One Team,
One Water

2021/22 Annual Business Plan

Approved by:
Halifax Water Board, January 28, 2021

Presented to:
Halifax Regional Council, March 9, 2021

STRAIGHT from the SOURCE

Halifax Water

Glossary

AMI	Advanced Meter Infrastructure
AM	Asset Management
AMP	Asset Management Plan
BPF	Biosolids Processing Facility
CBS	Corporate Balanced Scorecard
CCC	Capital Cost Contribution
DES	District Energy System
DOE	Department of Energy
ETS	Engineering and Technology Services
EMAP	Energy Management Action Plan
EMP	Emergency Management Plan
EMS	Environmental Management System
ERM	Enterprise Risk Management
ERP	Enterprise Resource Planning
GIS	Geographic Information System
H2O	Help to Others (Program)
HHSP	Halifax Harbour Solutions Plant
HRM	Halifax Regional Municipality
HRWC	Halifax Regional Water Commission
I&I	Inflow and Infiltration
IFRS	International Financial Reporting Standards
IMP	Integrated Master Plan
IRP	Integrated Resource Plan
IS	Information Services
IT	Information Technology
NOM	Natural Organic Matter
NSE	Nova Scotia Environment
NSERC	Natural Sciences and Engineering Research Council
NSPI	Nova Scotia Power Incorporated
NSUARB	Nova Scotia Utility and Review Board
OI	Organizational Indicator
RDC	Regional Development Charge
RDII	Rain Derived Inflow and Infiltration
RF	Radio Frequency
SCADA	Supervisory Control and Data Acquisition
SSES	Sanitary Sewer Evaluation Survey
UV	Ultraviolet
WRWIP	West Region Wastewater Infrastructure Plan
WSER	Wastewater System Effluent Regulations
WSP	Water Supply Plant
WWTF	Wastewater Treatment Facility

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APPENDICIES

1. INTRODUCTION

Halifax Water is an integrated water, wastewater and stormwater utility in its 76th year of operation, serving 105,000 customers and an estimated population of 370,000.

Halifax Water's business plan for 2021/22 is developed with recognition that some of the challenges of the preceding fiscal year will continue to impact Halifax Water's customers, employees and business partners. The COVID-19 global pandemic prompted some changes to how Halifax Water is delivering services, but Halifax Water has been able to deliver water, wastewater and stormwater services while maintaining the quality of the service and high levels of employee and customer satisfaction.

Halifax Water has ambitious plans for investment in critical infrastructure and continued innovation and improvement in 2021/22.

One Team, One Water

Our Vision

We will provide our customers with high quality water, wastewater, and stormwater services.

Through adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance, and stewardship of the environment.

We will fully engage employees through teamwork, innovation, and professional development.

Our Mission

To provide world-class services for our customers and our environment.

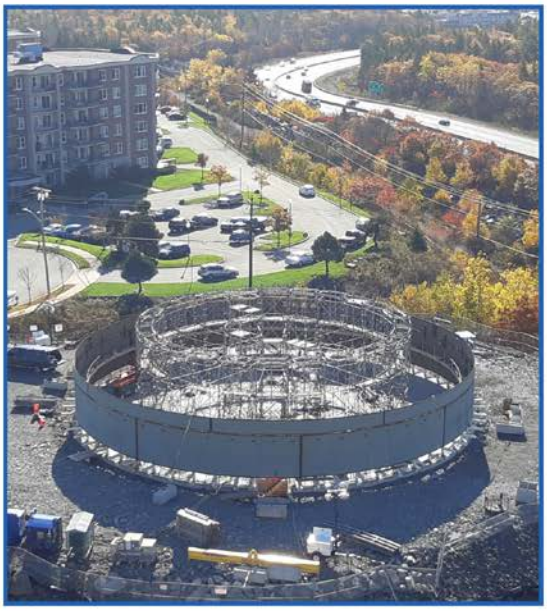
Our Values

Relationships: we nurture relationships with our customers, our team members and the environment. We are engaged in the neighbourhoods we serve and we support continual learning across our team.

Innovation: we are among the top utilities across the continent and we are known on the global stage. We always ask, "how can we improve efficiency, sustainability, creativity and the customer experience?"

Accountability: we refuse to cut corners. We check in with our excellence standards regularly and look to one another for support. Safety steers our decision-making. We are driven to make our policies, decisions and projects as clear as our drinking water.

Protection: Halifax Water protects the health and well-being of our population. We exist to guard natural resources, finding ways to sustain our communities and environment.



STRAIGHT from the SOURCE

Halifax Water

The Halifax Water business plans, capital and operating budgets and rates are developed based on established strategies that align with industry best practice: the 2019 Integrated Resource Plan (IRP), the Debt Strategy, and Cost of Service Manual (COSM).

Halifax Water is working to increase the level of capital expenditures to the level recommended by the IRP to address the strategic drivers of asset renewal, growth, and regulatory compliance. Of the three strategic drivers included in the IRP, asset renewal will present the greatest challenge recognizing the backlog of investments in relation to the replacement of aging infrastructure.

With fourteen years of experience operating as a "one water" utility delivering integrated water, wastewater and stormwater service, Halifax Water is making some adjustments to the organization structure effective April 1, 2021 to take the next step toward provision of integrated services. The organization structure changes will help Halifax Water standardize some business processes, promote a consistent high quality of service, effective resource utilization, and development of employees.

We are committed to creating opportunities to help develop employees and future leaders, and promoting a culture of respect and diversity where employees are engaged, motivated and committed to the mission of serving our customers and our environment. An engaged and motivated workforce is key to foster innovation, adaptation and resilience in the face of an on-going pandemic, climate change, rapid technological change, in addition to the traditional challenges of aging infrastructure, environmental compliance and financial constraints.

Effective 2021/22, Halifax Water's organization structure will reflect the following changes:

The Water Services and Wastewater/Stormwater Services departments will be combined and renamed the Operations department. Operations will be organized into groups responsible for the Water Distribution System, Water Supply Plants, Water Quality, the Wastewater/Stormwater Collection System, Wastewater Treatment Facilities, and Wastewater Quality plus Fleet, Facilities and Logistics. Some key challenges for this department in coming years will be consolidation of four operating depots to a new Burnside Operations Depot, and ensuring we have consistent operation approaches in all regions.

The Engineering and Information Services department will be renamed Engineering and Technology Services, and Technical Services will move to this department from Water Services. This will enhance the focus on cyber security, ensure all aspects of operational and information technology are working seamlessly together, and will help Halifax Water develop a roadmap for continued development as a digital utility considering data utilization and new technology. Some of other strategic priorities for this department include the Water Supply Enhancement Program, which will be the largest capital investment in water infrastructure in Halifax Water's history, the Harbour Solutions Plants Upgrade Program, and continuing to increase the capacity to prioritize and effectively deliver capital projects fulfilling the vision of the Integrated Resource Plan using sound asset management.

With the planned expansion of the Environmental Management System (EMS) corporate wide starting April 1, the capacity to support EMS is being increased with the Regulatory Services department. Regulatory Services will also be increasing capacity to more effectively support the Pollution Prevention and Inflow and Infiltration (I&I) programs, as well as introduce new programs that protect the environment and Halifax Water infrastructure – a Backflow Prevention Device retrofit program and a New Account Connection Compliance program. In recognition that climate change adaptation and mitigation activities cross many projects, programs and services at Halifax Water, Regulatory Services will take the lead in development and coordination of climate adaptation and mitigation activities, promoting alignment with HaliFACT2050.

Halifax Water delivers service through four departments; Operations; Engineering and Technology Services, Corporate Services, Regulatory Services, with Administration led by the General Manager, who is responsible for overall administration of the utility. The organization structure is detailed within Section 3 and illustrated in Appendix B.

The 2021/22 fiscal year is the second year of the Five-Year Business Plan approved by the Halifax Water Board in January 2020.

2. EXECUTIVE SUMMARY

Halifax Water develops both long-term and short-term business plans for the approval of the Commission Board. The 2021/22 Annual Business Plan reflects the strategic direction in the Five-Year Business Plan (2020/21 – 2024/25) and is consistent with the updated IRP approved by the Board in November 2019.

This annual business plan reflects increased capital investment as contemplated in the updated IRP. The capital budget is $126.2 M and with 69% of the projects arising due to the need to renew existing assets. One such example is the replacement of the Cowie Hill Reservoir, which is planned for 2021/22. Halifax Water has a major multi-year water supply enhancement program planned for the J.D. Kline (Pockwock Lake) and Lake Major water supply plants (WSPs), due to a combination of factors such as changes in source water due to lake recovery and age of some treatment plant components.

