	160	1972
1157	MH859MH857	MH859	MH857	Castine	Sewer	12	AC	167	1969
1164	MH932MH869	MH932	MH869	Castine	Combined	12		110	-
1167	MH887MH871	MH887	MH871	Castine	Combined	12		222	-
1168	MH869MH870	MH869	MH870	Castine	Combined	12		130	-
1169	MH871MH427	MH871	MH427	Castine	Combined			146	-
1170	MH870MH871	MH870	MH871	Castine	Combined	12		178	-
1172	MH875MH877	MH875	MH877	Castine	Combined	12	AC	170	1972
1173	MH876MH878	MH876	MH878	Castine	Sewer	12	AC	161	1969
1175	MH878MH877	MH878	MH877	Castine	Sewer	12		17	-
1185	MH1263MH934	MH1263	MH934	Castine	Combined	8	PVC	33	1999
1200	MH934MH907	MH934	MH907	Castine	Combined	12		365	-
1209	MH885MH883	MH885	MH883	Castine	Sewer	12	AC	86	1969
1211	MH888MH887	MH888	MH887	Castine	Combined	12		139	-
1212	MH892MH891	MH892	MH891	Castine	Combined	12	AC	147	1972

WP ID	UpstreamDownstream_ID	Upstream Manhole	Downstream Manhole	Drainage Area	Use	Pipe Size	Pipe Material	Length (FT)	Installation Date
1213	MH891MH890	MH891	MH890	Castine	Combined	12	AC	128	1972
1220	MH898MH892	MH898	MH892	Castine	Combined	10	AC	326	1972
1236	MH907MH888	MH907	MH888	Castine	Combined	12		202	-
1237	MH890MH884	MH890	MH884	Castine	Combined	12	AC	214	1972
1255	MH933MH932	MH933	MH932	Castine	Combined	12		75	-
1267	MH944MH947	MH944	MH947	Castine	Sewer	6		152	-
1268	MH941MH942	MH941	MH942	Castine	Sewer	6		101	-
1269	MH942MH943	MH942	MH943	Castine	Sewer	6		225	-
1270	MH943MH944	MH943	MH944	Castine	Sewer	6		60	-
1274	MH949MH1263	MH949	MH1263	Castine	Combined	8	PVC	53	-
1275	MH948MH949	MH948	MH949	Castine	Combined	8		137	-
1276	MH947MH948	MH947	MH948	Castine	Combined			79	-
1277	MH951MH953	MH951	MH953	Castine	Combined			81	2021
1281	MH953MH933	MH953	MH933	Castine	Combined			89	-
1455	MH884MH875	MH884	MH875	Castine	Combined	12	AC	256	1972
1456	MH883MH876	MH883	MH876	Castine	Sewer	12	AC	133	1969
1629	MH850PS7	MH850	PS7	Castine	Combined			26	1972
1744	MH1496MH430	MH1496	MH430	Castine	Combined	27		41	-
1745	MH1497MH435	MH1497	MH435	Castine	Combined	15	PVC	197	-
1764	MH877MH848	MH877	MH848	Castine	Combined	14	AC	162	1972
1481	MH1296MH595	MH1296	MH595	Commercial	Combined	18	PVC	27	2013
1482	MH275MH1296	MH275	MH1296	Commercial	Combined	18	PVC	168	2013
1606	MH1364MH758	MH1364	MH758	Commercial	Combined	36	AC	280	1969
1623	MH1377MH1198	MH1377	MH1198	Commercial	Combined	42	AC	108	1982
1624	MH744MH748	MH744	MH748	Commercial	Combined			16	-
1625	MH1200CB1811	MH1200	CB1811	Commercial	Combined	42	AC	85	1982
1694	MH653MH622	MH653	MH622	Commercial	Combined	18	PVC	114	2021
1767	MH280NONE	MH280	NONE	Commercial	Combined	18	PVC	212	2013
1768	MH1512MH279	MH1512	MH279	Commercial	Combined	18	PVC	12	2013
1787	MH748MH1200	MH748	MH1200	Commercial	Combined	15	PVC	13	2017
305	MH244MH239	MH244	MH239	Commercial	Sewer			310	-
308	MH239MH236	MH239	MH236	Commercial	Combined	12	VCP	151	-
309	MH235MH237	MH235	MH237	Commercial	Combined	15		53	-
310	MH236MH235	MH236	MH235	Commercial	Combined	15	VCP	175	-
313	MH237MH1512	MH237	MH1512	Commercial	Combined	18	HDPE	201	2013
357	MH1297MH275	MH1297	MH275	Commercial	Combined	18	PVC	86	2013
360	MH279MH280	MH279	MH280	Commercial	Combined	18	HDPE	111	2013
374	NONEMH1297	NONE	MH1297	Commercial	Combined	18	PVC	186	2013
595	MH588MH570	MH588	MH570	Commercial	Combined	16	Cast Iron	256	1988
598	MH560MH675	MH560	MH675	Commercial	Combined	15	PVC	282	1988
610	MH566MH647	MH566	MH647	Commercial	Combined	16	Cast Iron	265	1988

WP ID	UpstreamDownstream_ID	Upstream Manhole	Downstream Manhole	Drainage Area	Use	Pipe Size	Pipe Material	Length (FT)	Installation Date
613	MH647MH560	MH647	MH560	Commercial	Combined	15	PVC	192	1988
617	MH570MH569	MH570	MH569	Commercial	Combined	16	Cast Iron	123	1988
626	MH595MH592	MH595	MH592	Commercial	Combined	16		227	-
630	MH592MH589	MH592	MH589	Commercial	Combined	16		293	-
634	MH589MH588	MH589	MH588	Commercial	Combined	16		158	-
644	MH642MH653	MH642	MH653	Commercial	Combined	18	RCP	227	-
645	MH611MH690	MH611	MH690	Commercial	Combined	36	RCP	294	2021
656	MH621MH620	MH621	MH620	Commercial	Combined	27	RCP	305	2021
657	MH654MH619	MH654	MH619	Commercial	Sewer	15	RCP	194	-
660	MH615MH611	MH615	MH611	Commercial	Combined	36	RCP	179	2021
666	MH1464MH615	MH1464	MH615	Commercial	Sewer	12	AC	27	1975
667	MH616MH617	MH616	MH617	Commercial	Sewer	12	VCP	82	-
668	MH617MH1464	MH617	MH1464	Commercial	Sewer	12	VCP	32	-
669	MH620MH615	MH620	MH615	Commercial	Combined	36	RCP	73	2021
670	MH619MH620	MH619	MH620	Commercial	Sewer	24	RCP	31	-
671	MH622MH621	MH622	MH621	Commercial	Combined	24	RCP	301	2021
672	NONEMH654	NONE	MH654	Commercial	Sewer	12	VCP	429	-
688	MH638MH642	MH638	MH642	Commercial	Combined	18	RCP	87	1969
699	MH569MH566	MH569	MH566	Commercial	Combined	16	Cast Iron	208	1988
709	MH608MH616	MH608	MH616	Commercial	Sewer	12	VCP	188	-
727	MH742MH672	MH742	MH672	Commercial	Combined	15	PVC	229	1988
728	MH675MH672	MH675	MH672	Commercial	Combined	15	PVC	117	1988
743	MH692MH1364	MH692	MH1364	Commercial	Combined	36	AC	213	1969
745	MH687MH692	MH687	MH692	Commercial	Combined	36	RCP	84	1969
746	MH691MH687	MH691	MH687	Commercial	Combined	36	RCP	210	2021
750	MH690MH691	MH690	MH691	Commercial	Combined	36	RCP	31	2021
799	MH739MH744	MH739	MH744	Commercial	Combined	24	RCP	216	1969
800	MH733MH734	MH733	MH734	Commercial	Combined	21	PVC	164	2009
801	MH732MH733	MH732	MH733	Commercial	Combined	21	PVC	255	2009
802	MH866MH732	MH866	MH732	Commercial	Combined	21	PVC	169	2009
803	MH734MH736	MH734	MH736	Commercial	Combined	14	AC	230	1969
804	MH735MH738	MH735	MH738	Commercial	Combined	24	RCP	189	1969
805	MH736MH735	MH736	MH735	Commercial	Combined	24	RCP	26	1969
806	MH738MH739	MH738	MH739	Commercial	Combined	24	RCP	191	1969
812	MH748MH749	MH748	MH749	Commercial	Combined			70	-
813	MH746MH748	MH746	MH748	Commercial	Combined	18		25	-
814	MH747MH746	MH747	MH746	Commercial	Combined	15		72	-
815	MH745MH746	MH745	MH746	Commercial		18		32	-
816	MH749MH750	MH749	MH750	Commercial	Combined	18		139	-
817	MH750MH740	MH750	MH740	Commercial	Combined	18		19	-
819	MH740MH753	MH740	MH753	Commercial	Combined	18		205	-

WP ID	UpstreamDownstream_ID	Upstream Manhole	Downstream Manhole	Drainage Area	Use	Pipe Size	Pipe Material	Length (FT)	Installation Date
826	MH672MH742	MH672	MH742	Commercial	Combined	15		239	-
843	MH742MH768	MH742	MH768	Commercial	Combined	42	AC	8	1982
844	MH768MH769	MH768	MH769	Commercial	Combined	42	AC	62	1982
845	MH1376MH1377	MH1376	MH1377	Commercial	Combined	42	AC	144	1982
846	MH1198MH1200	MH1198	MH1200	Commercial	Combined	42	AC	47	1982
847	CB1811MH1201	CB1811	MH1201	Commercial	Combined	42	AC	156	1982
848	MH753MH756	MH753	MH756	Commercial	Combined	18		157	-
849	MH756MH758	MH756	MH758	Commercial	Combined	18		166	-
851	MH1201MH1196	MH1201	MH1196	Commercial	Combined	42	AC	147	1982
852	MH1196MH755	MH1196	MH755	Commercial	Combined	42	AC	164	1982
857	MH1197MH758	MH1197	MH758	Commercial	Combined			60	-
858	MH755MH1197	MH755	MH1197	Commercial	Combined	42	AC	139	1982
109	MH103MH93	MH103	MH93	Harward	Combined	18	VCP	290	-
118	MH1119MH1118	MH1119	MH1118	Harward	Combined	18	PVC	176	-
119	MH1120MH1119	MH1120	MH1119	Harward	Combined	18	PVC	32	-
120	MH1546MH97	MH1546	MH97	Harward	Combined	18	PVC	28	-
130	MH1118MH1114	MH1118	MH1114	Harward	Combined	18	PVC	165	1996
1479	MH99MH1546	MH99	MH1546	Harward	Combined	18	VCP	312	-
1480	MH93MH99	MH93	MH99	Harward	Combined	18	VCP	235	-
1493	MH494MH1324	MH494	MH1324	Harward	Combined	12	VCP	108	-
1494	MH1324MH500	MH1324	MH500	Harward	Combined	12		173	-
1628	MH227MH1382	MH227	MH1382	Harward	Combined	18	PVC	48	-
1675	MH1382MH159	MH1382	MH159	Harward	Combined	14	PVC	193	-
1714	MH446MH1460	MH446	MH1460	Harward	Sewer	12	AC	178	-
1716	MH488MH490	MH488	MH490	Harward	Combined	15	Clay	92	-
1762	MH1143MH1508	MH1143	MH1508	Harward	Combined	18	DI	96	1997
1782	MH479MH1553	MH479	MH1553	Harward	Combined	18	Clay	163	1995
1783	MH1553MH1519	MH1553	MH1519	Harward	Combined	18	Clay	95	1995
203	MH159MH160	MH159	MH160	Harward	Combined	18	PVC	136	1982
204	MH160MH155	MH160	MH155	Harward	Combined	18	PVC	47	1982
27	MH23MH42	MH23	MH42	Harward	Combined	18	PVC	228	1982
275	MH1107MH1639	MH1107	MH1639	Harward	Combined	18	PVC	195	1997
277	MH1639MH227	MH1639	MH227	Harward	Combined	18	PVC	16	-
280	MH1109MH1110	MH1109	MH1110	Harward	Combined	18	PVC	111	1995
281	MH1111MH1108	MH1111	MH1108	Harward	Combined	18	PVC	112	1995
282	MH1108MH1107	MH1108	MH1107	Harward	Combined	18	PVC	100	1995
289	MH1113MH1109	MH1113	MH1109	Harward	Combined	18	PVC	61	1995
290	MH1114MH1113	MH1114	MH1113	Harward	Combined	15	PVC	138	-
299	MH1110MH1111	MH1110	MH1111	Harward	Combined	18	PVC	24	1995
30	MH19MH22	MH19	MH22	Harward	Combined	18	PVC	221	1982
315	MH243MH103	MH243	MH103	Harward	Combined	18	Clay	244	-

WP ID	UpstreamDownstream_ID	Upstream Manhole	Downstream Manhole	Drainage Area	Use	Pipe Size	Pipe Material	Length (FT)	Installation Date
316	MH242MH243	MH242	MH243	Harward	Combined	18	Clay	102	-
32	MH155MH18	MH155	MH18	Harward	Combined	18	PVC	221	1982
34	MH18MH19	MH18	MH19	Harward	Combined	18	PVC	147	1982
36	MH22MH23	MH22	MH23	Harward	Combined	18	PVC	81	1982
421	MH546MH332	MH546	MH332	Harward	Combined	195	Clay	292	2020
422	MH332MH338	MH332	MH338	Harward	Combined	19	Clay	205	2020
428	MH523MH339	MH523	MH339	Harward	Combined	15		221	-
429	MH1508MH325	MH1508	MH325	Harward	Combined	18	Clay	361	-
431	MH1145MH1142	MH1145	MH1142	Harward	Combined	30	RCP	104	2020
433	MH338MH341	MH338	MH341	Harward	Combined	10	PVC	308	2020
434	MH339MH1334	MH339	MH1334	Harward	Combined	15	PVC	206	2018
434A	MH1334MH1155	MH1334	MH1155	Harward	Combined	15	PVC	86	2018
435	MH341MH1153	MH341	MH1153	Harward	Combined	30	RCP	91	2020
436	MH1155MH1154	MH1155	MH1154	Harward	Combined	15	VCP	115	2020
437	MH1153MH1151	MH1153	MH1151	Harward	Combined	30	RCP	298	2020
438	MH1154MH1152	MH1154	MH1152	Harward	Combined	15	AC	266	2020
439	MH1152MH1150	MH1152	MH1150	Harward	Combined	15	VCP	178	2020
440	MH1150MH1149	MH1150	MH1149	Harward	Combined	15	VCP	247	2020
441	MH1151MH1148	MH1151	MH1148	Harward	Combined	30	VCP	397	2020
445	MH1149MH1144	MH1149	MH1144	Harward	Combined	15	VCP	276	2020
446	MH1144MH1143	MH1144	MH1143	Harward	Combined	15	VCP	121	2020
447	MH325MH242	MH325	MH242	Harward	Combined	18	Clay	76	-
448	MH1148MH1146	MH1148	MH1146	Harward	Combined	30	RCP	170	2020
45	MH56MH60	MH56	MH60	Harward	Combined	18	RCP	278	1969
458	MH1146MH1145	MH1146	MH1145	Harward	Combined	30	PVC	105	2020
463	MH461MH471	MH461	MH471	Harward	Sewer	15	VCP	339	-
465	MH455MH461	MH455	MH461	Harward	Sewer	15		217	-
468	MH780MH446	MH780	MH446	Harward	Sewer	12	VCP	303	-
469	MH445MH1458	MH445	MH1458	Harward	Sewer	18	AC	431	-
470	MH1460MH445	MH1460	MH445	Harward	Sewer	18	AC	185	-
471	MH448MH453	MH448	MH453	Harward	Sewer	15	VCP	300	-
474	MH1458MH448	MH1458	MH448	Harward	Sewer	18	VCP	85	-
475	MH453MH455	MH453	MH455	Harward	Sewer	15	VCP	84	-
484	MH470MH476	MH470	MH476	Harward	Combined	18	VCP	244	1995
490	MH1519MH1269	MH1519	MH1269	Harward	Combined	15	PVC	82	1995
494	MH476MH479	MH476	MH479	Harward	Combined			64	1995
504	MH534MH515	MH534	MH515	Harward	Combined	12	VCP	319	-
505	MH505MH513	MH505	MH513	Harward	Combined	18	VCP	173	-
508	MH816MH489	MH816	MH489	Harward	Combined	18	PVC	340	2021
511	MH493MH501	MH493	MH501	Harward	Combined	18		322	-
514	MH490MH494	MH490	MH494	Harward	Combined	12	VCP	136	-

WP ID	UpstreamDownstream_ID	Upstream Manhole	Downstream Manhole	Drainage Area	Use	Pipe Size	Pipe Material	Length (FT)	Installation Date
515	MH489MH493	MH489	MH493	Harward	Combined	18	VCP	150	-
520	MH504MH534	MH504	MH534	Harward	Combined	12	VCP	119	-
526	MH501MH503	MH501	MH503	Harward	Combined	18		199	-
528	MH502MH504	MH502	MH504	Harward	Combined	12		166	-
529	MH500MH502	MH500	MH502	Harward	Combined	12		222	-
530	MH503MH505	MH503	MH505	Harward	Combined	18	VCP	242	2021
536	MH516MH520	MH516	MH520	Harward	Combined	12	VCP	236	-
538	MH513MH511	MH513	MH511	Harward	Combined	18	VCP	138	-
540	MH511MH514	MH511	MH514	Harward	Combined			40	-
541	MH515MH516	MH515	MH516	Harward	Combined	12	VCP	62	-
543	MH521MH518	MH521	MH518	Harward	Combined			38	-
55	MH43MH50	MH43	MH50	Harward	Combined	18	PVC	205	1982
553	MH1269MH546	MH1269	MH546	Harward	Combined	19	Clay	129	2020
555	MH514MH1158	MH514	MH1158	Harward	Combined			249	-
559	MH536MH537	MH536	MH537	Harward	Combined	24	PVC	200	-
56	MH42MH43	MH42	MH43	Harward	Combined	18	PVC	242	1982
564	MH520MH536	MH520	MH536	Harward	Combined	12	VCP	75	-
566	MH537MH523	MH537	MH523	Harward	Combined			56	-
568	MH1158MH521	MH1158	MH521	Harward	Combined	18	VCP	41	-
582	MH544MH536	MH544	MH536	Harward	Combined	12	VCP	13	-
583	MH518MH544	MH518	MH544	Harward	Combined			17	-
61	MH54MH55	MH54	MH55	Harward	Combined	24	PVC	146	2013
64	MH51MH52	MH51	MH52	Harward	Combined	24	PVC	67	2013
65	MH50MH51	MH50	MH51	Harward	Combined	18	PVC	87	1982
66	MH52MH54	MH52	MH54	Harward	Combined	24	PVC	24	2013
67	MH55MH56	MH55	MH56	Harward	Combined	18	AC	33	-
72	MH60MH67	MH60	MH67	Harward	Combined	14	AC	272	1969
877	MH778MH780	MH778	MH780	Harward	Sewer	12		127	-
906	MH810MH353	MH810	MH353	Harward	Sewer	12		291	-
911	MH370MH815	MH370	MH815	Harward	Combined	18	Clay	89	-
916	MH815MH816	MH815	MH816	Harward	Combined	18	Clay	113	-
937	MH354MH813	MH354	MH813	Harward	Sewer	18	Clay	290	-
940	MH353MH354	MH353	MH354	Harward	Sewer	15	Clay	162	-
956	MH813MH370	MH813	MH370	Harward	Combined	18	VCP	257	-
WP1954	MH97MH1120	MH97	MH1120	Harward	Combined	18	PVC	14	-
WP1956	MH523MH1550	MH523	MH1550	Harward	Combined	21	PVC	5	1997
WP1957	MH1550MH338	MH1550	MH338	Harward	Combined	20	Clay	221	-
1316	MH1000MH995	MH1000	MH995	Hunt	Sewer	8	PVC	202	1969
1330	MH994MH992	MH994	MH992	Hunt	Sewer	8	PVC	207	1969
1332	MH992MH993	MH992	MH993	Hunt	Sewer	8	PVC	31	1969
1333	MH995MH994	MH995	MH994	Hunt	Sewer	8	PVC	208	1969

WP ID	UpstreamDownstream_ID	Upstream Manhole	Downstream Manhole	Drainage Area	Use	Pipe Size	Pipe Material	Length (FT)	Installation Date
1336	MH1001MH1000	MH1001	MH1000	Hunt	Sewer	8	PVC	299	1969
1337	MH965MH1001	MH965	MH1001	Hunt	Sewer	8	PVC	112	1969
1215	MH900MH901	MH900	MH901	Rose	Sewer	8	AC	22	1969
1216	MH899MH900	MH899	MH900	Rose	Sewer	8	AC	216	1969
1240	MH918MH919	MH918	MH919	Rose	Combined	14	AC	265	1969
1242	MH921MH960	MH921	MH960	Rose	Combined	14	AC	170	1969
1244	MH919MH921	MH919	MH921	Rose	Combined	14	AC	199	1969
1253	MH901MH918	MH901	MH918	Rose	Combined	8	VCP	159	1969
1306	MH963MH1504	MH963	MH1504	Rose	Combined	10	AC	181	1969
1756	MH1504MH960	MH1504	MH960	Rose	Combined	10	AC	264	1969
205	MH168MH209	MH168	MH209	TreatmentPlant	Combined	18	AC	130	1969
208	MH167MH168	MH167	MH168	TreatmentPlant	Combined	18	AC	253	1969
214	MH270MH167	MH270	MH167	TreatmentPlant	Combined	18	AC	191	1969
255	MH209MH210	MH209	MH210	TreatmentPlant	Combined	27	AC	227	1969
258	MH210MH211	MH210	MH211	TreatmentPlant	Combined	27	AC	133	1969
259	MH212MH211	MH212	MH211	TreatmentPlant	Combined	15	PVC	81	2011
260	MH211MH213	MH211	MH213	TreatmentPlant	Combined	27		35	-
1622	MH769MH1376	MH769	MH1376		Combined			9	-
430	MH1142MH1143	MH1142	MH1143		Combined	18	Clay	18	2018

City of Bath Fiscal Sustainability Plan- Force Main Asset List

WP ID	Drainage Area	Use	Pipe Size	Pipe Material	Length (FT)	Installation Date
Aegis Drive FM	Aegis	Force Main	4	PVC	770	1985
Bridge Street FM	Bridge Street	Force Main	6	DI	2288	1969
Upper Commercial Street FM	Commercial Street	Force Main	24	DI	1490	2002
Lower Commercial Street FM	Commercial Street	Force Main	24	DI	3365	1969
Farrin Place FM	Farrin Place	Force Main	6	DI	1093	1969
Front Street FM	Front Street	Force Main	4	HDPE	82	2002
Harward Street FM	Harward Street	Force Main	16	DI	3017	2014
Hunt Street FM	Hunt Street	Force Main	8	DI	1649	1969
Hyde Park FM	Hyde Park	Force Main	8	DI	3843	2010
Landfill FM	Landfill	Force Main	6	HDPE	2961	2001
Pleasant Avenue FM	Pleasant Avenue	Force Main	16	DI	1510	1972
Riverview Road FM	Riverview Road	Force Main	6	DI	908	1969
Rose Street FM	Rose Street	Force Main	8	DI	1154	1972
Wing Farm FM	Wing Farm	Force Main	4	DI	535	1998