The budget provides a balanced investment in asset renewal, compliance and growth-related projects to support utility operations; but the predominant driver in each service (water, wastewater, stormwater) is asset renewal.

Halifax Water's wastewater treatment facilities are compliant with current environmental regulations, but the utility faces significant future expenditures both to maintain current and meet future compliance requirements. Halifax Water is working to develop a more detailed plan to upgrade the Halifax Harbour Solutions plants (HHSP) to meet the objectives stipulated in the federal Wastewater System Effluent Regulations by 2040, and this will be a significant area of focus in 2021/22.

Halifax Water's approach to water and wastewater treatment plant upgrades is to develop strategies that are based on thorough research and investigation of new technologies. To that end, in 2020/21, Halifax Water expanded the current NSERC Industrial Research Chair with Dalhousie to include a wastewater stream, and 2021/22 will mark the second year of the three-year wastewater research program focused on plant optimization and contaminants of emerging concern. Through the wastewater research program, in 2021/22, Halifax Water will also be supporting wastewater research regarding COVID-19. From the water perspective, research will continue on the effects of lake recovery, lead, geosmin and corrosion control; and water operations will be investigating artificial intelligence for leak detection, pressure management and optimizing distribution operations to prevent breaks.

Technology continues to transform our business and change how employees and customers can interact with the organization. Halifax Water has upgraded most customer meters to advanced metering infrastructure (AMI) and Halifax Water is now able to put water consumption data in the hands of the customer through Halifax Water's customer portal – Customer Connect. Detailed information on water consumption will allow customers to monitor their accounts for possible high consumption or leaks and will allow Halifax Water to refine its approach to water loss control to ensure it remains a world leader. In 2021/22, a second phase of enhancements will be launched to Customer Connect. Other projects such as an Employee Benefits and Training module and a new corporate Enterprise Resource Management (ERM) system will continue to drive significant organizational change. The value of technology is being proven throughout the response to COVID-19 as Halifax Water's services have continued with no impact on the quality of the service being provided.

Focusing on the environmental component of the mission, in 2021/22 Halifax Water start corporate wide expansion of the EMS and will centralize the planning and coordination of climate change adaptation and mitigation activities, developing specific targets and actions for Halifax Water that support HalifACT 2050. Halifax Water is taking positive actions towards climate adaptation and the 2019 IRP considers climate vulnerabilities to reduce risk to infrastructure and service delivery.

Climate change mitigation is the core driver for implementation of the Cogswell District Energy System as part of the Cogswell redevelopment. This exciting initiative will lead to significant reductions in GHG emissions compared to the business as usual case for new development.

One area of opportunity is anaerobic digestion for treating residual biosolids, to generate renewable gas and continuing to process the residual biosolids into soil amendment for beneficial reuse. This could result in a reduction in conventional fossil fuel use and therefore GHG emissions further mitigating climate change.

The 2021/22 fiscal year will see continued evolution of existing programs and services with the launch of the enhanced lead service line (LSL) rebate program to enable Halifax Water to meet its goals for LSL replacement by 2039 by integrating with HRM street renewal projects and by replacing the portion of LSLs on private property at the utility's expense. A program

to promote compliance of new service connections will also be introduced in 2021/22. This program will promote disclosure and resolution of issues at the point of sale.

Customer satisfaction and employee engagement are both fundamental to success of the utility. Halifax Water is committed to continually innovate, improve, and remain cost-effective with the understanding of the importance of keeping the cost of services affordable.

From a corporate perspective, continuing to adjust and adapt in response to COVID-19 will be an on-going challenge in 2021/22. Some other significant challenges and opportunities that impact multiple departments include:

1. **Optimizing delivery and funding of the IRP:** The current water, wastewater and stormwater rates are insufficient to meet the funding requirement identified in the IRP. The IRP acknowledges that wastewater and stormwater assets have been grossly underfunded historically. Halifax Water will have to work with other levels of government to secure infrastructure funding. Institutional capacity will have to be optimized over the term of this Business Plan in order to deliver the expected capital projects; and the processes used to plan, procure and deliver capital projects will be reviewed to achieve a target of spending 80 – 90% of the annual capital budget within the year it is approved. This is an aggressive target, given the multi-year nature and complexity of some of Halifax Water's capital projects and the relationship to the HRM capital program.

2. **Stakeholder consultation:** In 2021/22, Halifax Water will be consulting stakeholders on some key issues, including levels of service, to help inform asset management, the Regional Development Charge, and stormwater service delivery and rates.

3. **Customer communication and education:** In 2021/22, customer communication and education includes the launch of Phase 2 of Customer Connect, re-design of the Halifax Water bill, refreshed stormwater customer communication, and stakeholder consultation as noted above. The review and standardization of some operations business processes, combined with continued focus on enhancing integration and functionality of existing systems, will allow Halifax Water to improve measurement of utility performance relative to customer centric service levels and will enable more proactive communication with customers.

4. **Evidence based decision making:** The Water Loss Control program, Wet Weather Management Program, Asset Management Program, Enterprise Risk Management Program, and Water and Wastewater Research Programs are at different levels of maturity. As the maturity increases in each of these programs, integrating the information from these programs will help inform significant strategic decisions such around the Water Supply Plant upgrades, Harbour Solutions Plants upgrades, and future utility needs from an operational and information services technology perspective.

5. **Employee Satisfaction:** In the next five years many of Halifax Water's workforce will be eligible to retire. To compete, attract and retain top talent, in addition to providing competitive wages and benefits, Halifax Water is striving to maintain a respectful work environment where employees are fully engaged through teamwork, innovation and professional development. Continued investment in improving internal communications, talent management, training, civility and respect in the workplace, and diversity will help create the kind of work environment where our employees are engaged and provide service safely, and in a way that protects the environment, our assets, and always keeps the customer in mind.

6. **Environmental Stewardship:** Halifax Water's IRP contains projects that will help the utility with climate change adaptation and mitigation. Recent research indicates that climate change is accelerating, as evidenced by projections of sea level rise, more intense storm events, and changing precipitation patterns. Our environmental stewardship will also be enhanced through extension of the EMS (ISO 14001) on a corporate wide basis beginning in 2021/22. The EMS will help minimize the impact our operations have on the environment, and promote compliance with applicable laws, regulations, and other environmentally oriented requirements.

7. **Technological Investment and Strategy:** In 2021/22, Halifax Water's IT Strategic Plan will be refreshed with additional consideration of new smart technology and more sophisticated utilization of data "intelligent water". Fast paced advances in smart metering, valves and sensors are creating new opportunities for Halifax Water. Investments in core systems in 2020/21 include additional enhancements to Customer Connect, an employee benefits and training module, a new Enterprise Resource Planning system (ERP) and continued investments in foundational security projects that support cyber-security, continuity of service and protection of data.

8. **Enterprise Risk Management:** In 2021/22, Halifax Water will be updating the corporate risk register and rolling out training to employees on the Risk Management Policy.

The departmental strategic objectives for 2021/22 are shown below.

Operations

Wastewater & Stormwater Services

- Complete Biosolids Facility upgrade plan and progress procurement for Capital and Operations contracts
- Continue to implement Wastewater research program as per plan submitted to NSERC
- Stakeholder consultation on plan for HHSP upgrades to meet 2040 environmental compliance
- Complete Wet Weather Management projects and initiate any changes required to enable an effective private side I&I reduction program
- Communicate and implement actions from odour strategy

Water Services

- Complete Water Quality Master Plan V4
- Secure approval for water supply enhancement program
- Fully implement an enhanced algal monitoring program as a permanent program
- Launch and successfully implement year 1 of the new LSL replacement program
- Implement findings from dam safety review
- Recommend next steps for Water Loss Control program

Administration

- Obtain approval for regulations governing Cogswell District Energy System
- Update Service Level Agreement with HRM
- Roll out updated Code of Conduct to all employees
- Roll out training Risk Management Policy & update Corporate Risk Register
- Engage next Dispute Resolution Officer for NSUARB approval
- Enhance and roll out Stormwater customer communication and education
- Complete unconscious bias training for managers/supervisors and align Halifax Water with HRM culture & diversity initiatives

Engineering & Technology Services

- Optimize capital project delivery and % of annual capital budget spent
- Complete design and tender process for Burnside Depot construction
- HRM Cogswell Redevelopment infrastructure relocation
- Promote the multi-year Water Supply Enhancement Program (WSEP) and implement year 1 Clarifier design phase
- Develop a roadmap for data visualization & intelligent water & deliver key IT projects (cyber security & ERP)
- Finalize levels of service for asset management, and evaluation of Asset Management Program
- Monitor and report on progress of the Integrated Resource Plan

Regulatory Services

- Implement Regional Development Charge annual stakeholder consultation process
- Phased corporate implementation of EMS
- Maintain regulatory compliance and enhance reporting
- Launch new service account compliance program
- Evaluate ISO45001 (safety) certification and complete physical security audit
- Enhance stormwater credit program and continue support of stormwater billing
- Develop a climate action plan for Halifax Water to address adaptation and mitigation that also supports HalifAct2050.