City of Bath Fiscal Sustainability Plan - Pump Station Asset List

Equipment / Asset name	Pump Station	Manufacturer	Model/Unit Number	Size	Installation Date
Electrical Equipment & Enclosures	Aegis Drive	Wincom Corp	Serial No. 1608-I	230 V, 1 Phase, 60 Hz	1985
Process Piping & Valves	Aegis Drive				1985
Link Seals	Aegis Drive				1985
Pig Launcher	Aegis Drive				1985
Communications & Alarms	Aegis Drive	Pheonix Contact	RAD-ISM UHF Radio		2010
Lighting	Aegis Drive				1985
Pump No. 1	Aegis Drive	Goulds	Submersible WS5012D4	5 HP	1985
Pump No. 2	Aegis Drive	Goulds	Submersible WS5012D4	5 HP	1985
Control Panel & PLC	Aegis Drive	Schneider Electric PLC Schneider Electric OIT	Twido TWDLCDA24DRF PLC		2010
Valve Vault	Aegis Drive	Superior Concrete Co	112-85-L		1985
Instrumentation	Aegis Drive		Pressure Transducer Floats		2017
Wet Well	Aegis Drive	Superior Concrete Co	112-85-L		1985
Communications & Alarms	Bridge Street	Pheonix Contact	RAD-ISM UHF Radio		2010
Soft Starter	Bridge Street	Allen Bradley	SMC Flex		2000
Wet Well	Bridge Street				1969
Electrical Equipment & Enclosures	Bridge Street	Schneider Electric	Square D		2017
Control Panel & PLC	Bridge Street	Schneider Electric PLC Schneider Electric OIT	M241 TM241CE24R HMIS5T OIT		2017
Instrumentation	Bridge Street		Pressure Transducer Floats		2017
Pump Enclosure	Bridge Street				2017
Unit Heater	Bridge Street				2017
Exhaust Fans	Bridge Street				2017
Process Piping & Valves	Bridge Street				2017
Link Seals	Bridge Street				2017
Pump No. 1	Bridge Street	Gorman Rupp	T4 Suction Lift /T4C3SC-B/WW	20 HP	2017
Pump No. 2	Bridge Street	Gorman Rupp	T4 Suction Lift /T4C3SC-B/WW	20 HP	2017
Standby Automatic Generator	Bridge Street	Cummins	Diesel	60 KW	2020
Pig Launcher	Bridge Street				2017
Lighting	Bridge Street				2017

Equipment / Asset name	Pump Station	Manufacturer	Model/Unit Number	Size	Installation Date
Process Piping & Valves	Commercial Street				1969
VFDs	Commercial Street				2002
Link Seals	Commercial Street				1969
Electrical Equipment & Enclosures	Commercial Street				2002
Instrumentation	Commercial Street	Milltronics Khrone	Multiranger Plus IFC		2002
Pig Launcher	Commercial Street				1969
Wet Well	Commercial Street				1969
Control Panel & PLC	Commercial Street	Schneider Electric PLC Schneider Electric OIT	Twido TWDLCDA24DRF PLC		2010
Building	Commercial Street				1969
Pump No. 1 (Wet Weather)	Commercial Street	Fairbanks Morse Pump, Marathon Electric Motors	Extended Shaft Centrifugal	200 HP	2002
Pump No. 2 (Wet Weather)	Commercial Street	Fairbanks Morse Pump, Marathon Electric Motors	Extended Shaft Centrifugal	200 HP	2002
Pump No. 3 (Duty)	Commercial Street	Fairbanks Morse Pump, Marathon Electric Motors	Extended Shaft Centrifugal	40 HP	2002
Pump No. 4 (Duty)	Commercial Street	Fairbanks Morse Pump, Marathon Electric Motors	Extended Shaft Centrifugal	40 HP	2002
Communications & Alarms	Commercial Street	Pheonix Contact	RAD-ISM UHF Radio		2010
Pump Lifting Hooks/Cables	Commercial Street				2002
Doors	Commercial Street				1969
Unit Heaters	Commercial Street	5 KW, 480V/3Ph	Trane		2002
Dampers	Commercial Street				2002
Exhaust Fans	Commercial Street	Cook	245 CPA		2002
Veneers	Commercial Street				1969
Roof	Commercial Street				1969
Lighting	Commercial Street				2002
Mechanically Operated Generator Exhaust Louver	Commercial Street				2002
Domestic Water System	Commercial Street				2002
Windows	Commercial Street				1969
Standby Automatic Generator	Commercial Street	Cummins	Diesel (DFAC - 5569794)	250 KW	2002
VFDs (Not for pump control)	Farrin Place	Durapulse & Toshiba		30 HP	2010
Electrical Equipment & Enclosures	Farrin Place				1995
Instrumentation	Farrin Place	Milltronics Floats	MultiRanger Plus		1995

Equipment / Asset name	Pump Station	Manufacturer	Model/Unit Number	Size	Installation Date
Process Piping & Valves	Farrin Place				1969
Communications & Alarms	Farrin Place	Pheonix Contact	RAD-ISM UHF Radio		2010
Roof	Farrin Place				1969
Pump No. 1	Farrin Place	Gorman Rupp	T6 Suction Lift	30 HP, 500 gpm @ 96 TDH	1995
Pump No. 2	Farrin Place	Gorman Rupp	T6 Suction Lift	30 HP, 500 gpm @	1995
Control Panel & PLC	Farrin Place	Schneider Electric PLC Schneider Electric OIT	Twido TWDLCDA24DRF PLC		2010
Lighting	Farrin Place				1995
Building	Farrin Place				1969
Domestic Water System	Farrin Place				1995
Mechanically Operated Generator Exhaust Louver	Farrin Place				1995
Link Seals	Farrin Place				1995
Windows	Farrin Place				1969
Veneers	Farrin Place				1969
Wet Well	Farrin Place				1969
Standby Automatic Generator	Farrin Place	Olympian	Diesel (D60P1)	60 KW	1999
Doors	Farrin Place				1969
Unit Heater	Farrin Place				1995
Dampers	Farrin Place				1995
VFDs	Front Street				2003
Wet Well	Front Street				1969
Instrumentation	Front Street	Milltronics	MultiRanger Plus		2003
Electrical Equipment & Enclosures	Front Street				2003
Building	Front Street		3 levels of building		1969
Link Seals	Front Street				2003
Communications & Alarms	Front Street	Pheonix Contact	RAD-ISM UHF Radio		2010
Control Panel & PLC	Front Street	Schneider Electric PLC Schneider Electric OIT	Twido TWDLCDA24DRF PLC		2010
Pump No. 1	Front Street	Gorman Rupp	T4 Flooded Suction Lift T4A3S-B /F	10 HP, 250 gpm @ 58 TDH	2003
Pump No. 2	Front Street	Gorman Rupp	T4 Flooded Suction Lift T4A3S-B /F	10 HP, 250 gpm @ 58 TDH	2003
Lighting	Front Street				2003

Equipment / Asset name	Pump Station	Manufacturer	Model/Unit Number	Size	Installation Date
Unit Heaters	Front Street	5 KW, 480V/3Ph	Trane	UHXA053DI8-233-128	2003
Exhaust Fans	Front Street	Cook	245 CPA		2003
Process Piping & Valves	Front Street				2003
Mechanically Operated Generator Exhaust Louver	Front Street				2003
Standby Automatic Generator	Front Street	Cummins	Diesel	60 KW	2009
Dampers	Front Street				2003
Roof	Front Street				2003
Veneers	Front Street				2003
Doors	Front Street				2003
Windows	Front Street				2003
Process Piping & Valves	Harward Street	Kenway Fiberglass pipes (specialty-made for odd			1969
Electrical Equipment & Enclosures	Harward Street				1997
Link Seals	Harward Street				1969
Pump No. 3 (Lead)	Harward Street	Fairbanks Morse	Vertical Centrifugal, Single-stage	60 HP	1997
Pump No. 2 (Lag)	Harward Street	Fairbanks Morse	Vertical Centrifugal, Single-stage	100 HP	1997
Instrumentation	Harward Street	Milltronics Khrone	MultiRanger Plus IFC		1997
Pump No. 1 (Lag)	Harward Street	Fairbanks Morse	Vertical Centrifugal, Single-stage	100 HP	1997
Standby Automatic Generator	Harward Street	Cummins	Diesel	250 KW	1997
Control Panel & PLC	Harward Street	Schneider Electric PLC Schneider Electric OIT	Twido TWDLCDA24DRF PLC		1997
Communications & Alarms	Harward Street	Pheonix Contact	RAD-ISM UHF Radio		2010
Pig Launcher	Harward Street				1969
Building	Harward Street				1969
Lighting	Harward Street				1997
Wet Well	Harward Street				1969
Unit Heaters	Harward Street	10kW, 480V/3Ph	Singer	EUH10K	1997
Domestic Water System	Harward Street				1997
VFDs	Harward Street	100 HP= Durapulse 60 HP = Toshiba	100 HP= GS3-4100 60HP = G3	two 100 HP, one 60 HP	2020
Exhaust Fans	Harward Street		Acme	302QRN ARR/10	1997
Dampers	Harward Street				1997

Equipment / Asset name	Pump Station	Manufacturer	Model/Unit Number	Size	Installation Date
Roof	Harward Street				1997
Doors	Harward Street				1997
Windows	Harward Street				1997
Veneers	Harward Street				1997
VFDs	Hunt Street				1997
Process Piping & Valves	Hunt Street				1969
Electrical Equipment & Enclosures	Hunt Street				1969
Link Seals	Hunt Street				1969
Pump No. 1	Hunt Street	Fairbanks Morse	Flooded Suction Centrifugal	40 HP	1969
Pump No. 2	Hunt Street	Fairbanks Morse	Flooded Suction Centrifugal	40 HP	1969
Instrumentation	Hunt Street	Milltronics	MultiRanger Plus		1997
Building	Hunt Street				1969
Communications & Alarms	Hunt Street	Pheonix Contact	RAD-ISM UHF Radio		2010
Lighting	Hunt Street				1997
Wet Well	Hunt Street				1969
Veneers	Hunt Street				1969
Roof	Hunt Street				1969
Control Panel & PLC	Hunt Street	Schneider Electric PLC Schneider Electric OIT	Twido TWDLCDA24DRF PLC		2010
Domestic Water System	Hunt Street				1969
Unit Heater	Hunt Street	10kW, 480V/3Ph	Dayton	2YU70	1969
Exhaust Fans	Hunt Street				1969
Dampers	Hunt Street				1969
Doors	Hunt Street				1969
Louvers	Hunt Street				1969
Site	Hunt Street				1969
Windows	Hunt Street				1969
VFDs	Hyde Park	H3			2010
Instrumentation	Hyde Park	Milltronics Siemens	Multriranger Plus MagFlow		
Electrical Equipment & Enclosures	Hyde Park				

Equipment / Asset name	Pump Station	Manufacturer	Model/Unit Number	Size	Installation Date
Communications & Alarms	Hyde Park	Pheonix Contact	RAD-ISM UHF Radio		2010
Wet Well	Hyde Park				
Building	Hyde Park				
Standby Automatic Generator	Hyde Park	Cummins	Diesel	60 KW	1999
Control Panel & PLC	Hyde Park	Schneider Electric PLC Schneider Electric OIT	Twido TWDLCDA24DRF PLC		2010
Link Seals	Hyde Park				2010
Domestic Water System	Hyde Park				2010
Process Piping & Valves	Hyde Park				1999
Pump No. 1	Hyde Park	Gorman Rupp	T4 Suction Lift	30, HP 450 gpm @ 125 TDH	2010
Pump No. 2	Hyde Park	Gorman Rupp	T4 Suction Lift	30, HP 450 gpm @ 125 TDH	2010
Mechanically Operated Generator Exhaust Louver	Hyde Park				2010
Unit Heater	Hyde Park				2010
Louvers	Hyde Park				2010
Dampers	Hyde Park				2010
Lighting	Hyde Park				2010
Doors	Hyde Park				2010
Roof	Hyde Park				2010
Veneers	Hyde Park				2010
Instrumentation	Landfill	Siemens	MagFlo x2 Pressure Transducers		2017
Communications & Alarms	Landfill	Pheonix Contact	RAD-ISM UHF Radio		2017
Process Piping & Valves	Landfill				2017
Building	Landfill				2017
Control Panel & PLC	Landfill	Automation Direct PLC Automation Direct OIT	Productivity P-2 550 PLC		2017
Lighting	Landfill				2017
Electrical Equipment & Enclosures	Landfill				2017
VFDs	Landfill (Leachate PS)			20HP	2017
Pump No. 1	Landfill (Leachate PS)	Sligo	Series 3 Submersible	10 HP	2017
Pump No. 2	Landfill (Leachate PS)	Sligo	Series 3 Submersible	10 HP	2017
Wet Well	Landfill (Leachate PS)				2017

Equipment / Asset name	Pump Station	Manufacturer	Model/Unit Number	Size	Installation Date
VFDs	Landfill (wetwell pumps)				2017
Pump No. 3	Landfill (wetwell pumps)	Liberty	LSG202M Submersible	2 HP	2017
Pump No. 4	Landfill (wetwell pumps)	Liberty	LSG202M Submersible	2 HP	2017
Wet Well	Landfill (wetwell pumps)				2017
VFDs	Pleasant Avenue	Toshiba	VT130H9U4500	50 HP	2009
Link Seals	Pleasant Avenue				1969
Instrumentation	Pleasant Avenue	Siemens Krohne	Hydroranger 200 Enviromag 2000		2009
Electrical Equipment & Enclosures	Pleasant Avenue				1969
Domestic Water System	Pleasant Avenue	19gal, 2.5kW, 120V	AO Smith	EJCS20 200	2009
Process Piping & Valves	Pleasant Avenue				1969
Communications & Alarms	Pleasant Avenue	Pheonix Contact	RAD-ISM UHF Radio		2010
Building	Pleasant Avenue				1969
Wet Well	Pleasant Avenue				1969
Control Panel & PLC	Pleasant Avenue	Schneider Electric PLC Schneider Electric OIT	Twido TWDLCDA24DRF PLC		2010
Mechanically Operated Generator Exhaust Louver	Pleasant Avenue				2009
Exhaust Fans	Pleasant Avenue	5HP, 460V, XP	Acme	QBR245	2009
Dampers	Pleasant Avenue				2009
Pump No. 1	Pleasant Avenue	Fairbanks Morse	Extended Shaft Centrifugal	50 HP	2009
Standby Automatic Generator	Pleasant Avenue	Cummins	Diesel	125 KW	2009
Pump No. 2	Pleasant Avenue	Fairbanks Morse	Extended Shaft Centrifugal	50 HP	2009
Pump No. 3	Pleasant Avenue	Fairbanks Morse	Extended Shaft Centrifugal	50 HP	2009
Lighting	Pleasant Avenue				2009
Unit Heater	Pleasant Avenue	10kW, 480V/3Ph	Dayton	2YU70	2009
Louvers	Pleasant Avenue				2009
Roof	Pleasant Avenue				2009
Doors	Pleasant Avenue				2009
Veneers	Pleasant Avenue				2009
Windows	Pleasant Avenue				2009
Building	Riverview Road				1969

Equipment / Asset name	Pump Station	Manufacturer	Model/Unit Number	Size	Installation Date
Communications & Alarms	Riverview Road	Pheonix Contact	RAD-ISM UHF Radio		2017
Electrical Equipment & Enclosures	Riverview Road				2017
Control Panel & PLC	Riverview Road	Schneider Electric PLC Schneider Electric OIT	M241 TM241CE24R HMIS5T OIT		2017
Instrumentation	Riverview Road		Pressure Transducer Floats		2017
Unit Heater	Riverview Road				2017
Exhaust Fans	Riverview Road				2017
Domestic Water System	Riverview Road				2017
Louvers	Riverview Road				2017
Wet Well	Riverview Road				2017
Veneers	Riverview Road				2017
Pump Control Panel/Starter	Riverview Road				2017
Process Piping & Valves	Riverview Road				2017
Link Seals	Riverview Road				2017
Pump No. 2	Riverview Road	Gorman Rupp	T4 Suction Lift	15 HP	2017
Roof	Riverview Road				2017
Pump No. 1	Riverview Road	Gorman Rupp	T4 Suction Lift	15 HP	2017
Doors	Riverview Road				2017
Lighting	Riverview Road				2017
Process Piping & Valves	Rose Street				1969
Electrical Equipment & Enclosures	Rose Street				1969
VFD	Rose Street	Dura Pulse	GS3-2030	30 HP	2000
Link Seals	Rose Street				1969
Instrumentation	Rose Street	Milltronics	Multriranger Plus		1997
Communications & Alarms	Rose Street	Pheonix Contact	RAD-ISM UHF Radio		2010
Wet Well	Rose Street				1969
Roof	Rose Street				1969
Building	Rose Street				1969
Domestic Water System	Rose Street				1969
Control Panel & PLC	Rose Street	Schneider Electric PLC Schneider Electric OIT	Twido TWDLCDA24DRF PLC		2010

Equipment / Asset name	Pump Station	Manufacturer	Model/Unit Number	Size	Installation Date
Dampers	Rose Street				1969
Exhaust Fans	Rose Street		McQuay	FS1024	1969
Veneers	Rose Street				1969
Standby Automatic Generator	Rose Street	Cummins	Diesel	80 KW	2007
Doors	Rose Street				1969
Louvers	Rose Street				1969
Windows	Rose Street				1969
Pump No. 1	Rose Street	Fairbanks Morse	Flooded Suction Centrifugal	30 HP	2013
Pump No. 2	Rose Street	Fairbanks Morse	Flooded Suction Centrifugal	30 HP	2016
Unit Heater	Rose Street	3.6kW, 208V/1ph	Markel	FEB-3620-1RA	2017
Lighting	Rose Street				2007
Instrumentation	Wing Farm		Pressure Transducer		1999
Electrical Equipment & Enclosures	Wing Farm				1999
Control Panel & PLC	Wing Farm	Schneider Electric PLC Schneider Electric OIT	Twido TWDLCDA24DRF PLC		1999
Communications & Alarms	Wing Farm	Pheonix Contact	RAD-ISM UHF Radio		2010
Standby Automatic Generator	Wing Farm			25 KW	1999
Domestic Water System	Wing Farm				1999
Lighting	Wing Farm				1999
Link Seals	Wing Farm				1999
Pump No. 1	Wing Farm	Gorman Rupp	T3 Suction Lift	7.5 HP	1999
Pump No. 2	Wing Farm	Gorman Rupp	T3 Suction Lift	7.5 HP	1999
Unit Heater	Wing Farm	5kW, 208V	Qmark	MUH0581MG	1999
Louvers	Wing Farm				1991
Dampers	Wing Farm				1999
Roof	Wing Farm				1999
Process Piping & Valves	Wing Farm				1999
Doors	Wing Farm				1999
Veneers	Wing Farm				1999
Building	Wing Farm				1999

Equipment / Asset name	Pump Station	Manufacturer	Model/Unit Number	Size	Installation Date
Windows	Wing Farm				1999
Wet Well	Wing Farm				1999

City of Bath Fiscal Sustainability Plan- WPCF Asset List

Equipment / Asset Name	Location/Building	Room	Equipment Tag	Equipment Number	Equipment Size	Manufacturer	Model Number	Serial/Unit Number	Installation Date
Administration Building/Garage	Administration Building	--	--	--	--	--	--	--	1997
Ductless Split Fan Coil	Administration Building	Lobby	DS	1	--	Fujitsu	ASU9RLS2		2015
Ductless Split Heat Pump	Administration Building	Lobby - Exterior	HP	1	--	Fujitsu	AOU9RLS2	JQN012998	2015
Ductless Split Fan Coil	Administration Building	Office 1	DS	1	--	Fujitsu			2015
Ductless Split Heat Pump	Administration Building	Office 1 - Exterior	HP	1	--	Fujitsu	AOU9RLFF	MNN000957	2015
Ductless Split Fan Coil	Administration Building	Office 2	DS	1	--	Fujitsu	ASU9RLS2	JQA016868	2015
Ductless Split Heat Pump	Administration Building	Office 2 - Exterior	HP	1	--	Fujitsu	AOU9RLS2	JQN010752	2015
Ductless Split Fan Coil	Administration Building	Office 3	DS	1	--	Fujitsu	ASU9RLS2	JQA016874	2015
Ductless Split Heat Pump	Administration Building	Office 3 - Exterior	HP	1	--	Fujitsu	AOU9RLS2	JQN012982	2015
Plumbing Fixtures	Administration Building	Restroom	--	--	--	--	--	--	1997
Domestic Water Heater	Administration Building	Restroom	WH	1	--	Craftmaster	E1F20US015V	152J011207	2015
Roof	Administration Building	Roof	--	--	--	--	--	--	1997
Weather Station	Administration Building	Superintendent's Offic	--	1	--	Davis			2010
Topview Software	Administration Building	Superintendent's Offic	--	1	--	Exele	Topview		2010
Panelboards and Transformers	Administration Building	Throughout	--	--	--				1997
Lighting	Administration Building	Throughout	--	--	--				1997
Flooring	Administration Building	Throughout	--	--	--	--	--	--	1997
Fire Alarm	Administration Building	Throughout	--	--	--				1997
Siding	Administration Building	Throughout	--	--	--	--	--	--	1997
Interior/Exterior Doors	Administration Building	Throughout	--	--	--	--	--	--	1997
Windows	Administration Building	Throughout	--	--	--	--	--	--	1997
Interior Walls	Administration Building	Throughout	--	--	--	--	--	--	1997
SCADA System	Administration Building/Site	Throughout	--	1	--				2019
Aeration Tank Slide Gates	Aeration Tanks	--	MK-9 - 12	18	--				1997
Aeration Tanks	Aeration Tanks	--	AT-1, 2	2	--	--	--	--	1969
DO Probes	Aeration Tanks	--	AE-121, 122	2	--	Hach	LDO		2019
Air Diffuser Membranes	Aeration Tanks	--	--	--	--	EDI	FlexAir		2019
Secondary Effluent Chlorination Tank Mixer	Chlorine Contact Tank	--	SCMX-1	1	3 HP	Chemineer			1997
Secondary Effluent Dechlorination Tank Mixer	Chlorine Contact Tank	--	SDMX-1	1	2 HP	Chemineer			1997
Chlorine Contact Tank	Chlorine Contact Tank	--	--	1	--	--	--	--	1969
CCT Gate Actuators	Chlorine Contact Tank	--	--	2	--				2017
Chlorine Contact Tank Gates	Chlorine Contact Tank	--	SLG-1, 2	2	--				2017
Standby Generator	CSO Disinfection and Dechlorination Tank	--	--	1	250 kW				1993