Corporate Services

- Analyze impervious area data, and apply to adjust rates for stormwater service
- Integrate customer connect portal and continue to increase utilization
- Commence ERP design subject to NSUARB approval
- Update procurement policy and processes
- Improve financial forecast and reporting
- Update Cost of Service Manual and apply for NSUARB approval
- Implement new bill design and monthly billing, and improve the collection process

In order to maintain operations and achieve the strategic objectives next year, Halifax Water will carefully manage expenditures and increase some rates. Annual revenues will need to increase with the primary focus on the capital needs driven by asset renewal. There will be no changes to water rates in 2021/22. This will be the sixth year of stable water rates – an unprecedented accomplishment, but also a reason for concern as water rate increases cannot be deferred indefinitely. Wastewater rates will increase effective April 1, 2021. This will be the first increase in wastewater rates since April 1, 2016; as Halifax Water has been able to provide stable rates for over five years. An application to adjust stormwater rates is planned sometime in 2021/22, for new rates that would probably not be in effect until sometime in 2022/23. The current stormwater rates came into effect on July 1, 2017.

Halifax Water is not alone in its quest for increasing, and more sustainable funding. Unfortunately, water, wastewater and stormwater assets have been historically underfunded throughout North America. Requirements for future rate increases are always considered in the context of customer affordability. The utility will continue with the H20 (Help to Others) Program to support low income customers; and hopes to increase the funding, awareness, and utilization of this program.

Inherent in the business activities for Halifax Water is an obligation to provide value for customers as stewards of essential services. To that end, the Business Plan highlights very formal programs to deliver efficient and effective service through Enterprise Risk Management, Asset Management, Energy Management, Wet Weather Management, and the Cost Containment Program. The Wet Weather Management program, in particular, presents an opportunity to improve service delivery at a lower cost and has already shown positive results. A structured approach is in place, which is similar to the process used by the utility for water loss control. Halifax Water is recognized as a world leader in water loss control and the corporate goal is to put wet weather management in the same category.

The 2021/22 Business Plan provides an overview of the services provided by Halifax Water and an overview of the operating and capital budgets to support the delivery of these services. The Business Plan projects an operating deficit of $11.7 M as indicated in the operating budget summary in Table 1, and reflects the rates most recently approved by the NSUARB.

Although a loss is indicated for 2021/22, the utility has accumulated operating surplus which will be used to support continued operations until additional adjustments to rates are made.

Table 1 - Operating Budget Summary

Operating Budget Summary (in thousands)

	Actual 2019/20	Approved Budget 2020/21	Proposed Budget 2021/22	Increase
Operating revenues	$ 137,750	$ 138,618	$ 150,466	$ 11,849
Operating expenditures	109,326	118,110	125,379	7,269
Earnings from operations	28,424	20,508	25,087	4,579
Financial and other revenues	1,211	619	722	103
Financial and other expenditures	31,195	37,076	37,461	385
Earnings (loss)	$ (1,560)	$ (15,949)	$ (11,651)	$ 4,297

The utility faces financial pressure associated with the renewal of assets, increases in assets and customers due to growth in the municipality, and compliance with regulatory requirements, as described in the 2019 IRP and discussed in Section 5.13 of this document. Halifax Water continues to increase its investment in growth-related infrastructure and with funding from the RDC, will continue to focus on I&I reduction in the Halifax area to increase wastewater trunk sewer capacity. The capital budget provides a comprehensive investment across all asset classes of $126.2 M as outlined in Section 4.1.

3. SERVICE OVERVIEW

3.1 Operations

The Operations Department provides water, wastewater and stormwater service and activities are organized functionally in a way that ensures that respective services are managed as systems.

3.1.1 Water Services

Water Services division activities include operating and maintaining the municipal water system "from source to tap". The sections are organized to maintain and operate the water system as a holistic system, with managers assigned accountability for clearly defined aspects of the water system. The following water services are provided:

- **Source Water Protection:** Is responsible for managing and protecting watershed land, developing and maintaining source water plans, enforcement of Protected Water Area and other relevant source water regulations, source water community relations including working with and developing watershed advisory boards, real property maintenance of source water lands, and forestry management of watershed lands.

- **Water Quality Management:** Is responsible for water quality planning, water quality monitoring, process support to treatment plants, customer inquiries and investigations, water quality support to capital projects, policy development, research and management of the Halifax Water – Natural Sciences and Engineering Research Council (NSERC) Industrial Research Chair at Dalhousie University.

- **Water Supply Plant Operations:** Is responsible for operation and maintenance of 3 large water supply plants (Pockwock, Lake Major and Bennery Lake), 6 small systems, 6 dams, 2 emergency water supplies and 35 chlorine monitoring devices and rechlorination stations.

- **Distribution System Operations:** Is responsible for operation and maintenance of the water distribution and transmission systems. The system is managed according to three geographic regions with responsibility for over 1563 km of transmission and distribution mains, 8450 fire hydrants, 85,500 service connections, 141 pressure control/flow metering facilities, 21 pumping stations, 16,000 valves and 16 water storage facilities. This also includes responding to third party requests for buried infrastructure locates.

Water Services sections are also responsible for the following major programs:

- **Water Loss Control:** Halifax Water was the first utility in North America to adopt the International Water Association (IWA) methodology for managing leakage in the distribution system. Efforts save $650,000 per year in treatment chemical and electricity costs and have reduced water main breaks by 20%, saving $500,000 in repair costs annually. The program has won several national awards and Halifax Water staff are in demand to share expertise with industry and other utilities.

- **NSERC - Halifax Water Industrial Research Chair in Water Quality and Treatment:** This program, carried out in partnership with Dalhousie University over the last ten years, has realized significant operational savings, improved water quality and influenced Halifax Water policy. The Research Chair has produced more than 120 peer reviewed research papers in world recognized scientific journals over the last thirteen years and has allowed Halifax Water to become industry recognized leaders in areas such as LSL replacement and biofilm control in distribution systems. Several Halifax Water employees were trained as students under the Research Chair. Halifax Water and Dalhousie were awarded a third five-year term for the Research Chair, effective April 1, 2017.

- **Lead Service Line Replacement Program:** In 2017, Halifax Water initiated a program intended to remove all LSLs by 2050. In 2020 the NSUARB approved an enhanced LSL replacement program that will see private side service lines replaced at utility expense with a goal of completion by 2039. This year will see a focus on implementing this program.

3.1.2 Wastewater Services

The Wastewater and Stormwater Services division activities include operating and maintaining municipal systems from "drains back to the source again". In this regard, the Wastewater and Stormwater Services division has a mandate to protect the environment while providing essential collection and treatment services to its customers. These essential services are delivered in sections that are responsible for both stormwater and wastewater activities in three regions and fourteen treatment facilities. The supervisors and the field crews carry out both wastewater and stormwater related duties.

Wastewater Services strives to provide uninterrupted delivery of the following services:

- **Wastewater Treatment Facility Operations:** Is responsible for operation and maintenance of 14 wastewater treatment facilities (WWTFs) and associated infrastructure, regulatory reporting, and implementing and coordinating capital upgrades with other Halifax Water departments. As per the Wastewater System Effluent Regulations; 2 plants are classified as very large, 3 are large, 2 are medium and 9 are small capacity. The department also operates 4 additional small treatment facilities under contract from Halifax Regional Municipality (HRM) and the province.

- **Biosolids Processing:** Is responsible for liquid transport, dewatering and processing of sludge, operation and maintenance of various dewatering equipment at WWTFs, administering trucking contracts for dewatered biosolids and biosolids processing facility (BPF) operations contract, and processing of biosolids from on-site septic systems. The BPF, located at the Aerotech Industrial Park, produces a soil amendment for beneficial use in agriculture. Staff from WWTF operations carry out these related activities.

- **Collection System Operations:** Is responsible for operation, repair and maintenance of the wastewater collection and trunk sewer system. The system is managed according to three geographic regions with responsibility for over 1,425 km of collection pipes, 165 pump stations, 21 combined sewer overflow facilities, and 81,803 service connections.

- **Septage Treatment Services:** This is an unregulated activity for Halifax Water, but it provides an essential service to residents who do not have a centralized wastewater service. The septage from septic hauling companies who service these users was accepted at strategic locations within the core sewer service area and at the Aerotech WWTF. With the completion of the upgrade of Aerotech WWTF in 2019,

most of the septage has been diverted to the Aerotech WWTF from the core service area.

- **Facilities, Fleet & Logistics Services:** Is responsible to supply, maintain and repair approximately 270 pieces of mobile equipment and vehicles ranging from trailers and small utility service vehicles to large excavation, construction and transportation equipment. Replacement of vehicles and equipment on a life cycle costing basis and vehicles records management and regulatory compliance. This section also operates and maintains corporate facilities at the Cowie Hill Campus and provides logistical and services support to operations and treatment facilities to facilitate efficient operations. Targeted business process improvements for 2021-22 include implementation of vehicle fleet utilization targets and fleet rationalization to reduce operating costs, improve efficiencies and meet the recommendations from a 2019 Municipal Auditor General report on fleet usage.

3.1.3 Stormwater Services

The Stormwater Services division is responsible for operation and maintenance of stormwater infrastructure within the public right of way and within easements. This service has undergone significant changes over the past few years and continues to progress to achieve a higher level of service.

- **Collection System Operations:** This section provides operation, repair and maintenance of the stormwater collection and trunk sewer system. The system is managed by shared crews with Wastewater Services within the three geographic regions with responsibility for approximately 900 km of stormwater collection pipes, 45 stormwater retention facilities and over 600 km of ditches, 2,369 cross culverts and 16,000 driveway culverts. This section provides proactive maintenance of the pipes, ditches and other systems with a goal to ensure uninterrupted flow within HW owned infrastructure. Staff also replace a driveway and cross culverts on a priority basis to manage the infrastructure with sound asset management practices.

- **Service Review:** Operations provide support to the Stormwater Engineer within the Regulatory Services department, and allocates resources to drainage investigations, stormwater billing exemption requests, and operations support. Drainage investigations may be triggered by a customer inquiry on private property or an operational issue on Halifax Water owned infrastructure. The Stormwater Engineer reviews the drainage issues and renders a position which may involve an operational fix or a capital improvement. Complaints stemming from stormwater billing are vetted through the Stormwater Engineer and a decision is provided to the Customer.

3.2 Engineering and Technology Services

The Engineering & Technology Services (ETS) Department is responsible for the provision of engineering and technical services relating to the planning, design, construction, and maintenance of water, wastewater and stormwater infrastructure and related asset information. It is also responsible all of Halifax Water's digital infrastructure services including information management, geographic information systems and operational technology.

The ETS Department has six core areas of responsibility with eight specific operational sections delivering programs. The six core areas of responsibility are Asset Management, Infrastructure Engineering, Energy Efficiency, Engineering Information, Information Management, and Technical Services.

Asset Management: Is responsible for development of the Asset Management program (including the overall strategy, inventories, condition and performance assessments), and the development and delivery of annual Asset Management Plans (AMP). The section is also responsible for modelling and flow monitoring, long-term infrastructure master planning (including implementation of the IRP, and the development of the 5-Year and 1-Year Capital Budget.

Infrastructure Engineering: The Infrastructure Engineering section contains four groups that are responsible for the design, construction and project management for water, wastewater and stormwater capital projects, respectively. These four sections also provide support for capital project prioritization, master planning and asset management relating to the core infrastructure.

Energy Efficiency: Is responsible for the provision of engineering services related to energy management and energy efficiency of water, wastewater and stormwater infrastructure. At Highlighting 2021/22, this section is responsible for the development and implementation of two exciting new corporate initiatives. The first, the Cogswell District Energy System, is planned as a new regulated business unit to provide energy to proposed new buildings within the Municipalities Cogswell Redevelopment Area based on energy extracted from the warm wastewater effluent that discharges from Halifax Water's Halifax Wastewater Treatment Facility. The second, the new Biosolids Processing facility, is being strategically developed to efficiently manage the conversion of the utility's wastewater sludge into commercially viable soil amendment product and recoverable energy.

Engineering Information: Is responsible for the corporate GIS, including the maintenance and distribution of all record information. The section is also responsible for on-going GIS development including both desktop and mobile GIS applications. This section also supports capital projects and other initiatives through Computer Aided Drafting (CAD) and map production.

Information Services: Is responsible for administration of services relating to network resources (storage, servers, printers, etc.), users, access control and network security, server hardware and operating systems. All computer equipment is managed by the IS section. This includes desktops, laptops, monitors, printers and servers. The IS section is the first line of support for all information technology (IT) related problems or requirements. The corporate desktop software is administered by the IS section. The IS section is responsible for the updating and delivery of the IT Strategic Plan including all IT project delivery services.

Technical Services: Is responsible for operation and maintenance of the SCADA system and the process communications network; implementation of the SCADA Master Plan, process control cyber security, instrumentation maintenance, electrical maintenance, maintenance of water pumping stations, and operation and development of the process data warehouse.

3.3 Regulatory Services

The Regulatory Services Department continues to support the corporation through the delivery of programs such as Environmental Engineering, Engineering Approvals, Regulatory Compliance, Safety and Security, Stormwater Engineering and EMS.

Environmental Engineering: Is responsible for two key programs, Pollution Prevention (P2) and the private side I&I reduction. The group also provides support for updating Nova Scotia Environment (NSE) permits to operate, water withdrawals and oversees projects related to contaminated sites and impacts to Halifax Water's infrastructure.

Pollution Prevention: Is responsible for promoting compliance of waste discharges with the Rules and Regulations, through education and inspections. The P2 group coordinated the repairs of three cross connections (customer connections where the stormwater and wastewater discharges are crossed) this past year and are investigating and finalizing three more. Of note, customer premise inspections were impacted by COVID-19 restrictions and some follow ups with customers were delayed.

Inflow and Infiltration: The I&I group assists the Wet Weather Management Program (WWMP) in locating and addressing private side sources of I&I of stormwater into the wastewater systems.

This past year two key areas targeted for private side stormwater disconnection were associated with the capital projects on Wanda Lane and Tobin Drive where the existing sanitary system was converted to a dedicated stormwater system and a new wastewater system was installed. As well as the coordination of the disconnection of the downspouts associated with the sewer separation project on Bayers Road/Federal Avenue/Romans Avenue, it is anticipated these disconnections will be completed in Q1/Q2 of 2021/22.

This coming year, the group will be undertaking private site investigations and coordinating customer connection repairs and adjustments in support of the following target areas for the WWMP:

- Hornes Road,
- Fish Hatchery area,
- Eastern Passage and
- Loon Lake

The P2 and I&I groups are getting established with CityWorks to better manage and track work orders and enhance their ability to use data from operations to locate sources of system issues.

Regulatory Compliance: Is responsible for sampling of the water treatment and distribution systems for bacteria and residual chlorine, ensuring compliance with Canadian Drinking Water Guidelines and Operational permits issued by NSE. Similar sampling is completed for wastewater effluent parameters for compliance with permits issued by NSE, consistent with federal regulations. The group is also tasked with compiling and submitting reports associated with the sampling results to NSE.

Regulatory Compliance is working with the Water Quality group to implement new permit tracking and data management and reporting software to replace WaterTrax as part of the IT Strategic Program. A vendor has been selected and implementation of the new software is anticipated in Q3 of 2021-2022.

Nova Scotia Environment (NSE) Permits: As noted, Environmental Engineering coordinates the renewals or amendments, the following were requested this past year and received approval this past year:

- Water Course Alteration for maintenance at the Lake Major Dam,
- Minor amendments were obtained for the permits to operate Lake Major, Bennery Lake, Collins Park, and Middle Musquodobit,
- Renewal of the Silver Sands water withdrawal permit,
- Renewal of the Lake Lamont water withdrawal permit,
- Amendments to Halifax, Dartmouth and Eastern Passage Wastewater Treatment Facilities to allow for Seasonal Disinfection full time annually between November 1 and April 30,
- Variance approval for Herring Cove to allow for Seasonal Disinfection for 2020/21 between November 1 and April 30,
- With the decommissioning of the Miller Lake WSP, the permit to operate was extinguished and the distribution system merged with the Pockwock system.
- Bomont WSP is currently being upgraded and is anticipated to be completed Q1 of 2021/22. Staff will consult with NSE upon completion of the project as

to whether amendments are required to the permit to operate and proceed accordingly.

The following were submitted and pending review:

- Bennery Lake water withdrawal permit;
- Chain Lake water storage and withdrawal renewal.