Equipment / Asset Name	Location/Building	Room	Equipment Tag	Equipment Number	Equipment Size	Manufacturer	Model Number	Serial/Unit Number	Installation Date
CSO Chlorination Tank Mixer	CSO Disinfection and Dechlorination Tank	--	CSMX-1	1	3 HP	Chemineer			1997
CSO Chlorination Tank Mixer	CSO Disinfection and Dechlorination Tank	--	CSMX-2, 3	2	3 HP	Chemineer			1997
CSO Dechlorination Tank Mixer	CSO Disinfection and Dechlorination Tank	--	CSMX-2	1	3 HP	Chemineer			1997
CSO Effluent Flow Meter	CSO Disinfection and Dechlorination Tank	--	FE-190	1	--	Siemens	OCM III		1997
CSO Disinfection and Dechlorination Tank	CSO Disinfection and Dechlorination Tank	--	--	--	--	--	--	--	1997
Effluent Flow Meter	Dechlorination/Effluent Flow Metering Str	--	FE-2	1	--	Siemens	OCM III		2015
Dechlorination/Effluent Flow Metering Structu	Dechlorination/Effluent Flow Metering Str	--	--	1	--	--			1997
Effluent Well Level	Effluent Well	--	LE-260	1	--	Siemens	LUT-420		2019
Effluent Well	Effluent Well	--	--	1	--	--			2019
Flow Distribution Structure No. 1	Flow Distribution Structure 1	--	FDS-1	1	--	--	--	--	1997
Influent Flow Measurement	Flow Distribution Structure 1	--	FE-110A, B	2	--	Siemens	LUT-430	7ML1106-1BA20	2019
Flow Distribution Structure No. 2	Flow Distribution Structure 2	--	FDS-2	1	--	--	--	--	1997
Flow Distribution Structure No. 3	Flow Distribution Structure 3	--	FDS-3	1	--	--	--	--	1997
Headworks Building	Headworks Building	--	--	1	--	--	--	--	1997
Site Drainage	Headworks Building	--	--	--	--	--	--	--	1997
Gas Detection System	Headworks Building	Headworks	--	1	--	MSA			1997
Mechanical Bar Screen	Headworks Building	Headworks	MS-1	1	3 HP	IDI			1997
Headworks Piping	Headworks Building	Headworks	--	--	--	--	--	--	1997
Grit Piping and Valves	Headworks Building	Headworks	GT	--	--	--	--	--	1997
Headworks Slide Gates	Headworks Building	Headworks	MK-1, 2, 5, 6, 7	5	--				1997
Manually Cleaned Bar Rack	Headworks Building	Headworks	MBR-1	1	--				1997
Lighting	Headworks Building	Headworks	--	--	--				1997
Headworks Channel	Headworks Building	Headworks	--	2	--	--			1997
Unit Heaters	Headworks Building	Headworks	UH-6, 7	2	--	Ruffneck			1997
Exhaust Fan	Headworks Building	Headworks	EF-4	1	1.5 HP	Dynamaster	FN21K4	WVC755505	1997
Vortex Grit Mixer	Headworks Building	Headworks	VGC-1	1	2 HP	Schloss Engineered Equipment			2020
Grit Classifier	Headworks Building	Headworks	GTC-1	1	0.5 HP	Wemco	12-FF-GE-HYD	18DW12138-01	2019
Sump Pump	Headworks Building	Lower Pump Room	SP-X	1	.5 HP	Goulds	WE0511HU		1997
Lighting	Headworks Building	Lower Pump Room	--	--	--				1997
Unit Heater	Headworks Building	Lower Pump Room	UH-8	1	--	McQuay			1997
Grit Pump	Headworks Building	Lower Pump Room	GTP-1	1	10 HP				2020
Headworks Skylight	Headworks Building	Roof	--	--	--	--	--	--	1997
Roof	Headworks Building	Roof	--	--	--	--	--	--	1997
Link Seals	Headworks Building	Throughout	--	--	--				1997
Fire Alarm	Headworks Building	Throughout	--	--	--				1997
Hot Water Piping	Headworks Building	Throughout	--	--	--				1997

Equipment / Asset Name	Location/Building	Room	Equipment Tag	Equipment Number	Equipment Size	Manufacturer	Model Number	Serial/Unit Number	Installation Date
Louvers/Dampers	Headworks Building	Throughout	--	--	--				1997
Interior/Exterior Doors	Headworks Building	Throughout	--	--	--	--	--	--	1997
Veneer	Headworks Building	Throughout	--	--	--	--	--	--	1997
Transformer	Headworks Building	Upper Pump Room	--	1	--				1997
Motor Control Center 3E	Headworks Building	Upper Pump Room	MCC-3E	1	--				1997
Lighting Panel	Headworks Building	Upper Pump Room	--	1	--				1997
Headworks Building Control Panel	Headworks Building	Upper Pump Room	CP-2	1	--				1997
Lighting	Headworks Building	Upper Pump Room	--	--	--				1997
Portable Eyewash	Headworks Building	Upper Pump Room	--	1	--	--	--	--	1997
Exhaust Fan	Headworks Building	Upper Pump Room	--	1	0.25 HP	Dynamaster	FN14E4	WVC755507	1997
Operations Building	Operations Building	--	--	--	--	--	--	--	1969
Vertical Unit Heater	Operations Building	Break Room	--	1	--				1997
Lighting Panel	Operations Building	Corridor 1	LP-RP-2	1	--				1969
Motor Control Center 2E	Operations Building	Corridor 1	MCC-2E	1	--				1997
Lighting Panel	Operations Building	Corridor 2	LP-H	1	--				1969
Blended Sludge Pump VFDs	Operations Building	Electrical Room	--	4	--				2019
Automatic Temperature Control Panel	Operations Building	Electrical Room	ATC-2	1	--	XL Automation	-		2019
Motor Control Center 2N2	Operations Building	Electrical Room	MCC-2N2	1	--	Square D	6 LVMCC/ 6 MCC		2019
Transformer 2N2	Operations Building	Electrical Room	T-2N2	1	--	Square D	43006-850-01		2019
Operations Building Control Panel	Operations Building	Electrical Room	OBCP	1	--				2019
Operations Building Control Panel UPS	Operations Building	Electrical Room	--	2	--				2019
Lighting Panel	Operations Building	Electrical Room	LP-2N2	1	--				2019
Lighting	Operations Building	Electrical Room	--	--	--				2019
Convector	Operations Building	Entry	--	1	--	--	--	--	1969
Lighting	Operations Building	Laboratory	--	--	--				1993
Ductless Split Heat Pump	Operations Building	Laboratory	HP-1	1	--	Mitsubishi	PUZ-A18NKA7	73U06090B	2019
Ductless Split Heat Pump	Operations Building	Laboratory	HP-X	1	--	Fujitsu	AOU15RLS3	QUN 028641	2019
Boiler	Operations Building	Mechanical Room	B-1	1	--	Well-McLain	988		1969
Supply Fan	Operations Building	Mechanical Room	--	1	--	Delhi	209 INS		2013
Circulating Pumps	Operations Building	Mechanical Room	P-2A, 3A, 4A, 5A, 6A	5	.25, .33 HP	Taco	VR3452		2019
Backflow Preventor - Operations Building	Operations Building	Mechanical Room	RPZ	1	--	Watts	Series 009		2019
Effluent Well Pumps	Operations Building	Pipe Gallery	EWP-1, 2	2	5 HP				1969
Operations Building Flood Level	Operations Building	Pipe Gallery	LSH-201	1	--				2010
Lighting	Operations Building	Pipe Gallery	--	--	--				1969
Sump Pump	Operations Building	Pipe Gallery	SP-1	1	1 HP				2010
Polymer Containment Level	Operations Building	Polymer Mixing Area	LSH-220	1	--				2019

Equipment / Asset Name	Location/Building	Room	Equipment Tag	Equipment Number	Equipment Size	Manufacturer	Model Number	Serial/Unit Number	Installation Date
Polymer Blending Unit Mixer Drive	Operations Building	Polymer Mixing Area	--	2	1 HP	Nord	SKO2XF-56C		2019
Polymer Blending Unit Polymer Pump	Operations Building	Polymer Mixing Area	--	2	0.5 HP	ProMinent	MD-003-12		2019
Polymer Tote Mixer	Operations Building	Polymer Mixing Area	POLM-1	1	0.5 HP	Dynamix	ITM-730K-1		2019
Polymer Blending Units	Operations Building	Polymer Mixing Area	PBU-1, 2	2	--	ProMinent	0-300X2-2.5PB	PBU-1: 2018107!	2019
Power Distribution Panel L	Operations Building	Pump Area	PDP-L	1	--				1997
Transformer 5	Operations Building	Pump Area	T-5	1	--				1997
Transformer 6	Operations Building	Pump Area	T-6	1	--				1997
Transformer 7	Operations Building	Pump Area	T-7	1	--				1997
Transformer 8	Operations Building	Pump Area	T-8	1	--				1997
Lighting	Operations Building	Pump Area	--	--	--				1993
Blended Sludge Piping and Valves	Operations Building	Pump Area	BSL	--	--	--	--	--	2019
Blended Sludge Pump Grinders	Operations Building	Pump Area	BSLG-1, 2, 3, 4	4	3 HP	Vogelsang	XRP136-140Q	VECP83661T-4	2019
Blended Sludge Pumps	Operations Building	Pump Area	BSLP-1, 2, 3, 4	4	10 HP	Penn Valley	6DDSX76CNU-M	180253-1, 2, 3, 4	2019
Blended Sludge Flow Meter	Operations Building	Pump Area	FE-215, 216, 217, 2	4	--	Siemens	MagFlow		2019
Lighting Panel	Operations Building	Pump Room	LP-RP-1	1	--				1969
Lighting Panel	Operations Building	Pump Room	LP-4	1	--				1997
Lighting Panel	Operations Building	Pump Room	LP-5	1	--				1997
Lighting Panel	Operations Building	Pump Room	LP-8	1	--				1997
Unit Heaters	Operations Building	Pump Room/Tool Roo	UH-8A, 8B, 8C, 7A, :	5	--	Sterling	HS-125A	J180161057700-	2019
Roof	Operations Building	Roof	--	--	--	--	--	--	2000
Transformer 5	Operations Building	Sludge Handling Room	T-5	1	--				1997
Lighting Panel (120/240)	Operations Building	Sludge Handling Room	LP-2N	1	--				1969
Dewatering Equipment VFDs	Operations Building	Sludge Handling Room	--	6	--				2019
Floc Tanks	Operations Building	Sludge Handling Room	FT-1, 2	2	2 HP	Ishigaki	ISGK-CT-0600		2019
Rotary Screw Thickeners	Operations Building	Sludge Handling Room	RST-1, 2	2	2 HP	Ishigaki	ITA-804.5		2019
Energy Recovery Unit No. 2 VFD	Operations Building	Sludge Handling Room	--	1	--				2019
Air Handling Unit VFD	Operations Building	Sludge Handling Room	--	1	--				2019
Energy Recovery Unit	Operations Building	Sludge Handling Room	ERV-2	1	5 HP	RenewAire	HE3XIN	H1800137C	2019
Lighting	Operations Building	Sludge Handling Room	--	--	--				2019
Sludge Conveyor	Operations Building	Sludge Handling Room	C-1	1	3 HP	Custom Conveyc	--	441618 CONV C	2019
Dewatering Control Panel 1	Operations Building	Sludge Handling Room	DCP-1	1	--	Ishigaki			2019
Dewatering Control Panel 2	Operations Building	Sludge Handling Room	DCP-2	1	--	Ishigaki			2019
Air Compressor	Operations Building	Sludge Handling Room	--	1	2 HP	Speedaire	52YM09		2019
Rotary Thickened Sludge Pumps	Operations Building	Sludge Handling Room	RTP-1, 2	2	5 HP	Seepex	BTQ 17-6LS / A1-J0-L8F0-A		2019
Rotary Screw Presses	Operations Building	Sludge Handling Room	RSP-1, 2	2	5 HP	Ishigaki	ISGK-A-0706		2019
Air Handling Unit	Operations Building	Sludge Handling Room	MAU-1	1	1 HP	Greenheck	MSX-109-H12-H:	15609406	2019

Equipment / Asset Name	Location/Building	Room	Equipment Tag	Equipment Number	Equipment Size	Manufacturer	Model Number	Serial/Unit Number	Installation Date
Louvers/Dampers	Operations Building	Sludge Handling Room	--	--	--				2019
Unit Heaters	Operations Building	Sludge Handling Room	UH-1A, 1B, 1C, 1D	4	--	Sterling	VS-104	J180161057700-	2019
Exhaust Fans	Operations Building	Sludge Handling Room	EF-1, 2, 3, 4	4	.25, .33, .5, 1	Cook	100SQN, 135SQ	134SH90471-00/	2019
Fuel Oil Tank	Operations Building	Sludge Loading Area	--	1	--	--	--	--	1969
Sludge Distribution Conveyor Actuator	Operations Building	Sludge Loading Area	ZIC-252	1	1 HP	Rotork	IQ10		2019
Louvers/Dampers	Operations Building	Sludge Loading Area	--	--	--				2019
Sludge Conveyor (Truck Bay Distribution Conv	Operations Building	Sludge Loading Area	C-2	1	2 HP	Custom Conveyc	--	441618 CONV C	2019
Roll-Off Container Level	Operations Building	Sludge Loading Area	LE-255A, 255B, 255	3	--	Siemens	LUT-420		2019
Lighting	Operations Building	Sludge Loading Area	--	--	--				2019
Unit Heaters	Operations Building	Sludge Loading Area	UH-5A, 5B	2	--	Sterling	HS-048	J180161057700-	2019
Fire Alarm	Operations Building	Throughout	--	--	--				1997
Hot Water Piping	Operations Building	Throughout	--	--	--				1997
Breakroom	Operations Building	Throughout	--	--	--	--	--	--	1969
Windows	Operations Building	Throughout	--	--	--	--	--	--	1969
Domestic Water Pipe	Operations Building	Throughout	--	1	--	--	--	--	1997
Laboratory	Operations Building	Throughout	--	--	--	--	--	--	1997
Interior/Exterior Doors	Operations Building	Throughout	--	--	--	--	--	--	1969
Link Seals	Operations Building	Throughout	--	--	--				1969
Lockers/Bathrooms	Operations Building	Throughout	--	--	--	--	--	--	1969
Veneer	Operations Building	Throughout	--	--	--	--	--	--	1969
Kalwall	Operations Building	Throughout	--	--	--	--	--	--	2019
Lighting and Disconnects	Primary Clarifiers	--	--	2	--				1997
Primary Clarifier Mechanisms	Primary Clarifiers	--	PLC-1, 2	2	--	Eimco	C3 Type		1997
Primary Clarifier Drives	Primary Clarifiers	--	PLC-1, 2	2	0.75 HP	Eimco	L25534A31	25534-01A, 2553	1997
Primary Clarifiers	Primary Clarifiers	--	PC-1, 2	2	--	--	--	--	1969
Chlorine Contact Tank Chlorine/Dechlor Resid	Pump and Blower Building	--	AE-195, 196	2	--	Hach	CL17		2016
Pump and Blower Building	Pump and Blower Building	--	--	--	--	--	--	--	1997
Aeration Tank Blowers	Pump and Blower Building	Blower Room	ATB-1, 2, 3	3	75 HP	Gardner Denver/	Sutorbilt 716-4500		1997
Sludge Tank 1 and 2 Blowers	Pump and Blower Building	Blower Room	SLTB-1, 2	2	5/10 HP	Gardner Denver/	Sutorbilt Legend Model 4M		1997
Aeration Tank Blower VFD Control Panels	Pump and Blower Building	Blower Room	--	3	--				1997
Power Distribution Panel 1	Pump and Blower Building	Blower Room	PDP-1	1	--				1997
Lighting Panels	Pump and Blower Building	Blower Room	--	2	--				1997
Lighting	Pump and Blower Building	Blower Room	--	--	--				1997
Emergency Eyewash Station	Pump and Blower Building	Blower Room	--	1	--	--	--	--	1997
Unit Heaters	Pump and Blower Building	Blower Room	UH-1, 2	2	--	McQuay			1997
Exhaust Fan	Pump and Blower Building	Blower Room	EF-1	1	--				1997

Equipment / Asset Name	Location/Building	Room	Equipment Tag	Equipment Number	Equipment Size	Manufacturer	Model Number	Serial/Unit Number	Installation Date
Exhaust Fan	Pump and Blower Building	Blower Room	EF-2	1	--				1997
Sludge Tank 3 Blower	Pump and Blower Building	Blower Room	SLTB-3	1	50 HP	Roots	412RAM-J	1804B11158	2019
Chemical Fill Panels	Pump and Blower Building	Blower Room	CFP-419, 429	2	--				2019
Motor Control Center 1E	Pump and Blower Building	Electrical Room	MCC-1E	1	--				1997
Main Switchboard	Pump and Blower Building	Electrical Room	SWBD-1	1	--				1997
Transformer	Pump and Blower Building	Electrical Room		1	--				1997
Return Activated Sludge Pumps VFD Control P	Pump and Blower Building	Electrical Room	--	3	--				1997
Tank Drain Pump VFD Control Panel	Pump and Blower Building	Electrical Room	--	1	--				1997
Automatic Transfer Switch	Pump and Blower Building	Electrical Room	ATS-1	1	--				1993
Motor Control Center 1	Pump and Blower Building	Electrical Room	MCC-1	1	--				1997
Motor Control Center 1A	Pump and Blower Building	Electrical Room	MCC-1A	1	--				1997
Control Panel 1	Pump and Blower Building	Electrical Room	CP-1	1	--				1997
Lighting	Pump and Blower Building	Electrical Room	--	--	--				1997
Electric Unit Heater	Pump and Blower Building	Electrical Room	EUH-1	1	--	Berko			1997
Sludge Tank Blower No. 3 VFD	Pump and Blower Building	Electrical Room	--	1	--				2019
Automatic Temperature Control Panel	Pump and Blower Building	Electrical Room	ATC-1	1	--	XL Automation	-		2019
Ductless Split Heat Pump	Pump and Blower Building	Electrical Room	DS-2	1	2 ton	Mitsubishi	PKA-A24KA7	82M00620	2019
RAS Flow Meters	Pump and Blower Building	Pump Room	MFM-1, 2, 3	3	--				1997
Primary Sludge Flow Meter	Pump and Blower Building	Pump Room	FE-159	1	--	Khrone			1997
Waste Sludge Flow Meter	Pump and Blower Building	Pump Room	FE-173	1	--	Khrone			1997
Plant Water Pumps	Pump and Blower Building	Pump Room	PSP-1, 2, 3	3	10 HP, 5 HP	Pacoflow 9000			1997
Primary Sludge Scum Pump	Pump and Blower Building	Pump Room	SCPP-1	1	5 HP	Penn Valley			1997
Primary Scum Grinder	Pump and Blower Building	Pump Room	SCGP-1	1	2 HP	JWC			1997
Waste Sludge Pump	Pump and Blower Building	Pump Room	WSLP-1	1	5 HP	Penn Valley			1997
Waste Sludge Grinder	Pump and Blower Building	Pump Room	WSLG-1	1	2 HP	JWC			1997
Tank Drain Pump	Pump and Blower Building	Pump Room	TDP-1	1	5 HP	Gorman Rupp			1997
Sump Pump	Pump and Blower Building	Pump Room	SP-Y	1	1 HP	Goulds			1997
Primary Sludge Pumps	Pump and Blower Building	Pump Room	PSLP-1, 2	2	5 HP	Penn Valley			1997
Primary Sludge Grinder	Pump and Blower Building	Pump Room	PSLG-1, 2	2	2 HP	JWC			1997
Return Sludge Pumps	Pump and Blower Building	Pump Room	RSLP-1, 2, 3	3	5 HP	Gorman Rupp			2012
Lighting	Pump and Blower Building	Pump Room	--	--	--				1997
Unit Heaters	Pump and Blower Building	Pump Room	UH-3, 4, 5	3	--				1997
Chemical Control Panel UPS	Pump and Blower Building	Pump Room	--	1	--				2019
Sodium Hypochlorite Tank Level	Pump and Blower Building	Pump Room	LSH-411	1	--				2019
Sodium Bisulfite Tank Level	Pump and Blower Building	Pump Room	LSH-421	1	--				2019
Tank Drain Pump Flow Meter	Pump and Blower Building	Pump Room	FE-459	1	--				2019

Equipment / Asset Name	Location/Building	Room	Equipment Tag	Equipment Number	Equipment Size	Manufacturer	Model Number	Serial/Unit Number	Installation Date
Emergency Eyewash Station	Pump and Blower Building	Pump Room	--	1	--	--	--	--	2019
Electric Water Heater	Pump and Blower Building	Pump Room	WH-1	1	--	HTP	EVC100C3W135	012519H200504	2019
Chemical Piping and Valves	Pump and Blower Building	Pump Room	HYP/BIS	--	--	--	--	--	2019
Chemical Control Panel	Pump and Blower Building	Pump Room	CCP	1	--				2019
Sodium Hypochlorite Tank Level	Pump and Blower Building	Pump Room	LE-410	1	--	Siemens	LUT-420		2019
Sodium Bisulfite Tank Level	Pump and Blower Building	Pump Room	LE-420	1	--	Siemens	LUT-420		2019
Electric Duct Heater	Pump and Blower Building	Pump Room	EDH-1	1	--	Indeeco	ZUB		2019
Sodium Hypochlorite Tank	Pump and Blower Building	Pump Room	HYPT-1	1	5,000 gal	Kenway Compos	--	--	2019
Sodium Hypochlorite Pumps	Pump and Blower Building	Pump Room	HYPP-1, 2	2	36.5 gph	Flowrox	LPP-M3S-24-NL	HYPPT-1: 00090	2019
CSO Sodium Hypochlorite Pumps	Pump and Blower Building	Pump Room	HYPP-3, 4	2	39.5 gph	Flowrox	LPP-M3S-24-NL	HYPPT-3: 00090	2019
Sodium Bisulfite Tank	Pump and Blower Building	Pump Room	BIST-1	1	5,000 gal	Kenway Compos	--	--	2019
Sodium Bisulfite Pumps	Pump and Blower Building	Pump Room	BISP-1, 2	2	2.3 gph	Flowrox	LPP-M2S-24-NL	BISP-3: 000976C	2019
CSO Sodium Bisulfite Pumps	Pump and Blower Building	Pump Room	BISP-3, 4	2	2.3 gph	Flowrox	LPP-M2S-24-NL	BISP-1: 000976C	2019
Circulating Pump	Pump and Blower Building	Pump Room	P-1	1	0.025 HP	Taco	006ST		2019
Roof	Pump and Blower Building	Roof	--	--	--	--	--	--	1997
Exhaust Fan	Pump and Blower Building	Roof	--	1	--				1997
Energy Recovery Unit No. 1 VFD	Pump and Blower Building	Roof	--	1	--				2019
Energy Recovery Unit	Pump and Blower Building	Roof	ERV-1	1	5 HP	RenewAire	HE4XRT	H180188C	2019
Ductless Split Heat Pump	Pump and Blower Building	Roof	HP-2	1	2 ton	Mitsubishi	PUZ-A24NHA7	73U06578B	2019
Lighting	Pump and Blower Building	Stairwell	--	--	--				1997
Link Seals	Pump and Blower Building	Throughout	--	--	--				1997
Louvers/Dampers	Pump and Blower Building	Throughout	--	--	--				1997
Hot Water Piping	Pump and Blower Building	Throughout	--	--	--				1997
Interior/Exterior Doors	Pump and Blower Building	Throughout	--	--	--	--	--	--	1997
Veneer	Pump and Blower Building	Throughout	--	--	--	--	--	--	1997
Windows	Pump and Blower Building	Throughout	--	--	--	--	--	--	1997
Fire Alarm	Pump and Blower Building	Throughout	--	--	--				2019
Secondary Clarifiers	Secondary Clarifiers	--	SC-1, 2, 3	3	--	--	--	--	1997
Secondary Clarifier Mechanisms	Secondary Clarifiers	--	SCL-1, 2, 3	3	--	FMC			2012
Secondary Clarifier Drives	Secondary Clarifiers	--	SCL-1, 2, 3	3	0.5 HP	Evoqua	Baldor VEM3538	Tank 1&4: X180	2019
Sludge Piping and Valves	Site Wide	--	SL	--	--	--	--	--	1969
Influent Sewer/Treatment Effluent Piping	Site Wide	--	INF/S/PCE/SCE	--	--				1969
Plant Water Piping and Valves	Site Wide	--	PW	--	--	--	--	--	1993
Plant Water Hydrants	Site Wide	Throughout	--	--	--				1997
Sludge Tank Mixing System	Sludge Holding Tank No. 1, 2	--	--	1	--	Sanitaire			1997
Sludge Holding Tank No. 1 and 2	Sludge Holding Tank No. 1, 2	--	SHT-1, 2	2	--	--	--	--	1997