Staff are currently completing the following for submission in 2021-2022:

- Pockwock Lake water withdrawal renewal;
- Tomahawk Lake water withdrawal expires June 2022. The Tomahawk and Pockwock permits are 50 years old and through conversations with NSE, staff are confirming format and scope of the withdrawal application. A major consideration in this assessment will be whether withdrawal from Tomahawk is anticipated with the next ten years to supplement withdrawals from Pockwock. Staff will review the outcome of the hydrological assessment for Pockwock Lake within Q1 of 2021/22 and confirm any withdrawal requirements from Tomahawk are anticipated and follow up with NSE on the permit renewal requirements.
- Steeves and Eastern Passage WWTFs renew permit to operate;
- Amendment to the carrion control requirement within the Five Island Lake WSP permit to operate;
- Ongoing management of the storage tank registration and certification process.

Engineering Approvals: Is responsible for reviewing extensions of existing infrastructure, requests for new service connections, and enforcement of Halifax Water's design standards and specifications. The Engineering Approvals group continues to be engaged with HRM as the municipality implements its Regional Plan. In particular the group provides technical support and review on the servicing requirements to facilitate its Centre Plan, Master Plan communities such as Port Wallace and overall new serviced development within the municipality's serviced boundary.

The Engineering Approvals group recently submitted an application for the update to the Regional Development Charge (RDC) based on the 2019 Infrastructure Master Plan. A public hearing was held in June 2020. It is anticipated the charge will be in effect by Q1 of 2021/22 and the group will be tasked with implementation and communications with the development community.

With the RDC decision that was issued in October 2020, several annual reports were identified to be submitted starting September 2021. The reports will require coordination with other internal business units and are to incorporate outputs from stakeholder engagement and include the following topics:

- Wet weather management program,
- Asset management program,
- Stormwater management efforts,
- Benefit to Existing methodology,
- Annual review of the RDC, in the context of whether a +/- 15% change in the charge, occurred based on the core inputs.

The decision also outlined the requirements for analysis and reports being completed before the next five-year update to the RDC and the framework for some of the requirements will commence this year as part of the Infrastructure Master Plan update and others will commence this year independent of that project:

- Develop a new Industrial/Commercial/Institutional (ICI) cost allocation methodology,
- Identify potential water Demand Side Management (DSM) initiatives,
- Update the Compliance Plan to identify details and timing of the upgrades to secondary treatment for the Harbour Solutions WWTFs. Inclusive of a planning analysis of the growth impacts on the wastewater strength and removal efficiencies required to achieve both transitional and WSER standards. (A terms of reference document is to be submitted to the NSUARB by June 1, 2021, with status updates on the broader requirements be submitted annually, starting September 2021).
- Monitor the ratio of building type between single unit and multiple unit dwellings.
- Develop the framework and work plan to evaluate the ICI RDC rate using the Residential Equivalent Unit (REU) methodology as outlined in the AWWA Manual M1.
- Determine and collect the data required from HRM Development Services and development Community to develop a new ICI RDC methodology. (Status updates are required, starting September 2021).
- Complete a comprehensive study of the biosolids challenges and most cost-effective solutions. (Status updates are required, starting September 2021).
- Evaluate the most cost-effective solution for sewer separation projects, including the results in the capital budget submission to the NSUARB. This work will be completed by Engineering.
- Complete a comprehensive study of the Mill Cove WWTF. This work will be completed by Engineering.

A recent requirement of the permits to operate water supply systems, NSE is requiring a cross connection control program be developed to protect the potable water supply system from possible back flow events with industrial, commercial, institutional, and agricultural

customers. Halifax Water currently has a cross connection control program, and, commencing in Q1 of 2021/22, will expand the current program requiring all ICI customers to install a back-flow prevention device in their buildings. It is anticipated the retrofit program will span two years.

In keeping with the IT Strategic Plan to replace the Service Approvals Module, Halifax Water has been coordinating with HRM to replace their permitting software, HANSEN with POSSE and use this software as the Service Approval Module replacement. The roll-out of POSSE occurred in Q3 of 2020/21, and it is anticipated the full implementation will take place by Q1 of 2021/22.

Safety and Security: The Safety and Security section is responsible to provide support for the entire organization with respect to the safety training program, including documentation of safety training requirements to ensure employees have the appropriate training to conduct their daily activities and manage risk to the utility.

The Safety and Security section is also responsible for the development and update of the corporate Emergency Management Plan (EMP) including emergency response training. The group commenced broadening the current EMP to consolidate the response plans for each facility and establish a framework for the EMP to be accessible electronically. This work will continue into the coming year, with completion anticipated in Q3 2021/22.

As well, Halifax Water continues to participate in Public Safety Canada's Regional Resilience Assessment Program for treatment facilities. Facilities are evaluated using the Critical Infrastructure Resilience Tool, identifying areas where security and protection of critical assets can be improved or enhanced. Over the coming year, capital improvements will continue to enhance the physical security and staff will issue a request for proposal to develop an overall plan to document and make recommendations on the physical security profile at various facilities.

With the planned corporate expansion of EMS, the group will commence, in Q4 2021/22, the process to align the safety program with the ISO 45001 standard and seek certification in 2022/23.

Stormwater Engineering: Is responsible for reviewing drainage complaints, supporting Wastewater and Stormwater Operations, review of stormwater billing appeals, liaising with HRM on the joint Stormwater Policy and implementation of the National Disaster Mitigation Plan (NDMP).

With the approval of the stormwater credit program in 2017, there have only been six applications processed to date. The group is developing a plan to proactively engage with new customers when they complete their development and initiate their stormwater accounts. It is anticipated this program will be in place by Q3 of 2021/22.

The group is also providing technical support to the updating project for the Impervious Area. This project will be completed Q4 of 2020/21.

Environmental Management System: ISO 14001 is an international standard for Environmental Management Systems (EMS) essentially it is a system of procedures, records and process to manage environmental issues and assist with regulatory compliance. It also makes day to day operations more sustainable and engages employees in these operational activities. The EMS program can be audited against ISO 14001 standards, and if found to comply, receives a Certification through ISO. The ISO standard has a focus on organizational leadership and identification of risks and the associated influences, both internal and external to an organization.

The benefit of implementing an EMS is that it drives a process of continual improvement towards meeting defined environmental goals and objectives. Minimizing environmental impacts becomes one of the defined primary goals, and standard processes are put in place to identify issues and direct improvements through documented standard operating procedures. The standard pertaining to EMS is 14001- 2015 and requires an organization to:

1. Establish an environmental policy.
2. Identify environmental aspects that can impact the environment.
3. Identify our applicable Compliance obligations legal and regulatory requirements.
4. Set appropriate environmental objectives and targets.
5. Establish programs to implement our policy, achieve objectives and meet targets.
6. Periodically audit and review activities to ensure that the policy is complied with and the environmental management system remains appropriate.
7. Be stewards of the environment and local community.
8. Be capable of adapting to changing circumstances.

The group responsible for the implementation and maintenance of the EMS and oversees the adherence to the ISO 14001 – 2015 standard for our certified facilities at Pockwock, Lake Major, Bennery Lake, and Herring Cove, and Dartmouth WWTFs. Halifax, Eastern Passage and Mill Cove WWTFs recently underwent audits and the results of their certifications are pending.

Halifax Water has commenced the expansion of the corporate EMS program. Internal audits are scheduled for February 2021 for Regulatory Compliance, Aerotech WWTF and Small Systems for both Water and Wastewater. External audits will be scheduled in Q1 of 2021-2022 and other business units will be engaged for further expansion of the program. It is anticipated to span into 2024-2025.

3.4 Corporate Services

Corporate Services: Consists of 5 sections, with service to internal and external customers through Finance, Accounting, Procurement, Customer Care, and Metering and Billing.

Finance: Is responsible for development of operating budgets, funding plans for the capital budget, rate applications and financial modeling for business plans. This group assists E&IS in preparing the capital budgets and confirms the availability of funding sources. The group is responsible for forecasting revenues and expenditures, including associated trend analysis, administering the pension plan, internal control testing, and quality assurance activities around financial transactions including payroll.

Accounting: Is responsible for timely and accurate financial reporting, financial accounting, fixed asset accounting, financial analyses, and preparing the financial statements. This group is also responsible for revenue budgeting and developing cash flows, developing, and implementing accounting procedures and internal controls, and coordinating and supporting the annual audit. Accounting also assists Finance and ETS in preparing the capital budgets.

Procurement: Is responsible for planning and delivering procurement services to the organization ensuring compliance with corporate policies, legislation, and trade agreements. This section develops and implements reporting and monitoring systems, programs and procedures for inventory and procurement. Procurement also supports and guides internal departments in the acquisition of goods, services, and construction to meet Halifax Water's objectives and capital programs.

Customer Care: Is responsible for managing customer contacts, establishing corporate customer service standards, goals, and objectives, and coordinating the improvement of business processes in Customer Care and other departments.

Metering and Billing: Is responsible for installing, maintaining, reading, sampling, and testing meters, establishing standards, and billing customers in a timely and accurate manner.