Equipment / Asset Name	Location/Building	Room	Equipment Tag	Equipment Number	Equipment Size	Manufacturer	Model Number	Serial/Unit Number	Installation Date
Sludge Holding Tank No. 1 and 2 Level	Sludge Holding Tank No. 1, 2	--	LE-211, 212	2	--	Siemens	LUT-420		2019
Sludge Tank Mixing System	Sludge Holding Tank No. 3	--	--	1	--	Tideflex	TFA-030-007-6DCP40		2019
Sludge Holding Tank No. 3 Level	Sludge Holding Tank No. 3	--	LE-213	1	--	Siemens	LUT-420		2019
Sludge Holding Tank No. 3	Sludge Holding Tank No. 3	--	SHT-3	1	--	--	--	--	2019

WRIGHT-PIERCE
Engineering a Better Environment

B

Appendix B
WPCF Risk Assessment Scoring

City of Bath Fiscal Sustainability Plan - Pump Station Risk Assessment

				LoF Factors				CoF Factors										Current Year
				Age			Condition	Economic Cost			Social Cost			Environmental Cost				2022
Equipment / Asset name	Pump Station	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Electrical Equipment & Enclosures	Aegis Drive	1985	20	0	0%	5	5	5	5	4	1	2	1	1	4	5.00	2.83	14.15
Process Piping & Valves	Aegis Drive	1985	40	3	8%	5	4	5	5	4	1	2	1	1	4	4.50	2.83	12.74
Link Seals	Aegis Drive	1985	25	0	0%	5	3	4	5	4	1	2	1	1	4	4.00	2.72	10.88
Pig Launcher	Aegis Drive	1985	40	3	8%	5	3	3	3	4	1	2	1	1	4	4.00	2.39	9.55
Communications & Alarms	Aegis Drive	2010	15	3	20%	4	3	4	5	4	1	2	1	1	4	3.50	2.72	9.52
Lighting	Aegis Drive	1985	25	0	0%	5	5	2	1	2	1	2	1	1	4	5.00	1.83	9.16
Pump No. 1	Aegis Drive	1985	25	0	0%	5	2	5	3	4	1	2	1	1	4	3.50	2.61	9.13
Pump No. 2	Aegis Drive	1985	25	0	0%	5	2	5	3	4	1	2	1	1	4	3.50	2.61	9.13
Control Panel & PLC	Aegis Drive	2010	20	8	40%	3	3	5	5	4	1	2	1	1	4	3.00	2.83	8.49
Valve Vault	Aegis Drive	1985	60	23	38%	4	3	2	5	3	1	2	1	1	4	3.50	2.39	8.35
Instrumentation	Aegis Drive	2017	20	15	75%	2	4	4	5	4	1	2	1	1	4	3.00	2.72	8.16
Wet Well	Aegis Drive	1985	60	23	38%	4	1	4	5	3	1	2	1	1	4	2.50	2.61	6.52
Communications & Alarms	Bridge Street	2010	15	3	20%	5	4	4	5	4	3	2	2	5	1	4.50	3.22	14.49
Soft Starter	Bridge Street	2000	12	0	0%	5	1	5	5	4	5	3	1	2	2	3.00	3.22	9.66
Wet Well	Bridge Street	1969	60	7	12%	5	1	4	5	3	3	2	2	5	1	3.00	3.11	9.32
Electrical Equipment & Enclosures	Bridge Street	2017	20	15	75%	2	2	5	5	4	3	2	2	5	1	2.00	3.33	6.66
Control Panel & PLC	Bridge Street	2017	20	15	75%	2	2	5	5	4	3	2	2	5	1	2.00	3.33	6.66
Instrumentation	Bridge Street	2017	20	15	75%	2	2	4	5	4	3	2	2	5	1	2.00	3.22	6.44
Pump Enclosure	Bridge Street	2017	30	25	83%	1	3	3	5	4	3	2	2	5	1	2.00	3.11	6.22
Unit Heater	Bridge Street	2017	15	10	67%	2	2	1	1	2	3	2	2	5	1	2.00	2.22	4.44
Exhaust Fans	Bridge Street	2017	15	10	67%	2	1	1	1	2	3	2	2	5	1	1.50	2.22	3.33
Process Piping & Valves	Bridge Street	2017	40	35	88%	1	1	5	5	4	3	2	2	5	1	1.00	3.33	3.33

Equipment / Asset name	Pump Station	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Link Seals	Bridge Street	2017	25	20	80%	1	1	4	5	4	3	2	2	5	1	1.00	3.22	3.22
Pump No. 1	Bridge Street	2017	25	20	80%	1	1	5	3	4	3	2	2	5	1	1.00	3.11	3.11
Pump No. 2	Bridge Street	2017	25	20	80%	1	1	5	3	4	3	2	2	5	1	1.00	3.11	3.11
Standby Automatic Generator	Bridge Street	2020	35	33	94%	1	1	3	5	4	3	2	2	5	1	1.00	3.11	3.11
Pig Launcher	Bridge Street	2017	40	35	88%	1	1	3	3	4	3	2	2	5	1	1.00	2.89	2.89
Lighting	Bridge Street	2017	25	20	80%	1	1	2	1	2	3	2	2	5	1	1.00	2.33	2.33
Process Piping & Valves	Commercial Street	1969	40	0	0%	5	5	5	5	4	5	5	1	1	2	5.00	3.27	16.37
VFDs	Commercial Street	2002	12	0	0%	5	5	5	5	4	5	5	1	1	2	5.00	3.27	16.37
Link Seals	Commercial Street	1969	25	0	0%	5	5	4	5	4	5	5	1	1	2	5.00	3.16	15.82
Electrical Equipment & Enclosures	Commercial Street	2002	20	0	0%	5	4	5	5	4	5	5	1	1	2	4.50	3.27	14.74
Instrumentation	Commercial Street	2002	15	0	0%	5	4	4	5	4	5	5	1	1	2	4.50	3.16	14.24
Pig Launcher	Commercial Street	1969	40	0	0%	5	5	3	3	4	5	5	1	1	2	5.00	2.83	14.15
Wet Well	Commercial Street	1969	60	7	12%	5	3	4	5	3	5	5	1	1	2	4.00	3.05	12.21
Control Panel & PLC	Commercial Street	2010	20	8	40%	3	4	5	5	4	5	5	1	1	2	3.50	3.27	11.46
Building	Commercial Street	1969	60	7	12%	5	3	2	5	3	5	5	1	1	2	4.00	2.83	11.32
Pump No. 1 (Wet Weather)	Commercial Street	2002	25	5	20%	4	4	5	1	4	5	5	1	1	2	4.00	2.83	11.32
Pump No. 2 (Wet Weather)	Commercial Street	2002	25	5	20%	4	4	5	1	4	5	5	1	1	2	4.00	2.83	11.32
Pump No. 3 (Duty)	Commercial Street	2002	25	5	20%	4	4	5	1	4	5	5	1	1	2	4.00	2.83	11.32
Pump No. 4 (Duty)	Commercial Street	2002	25	5	20%	4	4	5	1	4	5	5	1	1	2	4.00	2.83	11.32
Communications & Alarms	Commercial Street	2010	15	3	20%	4	3	4	5	4	5	5	1	1	2	3.50	3.16	11.07
Pump Lifting Hooks/Cables	Commercial Street	2002	30	10	33%	4	4	2	3	3	5	5	1	1	2	4.00	2.61	10.43
Doors	Commercial Street	1969	60	7	12%	5	3	2	3	2	5	5	1	1	2	4.00	2.50	9.99
Unit Heaters	Commercial Street	2002	15	0	0%	5	4	1	1	2	5	5	1	1	2	4.50	2.16	9.74
Dampers	Commercial Street	2002	15	0	0%	5	4	1	1	2	5	5	1	1	2	4.50	2.16	9.74

Equipment / Asset name	Pump Station	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Exhaust Fans	Commercial Street	2002	15	0	0%	5	4	1	1	2	5	5	1	1	2	4.50	2.16	9.74
Veneers	Commercial Street	1969	60	7	12%	5	3	1	3	2	5	5	1	1	2	4.00	2.39	9.55
Roof	Commercial Street	1969	60	7	12%	5	2	3	3	3	5	5	1	1	2	3.50	2.72	9.52
Lighting	Commercial Street	2002	25	5	20%	4	4	2	1	2	5	5	1	1	2	4.00	2.28	9.10
Mechanically Operated Generator Exhaust Louver	Commercial Street	2002	35	15	43%	3	3	1	5	4	5	5	1	1	2	3.00	2.83	8.49
Domestic Water System	Commercial Street	2002	40	20	50%	3	3	3	5	2	5	5	1	1	2	3.00	2.83	8.49
Windows	Commercial Street	1969	60	7	12%	5	2	1	3	2	5	5	1	1	2	3.50	2.39	8.35
Standby Automatic Generator	Commercial Street	2002	35	15	43%	3	2	3	5	4	5	5	1	1	2	2.50	3.05	7.63
VFDs (Not for pump control)	Farrin Place	2010	12	0	0%	5	4	5	5	4	5	1	1	1	3	4.50	3.00	13.49
Electrical Equipment & Enclosures	Farrin Place	1995	20	0	0%	5	4	5	5	4	5	1	1	1	3	4.50	3.00	13.49
Instrumentation	Farrin Place	1995	5	0	0%	5	4	4	5	4	5	1	1	1	3	4.50	2.89	12.99
Process Piping & Valves	Farrin Place	1969	40	0	0%	5	3	5	5	4	5	1	1	1	3	4.00	3.00	11.99
Communications & Alarms	Farrin Place	2010	15	3	20%	4	4	4	5	4	5	1	1	1	3	4.00	2.89	11.54
Roof	Farrin Place	1969	60	7	12%	5	3	4	3	3	5	1	1	1	3	4.00	2.55	10.21
Pump No. 1	Farrin Place	1995	25	0	0%	5	2	5	3	4	5	1	1	1	3	3.50	2.78	9.71
Pump No. 2	Farrin Place	1995	25	0	0%	5	2	5	3	4	5	1	1	1	3	3.50	2.78	9.71
Control Panel & PLC	Farrin Place	2010	20	8	40%	3	3	5	5	4	5	1	1	1	3	3.00	3.00	8.99
Lighting	Farrin Place	1995	25	0	0%	5	4	2	1	2	5	1	1	1	3	4.50	2.00	8.99
Building	Farrin Place	1969	60	7	12%	5	2	2	5	3	5	1	1	1	3	3.50	2.55	8.94
Domestic Water System	Farrin Place	1995	40	13	33%	4	3	3	5	2	5	1	1	1	3	3.50	2.55	8.94
Mechanically Operated Generator Exhaust Louver	Farrin Place	1995	15	0	0%	5	2	1	5	4	5	1	1	1	3	3.50	2.55	8.94
Link Seals	Farrin Place	1995	25	0	0%	5	1	4	5	4	5	1	1	1	3	3.00	2.89	8.66
Windows	Farrin Place	1969	60	7	12%	5	3	1	3	2	5	1	1	1	3	4.00	2.11	8.44
Veneers	Farrin Place	1969	60	7	12%	5	3	1	3	2	5	1	1	1	3	4.00	2.11	8.44

Equipment / Asset name	Pump Station	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Wet Well	Farrin Place	1969	60	7	12%	5	1	4	5	3	5	1	1	1	3	3.00	2.78	8.33
Standby Automatic Generator	Farrin Place	1999	35	12	34%	4	2	3	5	4	5	1	1	1	3	3.00	2.78	8.33
Doors	Farrin Place	1969	60	7	12%	5	2	2	3	2	5	1	1	1	3	3.50	2.22	7.77
Unit Heater	Farrin Place	1995	15	0	0%	5	3	1	1	2	5	1	1	1	3	4.00	1.89	7.55
Dampers	Farrin Place	1995	15	0	0%	5	2	1	1	2	5	1	1	1	3	3.50	1.89	6.60
VFDs	Front Street	2003	12	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Wet Well	Front Street	1969	60	7	12%	5	4	4	5	3	5	4	1	1	1	4.50	2.78	12.49
Instrumentation	Front Street	2003	15	0	0%	5	3	4	5	4	5	4	1	1	1	4.00	2.89	11.54
Electrical Equipment & Enclosures	Front Street	2003	20	1	5%	5	2	5	5	4	5	4	1	1	1	3.50	3.00	10.49
Building	Front Street	1969	60	7	12%	5	3	2	5	3	5	4	1	1	1	4.00	2.55	10.21
Link Seals	Front Street	2003	25	6	24%	4	3	4	5	4	5	4	1	1	1	3.50	2.89	10.10
Communications & Alarms	Front Street	2010	15	3	20%	4	3	4	5	4	5	4	1	1	1	3.50	2.89	10.10
Control Panel & PLC	Front Street	2010	20	8	40%	3	3	5	5	4	5	4	1	1	1	3.00	3.00	8.99
Pump No. 1	Front Street	2003	25	6	24%	4	2	5	3	4	5	4	1	1	1	3.00	2.78	8.33
Pump No. 2	Front Street	2003	25	6	24%	4	2	5	3	4	5	4	1	1	1	3.00	2.78	8.33
Lighting	Front Street	2003	25	6	24%	4	4	2	1	2	5	4	1	1	1	4.00	2.00	7.99
Unit Heaters	Front Street	2003	15	0	0%	5	3	1	1	2	5	4	1	1	1	4.00	1.89	7.55
Exhaust Fans	Front Street	2003	15	0	0%	5	3	1	1	2	5	4	1	1	1	4.00	1.89	7.55
Process Piping & Valves	Front Street	2003	40	21	53%	3	2	5	5	4	5	4	1	1	1	2.50	3.00	7.49
Mechanically Operated Generator Exhaust Louver	Front Street	2003	35	16	46%	3	3	1	5	2	5	4	1	1	1	3.00	2.33	6.99
Standby Automatic Generator	Front Street	2009	35	22	63%	2	3	3	5	4	5	4	1	1	1	2.50	2.78	6.94
Dampers	Front Street	2003	15	0	0%	5	2	1	1	2	5	4	1	1	1	3.50	1.89	6.60
Roof	Front Street	2003	60	41	68%	2	2	3	5	3	5	4	1	1	1	2.00	2.66	5.33
Veneers	Front Street	2003	60	41	68%	2	3	1	3	2	5	4	1	1	1	2.50	2.11	5.27

Equipment / Asset name	Pump Station	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Doors	Front Street	2003	60	41	68%	2	2	2	3	2	5	4	1	1	1	2.00	2.22	4.44
Windows	Front Street	2003	60	41	68%	2	2	1	3	2	5	4	1	1	1	2.00	2.11	4.22
Process Piping & Valves	Harward Street	1969	40	0	0%	5	5	5	5	5	3	1	1	5	5	5.00	3.89	19.43
Electrical Equipment & Enclosures	Harward Street	1997	20	0	0%	5	5	5	5	4	3	1	1	5	5	5.00	3.77	18.87
Link Seals	Harward Street	1969	25	0	0%	5	5	4	5	4	3	1	1	5	5	5.00	3.66	18.32
Pump No. 3 (Lead)	Harward Street	1997	25	0	0%	5	5	5	3	4	3	1	1	5	5	5.00	3.55	17.76
Pump No. 2 (Lag)	Harward Street	1997	25	0	0%	5	5	5	3	4	3	1	1	5	5	5.00	3.55	17.76
Instrumentation	Harward Street	1997	15	0	0%	5	4	4	5	4	3	1	1	5	5	4.50	3.66	16.48
Pump No. 1 (Lag)	Harward Street	1997	25	0	0%	5	4	5	3	4	3	1	1	5	5	4.50	3.55	15.98
Standby Automatic Generator	Harward Street	1997	35	10	29%	4	5	3	5	4	3	1	1	5	5	4.50	3.55	15.98
Control Panel & PLC	Harward Street	1997	20	0	0%	5	3	5	5	4	3	1	1	5	5	4.00	3.77	15.10
Communications & Alarms	Harward Street	2010	15	3	20%	4	4	4	5	4	3	1	1	5	5	4.00	3.66	14.65
Pig Launcher	Harward Street	1969	40	0	0%	5	3	3	3	4	3	1	1	5	5	4.00	3.33	13.32
Building	Harward Street	1969	60	7	12%	5	3	2	5	3	3	1	1	5	5	4.00	3.33	13.32
Lighting	Harward Street	1997	25	0	0%	5	4	2	1	2	3	1	1	5	5	4.50	2.78	12.49
Wet Well	Harward Street	1969	60	7	12%	5	2	4	5	3	3	1	1	5	5	3.50	3.55	12.43
Unit Heaters	Harward Street	1997	15	0	0%	5	4	1	1	2	3	1	1	5	5	4.50	2.66	11.99
Domestic Water System	Harward Street	1997	40	15	38%	4	3	3	5	2	3	1	1	5	5	3.50	3.33	11.66
VFDs	Harward Street	2020	12	10	83%	1	5	5	5	4	3	1	1	5	5	3.00	3.77	11.32
Exhaust Fans	Harward Street	1997	15	0	0%	5	3	1	1	2	3	1	1	5	5	4.00	2.66	10.66
Dampers	Harward Street	1997	15	0	0%	5	3	1	1	2	3	1	1	5	5	4.00	2.66	10.66
Roof	Harward Street	1997	60	35	58%	3	3	3	5	3	3	1	1	5	5	3.00	3.44	10.32
Doors	Harward Street	1997	60	35	58%	3	3	2	3	2	3	1	1	5	5	3.00	3.00	8.99
Windows	Harward Street	1997	60	35	58%	3	3	1	3	2	3	1	1	5	5	3.00	2.89	8.66

Equipment / Asset name	Pump Station	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Veneers	Harward Street	1997	60	35	58%	3	2	1	3	2	3	1	1	5	5	2.50	2.89	7.22
VFDs	Hunt Street	1997	12	0	0%	5	5	5	5	4	3	1	1	3	2	5.00	2.94	14.71
Process Piping & Valves	Hunt Street	1969	40	0	0%	5	5	5	5	4	3	1	1	3	2	5.00	2.94	14.71
Electrical Equipment & Enclosures	Hunt Street	1969	20	0	0%	5	5	5	5	4	3	1	1	3	2	5.00	2.94	14.71
Link Seals	Hunt Street	1969	25	0	0%	5	5	4	5	4	3	1	1	3	2	5.00	2.83	14.15
Pump No. 1	Hunt Street	1969	25	0	0%	5	4	5	3	4	3	1	1	3	2	4.50	2.72	12.24
Pump No. 2	Hunt Street	1969	25	0	0%	5	4	5	3	4	3	1	1	3	2	4.50	2.72	12.24
Instrumentation	Hunt Street	1997	15	0	0%	5	3	4	5	4	3	1	1	3	2	4.00	2.83	11.32
Building	Hunt Street	1969	60	7	12%	5	3	2	5	3	3	1	1	3	2	4.00	2.50	9.99
Communications & Alarms	Hunt Street	2010	15	3	20%	4	3	4	5	4	3	1	1	3	2	3.50	2.83	9.91
Lighting	Hunt Street	1997	25	0	0%	5	5	2	1	2	3	1	1	3	2	5.00	1.94	9.71
Wet Well	Hunt Street	1969	60	7	12%	5	2	4	5	3	3	1	1	3	2	3.50	2.72	9.52
Veneers	Hunt Street	1969	60	7	12%	5	4	1	3	2	3	1	1	3	2	4.50	2.05	9.24
Roof	Hunt Street	1969	60	7	12%	5	2	3	5	3	3	1	1	3	2	3.50	2.61	9.13
Control Panel & PLC	Hunt Street	2010	20	8	40%	3	3	5	5	4	3	1	1	3	2	3.00	2.94	8.82
Domestic Water System	Hunt Street	1969	40	0	0%	5	2	3	5	2	3	1	1	3	2	3.50	2.50	8.74
Unit Heater	Hunt Street	1969	15	0	0%	5	4	1	1	2	3	1	1	3	2	4.50	1.83	8.24
Exhaust Fans	Hunt Street	1969	15	0	0%	5	4	1	1	2	3	1	1	3	2	4.50	1.83	8.24
Dampers	Hunt Street	1969	15	0	0%	5	4	1	1	2	3	1	1	3	2	4.50	1.83	8.24
Doors	Hunt Street	1969	60	7	12%	5	2	2	3	2	3	1	1	3	2	3.50	2.16	7.58
Louvers	Hunt Street	1969	15	0	0%	5	3	1	1	2	3	1	1	3	2	4.00	1.83	7.33
Site	Hunt Street	1969	100	47	47%	3	4	1	3	2	3	1	1	3	2	3.50	2.05	7.19
Windows	Hunt Street	1969	60	7	12%	5	2	1	3	2	3	1	1	3	2	3.50	2.05	7.19
VFDs	Hyde Park	2010	12	0	0%	5	4	5	5	4	1	1	1	1	1	4.50	2.22	9.99

Equipment / Asset name	Pump Station	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Instrumentation	Hyde Park		15	0	0%	5	4	4	5	4	1	1	1	1	1	4.50	2.11	9.49
Electrical Equipment & Enclosures	Hyde Park		20	0	0%	5	3	5	5	4	1	1	1	1	1	4.00	2.22	8.88
Communications & Alarms	Hyde Park	2010	15	3	20%	4	4	4	5	4	1	1	1	1	1	4.00	2.11	8.44
Wet Well	Hyde Park		60	0	0%	5	3	4	5	3	1	1	1	1	1	4.00	2.00	7.99
Building	Hyde Park		60	0	0%	5	3	2	5	3	1	1	1	1	1	4.00	1.78	7.10
Standby Automatic Generator	Hyde Park	1999	35	12	34%	4	3	3	5	4	1	1	1	1	1	3.50	2.00	6.99
Control Panel & PLC	Hyde Park	2010	20	8	40%	3	3	5	5	4	1	1	1	1	1	3.00	2.22	6.66
Link Seals	Hyde Park	2010	25	13	52%	3	3	4	5	4	1	1	1	1	1	3.00	2.11	6.33
Domestic Water System	Hyde Park	2010	15	3	20%	4	3	3	5	2	1	1	1	1	1	3.50	1.78	6.22
Process Piping & Valves	Hyde Park	1999	40	17	43%	3	2	5	5	4	1	1	1	1	1	2.50	2.22	5.55
Pump No. 1	Hyde Park	2010	25	13	52%	3	2	5	3	4	1	1	1	1	1	2.50	2.00	5.00
Pump No. 2	Hyde Park	2010	25	13	52%	3	2	5	3	4	1	1	1	1	1	2.50	2.00	5.00
Mechanically Operated Generator Exhaust Louver	Hyde Park	2010	15	3	20%	4	2	1	5	2	1	1	1	1	1	3.00	1.55	4.66
Unit Heater	Hyde Park	2010	15	3	20%	4	3	1	1	2	1	1	1	1	1	3.50	1.11	3.89
Louvers	Hyde Park	2010	15	3	20%	4	3	1	1	2	1	1	1	1	1	3.50	1.11	3.89
Dampers	Hyde Park	2010	15	3	20%	4	3	1	1	2	1	1	1	1	1	3.50	1.11	3.89
Lighting	Hyde Park	2010	25	13	52%	3	2	2	1	2	1	1	1	1	1	2.50	1.22	3.05
Doors	Hyde Park	2010	60	48	80%	1	3	2	3	2	1	1	1	1	1	2.00	1.44	2.89
Roof	Hyde Park	2010	60	48	80%	1	2	3	5	3	1	1	1	1	1	1.50	1.89	2.83
Veneers	Hyde Park	2010	60	48	80%	1	3	1	3	2	1	1	1	1	1	2.00	1.33	2.66
Instrumentation	Landfill	2017	20	15	75%	2	4	4	5	4	1	1	1	2	1	3.00	2.28	6.83
Communications & Alarms	Landfill	2017	15	10	67%	2	4	4	5	4	1	1	1	2	1	3.00	2.28	6.83
Process Piping & Valves	Landfill	2017	40	35	88%	1	4	5	5	4	1	1	1	2	1	2.50	2.39	5.97
Building	Landfill	2017	60	55	92%	1	5	2	5	3	1	1	1	2	1	3.00	1.94	5.83