The most significant objectives for Corporate Services in the 2021/22 fiscal year are:

- Improve financial forecasting and reporting to better enable internal and external users of financial information to make decisions.

- Enterprise Resource Planning (ERP) system replacement – In late 2019/20 Halifax Water established a project team to begin planning an upgrade to the ERP system. A preferred system has now been selected. The project is undergoing the approval process and is expected to begin implementation early in 2021/22 with completion in the following year. This project will impact almost all business processes and employee groups.

- Update the impervious area used for stormwater billing, and business processes to ensure impervious area is captured and billed accurately.

- Complete the Customer Connect - Advanced Meter Infrastructure (AMI) Project. The project was approved by the NSUARB on October 6, 2016 and is substantially completed. There are approximately 2,000 meter installs remaining for the 2020/21 fiscal year. All remaining non-AMI meters will be billed a meter read fee.

- A new telephony system was implemented in February 2020. In 2020/21, the Customer Care business process review will continue to identify opportunities to further improve the current Customer Relationship Management System (Cayenta), performance reporting, knowledge base and scripts for customer care representatives, and workflow and integration with the Computerized Maintenance Management System (CMMS). These will be underpinned by the introduction of a customer care quality program starting with call contact and eventually spanning all means of customer contact (email, face to face etc.) Customer Connect was implemented in 2020. In 2020/21, Customer Connect will continue to be enhanced and customers will be able to access information about their water consumption, water saving tips, account information and billing characteristics, and conduct some business on-line with on-line service requests, bill presentment and bill payment.

- The business case and process to implement monthly billing for customers that are currently billed on a quarterly basis will be finalized in 2020/21, with a view to implement monthly billing by the end of the first quarter of 2021/22.

- Halifax Water will update the Cost of Service Manual and submit to the Nova Scotia Utility and Review Board for approval.

3.5 Administration

General Managers' Office: Is responsible for overall administration of the utility. Some initiatives led by the General Manager's Office include governance, business planning, public and stakeholder relationships, and employee relations. Communications, Legal Services and Human Resources fall directly under the General Manager's Office.

Communications: Is responsible for external and internal communications, maintaining the internet and intranet sites, media relations, social media, and providing support to operations and capital delivery to ensure the public is kept informed of significant projects, service disruptions, and initiatives.

Legal Services: Includes the legal function, corporate records management, FOIPOP administration as well as land administration. The General Counsel acts as the Corporate Secretary to the Halifax Water Board and helps ensure that board governance processes function smoothly.

Human Resources: Is responsible for the effective delivery of all Human Resource initiatives including; effective workforce planning, organizational change and development, recruitment functions, disability management, health and wellness initiatives, labour/ employee relations, compensation and benefit functions, pension administration, and employment equity.

3.6 Unregulated Business

Halifax Water conducts some lines of business that are ancillary to the core water, wastewater and stormwater services. These activities include leasing of land for telecommunications, cell phone and radio towers, and some energy related initiatives such as leasing land for wind turbines at Pockwock and generating electricity through in-line turbines in the water system. The most material lines of un-regulated business are treatment of septage from waste haulers dealing with private septic systems, treatment of airline effluent. Halifax Water also can provide some services such as contract operations, consulting or leak detecting on a fee for service bases. Unregulated business is conducted for the benefit of the regulated rate base.

4. BUDGET SUMMARY

4.1 Capital Budget

Halifax Water's 2019 Integrated Resource Plan (IRP) identifies a 30-year capital investment plan valued at $4.05 billion ($2.69 billion net present value). The Capital Budget is developed based on the 2019 IRP. This 30-year plan provides a strong vision for the infrastructure required to ensure the long-term integrity of the utility's assets. The 2021/22 Capital Budget includes many projects from the IRP that will begin to shape the overall direction of the capital plan for years to come.

The capital budget program focuses on providing required infrastructure for asset renewal, regulatory compliance, and growth., and helps ensure that Halifax Water continues to provide services in a cost effective and efficient manner with a focus on long-term sustainability. Mitigation of operational risks as well as climate change adaptation and mitigation are also taken into consideration when the Capital Budget is developed.

The Capital Budget funds traditional capital requirements for utility operation, along with a focus on several key strategic initiatives. The following sections provide highlighted details of the Capital Budget by asset category.

Appendix C contains the proposed Capital Budget for Halifax Water for the fiscal year April 1, 2021 to March 31, 2022. It includes projects for Water, Wastewater, and Stormwater service delivery with a total value of $126.2 M, as demonstrated in Figure 1 below.

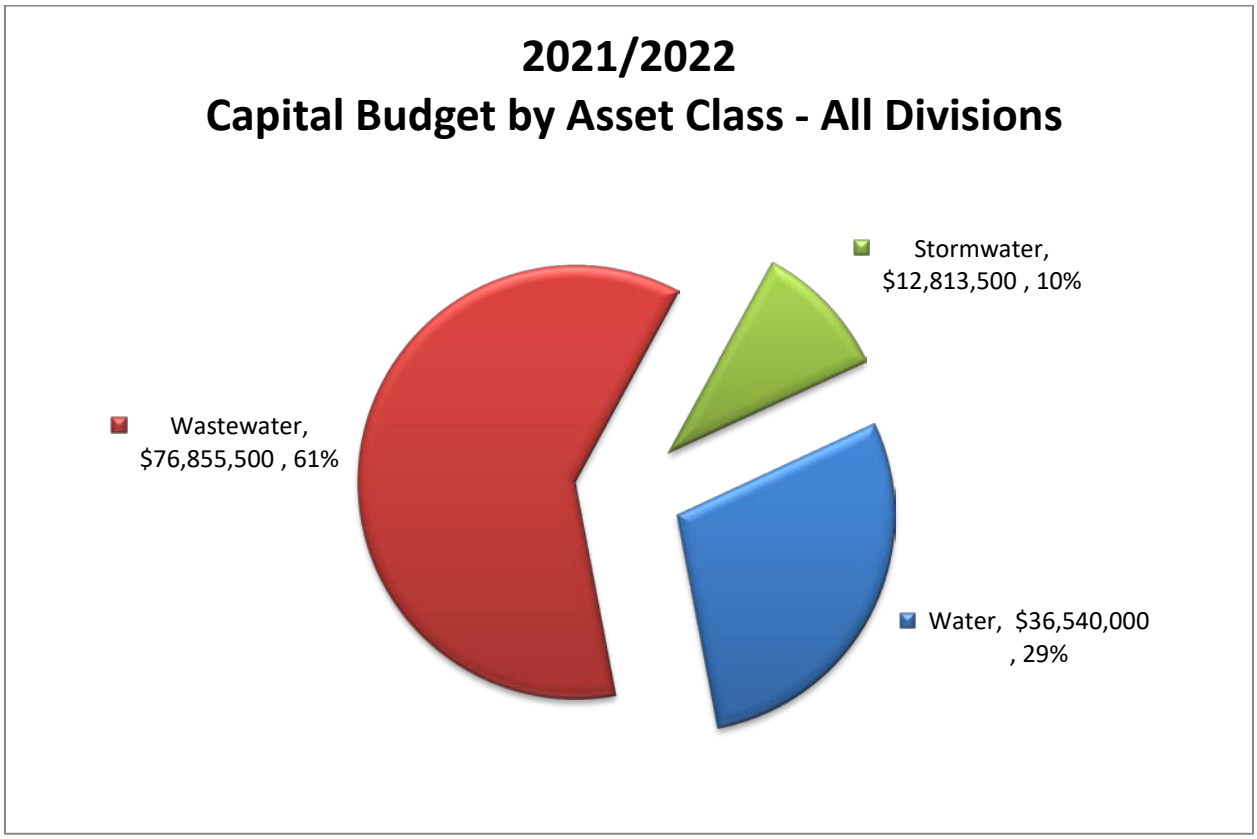


Figure 1 - Capital Budget by Asset Class

Water

The 2021/22 capital budget for WATER assets identifies the start of a significant reinvestment in Water Supply Plants (WSP) with the introduction of the Water Supply Enhancement Program (WSEP).

The JD Kline and Lake Major Water WSPs are entering a period of wholesale capital renewal, upgrade, and enhancement, which is planned to occur over the next 10 years. These changes are being driven by operational risks due to climate change, lake recovery, obsolescence, end of asset life, and ongoing treatment plant performance issues that have converged into the present-day operating conditions. In terms of recent water quality events, the presence of taste and odour compounds (e.g. geosmin), coupled with algal matter and algal toxin risk is at the forefront of the evolving treatment process needs for the utility.