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Control Panel & PLC	Landfill	2017	20	15	75%	2	2	5	5	4	1	1	1	2	1	2.00	2.39	4.77
Lighting	Landfill	2017	25	20	80%	1	1	2	1	2	1	1	1	2	1	1.00	1.39	1.39
Electrical Equipment & Enclosures	Landfill	2017	20	15	75%	2	5	5	5	4	1	1	1	2	1	3.50	2.39	8.35
VFDs	Landfill (Leachate PS)	2017	12	7	58%	3	4	5	5	4	1	1	1	2	1	3.50	2.39	8.35
Pump No. 1	Landfill (Leachate PS)	2017	25	20	80%	1	3	5	3	4	1	1	1	2	1	2.00	2.16	4.33
Pump No. 2	Landfill (Leachate PS)	2017	25	20	80%	1	3	5	3	4	1	1	1	2	1	2.00	2.16	4.33
Wet Well	Landfill (Leachate PS)	2017	60	55	92%	1	3	4	5	3	1	1	1	2	1	2.00	2.16	4.33
VFDs	Landfill (wetwell pumps)	2017	12	7	58%	3	4	5	5	4	1	1	1	2	1	3.50	2.39	8.35
Pump No. 3	Landfill (wetwell pumps)	2017	25	20	80%	1	3	5	3	4	1	1	1	2	1	2.00	2.16	4.33
Pump No. 4	Landfill (wetwell pumps)	2017	25	20	80%	1	3	5	3	4	1	1	1	2	1	2.00	2.16	4.33
Wet Well	Landfill (wetwell pumps)	2017	60	55	92%	1	1	4	5	3	1	1	1	2	1	1.00	2.16	2.16
VFDs	Pleasant Avenue	2009	12	0	0%	5	4	5	5	4	1	2	1	1	1	4.50	2.33	10.49
Link Seals	Pleasant Avenue	1969	25	0	0%	5	4	4	5	4	1	2	1	1	1	4.50	2.22	9.99
Instrumentation	Pleasant Avenue	2009	15	2	13%	5	4	4	5	4	1	2	1	1	1	4.50	2.22	9.99
Electrical Equipment & Enclosures	Pleasant Avenue	1969	20	0	0%	5	3	5	5	4	1	2	1	1	1	4.00	2.33	9.32
Domestic Water System	Pleasant Avenue	2009	15	2	13%	5	4	3	5	2	1	2	1	1	1	4.50	1.89	8.49
Process Piping & Valves	Pleasant Avenue	1969	40	0	0%	5	2	5	5	4	1	2	1	1	1	3.50	2.33	8.16
Communications & Alarms	Pleasant Avenue	2010	15	3	20%	4	3	4	5	4	1	2	1	1	1	3.50	2.22	7.77
Building	Pleasant Avenue	1969	60	7	12%	5	3	2	5	3	1	2	1	1	1	4.00	1.89	7.55
Wet Well	Pleasant Avenue	1969	60	7	12%	5	2	4	5	3	1	2	1	1	1	3.50	2.11	7.38
Control Panel & PLC	Pleasant Avenue	2010	20	8	40%	3	3	5	5	4	1	2	1	1	1	3.00	2.33	6.99
Mechanically Operated Generator Exhaust Louver	Pleasant Avenue	2009	15	2	13%	5	2	1	5	2	1	2	1	1	1	3.50	1.67	5.83
Exhaust Fans	Pleasant Avenue	2009	15	2	13%	5	4	1	1	2	1	2	1	1	1	4.50	1.22	5.49
Dampers	Pleasant Avenue	2009	15	2	13%	5	4	1	1	2	1	2	1	1	1	4.50	1.22	5.49

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Pump No. 1	Pleasant Avenue	2009	25	12	48%	3	2	5	3	4	1	2	1	1	1	2.50	2.11	5.27
Standby Automatic Generator	Pleasant Avenue	2009	35	22	63%	2	3	3	5	4	1	2	1	1	1	2.50	2.11	5.27
Pump No. 2	Pleasant Avenue	2009	25	12	48%	3	2	5	1	4	1	2	1	1	1	2.50	1.89	4.72
Pump No. 3	Pleasant Avenue	2009	25	12	48%	3	2	5	1	4	1	2	1	1	1	2.50	1.89	4.72
Lighting	Pleasant Avenue	2009	25	12	48%	3	4	2	1	2	1	2	1	1	1	3.50	1.33	4.66
Unit Heater	Pleasant Avenue	2009	15	2	13%	5	2	1	1	2	1	2	1	1	1	3.50	1.22	4.27
Louvers	Pleasant Avenue	2009	15	2	13%	5	2	1	1	2	1	2	1	1	1	3.50	1.22	4.27
Roof	Pleasant Avenue	2009	60	47	78%	2	2	3	5	3	1	2	1	1	1	2.00	2.00	4.00
Doors	Pleasant Avenue	2009	60	47	78%	2	3	2	3	2	1	2	1	1	1	2.50	1.55	3.89
Veneers	Pleasant Avenue	2009	60	47	78%	2	3	1	3	2	1	2	1	1	1	2.50	1.44	3.61
Windows	Pleasant Avenue	2009	60	47	78%	2	2	1	3	2	1	2	1	1	1	2.00	1.44	2.89
Building	Riverview Road	1969	60	7	12%	5	2	2	5	3	5	1	1	5	5	3.50	3.55	12.43
Communications & Alarms	Riverview Road	2017	15	10	67%	2	4	4	5	4	5	1	1	5	5	3.00	3.89	11.66
Electrical Equipment & Enclosures	Riverview Road	2017	20	15	75%	2	3	5	5	4	5	1	1	5	5	2.50	4.00	9.99
Control Panel & PLC	Riverview Road	2017	20	15	75%	2	2	5	5	4	5	1	1	5	5	2.00	4.00	7.99
Instrumentation	Riverview Road	2017	20	15	75%	2	2	4	5	4	5	1	1	5	5	2.00	3.89	7.77
Unit Heater	Riverview Road	2017	15	10	67%	2	3	1	1	2	5	1	1	5	5	2.50	2.89	7.22
Exhaust Fans	Riverview Road	2017	15	10	67%	2	3	1	1	2	5	1	1	5	5	2.50	2.89	7.22
Domestic Water System	Riverview Road	2017	15	10	67%	2	2	3	5	2	5	1	1	5	5	2.00	3.55	7.10
Louvers	Riverview Road	2017	15	10	67%	2	2	1	1	2	5	1	1	5	5	2.00	2.89	5.77
Wet Well	Riverview Road	2017	60	55	92%	1	2	4	5	3	5	1	1	5	5	1.50	3.77	5.66
Veneers	Riverview Road	2017	60	55	92%	1	2	1	3	2	5	1	1	5	5	1.50	3.11	4.66
Pump Control Panel/Starter	Riverview Road	2017	15	10	67%	2	1	1	1	2	5	1	1	5	5	1.50	2.89	4.33
Process Piping & Valves	Riverview Road	2017	40	35	88%	1	1	5	5	4	5	1	1	5	5	1.00	4.00	4.00

Equipment / Asset name	Pump Station	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Link Seals	Riverview Road	2017	25	20	80%	1	1	4	5	4	5	1	1	5	5	1.00	3.89	3.89
Pump No. 2	Riverview Road	2017	25	20	80%	1	1	5	3	4	5	1	1	5	5	1.00	3.77	3.77
Roof	Riverview Road	2017	60	55	92%	1	1	3	5	3	5	1	1	5	5	1.00	3.66	3.66
Pump No. 1	Riverview Road	2017	25	20	80%	1	1	5	1	4	5	1	1	5	5	1.00	3.55	3.55
Doors	Riverview Road	2017	60	55	92%	1	1	2	3	2	5	1	1	5	5	1.00	3.22	3.22
Lighting	Riverview Road	2017	25	20	80%	1	1	2	1	2	5	1	1	5	5	1.00	3.00	3.00
Process Piping & Valves	Rose Street	1969	40	0	0%	5	5	5	5	4	5	3	1	2	2	5.00	3.22	16.10
Electrical Equipment & Enclosures	Rose Street	1969	20	0	0%	5	5	5	5	4	5	3	1	2	2	5.00	3.22	16.10
VFD	Rose Street	2000	12	0	0%	5	5	5	5	4	5	3	1	2	2	5.00	3.22	16.10
Link Seals	Rose Street	1969	25	0	0%	5	5	4	5	4	5	3	1	2	2	5.00	3.11	15.54
Instrumentation	Rose Street	1997	15	0	0%	5	3	4	5	4	5	3	1	2	2	4.00	3.11	12.43
Communications & Alarms	Rose Street	2010	15	3	20%	4	4	4	5	4	5	3	1	2	2	4.00	3.11	12.43
Wet Well	Rose Street	1969	60	7	12%	5	3	4	5	3	5	3	1	2	2	4.00	3.00	11.99
Roof	Rose Street	1969	60	7	12%	5	3	3	5	3	5	3	1	2	2	4.00	2.89	11.54
Building	Rose Street	1969	60	7	12%	5	3	2	5	3	5	3	1	2	2	4.00	2.78	11.10
Domestic Water System	Rose Street	1969	40	0	0%	5	2	3	5	2	5	3	1	2	2	3.50	2.78	9.71
Control Panel & PLC	Rose Street	2010	20	8	40%	3	3	5	5	4	5	3	1	2	2	3.00	3.22	9.66
Dampers	Rose Street	1969	15	0	0%	5	4	1	1	2	5	3	1	2	2	4.50	2.11	9.49
Exhaust Fans	Rose Street	1969	15	0	0%	5	4	1	1	2	5	3	1	2	2	4.50	2.11	9.49
Veneers	Rose Street	1969	60	7	12%	5	3	1	3	2	5	3	1	2	2	4.00	2.33	9.32
Standby Automatic Generator	Rose Street	2007	35	20	57%	3	3	3	5	4	5	3	1	2	2	3.00	3.00	8.99
Doors	Rose Street	1969	60	7	12%	5	2	2	3	2	5	3	1	2	2	3.50	2.44	8.55
Louvers	Rose Street	1969	15	0	0%	5	3	1	1	2	5	3	1	2	2	4.00	2.11	8.44
Windows	Rose Street	1969	60	7	12%	5	2	1	3	2	5	3	1	2	2	3.50	2.33	8.16

Equipment / Asset name	Pump Station	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Pump No. 1	Rose Street	2013	25	16	64%	2	3	5	3	4	5	3	1	2	2	2.50	3.00	7.49
Pump No. 2	Rose Street	2016	25	19	76%	2	3	5	3	4	5	3	1	2	2	2.50	3.00	7.49
Unit Heater	Rose Street	2017	15	10	67%	2	2	1	1	2	5	3	1	2	2	2.00	2.11	4.22
Lighting	Rose Street	2007	25	10	40%	3		2	1	2	5	3	1	2	2	1.50	2.22	3.33
Instrumentation	Wing Farm	1999	20	0	0%	5	4	4	5	4	1	4	1	1	3	4.50	2.78	12.49
Electrical Equipment & Enclosures	Wing Farm	1999	20	0	0%	5	3	5	5	4	1	4	1	1	3	4.00	2.89	11.54
Control Panel & PLC	Wing Farm	1999	20	0	0%	5	3	5	5	4	1	4	1	1	3	4.00	2.89	11.54
Communications & Alarms	Wing Farm	2010	15	3	20%	4	3	4	5	4	1	4	1	1	3	3.50	2.78	9.71
Standby Automatic Generator	Wing Farm	1999	35	12	34%	4	3	3	5	4	1	4	1	1	3	3.50	2.66	9.32
Domestic Water System	Wing Farm	1999	15	0	0%	5	2	3	5	2	1	4	1	1	3	3.50	2.44	8.55
Lighting	Wing Farm	1999	25	2	8%	5	4	2	1	2	1	4	1	1	3	4.50	1.89	8.49
Link Seals	Wing Farm	1999	25	2	8%	5	1	4	5	4	1	4	1	1	3	3.00	2.78	8.33
Pump No. 1	Wing Farm	1999	25	2	8%	5	1	5	3	4	1	4	1	1	3	3.00	2.66	7.99
Pump No. 2	Wing Farm	1999	25	2	8%	5	1	5	3	4	1	4	1	1	3	3.00	2.66	7.99
Unit Heater	Wing Farm	1999	15	0	0%	5	3	1	1	2	1	4	1	1	3	4.00	1.78	7.10
Louvers	Wing Farm	1991	15	0	0%	5	3	1	1	2	1	4	1	1	3	4.00	1.78	7.10
Dampers	Wing Farm	1999	15	0	0%	5	3	1	1	2	1	4	1	1	3	4.00	1.78	7.10
Roof	Wing Farm	1999	60	37	62%	2	3	3	5	3	1	4	1	1	3	2.50	2.55	6.38
Process Piping & Valves	Wing Farm	1999	40	17	43%	3	1	5	5	4	1	4	1	1	3	2.00	2.89	5.77
Doors	Wing Farm	1999	60	37	62%	2	3	2	3	2	1	4	1	1	3	2.50	2.11	5.27
Veneers	Wing Farm	1999	60	37	62%	2	3	1	3	2	1	4	1	1	3	2.50	2.00	5.00
Building	Wing Farm	1999	60	37	62%	2	2	2	5	3	1	4	1	1	3	2.00	2.44	4.88
Windows	Wing Farm	1999	60	37	62%	2	2	1	3	2	1	4	1	1	3	2.00	2.00	4.00
Wet Well	Wing Farm	1999	60	37	62%	2	1	4	5	3	1	4	1	1	3	1.50	2.66	4.00

City of Bath Fiscal Sustainability Plan - Collection System Risk Assessment

						LoF Factors					CoF Factors								Current Year
						Age		Condition			Economic Cost	Social Cost			Environmental Cost				2022
WP ID	Upstream Manhole	Downstream Manhole	Installation Date	Expected Useful Life	Remaining Useful Life	Remaining Useful Life (YR)	RUL Score	PACP Rating	Relative Condition	Material	Operational Significance/ Size	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
1052	MH389	MH388	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	3	1	2	1	1	1	#N/A	1.78	#N/A
1054	MH388	MH386	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	1	2	1	1	1	#N/A	2.44	#N/A
1055	MH385	MH387	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	1	2	1	1	1	#N/A	2.44	#N/A
1056	MH386	MH385	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	#N/A	1	2	1	1	1	#N/A	#N/A	#N/A
1058	MH391	MH377	1982	50	10	10	4	0	3	1	3	1	1	1	1	1	3.00	1.67	5.00
1059	MH377	MH389	1982	50	10	10	4	0	3	1	3	1	1	1	1	1	3.00	1.67	5.00
1063	MH1540	MH951	no data	50	#VALUE!	no data	4	4	4	3	5	1	1	1	1	1	3.75	2.33	8.75
1090	MH387	MH1253	no data	50	#VALUE!	no data	#N/A	0	#N/A	5	5	1	2	1	1	1	#N/A	2.44	#N/A
1092	MH1253	MH1254	no data	50	#VALUE!	no data	#N/A	0	#N/A	5	5	1	2	1	1	1	#N/A	2.44	#N/A
1093	MH1254	MH1252	no data	50	#VALUE!	no data	#N/A	0	#N/A	5	5	1	1	1	1	1	#N/A	2.33	#N/A
1094	MH1252	MH1540	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	1	1	1	1	1	#N/A	2.33	#N/A
1103	MH435	MH849	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	4	1	2	1	1	1	#N/A	2.11	#N/A
1112	MH427	MH1496	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	1	2	1	1	1	#N/A	2.44	#N/A
1120	MH430	MH1497	no data	50	#VALUE!	no data	#N/A	0	#N/A	1	4	1	2	1	1	1	#N/A	2.11	#N/A
1140	MH848	MH854	1972	50	0	0	5	1	5	4	3	5	3	1	1	1	3.75	2.33	8.75
1142	MH854	MH852	1972	50	0	0	5	0	4	3	5	5	3	1	1	1	4.25	3.00	12.75
1143	MH852	MH849	1972	50	0	0	5	0	4	3	5	1	2	1	1	1	4.25	2.44	10.39
1144	MH849	MH850	1972	50	0	0	5	0	4	3	5	1	2	1	1	1	4.25	2.44	10.39
1146	MH846	MH854	1972	50	0	0	5	5	5	4	3	5	3	1	1	1	4.75	2.33	11.08
1150	MH858	MH846	1972	50	0	0	5	0	5	4	3	5	3	1	1	1	4.75	2.33	11.08
1151	MH857	MH855	1969	50	0	0	5	0	5	4	3	5	3	1	1	1	4.75	2.33	11.08
1156	MH860	MH858	1972	50	0	0	5	0	5	4	3	5	3	1	1	1	4.75	2.33	11.08
1157	MH859	MH857	1969	50	0	0	5	0	5	4	3	5	3	1	1	1	4.75	2.33	11.08
1164	MH932	MH869	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	3	1	2	1	1	1	#N/A	1.78	#N/A
1167	MH887	MH871	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	3	1	2	1	1	1	#N/A	1.78	#N/A
1168	MH869	MH870	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	3	1	2	1	1	1	#N/A	1.78	#N/A
1169	MH871	MH427	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	#N/A	1	2	1	1	1	#N/A	#N/A	#N/A
1170	MH870	MH871	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	3	1	2	1	1	1	#N/A	1.78	#N/A
1172	MH875	MH877	1972	50	0	0	5	1	5	4	3	5	3	1	1	1	3.75	2.33	8.75
1173	MH876	MH878	1969	50	0	0	5	0	5	4	3	5	3	1	1	1	4.75	2.33	11.08
1175	MH878	MH877	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	3	5	3	1	1	1	#N/A	2.33	#N/A
1185	MH1263	MH934	1999	50	27	27	3	0	2	1	1	1	1	1	1	1	2.25	1.00	2.25
1200	MH934	MH907	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	3	1	2	1	1	1	#N/A	1.78	#N/A
1209	MH885	MH883	1969	50	0	0	5	0	5	4	3	5	3	1	1	1	4.75	2.33	11.08
1211	MH888	MH887	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	3	1	1	1	1	1	#N/A	1.67	#N/A
1212	MH892	MH891	1972	50	0	0	5	1	5	4	3	5	3	1	3	4	3.75	3.17	11.88
1213	MH891	MH890	1972	50	0	0	5	3	5	4	3	5	3	1	3	4	4.25	3.17	13.46
1220	MH898	MH892	1972	50	0	0	5	0	5	4	2	5	3	1	3	5	4.75	3.00	14.25
1236	MH907	MH888	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	3	1	1	1	1	1	#N/A	1.67	#N/A
1237	MH890	MH884	1972	50	0	0	5	0	5	4	3	5	3	1	3	3	4.75	3.00	14.25
1255	MH933	MH932	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	3	1	1	1	1	1	#N/A	1.67	#N/A
1267	MH944	MH947	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	1	1	1	1	1	1	#N/A	1.00	#N/A
1268	MH941	MH942	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	1	1	1	1	1	1	#N/A	1.00	#N/A
1269	MH942	MH943	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	1	1	1	1	1	1	#N/A	1.00	#N/A
1270	MH943	MH944	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	1	1	1	1	1	1	#N/A	1.00	#N/A
1274	MH949	MH1263	no data	50	#VALUE!	no data	#N/A	0	#N/A	1	1	1	1	1	1	1	#N/A	1.00	#N/A
1275	MH948	MH949	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	1	1	1	1	1	1	#N/A	1.00	#N/A

WP ID	Upstream Manhole	Downstream Manhole	Installation Date	Expected Useful Life	Remaining Useful Life	Remaining Useful Life (YR)	RUL Score	PACP Rating	Relative Condition	Material	Operational Significance/ Size	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
1276	MH947	MH948	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	#N/A	1	1	1	1	1	#N/A	#N/A	#N/A
1277	MH951	MH953	2021	50	49	49	1	0	#N/A	#N/A	#N/A	1	1	1	1	1	#N/A	#N/A	#N/A
1281	MH953	MH933	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	#N/A	1	1	1	1	1	#N/A	#N/A	#N/A
1455	MH884	MH875	1972	50	0	0	5	0	5	4	3	5	3	1	1	1	4.75	2.33	11.08
1456	MH883	MH876	1969	50	0	0	5	0	5	4	3	5	3	1	1	1	4.75	2.33	11.08
1629	MH850	PS7	1972	50	0	0	5	0	#N/A	#N/A	#N/A	1	2	1	1	1	#N/A	#N/A	#N/A
1744	MH1496	MH430	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	1	2	1	1	1	#N/A	2.44	#N/A
1745	MH1497	MH435	no data	50	#VALUE!	no data	#N/A	0	#N/A	1	4	1	2	1	1	1	#N/A	2.11	#N/A
1764	MH877	MH848	1972	50	0	0	5	0	5	4	4	5	3	1	1	1	4.75	2.67	12.67
1481	MH1296	MH595	2013	50	41	41	1	0	1	1	5	1	1	1	1	1	1.00	2.33	2.33
1482	MH275	MH1296	2013	50	41	41	1	0	1	1	5	1	1	1	1	1	1.00	2.33	2.33
1606	MH1364	MH758	1969	50	0	0	5	0	5	4	5	5	5	1	1	3	4.75	3.56	16.89
1623	MH1377	MH1198	1982	50	10	10	4	0	4	4	5	2		1	1	1	4.00	2.33	9.33
1624	MH744	MH748	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	#N/A	3	5	1	1	1	#N/A	#N/A	#N/A
1625	MH1200	CB1811	1982	50	10	10	4	0	4	4	5	2	5	1	1	1	4.00	2.89	11.56
1694	MH653	MH622	2021	50	49	49	1	0	1	1	5	5	5	1	1	1	1.00	3.22	3.22
1767	MH280	NONE	2013	50	41	41	1	0	1	1	5	1	1	1	1	1	1.00	2.33	2.33
1768	MH1512	MH279	2013	50	41	41	1	0	1	1	5	1	1	1	1	1	1.00	2.33	2.33
1787	MH748	MH1200	2017	50	45	45	1	0	1	1	4	2	5	1	1	1	1.00	2.56	2.56
305	MH244	MH239	no data	50	#VALUE!	no data	#N/A	4	#N/A	#N/A	#N/A	1	1	1	1	1	#N/A	#N/A	#N/A
308	MH239	MH236	no data	50	#VALUE!	no data	5	5	5	5	3	1	1	1	1	1	5.00	1.67	8.33
309	MH235	MH237	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	4	1	1	1	1	1	#N/A	2.00	#N/A
310	MH236	MH235	no data	50	#VALUE!	no data	5	5	5	5	4	1	1	1	1	1	5.00	2.00	10.00
313	MH237	MH1512	2013	50	41	41	1	0	1	1	5	1	1	1	1	1	1.00	2.33	2.33
357	MH1297	MH275	2013	50	41	41	1	0	1	1	5	1	1	1	1	1	1.00	2.33	2.33
360	MH279	MH280	2013	50	41	41	1	0	1	1	5	1	1	1	1	1	1.00	2.33	2.33
374	NONE	MH1297	2013	50	41	41	1	0	1	1	5	1	1	1	1	1	1.00	2.33	2.33
595	MH588	MH570	1988	50	16	16	4	0	3	2	5	1	1	1	1	1	3.25	2.33	7.58
598	MH560	MH675	1988	50	16	16	4	0	3	1	4	1	5	1	1	1	3.00	2.44	7.33
610	MH566	MH647	1988	50	16	16	4	0	3	2	5	1	2	1	1	1	3.25	2.44	7.94
613	MH647	MH560	1988	50	16	16	4	0	3	1	4	1	2	1	1	1	3.00	2.11	6.33
617	MH570	MH569	1988	50	16	16	4	0	3	2	5	1	1	1	1	1	3.25	2.33	7.58
626	MH595	MH592	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	1	1	1	1	1	#N/A	2.33	#N/A
630	MH592	MH589	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	1	1	1	1	1	#N/A	2.33	#N/A
634	MH589	MH588	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	1	1	1	1	1	#N/A	2.33	#N/A
644	MH642	MH653	no data	50	#VALUE!	no data	0	0	2	3	5	5	5	1	1	1	1.25	3.22	4.03
645	MH611	MH690	2021	50	49	49	1	0	1	1	5	5	5	1	1	1	1.00	3.22	3.22
656	MH621	MH620	2021	50	49	49	1	1	1	1	5	5	5	1	1	1	1.00	3.22	3.22
657	MH654	MH619	no data	50	#VALUE!	no data	1	1	2	3	4	5	5	1	1	1	1.50	2.89	4.33
660	MH615	MH611	2021	50	49	49	1	0	1	1	5	5	5	1	1	1	1.00	3.22	3.22
666	MH1464	MH615	1975	50	3	3	5	0	5	4	3	5	5	1	1	1	4.75	2.56	12.14
667	MH616	MH617	no data	50	#VALUE!	no data	5	5	5	5	3	5	5	1	1	1	5.00	2.56	12.78
668	MH617	MH1464	no data	50	#VALUE!	no data	5	5	5	5	3	5	5	1	1	1	5.00	2.56	12.78
669	MH620	MH615	2021	50	49	49	1	0	1	1	5	5	5	1	1	1	1.00	3.22	3.22
670	MH619	MH620	no data	50	#VALUE!	no data	0	0	2	3	5	5	5	1	1	1	1.25	3.22	4.03
671	MH622	MH621	2021	50	49	49	1	0	1	1	5	5	5	1	1	1	1.00	3.22	3.22
672	NONE	MH654	no data	50	#VALUE!	no data	0	0	3	5	3	5	5	1	1	1	2.00	2.56	5.11
688	MH638	MH642	1969	50	0	0	5	0	4	3	5	5	5	1	1	1	4.25	3.22	13.69
699	MH569	MH566	1988	50	16	16	4	0	3	2	5	1	2	1	1	1	3.25	2.44	7.94
709	MH608	MH616	no data	50	#VALUE!	no data	5	5	5	5	3	5	5	1	1	1	5.00	2.56	12.78
727	MH742	MH672	1988	50	16	16	4	0	3	1	4	1	5	1	1	1	3.00	2.44	7.33

WP ID	Upstream Manhole	Downstream Manhole	Installation Date	Expected Useful Life	Remaining Useful Life	Remaining Useful Life (YR)	RUL Score	PACP Rating	Relative Condition	Material	Operational Significance/ Size	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
728	MH675	MH672	1988	50	16	16	4	0	3	1	4	1	5	1	1	1	3.00	2.44	7.33
743	MH692	MH1364	1969	50	0	0	5	0	5	4	5	5	5	1	1	3	4.75	3.56	16.89
745	MH687	MH692	1969	50	0	0	5	0	4	3	5	5	5	1	1	2	4.25	3.39	14.40
746	MH691	MH687	2021	50	49	49	1	0	1	1	5	5	5	1	1	1	1.00	3.22	3.22
750	MH690	MH691	2021	50	49	49	1	0	1	1	5	5	5	1	1	1	1.00	3.22	3.22
799	MH739	MH744	1969	50	0	0	5	0	4	3	5	5	5	1	1	1	4.25	3.22	13.69
800	MH733	MH734	2009	50	37	37	2	0	2	1	5	5	3	1	1	1	1.75	3.00	5.25
801	MH732	MH733	2009	50	37	37	2	0	2	1	5	5	3	1	1	1	1.75	3.00	5.25
802	MH866	MH732	2009	50	37	37	2	0	2	1	5	5	3	1	1	1	1.75	3.00	5.25
803	MH734	MH736	1969	50	0	0	5	0	5	4	4	5	3	1	1	1	4.75	2.67	12.67
804	MH735	MH738	1969	50	0	0	5	0	4	3	5	5	3	1	1	1	4.25	3.00	12.75
805	MH736	MH735	1969	50	0	0	5	0	4	3	5	5	3	1	1	1	4.25	3.00	12.75
806	MH738	MH739	1969	50	0	0	5	0	4	3	5	5	5	1	1	1	4.25	3.22	13.69
812	MH748	MH749	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	#N/A	2	5	1	1	1	#N/A	#N/A	#N/A
813	MH746	MH748	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	2	5	1	1	1	#N/A	2.89	#N/A
814	MH747	MH746	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	4	2	5	1	1	1	#N/A	2.56	#N/A
815	MH745	MH746	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	2	5	1	1	1	#N/A	2.89	#N/A
816	MH749	MH750	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	2	5	1	1	1	#N/A	2.89	#N/A
817	MH750	MH740	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	2	5	1	1	1	#N/A	2.89	#N/A
819	MH740	MH753	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	2	5	1	1	1	#N/A	2.89	#N/A
826	MH672	MH742	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	4	1	5	1	1	1	#N/A	2.44	#N/A
843	MH742	MH768	1982	50	10	10	4	0	4	4	5	1	5	1	1	1	4.00	2.78	11.11
844	MH768	MH769	1982	50	10	10	4	0	4	4	5	1	5	1	1	1	4.00	2.78	11.11
845	MH1376	MH1377	1982	50	10	10	4	0	4	4	5	1	5	1	1	1	4.00	2.78	11.11
846	MH1198	MH1200	1982	50	10	10	4	0	4	4	5	2	5	1	1	1	4.00	2.89	11.56
847	CB1811	MH1201	1982	50	10	10	4	0	4	4	5	2	5	1	1	1	4.00	2.89	11.56
848	MH753	MH756	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	2	5	1	1	1	#N/A	2.89	#N/A
849	MH756	MH758	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	5	5	1	1	1	#N/A	3.22	#N/A
851	MH1201	MH1196	1982	50	10	10	4	0	4	4	5	2	5	1	1	1	4.00	2.89	11.56
852	MH1196	MH755	1982	50	10	10	4	0	4	4	5	2	5	1	1	1	4.00	2.89	11.56
857	MH1197	MH758	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	#N/A	5	5	1	1	1	#N/A	#N/A	#N/A
858	MH755	MH1197	1982	50	10	10	4	0	4	4	5	5	5	1	1	1	4.00	3.22	12.89
109	MH103	MH93	no data	50	#VALUE!	no data	1	1	3	5	5	1	1	1	1	5	2.00	3.00	6.00
118	MH1119	MH1118	no data	50	#VALUE!	no data	0	0	1	1	5	1	1	1	1	5	0.50	3.00	1.50
119	MH1120	MH1119	no data	50	#VALUE!	no data	0	0	1	1	5	1	1	1	1	5	0.50	3.00	1.50
120	MH1546	MH97	no data	50	#VALUE!	no data	0	0	1	1	5	1	1	1	1	5	0.50	3.00	1.50
130	MH1118	MH1114	1996	50	24	24	3	0	2	1	5	1	1	1	1	5	2.25	3.00	6.75
1479	MH99	MH1546	no data	50	#VALUE!	no data	1	1	3	5	5	1	1	1	1	5	2.00	3.00	6.00
1480	MH93	MH99	no data	50	#VALUE!	no data	3	3	4	5	5	1	1	1	1	2	3.50	2.50	8.75
1493	MH494	MH1324	no data	50	#VALUE!	no data	2	2	4	5	3	1	1	1	1	1	2.75	1.67	4.58
1494	MH1324	MH500	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	3	1	1	1	1	1	#N/A	1.67	#N/A
1628	MH227	MH1382	no data	50	#VALUE!	no data	0	0	1	1	5	1	1	1	1	1	0.50	2.33	1.17
1675	MH1382	MH159	no data	50	#VALUE!	no data	#N/A	0	#N/A	1	4	1	1	1	1	1	#N/A	2.00	#N/A
1714	MH446	MH1460	no data	50	#VALUE!	no data	0	0	2	4	3	1	2	1	1	1	1.50	1.78	2.67
1716	MH488	MH490	no data	50	#VALUE!	no data	4	4	5	5	4	1	1	1	1	1	4.25	2.00	8.50
1762	MH1143	MH1508	1997	50	25	25	3	0	3	2	5	1	2	1	1	5	2.75	3.11	8.56
1782	MH479	MH1553	1995	50	23	23	3	0	4	5	5	1	1	1	1	1	3.75	2.33	8.75
1783	MH1553	MH1519	1995	50	23	23	3	0	4	5	5	1	1	1	1	1	3.75	2.33	8.75
203	MH159	MH160	1982	50	10	10	4	0	3	1	5	1	1	1	1	1	3.00	2.33	7.00
204	MH160	MH155	1982	50	10	10	4	0	3	1	5	1	1	1	1	1	3.00	2.33	7.00
27	MH23	MH42	1982	50	10	10	4	0	3	1	5	1	1	1	1	5	3.00	3.00	9.00

WP ID	Upstream Manhole	Downstream Manhole	Installation Date	Expected Useful Life	Remaining Useful Life	Remaining Useful Life (YR)	RUL Score	PACP Rating	Relative Condition	Material	Operational Significance/ Size	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
275	MH1107	MH1639	1997	50	25	25	3	0	2	1	5	1	1	1	1	1	2.25	2.33	5.25
277	MH1639	MH227	no data	50	#VALUE!	no data	0	0	1	1	5	1	1	1	1	1	0.50	2.33	1.17
280	MH1109	MH1110	1995	50	23	23	3	0	2	1	5	1	1	1	1	2	2.25	2.50	5.63
281	MH1111	MH1108	1995	50	23	23	3	0	2	1	5	1	1	1	1	1	2.25	2.33	5.25
282	MH1108	MH1107	1995	50	23	23	3	1	2	1	5	1	1	1	1	1	2.00	2.33	4.67
289	MH1113	MH1109	1995	50	23	23	3	0	2	1	5	1	1	1	1	2	2.25	2.50	5.63
290	MH1114	MH1113	no data	50	#VALUE!	no data	0	0	1	1	4	1	1	1	1	5	0.50	2.67	1.33
299	MH1110	MH1111	1995	50	23	23	3	0	2	1	5	1	1	1	1	1	2.25	2.33	5.25
30	MH19	MH22	1982	50	10	10	4	0	3	1	5	1	1	1	1	5	3.00	3.00	9.00
315	MH243	MH103	no data	50	#VALUE!	no data	2	2	4	5	5	1	1	1	1	5	2.75	3.00	8.25
316	MH242	MH243	no data	50	#VALUE!	no data	2	2	4	5	5	1	1	1	1	5	2.75	3.00	8.25
32	MH155	MH18	1982	50	10	10	4	0	3	1	5	1	1	1	1	1	3.00	2.33	7.00
34	MH18	MH19	1982	50	10	10	4	0	3	1	5	1	1	1	1	2	3.00	2.50	7.50
36	MH22	MH23	1982	50	10	10	4	0	3	1	5	1	1	1	1	5	3.00	3.00	9.00
421	MH546	MH332	2020	50	48	48	1	0	1	1	5	1	2	1	1	2	1.00	2.61	2.61
422	MH332	MH338	2020	50	48	48	1	0	1	1	5	1	2	1	1	5	1.00	3.11	3.11
428	MH523	MH339	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	4	1	2	1	1	5	#N/A	2.78	#N/A
429	MH1508	MH325	no data	50	#VALUE!	no data	#N/A	0	#N/A	5	5	1	1	1	1	5	#N/A	3.00	#N/A
431	MH1145	MH1142	2020	50	48	48	1	0	1	1	5	1	2	1	1	5	1.00	3.11	3.11
433	MH338	MH341	2020	50	48	48	1	0	1	1	2	1	2	1	1	5	1.00	2.11	2.11
434	MH339	MH1334	2018	50	46	46	1	0	1	1	4	1	2	1	1	5	1.00	2.78	2.78
434A	MH1334	MH1155	2018	50	46	46	1	0	1	1	4	1	2	1	1	4	1.00	2.61	2.61
435	MH341	MH1153	2020	50	48	48	1	1	2	3	5	1	2	1	1	4	1.50	2.94	4.42
436	MH1155	MH1154	2020	50	48	48	1	1	1	1	4	1	2	1	1	4	1.00	2.61	2.61
437	MH1153	MH1151	2020	50	48	48	1	1	2	3	5	1	2	1	1	5	1.50	3.11	4.67
438	MH1154	MH1152	2020	50	48	48	1	1	1	1	4	1	2	1	1	5	1.00	2.78	2.78
439	MH1152	MH1150	2020	50	48	48	1	1	1	1	4	1	2	1	1	5	1.00	2.78	2.78
440	MH1150	MH1149	2020	50	48	48	1	1	1	1	4	1	2	1	1	4	1.00	2.61	2.61
441	MH1151	MH1148	2020	50	48	48	1	0	1	1	5	1	2	1	1	5	1.00	3.11	3.11
445	MH1149	MH1144	2020	50	48	48	1	1	1	1	4	1	2	1	1	4	1.00	2.61	2.61
446	MH1144	MH1143	2020	50	48	48	1	0	1	1	4	1	2	1	1	5	1.00	2.78	2.78
447	MH325	MH242	no data	50	#VALUE!	no data	5	5	5	5	5	1	1	1	1	5	5.00	3.00	15.00
448	MH1148	MH1146	2020	50	48	48	1	0	1	1	5	1	2	1	1	4	1.00	2.94	2.94
45	MH56	MH60	1969	50	0	0	5	0	4	3	5	1	1	1	5	5	4.25	3.67	15.58
458	MH1146	MH1145	2020	50	48	48	1	0	1	1	5	1	2	1	1	4	1.00	2.94	2.94
463	MH461	MH471	no data	50	#VALUE!	no data	3	3	4	5	4	1	2	1	1	1	3.50	2.11	7.39
465	MH455	MH461	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	4	1	2	1	1	1	#N/A	2.11	#N/A
468	MH780	MH446	no data	50	#VALUE!	no data	5	5	5	5	3	1	2	1	1	1	5.00	1.78	8.89
469	MH445	MH1458	no data	50	#VALUE!	no data	0	0	2	4	5	1	2	1	1	1	1.50	2.44	3.67
470	MH1460	MH445	no data	50	#VALUE!	no data	0	0	2	4	5	1	2	1	1	1	1.50	2.44	3.67
471	MH448	MH453	no data	50	#VALUE!	no data	5	5	5	5	4	1	2	1	1	1	5.00	2.11	10.56
474	MH1458	MH448	no data	50	#VALUE!	no data	2	2	4	5	5	1	2	1	1	1	2.75	2.44	6.72
475	MH453	MH455	no data	50	#VALUE!	no data	5	5	5	5	4	1	2	1	1	1	5.00	2.11	10.56
484	MH470	MH476	1995	50	23	23	3	5	4	5	5	1	1	1	1	1	4.00	2.33	9.33
490	MH1519	MH1269	1995	50	23	23	3	0	2	1	4	1	1	1	1	1	2.25	2.00	4.50
494	MH476	MH479	1995	50	23	23	3	0	#N/A	#N/A	#N/A	1	1	1	1	1	#N/A	#N/A	#N/A
504	MH534	MH515	no data	50	#VALUE!	no data	5	5	5	5	3	1	1	1	1	1	5.00	1.67	8.33
505	MH505	MH513	no data	50	#VALUE!	no data	0	0	3	5	5	1	1	1	1	1	2.00	2.33	4.67
508	MH816	MH489	2021	50	49	49	1	3	1	1	5	1	1	1	1	1	1.50	2.33	3.50
511	MH493	MH501	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	1	1	1	1	1	#N/A	2.33	#N/A
514	MH490	MH494	no data	50	#VALUE!	no data	3	3	4	5	3	1	1	1	1	1	3.50	1.67	5.83

WP ID	Upstream Manhole	Downstream Manhole	Installation Date	Expected Useful Life	Remaining Useful Life	Remaining Useful Life (YR)	RUL Score	PACP Rating	Relative Condition	Material	Operational Significance/ Size	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
515	MH489	MH493	no data	50	#VALUE!	no data	5	5	5	5	5	1	1	1	1	1	5.00	2.33	11.67
520	MH504	MH534	no data	50	#VALUE!	no data	3	3	4	5	3	1	1	1	1	1	3.50	1.67	5.83
526	MH501	MH503	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	1	1	1	1	1	#N/A	2.33	#N/A
528	MH502	MH504	no data	50	#VALUE!	no data	4	4	#N/A	#N/A	3	1	1	1	1	1	#N/A	1.67	#N/A
529	MH500	MH502	no data	50	#VALUE!	no data	3	3	#N/A	#N/A	3	1	1	1	1	1	#N/A	1.67	#N/A
530	MH503	MH505	2021	50	49	49	1	0	3	5	5	1	1	1	1	1	2.50	2.33	5.83
536	MH516	MH520	no data	50	#VALUE!	no data	5	5	5	5	3	1	1	1	1	1	5.00	1.67	8.33
538	MH513	MH511	no data	50	#VALUE!	no data	5	5	5	5	5	1	1	1	1	1	5.00	2.33	11.67
540	MH511	MH514	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	#N/A	1	1	1	1	1	#N/A	#N/A	#N/A
541	MH515	MH516	no data	50	#VALUE!	no data	5	FALSE	5	5	3	1	1	1	1	1	3.75	1.67	6.25
543	MH521	MH518	no data	50	#VALUE!	no data	4	4	#N/A	#N/A	#N/A	1	1	1	1	1	#N/A	#N/A	#N/A
55	MH43	MH50	1982	50	10	10	4	0	3	1	5	1	1	1	2	5	3.00	3.17	9.50
553	MH1269	MH546	2020	50	48	48	1	0	1	1	5	1	1	1	1	1	1.00	2.33	2.33
555	MH514	MH1158	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	#N/A	1	1	1	1	1	#N/A	#N/A	#N/A
559	MH536	MH537	no data	50	#VALUE!	no data	3	3	2	1	5	1	1	1	1	1	2.50	2.33	5.83
56	MH42	MH43	1982	50	10	10	4	0	3	1	5	1	1	1	1	5	3.00	3.00	9.00
564	MH520	MH536	no data	50	#VALUE!	no data	5	5	5	5	3	1	1	1	1	1	5.00	1.67	8.33
566	MH537	MH523	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	#N/A	1	1	1	1	1	#N/A	#N/A	#N/A
568	MH1158	MH521	no data	50	#VALUE!	no data	3	3	4	5	5	1	1	1	1	1	3.50	2.33	8.17
582	MH544	MH536	no data	50	#VALUE!	no data	2	2	4	5	3	1	1	1	1	1	2.75	1.67	4.58
583	MH518	MH544	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	#N/A	1	1	1	1	1	#N/A	#N/A	#N/A
61	MH54	MH55	2013	50	41	41	1	0	1	1	5	1	1	1	5	5	1.00	3.67	3.67
64	MH51	MH52	2013	50	41	41	1	5	1	1	5	1	1	1	5	5	2.00	3.67	7.33
65	MH50	MH51	1982	50	10	10	4	0	3	1	5	1	1	1	5	5	3.00	3.67	11.00
66	MH52	MH54	2013	50	41	41	1	5	1	1	5	1	1	1	5	5	2.00	3.67	7.33
67	MH55	MH56	no data	50	#VALUE!	no data	0	0	2	4	5	1	1	1	4	5	1.50	3.50	5.25
72	MH60	MH67	1969	50	0	0	5	4	5	4	4	1	1	1	5	5	4.50	3.33	15.00
877	MH778	MH780	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	3	1	2	1	1	1	#N/A	1.78	#N/A
906	MH810	MH353	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	3	1	2	1	1	1	#N/A	1.78	#N/A
911	MH370	MH815	no data	50	#VALUE!	no data	#N/A	0	#N/A	5	5	1	1	1	1	1	#N/A	2.33	#N/A
916	MH815	MH816	no data	50	#VALUE!	no data	#N/A	0	#N/A	5	5	1	1	1	1	1	#N/A	2.33	#N/A
937	MH354	MH813	no data	50	#VALUE!	no data	#N/A	0	#N/A	5	5	1	2	1	1	1	#N/A	2.44	#N/A
940	MH353	MH354	no data	50	#VALUE!	no data	#N/A	0	#N/A	5	4	1	2	1	1	1	#N/A	2.11	#N/A
956	MH813	MH370	no data	50	#VALUE!	no data	5	5	5	5	5	1	1	1	1	1	5.00	2.33	11.67
WP1954	MH97	MH1120	no data	50	#VALUE!	no data	0	0	1	1	5	1	1	1	1	5	0.50	3.00	1.50
WP1956	MH523	MH1550	1997	50	25	25	3	0	2	1	5	1	1	1	1	1	2.25	2.33	5.25
WP1957	MH1550	MH338	no data	50	#VALUE!	no data	#N/A	0	#N/A	5	5	1	2	1	1	5	#N/A	3.11	#N/A
1316	MH1000	MH995	1969	50	0	0	5	0	3	1	1	1	4	1	5	1	3.50	2.00	7.00
1330	MH994	MH992	1969	50	0	0	5	0	3	1	1	1	4	1	5	2	3.50	2.17	7.58
1332	MH992	MH993	1969	50	0	0	5	5	3	1	1	1	4	1	5	3	4.00	2.33	9.33
1333	MH995	MH994	1969	50	0	0	5	0	3	1	1	1	4	1	5	1	3.50	2.00	7.00
1336	MH1001	MH1000	1969	50	0	0	5	1	3	1	1	1	4	1	1	1	3.00	1.33	4.00
1337	MH965	MH1001	1969	50	0	0	5	0	3	1	1	1	4	1	1	1	3.50	1.33	4.67
1215	MH900	MH901	1969	50	0	0	5	0	5	4	1	5	3	1	3	4	4.75	2.50	11.88
1216	MH899	MH900	1969	50	0	0	5	0	5	4	1	5	3	1	3	3	4.75	2.33	11.08
1240	MH918	MH919	1969	50	0	0	5	0	5	4	4	5	3	1	3	4	4.75	3.50	16.63
1242	MH921	MH960	1969	50	0	0	5	0	5	4	4	5	3	1	1	2	4.75	2.83	13.46
1244	MH919	MH921	1969	50	0	0	5	0	5	4	4	5	1	1	1	1	4.75	2.44	11.61
1253	MH901	MH918	1969	50	0	0	5	5	5	5	1	5	3	1	4	4	5.00	2.67	13.33
1306	MH963	MH1504	1969	50	0	0	5	0	5	4	2	2	1	1	1	1	4.75	1.44	6.86
1756	MH1504	MH960	1969	50	0	0	5	0	5	4	2	5	3	1	1	2	4.75	2.17	10.29

WP ID	Upstream Manhole	Downstream Manhole	Installation Date	Expected Useful Life	Remaining Useful Life	Remaining Useful Life (YR)	RUL Score	PACP Rating	Relative Condition	Material	Operational Significance/ Size	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
205	MH168	MH209	1969	50	0	0	5	0	5	4	5	1	4	1	1	1	4.75	2.67	12.67
208	MH167	MH168	1969	50	0	0	5	0	5	4	5	1	4	1	1	1	4.75	2.67	12.67
214	MH270	MH167	1969	50	0	0	5	0	5	4	5	1	4	1	1	1	4.75	2.67	12.67
255	MH209	MH210	1969	50	0	0	5	0	5	4	5	1	4	1	1	1	4.75	2.67	12.67
258	MH210	MH211	1969	50	0	0	5	0	5	4	5	1	4	1	1	1	4.75	2.67	12.67
259	MH212	MH211	2011	50	39	39	2	0	2	1	4	1	4	1	1	1	1.75	2.33	4.08
260	MH211	MH213	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	5	1	4	1	1	1	#N/A	2.67	#N/A
1622	MH769	MH1376	no data	50	#VALUE!	no data	#N/A	0	#N/A	#N/A	#N/A	1	5	1	1	1	#N/A	#N/A	#N/A
430	MH1142	MH1143	2018	50	46	46	1	0	3	5	5	1	2	1	1	5	2.50	3.11	7.78

City of Bath Fiscal Sustainability Plan- Force Main Risk Assessment

				LoF Factors						CoF Factors								Current Year
				Age			Condition			Economic Cost	Social Cost			Environmental Cost				2022
WP ID	Drainage Area	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	PACP Rating	Relative Condition	Material	Operational Significance/ Size	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Aegis Drive FM	Aegis	1985	50	13	26%	4	0	3	1	3	1	2	1	1	5	3.00	2.44	7.33
Bridge Street FM	Bridge Street	1969	50	0	0%	5	0	4	2	1	1	1	1	5	4	4.00	2.17	8.67
Upper Commercial Street FM	Commercial Street	2002	50	30	60%	2	0	2	2	5	5	5	1	1	4	2.00	3.72	7.44
Lower Commercial Street FM	Commercial Street	1969	50	0	0%	5	0	4	2	5	5	5	1	1	4	4.00	3.72	14.89
Farrin Place FM	Farrin Place	1969	50	0	0%	5	0	4	2	1	1	1	1	1	3	4.00	1.33	5.33
Front Street FM	Front Street	2002	50	30	60%	2	0	2	1	3	1	4	1	1	1	1.75	2.00	3.50
Harward Street FM	Harward Street	2014	50	42	84%	1	0	2	2	5	1	1	1	5	5	1.50	3.67	5.50
Hunt Street FM	Hunt Street	1969	50	0	0%	5	0	4	2	1	1	4	1	5	5	4.00	2.67	10.67
Hyde Park FM	Hyde Park	2010	50	38	76%	2	0	2	2	1	1	4	1	1	5	2.00	2.00	4.00
Landfill FM	Landfill	2001	50	29	58%	3	0	2	1	1	1	1	1	2	5	2.25	1.83	4.13
Pleasant Avenue FM	Pleasant Avenue	1972	50	0	0%	5	0	4	2	5	5	3	1	1	1	4.00	3.00	12.00
Riverview Road FM	Riverview Road	1969	50	0	0%	5	0	4	2	1	1	1	1	5	5	4.00	2.33	9.33
Rose Street FM	Rose Street	1972	50	0	0%	5	0	4	2	1	5	3	1	4	4	4.00	2.67	10.67
Wing Farm FM	Wing Farm	1998	50	26	52%	3	0	3	2	3	1	4	1	1	5	2.75	2.67	7.33

City of Bath Fiscal Sustainability Plan- WPCF Risk Assesment

				LOF Factors				COF Factors										Current Year
				Age			Condition	Economic Cost			Social Cost			Environmental Cost				2022
Equipment / Asset Name	Location/Building	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Administration Building/Garage	Administration Building	1997	60	35	58%	3	3	2	5	3	5	4	1	1	1	3.00	2.55	7.66
Ductless Split Fan Coil	Administration Building	2015	15	8	53%	3	4	1	1	2	5	4	1	1	1	3.50	1.89	6.60
Ductless Split Heat Pump	Administration Building	2015	15	8	53%	3	2	1	1	2	5	4	1	1	1	2.50	1.89	4.72
Ductless Split Fan Coil	Administration Building	2015	15	8	53%	3	2	1	1	2	5	4	1	1	1	2.50	1.89	4.72
Ductless Split Heat Pump	Administration Building	2015	15	8	53%	3	2	1	1	2	5	4	1	1	1	2.50	1.89	4.72
Ductless Split Fan Coil	Administration Building	2015	15	8	53%	3	4	1	1	2	5	4	1	1	1	3.50	1.89	6.60
Ductless Split Heat Pump	Administration Building	2015	15	8	53%	3	2	1	1	2	5	4	1	1	1	2.50	1.89	4.72
Ductless Split Fan Coil	Administration Building	2015	15	8	53%	3	2	1	1	2	5	4	1	1	1	2.50	1.89	4.72
Ductless Split Heat Pump	Administration Building	2015	15	8	53%	3	2	1	1	2	5	4	1	1	1	2.50	1.89	4.72
Plumbing Fixtures	Administration Building	1997	15	0	0%	5	4	1	5	2	5	4	1	1	1	4.50	2.33	10.49
Domestic Water Heater	Administration Building	2015	15	8	53%	3	3	3	5	2	5	4	1	1	1	3.00	2.55	7.66
Roof	Administration Building	1997	60	35	58%	3	3	3	5	3	5	4	1	1	1	3.00	2.66	7.99
Weather Station	Administration Building	2010	10	0	0%	5	3	2	5	2	5	4	1	1	1	4.00	2.44	9.77
Topview Software	Administration Building	2010	10	0	0%	5	1	4	5	3	5	4	1	1	1	3.00	2.78	8.33
Panelboards and Transformers	Administration Building	1997	25	0	0%	5	3	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Lighting	Administration Building	1997	25	0	0%	5	5	2	1	2	5	4	1	1	1	5.00	2.00	9.99
Flooring	Administration Building	1997	20	0	0%	5	4	2	1	2	5	4	1	1	1	4.50	2.00	8.99
Fire Alarm	Administration Building	1997	25	0	0%	5	1	4	5	4	5	4	1	1	1	3.00	2.89	8.66
Siding	Administration Building	1997	20	0	0%	5	3	2	1	2	5	4	1	1	1	4.00	2.00	7.99
Interior/Exterior Doors	Administration Building	1997	60	35	58%	3	3	2	3	2	5	4	1	1	1	3.00	2.22	6.66
Windows	Administration Building	1997	60	35	58%	3	3	1	3	2	5	4	1	1	1	3.00	2.11	6.33
Interior Walls	Administration Building	1997	60	35	58%	3	3	1	1	2	5	4	1	1	1	3.00	1.89	5.66
SCADA System	Administration Building/Site	2019	5	2	40%	3	3	4	5	4	5	4	1	1	1	3.00	2.89	8.66
Aeration Tank Slide Gates	Aeration Tanks	1997	30	5	17%	5	3	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Aeration Tanks	Aeration Tanks	1969	45	0	0%	5	2	3	5	3	5	4	1	1	1	3.50	2.66	9.32
DO Probes	Aeration Tanks	2019	10	7	70%	2	2	4	5	4	5	4	1	1	1	2.00	2.89	5.77
Air Diffuser Membranes	Aeration Tanks	2019	10	7	70%	2	1	5	5	4	5	4	1	1	1	1.50	3.00	4.50
Secondary Effluent Chlorination Tank Mi	Chlorine Contact Tank	1997	20	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Secondary Effluent Dechlorination Tank	Chlorine Contact Tank	1997	20	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Chlorine Contact Tank	Chlorine Contact Tank	1969	45	0	0%	5	2	3	3	3	5	4	1	1	1	3.50	2.44	8.55
CCT Gate Actuators	Chlorine Contact Tank	2017	20	15	75%	2	2	4	5	4	5	4	1	1	1	2.00	2.89	5.77
Chlorine Contact Tank Gates	Chlorine Contact Tank	2017	30	25	83%	1	2	5	3	4	5	4	1	1	1	1.50	2.78	4.16
Standby Generator	CSO Disinfection and Dechlorination Tank	1993	35	6	17%	5	5	3	5	4	5	4	1	1	1	5.00	2.78	13.88
CSO Chlorination Tank Mixer	CSO Disinfection and Dechlorination Tank	1997	20	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
CSO Chlorination Tank Mixer	CSO Disinfection and Dechlorination Tank	1997	20	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
CSO Dechlorination Tank Mixer	CSO Disinfection and Dechlorination Tank	1997	20	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
CSO Effluent Flow Meter	CSO Disinfection and Dechlorination Tank	1997	15	0	0%	5	4	4	5	4	5	4	1	1	1	4.50	2.89	12.99
CSO Disinfection and Dechlorination Tan	CSO Disinfection and Dechlorination Tank	1997	45	20	44%	3	2	3	3	3	5	4	1	1	1	2.50	2.44	6.11
Effluent Flow Meter	Dechlorination/Effluent Flow Metering Struc	2015	15	8	53%	3	4	4	5	4	5	4	1	1	1	3.50	2.89	10.10

Equipment / Asset Name	Location/Building	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Dechlorination/Effluent Flow Metering S	Dechlorination/Effluent Flow Metering Struc	1997	30	5	17%	5	2	3	5	3	5	4	1	1	1	3.50	2.66	9.32
Effluent Well Level	Effluent Well	2019	15	12	80%	1	1	4	5	4	5	4	1	1	1	1.00	2.89	2.89
Effluent Well	Effluent Well	2019	30	27	90%	1	1	3	5	3	5	4	1	1	1	1.00	2.66	2.66
Flow Distribution Structure No. 1	Flow Distribution Structure 1	1997	30	5	17%	5	2	3	5	3	5	4	1	1	1	3.50	2.66	9.32
Influent Flow Measurement	Flow Distribution Structure 1	2019	15	12	80%	1	1	4	5	4	5	4	1	1	1	1.00	2.89	2.89
Flow Distribution Structure No. 2	Flow Distribution Structure 2	1997	30	5	17%	5	2	3	5	3	5	4	1	1	1	3.50	2.66	9.32
Flow Distribution Structure No. 3	Flow Distribution Structure 3	1997	30	5	17%	5	2	3	5	3	5	4	1	1	1	3.50	2.66	9.32
Headworks Building	Headworks Building	1997	60	35	58%	3	4	2	5	3	5	4	1	1	1	3.50	2.55	8.94
Site Drainage	Headworks Building	1997	50	25	50%	3	4	1	1	1	5	4	1	1	1	3.50	1.78	6.22
Gas Detection System	Headworks Building	1997	10	0	0%	5	5	4	5	4	5	4	1	1	1	5.00	2.89	14.43
Mechanical Bar Screen	Headworks Building	1997	20	0	0%	5	5	5	3	4	5	4	1	1	1	5.00	2.78	13.88
Headworks Piping	Headworks Building	1997	35	10	29%	4	5	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Grit Piping and Valves	Headworks Building	1997	35	10	29%	4	5	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Headworks Slide Gates	Headworks Building	1997	30	5	17%	5	3	4	5	4	5	4	1	1	1	4.00	2.89	11.54
Manually Cleaned Bar Rack	Headworks Building	1997	30	5	17%	5	3	5	3	4	5	4	1	1	1	4.00	2.78	11.10
Lighting	Headworks Building	1997	25	0	0%	5	5	2	1	2	5	4	1	1	1	5.00	2.00	9.99
Headworks Channel	Headworks Building	1997	60	35	58%	3	4	4	5	3	5	4	1	1	1	3.50	2.78	9.71
Unit Heaters	Headworks Building	1997	15	0	0%	5	5	1	1	2	5	4	1	1	1	5.00	1.89	9.44
Exhaust Fan	Headworks Building	1997	15	0	0%	5	5	1	1	2	5	4	1	1	1	5.00	1.89	9.44
Vortex Grit Mixer	Headworks Building	2020	20	18	90%	1	2	5	5	4	5	4	1	1	1	1.50	3.00	4.50
Grit Classifier	Headworks Building	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Sump Pump	Headworks Building	1997	30	5	17%	5	3	3	5	2	5	4	1	1	1	4.00	2.55	10.21
Lighting	Headworks Building	1997	25	0	0%	5	5	2	1	2	5	4	1	1	1	5.00	2.00	9.99
Unit Heater	Headworks Building	1997	15	0	0%	5	3	1	1	2	5	4	1	1	1	4.00	1.89	7.55
Grit Pump	Headworks Building	2020	20	18	90%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Headworks Skylight	Headworks Building	1997	60	35	58%	3	4	3	5	3	5	4	1	1	1	3.50	2.66	9.32
Roof	Headworks Building	1997	60	35	58%	3	4	3	5	3	5	4	1	1	1	3.50	2.66	9.32
Link Seals	Headworks Building	1997	25	0	0%	5	5	4	5	4	5	4	1	1	1	5.00	2.89	14.43
Fire Alarm	Headworks Building	1997	25	0	0%	5	3	4	5	4	5	4	1	1	1	4.00	2.89	11.54
Hot Water Piping	Headworks Building	1997	15	0	0%	5	4	3	5	2	5	4	1	1	1	4.50	2.55	11.49
Louvers/Dampers	Headworks Building	1997	15	0	0%	5	4	1	5	2	5	4	1	1	1	4.50	2.33	10.49
Interior/Exterior Doors	Headworks Building	1997	60	35	58%	3	4	2	3	2	5	4	1	1	1	3.50	2.22	7.77
Veneer	Headworks Building	1997	60	35	58%	3	4	1	3	2	5	4	1	1	1	3.50	2.11	7.38
Transformer	Headworks Building	1997	25	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Motor Control Center 3E	Headworks Building	1997	35	10	29%	4	4	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Lighting Panel	Headworks Building	1997	25	0	0%	5	3	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Headworks Building Control Panel	Headworks Building	1997	20	0	0%	5	2	5	5	4	5	4	1	1	1	3.50	3.00	10.49
Lighting	Headworks Building	1997	25	0	0%	5	5	2	1	2	5	4	1	1	1	5.00	2.00	9.99
Portable Eyewash	Headworks Building	1997	15	0	0%	5	2	3	5	2	5	4	1	1	1	3.50	2.55	8.94
Exhaust Fan	Headworks Building	1997	15	0	0%	5	2	1	1	2	5	4	1	1	1	3.50	1.89	6.60
Operations Building	Operations Building	1969	60	7	12%	5	3	2	5	3	5	4	1	1	1	4.00	2.55	10.21
Vertical Unit Heater	Operations Building	1997	15	0	0%	5	4	1	1	2	5	4	1	1	1	4.50	1.89	8.49

Equipment / Asset Name	Location/Building	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Lighting Panel	Operations Building	1969	25	0	0%	5	4	4	5	4	5	4	1	1	1	4.50	2.89	12.99
Motor Control Center 2E	Operations Building	1997	35	10	29%	4	3	5	5	4	5	4	1	1	1	3.50	3.00	10.49
Lighting Panel	Operations Building	1969	25	0	0%	5	4	4	5	4	5	4	1	1	1	4.50	2.89	12.99
Blended Sludge Pump VFDs	Operations Building	2019	12	9	75%	2	1	5	5	4	5	4	1	1	1	1.50	3.00	4.50
Automatic Temperature Control Panel	Operations Building	2019	15	12	80%	1	2	3	5	2	5	4	1	1	1	1.50	2.55	3.83
Motor Control Center 2N2	Operations Building	2019	35	32	91%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Transformer 2N2	Operations Building	2019	25	22	88%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Operations Building Control Panel	Operations Building	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Operations Building Control Panel UPS	Operations Building	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Lighting Panel	Operations Building	2019	25	22	88%	1	1	4	5	4	5	4	1	1	1	1.00	2.89	2.89
Lighting	Operations Building	2019	25	22	88%	1	1	2	1	2	5	4	1	1	1	1.00	2.00	2.00
Convector	Operations Building	1969	15	0	0%	5	3	1	1	2	5	4	1	1	1	4.00	1.89	7.55
Lighting	Operations Building	1993	25	0	0%	5	4	2	1	2	5	4	1	1	1	4.50	2.00	8.99
Ductless Split Heat Pump	Operations Building	2019	15	12	80%	1	1	1	1	2	5	4	1	1	1	1.00	1.89	1.89
Ductless Split Heat Pump	Operations Building	2019	15	12	80%	1	1	1	1	2	5	4	1	1	1	1.00	1.89	1.89
Boiler	Operations Building	1969	15	0	0%	5	5	3	5	2	5	4	1	1	1	5.00	2.55	12.77
Supply Fan	Operations Building	2013	15	6	40%	3	2	1	1	2	5	4	1	1	1	2.50	1.89	4.72
Circulating Pumps	Operations Building	2019	15	12	80%	1	2	3	5	2	5	4	1	1	1	1.50	2.55	3.83
Backflow Preventor - Operations Buildin	Operations Building	2019	30	27	90%	1	1	3	5	2	5	4	1	1	1	1.00	2.55	2.55
Effluent Well Pumps	Operations Building	1969	30	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Operations Building Flood Level	Operations Building	2010	5	0	0%	5	2	4	5	4	5	4	1	1	1	3.50	2.89	10.10
Lighting	Operations Building	1969	25	0	0%	5	5	2	1	2	5	4	1	1	1	5.00	2.00	9.99
Sump Pump	Operations Building	2010	30	18	60%	2	3	3	5	2	5	4	1	1	1	2.50	2.55	6.38
Polymer Containment Level	Operations Building	2019	5	2	40%	3	1	4	5	4	5	4	1	1	1	2.00	2.89	5.77
Polymer Blending Unit Mixer Drive	Operations Building	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Polymer Blending Unit Polymer Pump	Operations Building	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Polymer Tote Mixer	Operations Building	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Polymer Blending Units	Operations Building	2019	20	17	85%	1	1	5	1	4	5	4	1	1	1	1.00	2.55	2.55
Power Distribution Panel L	Operations Building	1997	20	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Transformer 5	Operations Building	1997	25	0	0%	5	2	5	5	4	5	4	1	1	1	3.50	3.00	10.49
Transformer 6	Operations Building	1997	25	0	0%	5	2	5	5	4	5	4	1	1	1	3.50	3.00	10.49
Transformer 7	Operations Building	1997	25	0	0%	5	2	5	5	4	5	4	1	1	1	3.50	3.00	10.49
Transformer 8	Operations Building	1997	25	0	0%	5	2	5	5	4	5	4	1	1	1	3.50	3.00	10.49
Lighting	Operations Building	1993	25	0	0%	5	5	2	1	2	5	4	1	1	1	5.00	2.00	9.99
Blended Sludge Piping and Valves	Operations Building	2019	35	32	91%	1	3	5	5	4	5	4	1	1	1	2.00	3.00	5.99
Blended Sludge Pump Grinders	Operations Building	2019	20	17	85%	1	1	5	3	4	5	4	1	1	1	1.00	2.78	2.78
Blended Sludge Pumps	Operations Building	2019	25	22	88%	1	1	5	3	4	5	4	1	1	1	1.00	2.78	2.78
Blended Sludge Flow Meter	Operations Building	2019	20	17	85%	1	1	4	3	4	5	4	1	1	1	1.00	2.66	2.66
Lighting Panel	Operations Building	1969	25	0	0%	5	5	4	5	4	5	4	1	1	1	5.00	2.89	14.43
Lighting Panel	Operations Building	1997	25	0	0%	5	3	4	5	4	5	4	1	1	1	4.00	2.89	11.54
Lighting Panel	Operations Building	1997	25	0	0%	5	3	4	5	4	5	4	1	1	1	4.00	2.89	11.54
Lighting Panel	Operations Building	1997	25	0	0%	5	3	4	5	4	5	4	1	1	1	4.00	2.89	11.54

Equipment / Asset Name	Location/Building	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Unit Heaters	Operations Building	2019	15	12	80%	1	1	1	1	2	5	4	1	1	1	1.00	1.89	1.89
Roof	Operations Building	2000	60	38	63%	2	4	3	5	3	5	4	1	1	1	3.00	2.66	7.99
Transformer 5	Operations Building	1997	25	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Lighting Panel (120/240)	Operations Building	1969	25	0	0%	5	4	4	5	4	5	4	1	1	1	4.50	2.89	12.99
Dewatering Equipment VFDs	Operations Building	2019	12	9	75%	2	1	5	5	4	5	4	1	1	1	1.50	3.00	4.50
Floc Tanks	Operations Building	2019	20	17	85%	1	2	5	1	4	5	4	1	1	1	1.50	2.55	3.83
Rotary Screw Thickeners	Operations Building	2019	20	17	85%	1	2	5	1	4	5	4	1	1	1	1.50	2.55	3.83
Energy Recovery Unit No. 2 VFD	Operations Building	2019	12	9	75%	2	1	2	5	3	5	4	1	1	1	1.50	2.55	3.83
Air Handling Unit VFD	Operations Building	2019	12	9	75%	2	1	2	5	3	5	4	1	1	1	1.50	2.55	3.83
Energy Recovery Unit	Operations Building	2019	15	12	80%	1	2	2	5	2	5	4	1	1	1	1.50	2.44	3.66
Lighting	Operations Building	2019	25	22	88%	1	2	2	1	2	5	4	1	1	1	1.50	2.00	3.00
Sludge Conveyor	Operations Building	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Dewatering Control Panel 1	Operations Building	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Dewatering Control Panel 2	Operations Building	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Air Compressor	Operations Building	2019	25	22	88%	1	1	4	5	4	5	4	1	1	1	1.00	2.89	2.89
Rotary Thickened Sludge Pumps	Operations Building	2019	20	17	85%	1	1	5	1	4	5	4	1	1	1	1.00	2.55	2.55
Rotary Screw Presses	Operations Building	2019	20	17	85%	1	1	5	1	4	5	4	1	1	1	1.00	2.55	2.55
Air Handling Unit	Operations Building	2019	15	12	80%	1	1	2	5	2	5	4	1	1	1	1.00	2.44	2.44
Louvers/Dampers	Operations Building	2019	15	12	80%	1	1	1	5	2	5	4	1	1	1	1.00	2.33	2.33
Unit Heaters	Operations Building	2019	15	12	80%	1	1	1	1	2	5	4	1	1	1	1.00	1.89	1.89
Exhaust Fans	Operations Building	2019	15	12	80%	1	1	1	1	2	5	4	1	1	1	1.00	1.89	1.89
Fuel Oil Tank	Operations Building	1969	15	0	0%	5	4	1	5	2	5	4	1	1	1	4.50	2.33	10.49
Sludge Distribution Conveyor Actuator	Operations Building	2019	20	17	85%	1	2	4	5	4	5	4	1	1	1	1.50	2.89	4.33
Louvers/Dampers	Operations Building	2019	15	12	80%	1	2	1	5	2	5	4	1	1	1	1.50	2.33	3.50
Sludge Conveyor (Truck Bay Distribution	Operations Building	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Roll-Off Container Level	Operations Building	2019	15	12	80%	1	1	4	5	4	5	4	1	1	1	1.00	2.89	2.89
Lighting	Operations Building	2019	25	22	88%	1	1	2	1	2	5	4	1	1	1	1.00	2.00	2.00
Unit Heaters	Operations Building	2019	15	12	80%	1	1	1	1	2	5	4	1	1	1	1.00	1.89	1.89
Fire Alarm	Operations Building	1997	25	0	0%	5	3	4	5	4	5	4	1	1	1	4.00	2.89	11.54
Hot Water Piping	Operations Building	1997	15	0	0%	5	4	3	5	2	5	4	1	1	1	4.50	2.55	11.49
Breakroom	Operations Building	1969	60	7	12%	5	5	2	1	2	5	4	1	1	1	5.00	2.00	9.99
Windows	Operations Building	1969	60	7	12%	5	4	1	3	2	5	4	1	1	1	4.50	2.11	9.49
Domestic Water Pipe	Operations Building	1997	15	0	0%	5	2	3	5	2	5	4	1	1	1	3.50	2.55	8.94
Laboratory	Operations Building	1997	60	35	58%	3	4	2	5	3	5	4	1	1	1	3.50	2.55	8.94
Interior/Exterior Doors	Operations Building	1969	60	7	12%	5	3	2	3	2	5	4	1	1	1	4.00	2.22	8.88
Link Seals	Operations Building	1969	25	0	0%	5	1	4	5	4	5	4	1	1	1	3.00	2.89	8.66
Lockers/Bathrooms	Operations Building	1969	60	7	12%	5	4	1	1	2	5	4	1	1	1	4.50	1.89	8.49
Veneer	Operations Building	1969	60	7	12%	5	2	1	3	2	5	4	1	1	1	3.50	2.11	7.38
Kalwall	Operations Building	2019	30	27	90%	1	1	1	1	2	5	4	1	1	1	1.00	1.89	1.89
Lighting and Disconnects	Primary Clarifiers	1997	25	0	0%	5	5	5	5	3	5	4	1	1	1	5.00	2.89	14.43
Primary Clarifier Mechanisms	Primary Clarifiers	1997	30	5	17%	5	5	5	3	4	5	4	1	1	1	5.00	2.78	13.88
Primary Clarifier Drives	Primary Clarifiers	1997	25	0	0%	5	5	5	3	4	5	4	1	1	1	5.00	2.78	13.88

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Primary Clarifiers	Primary Clarifiers	1969	45	0	0%	5	4	3	5	3	5	4	1	1	1	4.50	2.66	11.99
Chlorine Contact Tank Chlorine/Dechlor	Pump and Blower Building	2016	10	4	40%	3	3	4	5	4	5	4	1	1	1	3.00	2.89	8.66
Pump and Blower Building	Pump and Blower Building	1997	60	35	58%	3	3	2	5	3	5	4	1	1	1	3.00	2.55	7.66
Aeration Tank Blowers	Pump and Blower Building	1997	20	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Sludge Tank 1 and 2 Blowers	Pump and Blower Building	1997	20	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Aeration Tank Blower VFD Control Panel	Pump and Blower Building	1997	12	0	0%	5	3	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Power Distribution Panel 1	Pump and Blower Building	1997	20	0	0%	5	3	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Lighting Panels	Pump and Blower Building	1997	25	0	0%	5	3	4	5	4	5	4	1	1	1	4.00	2.89	11.54
Lighting	Pump and Blower Building	1997	25	0	0%	5	4	2	1	2	5	4	1	1	1	4.50	2.00	8.99
Emergency Eyewash Station	Pump and Blower Building	1997	15	0	0%	5	2	3	5	2	5	4	1	1	1	3.50	2.55	8.94
Unit Heaters	Pump and Blower Building	1997	15	0	0%	5	3	1	1	2	5	4	1	1	1	4.00	1.89	7.55
Exhaust Fan	Pump and Blower Building	1997	15	0	0%	5	3	1	1	2	5	4	1	1	1	4.00	1.89	7.55
Exhaust Fan	Pump and Blower Building	1997	15	0	0%	5	3	1	1	2	5	4	1	1	1	4.00	1.89	7.55
Sludge Tank 3 Blower	Pump and Blower Building	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Chemical Fill Panels	Pump and Blower Building	2019	20	17	85%	1	1	4	5	4	5	4	1	1	1	1.00	2.89	2.89
Motor Control Center 1E	Pump and Blower Building	1997	35	10	29%	4	5	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Main Switchboard	Pump and Blower Building	1997	20	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Transformer	Pump and Blower Building	1997	25	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Return Activated Sludge Pumps VFD Con	Pump and Blower Building	1997	12	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Tank Drain Pump VFD Control Panel	Pump and Blower Building	1997	12	0	0%	5	4	5	5	4	5	4	1	1	1	4.50	3.00	13.49
Automatic Transfer Switch	Pump and Blower Building	1993	25	0	0%	5	4	3	5	4	5	4	1	1	1	4.50	2.78	12.49
Motor Control Center 1	Pump and Blower Building	1997	35	10	29%	4	4	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Motor Control Center 1A	Pump and Blower Building	1997	35	10	29%	4	4	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Control Panel 1	Pump and Blower Building	1997	20	0	0%	5	3	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Lighting	Pump and Blower Building	1997	25	0	0%	5	4	2	1	2	5	4	1	1	1	4.50	2.00	8.99
Electric Unit Heater	Pump and Blower Building	1997	15	0	0%	5	3	1	1	2	5	4	1	1	1	4.00	1.89	7.55
Sludge Tank Blower No. 3 VFD	Pump and Blower Building	2019	12	9	75%	2	1	5	5	4	5	4	1	1	1	1.50	3.00	4.50
Automatic Temperature Control Panel	Pump and Blower Building	2019	15	12	80%	1	2	3	5	2	5	4	1	1	1	1.50	2.55	3.83
Ductless Split Heat Pump	Pump and Blower Building	2019	15	12	80%	1	1	1	1	2	5	4	1	1	1	1.00	1.89	1.89
RAS Flow Meters	Pump and Blower Building	1997	20	0	0%	5	4	4	5	4	5	4	1	1	1	4.50	2.89	12.99
Primary Sludge Flow Meter	Pump and Blower Building	1997	20	0	0%	5	4	4	5	4	5	4	1	1	1	4.50	2.89	12.99
Waste Sludge Flow Meter	Pump and Blower Building	1997	20	0	0%	5	4	4	5	4	5	4	1	1	1	4.50	2.89	12.99
Plant Water Pumps	Pump and Blower Building	1997	30	5	17%	5	4	5	3	4	5	4	1	1	1	4.50	2.78	12.49
Primary Sludge Scum Pump	Pump and Blower Building	1997	25	0	0%	5	3	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Primary Scum Grinder	Pump and Blower Building	1997	20	0	0%	5	3	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Waste Sludge Pump	Pump and Blower Building	1997	25	0	0%	5	3	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Waste Sludge Grinder	Pump and Blower Building	1997	20	0	0%	5	3	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Tank Drain Pump	Pump and Blower Building	1997	30	5	17%	5	3	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Sump Pump	Pump and Blower Building	1997	30	5	17%	5	4	3	5	2	5	4	1	1	1	4.50	2.55	11.49
Primary Sludge Pumps	Pump and Blower Building	1997	25	0	0%	5	3	5	3	4	5	4	1	1	1	4.00	2.78	11.10
Primary Sludge Grinder	Pump and Blower Building	1997	20	0	0%	5	3	5	3	4	5	4	1	1	1	4.00	2.78	11.10
Return Sludge Pumps	Pump and Blower Building	2012	30	20	67%	2	4	5	3	4	5	4	1	1	1	3.00	2.78	8.33

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Lighting	Pump and Blower Building	1997	25	0	0%	5	3	2	1	2	5	4	1	1	1	4.00	2.00	7.99
Unit Heaters	Pump and Blower Building	1997	15	0	0%	5	3	1	1	2	5	4	1	1	1	4.00	1.89	7.55
Chemical Control Panel UPS	Pump and Blower Building	2019	20	17	85%	1	3	5	5	4	5	4	1	1	1	2.00	3.00	5.99
Sodium Hypochlorite Tank Level	Pump and Blower Building	2019	5	2	40%	3	1	4	5	4	5	4	1	1	1	2.00	2.89	5.77
Sodium Bisulfite Tank Level	Pump and Blower Building	2019	5	2	40%	3	1	4	5	4	5	4	1	1	1	2.00	2.89	5.77
Tank Drain Pump Flow Meter	Pump and Blower Building	2019	20	17	85%	1	2	4	5	4	5	4	1	1	1	1.50	2.89	4.33
Emergency Eyewash Station	Pump and Blower Building	2019	15	12	80%	1	2	3	5	2	5	4	1	1	1	1.50	2.55	3.83
Electric Water Heater	Pump and Blower Building	2019	15	12	80%	1	2	3	5	2	5	4	1	1	1	1.50	2.55	3.83
Chemical Piping and Valves	Pump and Blower Building	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Chemical Control Panel	Pump and Blower Building	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Sodium Hypochlorite Tank Level	Pump and Blower Building	2019	15	12	80%	1	1	4	5	4	5	4	1	1	1	1.00	2.89	2.89
Sodium Bisulfite Tank Level	Pump and Blower Building	2019	15	12	80%	1	1	4	5	4	5	4	1	1	1	1.00	2.89	2.89
Electric Duct Heater	Pump and Blower Building	2019	15	12	80%	1	2	1	1	2	5	4	1	1	1	1.50	1.89	2.83
Sodium Hypochlorite Tank	Pump and Blower Building	2019	15	12	80%	1	1	5	3	4	5	4	1	1	1	1.00	2.78	2.78
Sodium Hypochlorite Pumps	Pump and Blower Building	2019	15	12	80%	1	1	5	3	4	5	4	1	1	1	1.00	2.78	2.78
CSO Sodium Hypochlorite Pumps	Pump and Blower Building	2019	15	12	80%	1	1	5	3	4	5	4	1	1	1	1.00	2.78	2.78
Sodium Bisulfite Tank	Pump and Blower Building	2019	15	12	80%	1	1	5	3	4	5	4	1	1	1	1.00	2.78	2.78
Sodium Bisulfite Pumps	Pump and Blower Building	2019	15	12	80%	1	1	5	3	4	5	4	1	1	1	1.00	2.78	2.78
CSO Sodium Bisulfite Pumps	Pump and Blower Building	2019	15	12	80%	1	1	5	3	4	5	4	1	1	1	1.00	2.78	2.78
Circulating Pump	Pump and Blower Building	2019	15	12	80%	1	1	3	5	2	5	4	1	1	1	1.00	2.55	2.55
Roof	Pump and Blower Building	1997	60	35	58%	3	3	3	5	3	5	4	1	1	1	3.00	2.66	7.99
Exhaust Fan	Pump and Blower Building	1997	15	0	0%	5	3	1	1	2	5	4	1	1	1	4.00	1.89	7.55
Energy Recovery Unit No. 1 VFD	Pump and Blower Building	2019	12	9	75%	2	1	2	5	3	5	4	1	1	1	1.50	2.55	3.83
Energy Recovery Unit	Pump and Blower Building	2019	15	12	80%	1	1	2	5	2	5	4	1	1	1	1.00	2.44	2.44
Ductless Split Heat Pump	Pump and Blower Building	2019	15	12	80%	1	1	1	1	2	5	4	1	1	1	1.00	1.89	1.89
Lighting	Pump and Blower Building	1997	25	0	0%	5	4	2	1	2	5	4	1	1	1	4.50	2.00	8.99
Link Seals	Pump and Blower Building	1997	25	0	0%	5	5	4	5	4	5	4	1	1	1	5.00	2.89	14.43
Louvers/Dampers	Pump and Blower Building	1997	15	0	0%	5	3	1	5	2	5	4	1	1	1	4.00	2.33	9.32
Hot Water Piping	Pump and Blower Building	1997	15	0	0%	5	2	3	5	2	5	4	1	1	1	3.50	2.55	8.94
Interior/Exterior Doors	Pump and Blower Building	1997	60	35	58%	3	3	2	3	2	5	4	1	1	1	3.00	2.22	6.66
Veneer	Pump and Blower Building	1997	60	35	58%	3	3	1	3	2	5	4	1	1	1	3.00	2.11	6.33
Windows	Pump and Blower Building	1997	60	35	58%	3	1	1	3	2	5	4	1	1	1	2.00	2.11	4.22
Fire Alarm	Pump and Blower Building	2019	25	22	88%	1	1	4	5	4	5	4	1	1	1	1.00	2.89	2.89
Secondary Clarifiers	Secondary Clarifiers	1997	30	5	17%	5	4	3	5	3	5	4	1	1	1	4.50	2.66	11.99
Secondary Clarifier Mechanisms	Secondary Clarifiers	2012	30	20	67%	2	2	5	3	4	5	4	1	1	1	2.00	2.78	5.55
Secondary Clarifier Drives	Secondary Clarifiers	2019	25	22	88%	1	2	5	3	4	5	4	1	1	1	1.50	2.78	4.16
Sludge Piping and Valves	Site Wide	1969	35	0	0%	5	3	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Influent Sewer/Treatment Effluent Pipin	Site Wide	1969	40	0	0%	5	3	5	5	4	5	4	1	1	1	4.00	3.00	11.99
Plant Water Piping and Valves	Site Wide	1993	50	21	42%	3	4	5	5	4	5	4	1	1	1	3.50	3.00	10.49
Plant Water Hydrants	Site Wide	1997	30	5	17%	5	5	2	1	3	5	4	1	1	1	5.00	2.11	10.55
Sludge Tank Mixing System	Sludge Holding Tank No. 1, 2	1997	10	0	0%	5	5	5	5	4	5	4	1	1	1	5.00	3.00	14.99
Sludge Holding Tank No. 1 and 2	Sludge Holding Tank No. 1, 2	1997	30	5	17%	5	3	3	5	3	5	4	1	1	1	4.00	2.66	10.66

Equipment / Asset Name	Location/Building	Installation Date	Expected Useful Life	Remaining Useful Life (YR)	Remaining Useful Life (%)	RUL Score	Relative Condition	Operational Significance/ Size	Redundancy	Availability of Spare Parts	Waterfront Properties	Important Local Users	Beaches	Critical Plant/ Animal Habitat	Wetlands & Waterbodies	LoF Score	CoF Score	Criticality Score
Sludge Holding Tank No. 1 and 2 Level	Sludge Holding Tank No. 1, 2	2019	15	12	80%	1	1	4	5	4	5	4	1	1	1	1.00	2.89	2.89
Sludge Tank Mixing System	Sludge Holding Tank No. 3	2019	20	17	85%	1	1	5	5	4	5	4	1	1	1	1.00	3.00	3.00
Sludge Holding Tank No. 3 Level	Sludge Holding Tank No. 3	2019	15	12	80%	1	1	4	5	4	5	4	1	1	1	1.00	2.89	2.89
Sludge Holding Tank No. 3	Sludge Holding Tank No. 3	2019	30	27	90%	1	1	3	5	3	5	4	1	1	1	1.00	2.66	2.66

C

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Appendix C
WPCF, Pump Station, Collection System Capital Improvement Project Summary

SHORT-TERM (0-5 years)
MEDIUM-TERM (5-10 years)
LONG-TERM (10-15 years)

Table 5-4 Implementation Schedule

FSP Project #	Project	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	Estimated Project Cost with Escalation	Status Done / Ongoing / Not Started
WPCF-1	Sludge Tank Mixing Upgrade		$ 526,000														$526,000	
WPCF-2	Headworks Upgrade			$ 2,631,000													$2,631,000	
WPCF-3	Primary Clarifier Upgrade		$ 1,282,000														$1,282,000	
WPCF-4	Generator Upgrade				$ 821,000												$821,000	
WPCF-5	Plant Water Upgrade					$ 594,000											$594,000	
WPCF-6	Sludge Pumping Upgrade							$ 2,050,000									$2,050,000	
WPCF-7	Secondary Clarifier and Site Piping Upgrade									$ 2,489,000							$2,489,000	
WPCF-8	Aeration Tanks Upgrade								$ 2,025,000								$2,025,000	
WPCF-9	Disinfection System Upgrade								$ 153,000								$153,000	
WPCF-10	Pump and Blower Building Electrical Upgrade				$ 2,563,000												$2,563,000	
WPCF-11	Boiler and Domestic Water Upgrade									$ 629,000							$629,000	
WPCF-12	Operations Building Electrical Upgrade											$ 1,181,000					$1,181,000	
WPCF-13	Administration Building Upgrade													$ 2,245,000			$2,245,000	
WPCF-14	Operations Building Upgrade															$ 873,000	$873,000	
WPCF-15	Pump and Blower Building Upgrade															$ 581,000	$581,000	
	WPCF Projects Subtotal	**$0**	**$1,808,000**	**$2,631,000**	**$3,384,000**	**$594,000**	**$0**	**$2,050,000**	**$2,178,000**	**$3,118,000**	**$0**	**$1,181,000**	**$0**	**$2,245,000**	**$0**	**$1,454,000**	**$20,643,000**	
PS-1	Harward Pump Station Upgrade - CSO See Below																-	see below
PS-2	Hunt Pump Station and FM Upgrade - CSO See Below																-	see below
PS-3	Commercial Street			$ 3,443,000													$3,443,000	
PS-4	Farrin Place Upgrade					$ 953,000											$953,000	
PS A-1	Front Street VFDs, Wet Well Rehabilitation	$ 75,000															$75,000	
PS A-2	Wing Farm Electrical & Instrumentation	$ 165,000															$165,000	
PS A-3	Riverview Road "Tin Can" Rehabilitation	$ 9,000															$9,000	
PS-5	Rose Street								$ 1,109,000								$1,109,000	
PS-6	Communications Upgrade		$ 265,000														$265,000	
PS-7	Aegis Drive							$ 490,000									$490,000	
PS-8	Pleasant Street													$ 1,630,000			$ 1,630,000	
	Pump Station Projects Subtotal	**$249,000**	**$265,000**	**$3,443,000**	**$0**	**$953,000**	**$0**	**$490,000**	**$1,109,000**	**$0**	**$0**	**$0**	**$0**	**$1,630,000**	**$0**	**$0**	**$8,139,000**	
CS-1	Harward Interceptor Capacity Increase - CSO See Below																$0	see below
CS-2	CCTV of South End	$ 45,000															$45,000	
CS-3	Cross Country Interceptor Replacement			$ 5,360,000													$5,360,000	
CS-4	Commercial Street Forcemain Replacement		$ 4,240,000														$4,240,000	
CS-5	Middle and Commercial Relining						$ 720,000										$720,000	
CS-6	Bowery Street Relining								$ 690,000								$690,000	
CS-7	Pleasant Street Forcemain Replacement											$ 1,580,000					$1,580,000	
	Collection System Projects Subtotal	**$45,000**	**$4,240,000**	**$5,360,000**	**$0**	**$0**	**$720,000**	**$0**	**$690,000**	**$0**	**$0**	**$1,580,000**	**$0**	**$0**	**$0**	**$0**	**$12,635,000**	
CS-1	Harward Interceptor Capacity Increase			$ 4,827,000													$4,827,000	ongoing - analysis complete
PS-1	Harward Pump Station Upgrade			$ 2,438,000													$2,438,000	ongoing - scope and fee
PS-2	Hunt Pump Station and FM Upgrade		$ 6,530,000														$6,530,000	ongoing - scope and fee
-	Pleasant CSO Abatement Ph. 2: Separation of CBs on High/South, West, and Richardson			$ 1,040,000													$1,040,000	
-	Commercial Street: CSO Abatement Ph. 1: SSES Investigations between York and School St		$ -														$0	
-	Commercial Street: CSO Abatement Ph. 1: CB Separation on King Street and South Street		$ 100,000														$100,000	
-	Commercial Street: CSO Abatement Ph. 2: Construction projects based on SSES				$ 1,706,000												$1,706,000	
-	Harward Street: CSO Abatement Ph. 4: Future Collection System Capacity Increase based on InfoSWMM						$ 2,434,000										$2,434,000	
-	Farrin Place Pump Station I/I Removal		$ 1,128,000														$1,128,000	
-	WPCF Bypass Increasing Hydraulic Capacity Analysis			$ 26,000													$26,000	
	CSO Master Plan Projects Subtotal	**$ -**	**$ 7,758,000**	**$ 8,331,000**	**$ 1,706,000**	**$ -**	**$ 2,434,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$20,229,000**	
	Total	**$ 294,000**	**$ 14,071,000**	**$ 19,765,000**	**$ 5,090,000**	**$ 1,547,000**	**$ 3,154,000**	**$ 2,540,000**	**$ 3,977,000**	**$ 3,118,000**	**$ -**	**$ 2,761,000**	**$ -**	**$ 3,875,000**	**$ -**	**$ 1,454,000**	**$61,646,000**	

NOTES

1. The costs displayed are Project Cost Estimates, which include construction costs, technical services, design contingency, and other standard project inflationary measures. Refer to FSP for a more detailed summary of each item.
2. The year columns that the projects are displayed correspond with the start of construction, when all project funds should be secured by the City. However, portions of the technical services component of the project cost estimate will need to be secured prior to the start of construction to facilitate design.
3. The projects that have significant overlap with the CSO Master Plan Projects are shown under the CSO Master Plan section of the spreadsheet and are not double-counted. Costs presented in the FSP are higher than those presented in the 2022 CSO Master Plan because the FSP scope of the projects are more encompassing.
4. Annual inflation for projects is currently set at 3%, but can be adjusted within "Adjustments Tab"
5. All project cost estimates were developed using ENR 13175, from 12/2022

D

Appendix D
Water and Energy Conservation Certification

Maine CWSRF
Water and Energy Conservation Certification

Loan Recipient: ____________________________ CWSRF Loan Number: _____________

Project Name: ____________________________________

The passage of the *Water Resources Reform and Development Act* (WRRDA) of 2014 makes significant changes to Titles I, II, V, and VI of the *Federal Water Pollution Control Act*, as amended. Effective October 1, 2014, all loan recipients proposing to repair, replace, or expand their treatment works are required to develop and implement a Fiscal Sustainability Plan (FSP).

As stated in section 603(d)(1)(E)(i)(III) of the *Federal Water Pollution Control Act*, as amended, as part of the FSP, the recipient of a Clean Water State Revolving Fund loan is required to certify that water and energy conservation efforts have been evaluated and will be implemented.

> *"(III) a certification that the recipient has evaluated and will be implementing water and energy conservation efforts as part of the plan;…"*

I (*name*), ____________________________, (*title/position*) ________________________, of (*loan recipient*) ______________________________ hereby certify to the Maine Department of Environmental Protection that we have evaluated and will be implementing water and energy conservation efforts as part of the Fiscal Sustainability Plan.

_________________________________ _______________________________

(Signature) (Date)

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E

Appendix E
FSP Certification

Maine CWSRF Fiscal Sustainability Plan (FSP) Certification

Loan Recipient: ____________________________ CWSRF Loan Number: _____________

Project Name: ____________________________________

The passage of the *Water Resources Reform and Development Act (WRRDA) of 2014* makes significant changes to Titles I, II, V, and VI of the *Federal Water Pollution Control Act*, as amended. Effective October 1, 2014, all loan recipients proposing to repair, replace, or expand their treatment works are required to develop and implement a Fiscal Sustainability Plan (FSP).

As stated in section 603(d)(1)(E) of the *Federal Water Pollution Control Act*, as amended:

> *"(E) for a treatment works proposed for repair, replacement, or expansion, and eligible for assistance under subsection (c)(1), the recipient of a loan shall –*
>
> *(i) develop and implement a fiscal sustainability plan that includes –*
>
> *(I) an inventory of critical assets that are part of the treatment works;*
>
> *(II) an evaluation of the conditions and performance of inventoried assets or asset groupings;*
>
> *(III) a certification that the recipient has evaluated and will be implementing water and energy conservation efforts as part of the plan; and*
>
> *(IV) a plan for maintaining, repairing, and, as necessary, replacing the treatment works and a plan for funding such activities; or*
>
> *(ii) certify that the recipient has developed and implemented a plan that meets requirements under clause (i);"*

I (*name*), ____________________________, (*title/position*) ________________________, of (*loan recipient*) __________________________ hereby certify that to the best of my knowledge that the Fiscal Sustainability Plan has been developed consistent with the criteria contained in the *Maine CWSRF Requirements and Guidance for a Fiscal Sustainability Plan* and has been fully implemented for the agreed upon asset planning area as described in the FSP Agreement.

_________________________________ _______________________________

(Signature) (Date)

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