The development of the capital plans for each WSP has been progressing over the last two years. These capital plans have developed the needs, scope, concept level cost estimate, and priority of major projects to be completed at each facility. Such projects are primarily beyond the scale of small and medium projects which have been ongoing at these facilities in recent years.

The Lake Major and JD Kline facilities have many common elements including technical challenges, management expectations, project team staffing, and overall project approaches. Therefore, the two WSP capital programs are being integrated into an overall WSP capital program in order to prioritize, sequence, gain synergies, and reduce overall costs by considering the modifications as one complete program. Together, these projects represent the largest value capital investment programs for water treatment infrastructure in the history of the utility. The overall Water Supply Enhancement Program includes 15 projects: 10 at the JD Kline WSP and 5 at the Lake Major WSP. The estimated total capital cost of the ten-year WSEP program is currently estimated at $230 M.

The need for this program is directly connected to the continued provision of water from the utility's two largest treatment facilities meeting quantity and quality objectives.

The value of the overall WATER capital budget for 2021/22 is $26.3 M. The major capital projects within this asset class for 2021/22 implementation includes:

- WSEP – JD Kline and Lake Major Clarifier Design
- Cobequid Road Transmission Main Looping – Windgate Drive Extension
- Water Distribution – Main Renewal Program
- Lead Service Line Replacement Program
- Cowie Hill Reservoir - Replacement
- HRM Cogswell Redevelopment – Water Transmission Main Relocation

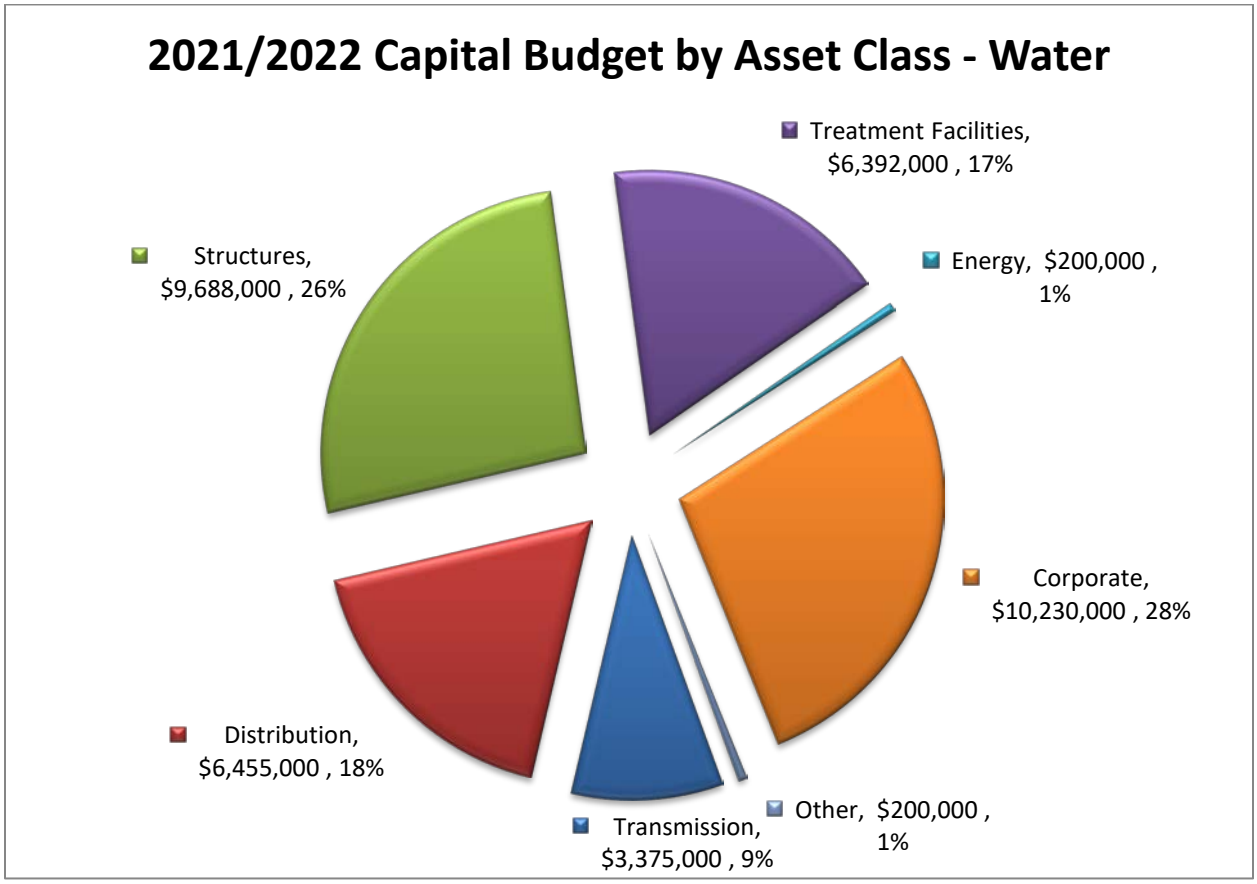


Figure 2 - Water Capital Budget

Wastewater:

The value of the WASTEWATER capital budget for 2021/22 is $64.78 M. The major capital projects within this asset class for 2021/22 implementation includes:

- Fairview Cove Trunk Sewer – Tunnel Construction
- Wastewater System – Trenchless Rehabilitation Program
- Integrated Wastewater Collection Projects
- Albro Lake Watershed Separation
- Morris Lake and Russell Lake Forcemains – Rehabilitation
- Pumping Station Rehabilitations
- Punch Bowl Pumping Station Elimination
- Halifax WWTF – Fine Screen Replacements and Clarifier Upgrades
- HRM Cogswell Redevelopment – Wastewater Sewer Relocation
- Biosolids Processing Facility – Preliminary Design

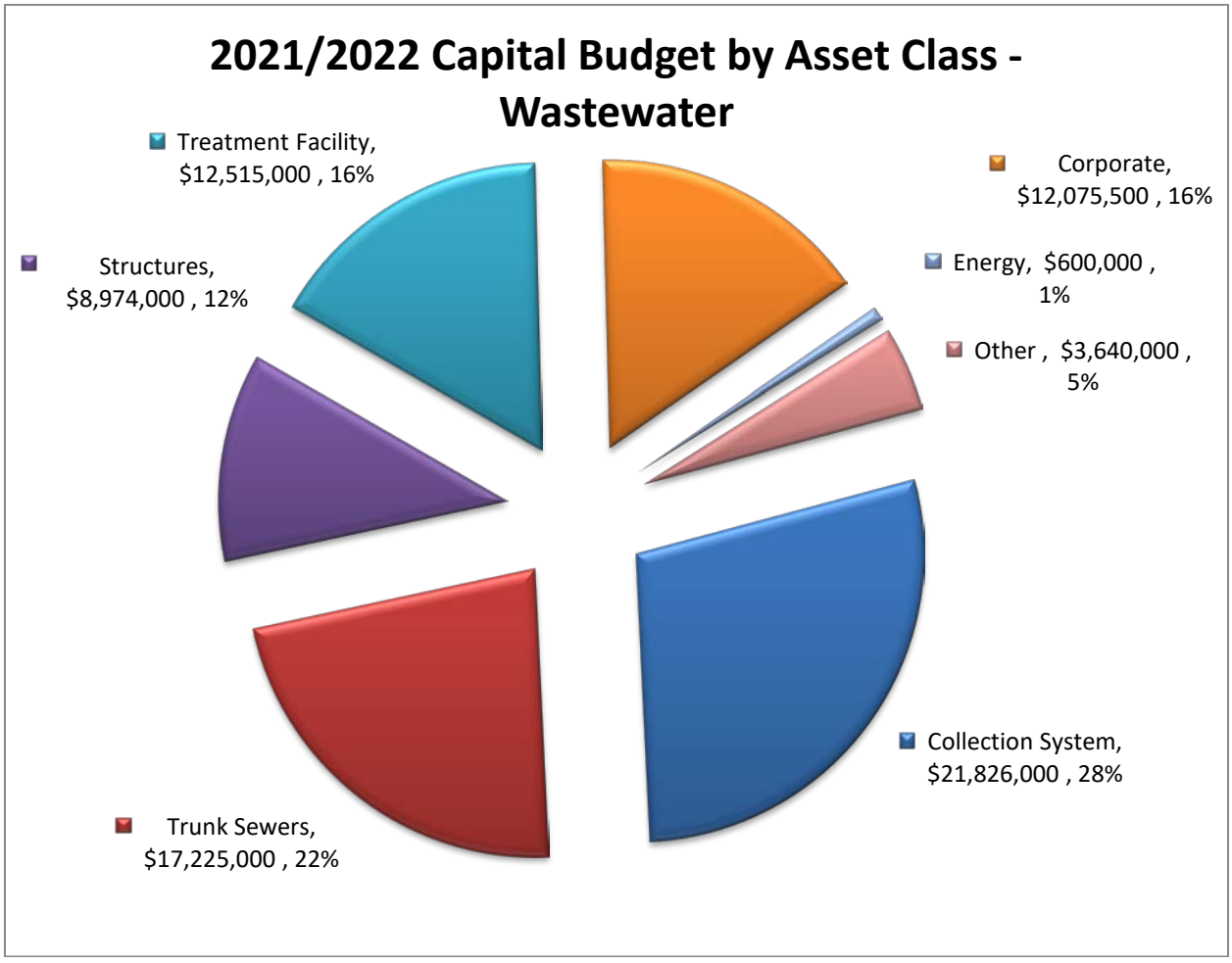


Figure 3 - Wastewater Capital Budget

Stormwater:

The value of the STORMWATER capital budget for 2021/22 is $10,764 M. The major capital projects within this asset class for 2021/22 implementation includes:

- Integrated Stormwater Collection Projects
- Driveway and Cross Culvert Renewal Program
- Ellenvale Run Retaining Wall System Replacement – Phase 5
- HRM Cogswell Redevelopment – Storm Sewer Relocation

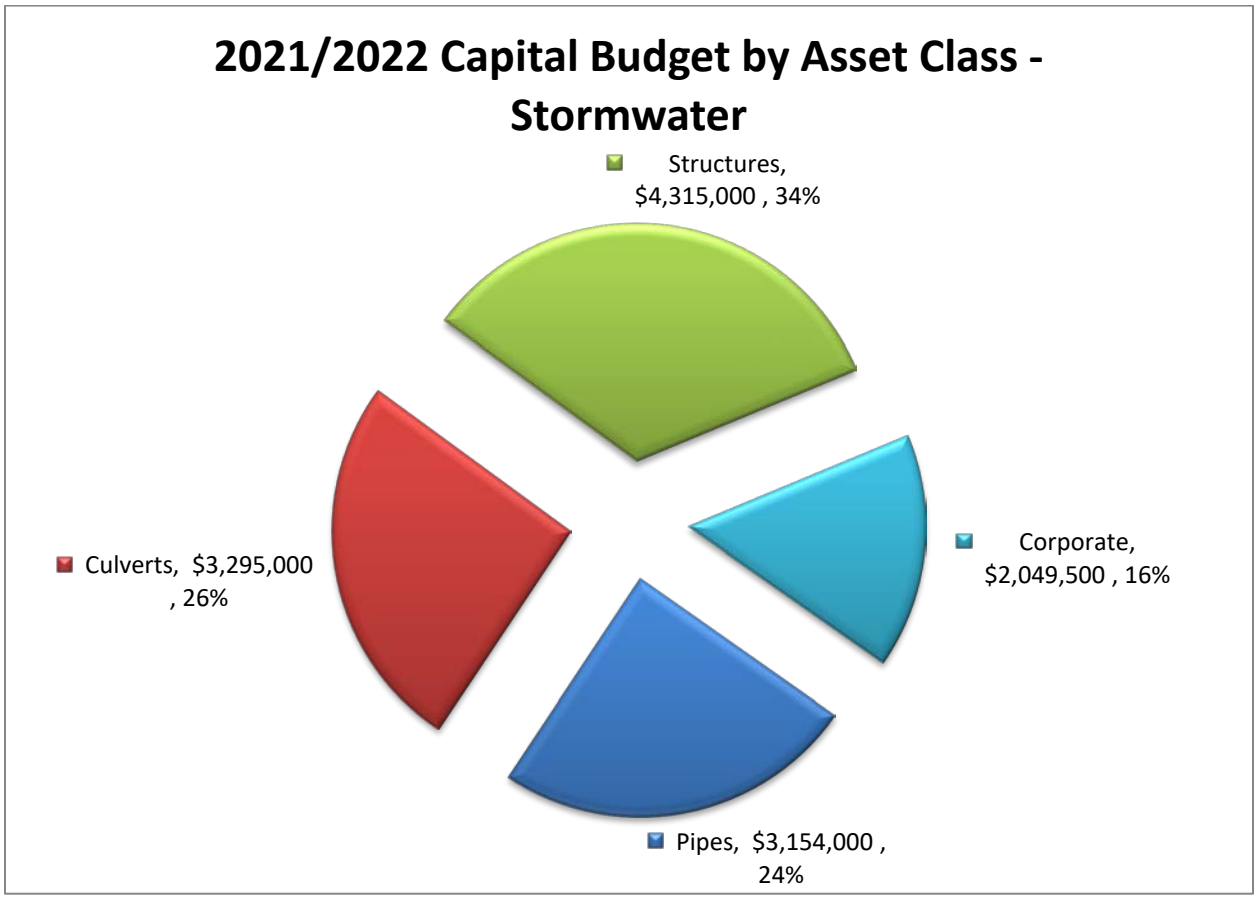


Figure 4 - Stormwater Capital Budgets

Corporate Projects:

The value of the CORPORATE capital budget for 2021/22 is $24,355 M. The major capital projects within this asset class includes:

Major Corporate Projects for 2021/22 implementation include:

- IT Strategic Plan Implementation Year 4
  - Enterprise Resource Planning Solution
  - Cybersecurity Program
- Corporate Flow Monitoring Program
- Detailed Design of Burnside Operations Facility
- Fleet Upgrade Program

The 2021/22 capital budget does not include the Cogswell District Energy project. If that project proceeds, it will have a separate capital budget which would be brought forward to the Halifax Water Board in conjunction with the business case and recommendation to proceed as a separate regulated utility. This discussion is targeted for March 2021.

BUDGET IMPLICATIONS

The funding plan for the proposed Capital Budget is shown in Table 2 below:

Table 2 - 2021/22 Proposed Capital Budget

2021/2022 Capital Budget Funding Sources		
Water:	Depreciation	$12,275,000
	Debt	$21,005,000
	RDC	$1,238,000
	External Funding Building Canada & CWWF	$2,022,000
	Capital Cost Contributions	$0
	TOTAL	**$36,540,000**
Wastewater:	Depreciation	$16,673,500
	Debt	$36,192,000
	RDC	$22,472,000
	External Funding HRM	$1,326,000
	Capital Cost Contributions	$192,000
	TOTAL	**$76,855,500**
Stormwater:	Depreciation	$1,953,500
	External Funding HRM	$256,000
	Debt	$10,604,000
	TOTAL	**$12,813,500**
TOTAL CAPITAL FUNDING:		**$126,209,000**

4.2 Operating Budget

The operating budget prepared for 2021/22 is based on year two of the Five-Year Business Plan submitted to the Halifax Water Board in January 2020. The operating budget is built based on rates currently approved by the Nova Scotia Utility and Review Board. Table 3 below outlines the operating budget for 2021/22 which shows a projected deficit of $11.7 M. The budget reflects requirements to maintain current levels of service, deliver projects already in progress or approved, and address any changing environmental or regulatory requirements. The detailed 2020/21 Operations Budget is contained in Appendix C. A summary version of the Operations Budget is shown in Table 3 – Operating Budget Summary.

Table 3 - Operating Budget Summary

Operating Budget Summary (in thousands)

	Actual 2019/20	Approved Budget 2020/21	Proposed Budget 2021/22	Increase
Operating revenues	$ 137,750	$ 138,618	$ 150,466	$ 11,849
Operating expenditures	109,326	118,110	125,379	7,269
Earnings from operations	28,424	20,508	25,087	4,579
Financial and other revenues	1,211	619	722	103
Financial and other expenditures	31,195	37,076	37,461	385
Earnings (loss)	$ (1,560)	$ (15,949)	$ (11,651)	$ 4,297

Halifax Water's operating budget is sensitive to many factors including the rate of capital project delivery, interest rates, weather, water consumption, and customer growth. Some of the primary operating budget drivers and assumptions are:

REVENUES:

As shown in Table 3 - Operating Budget Summary, operating revenues are budgeted to increase by $11.8 M to $150.5 M in 2021/22 compared to the 2020/21, representing an increase of 8.5%. Financial and other revenues are budgeted to increase by $0.1 M or 16.7% to $0.7 M compared to 2020/21.

The current rates for water and wastewater service have been unchanged since April 1, 2016. The volumetric rate for wastewater discharge is set to increase on April 1, 2021 to $2.073/m^3 from $1.753/m^3 which is the main driver for the increase in revenue for the 2021/22 budget. The current rates for stormwater service came into effect July 1, 2017

(revenue requirements for stormwater service did not increase, but the rate design changed).

Most of Halifax Water's revenues come from rate-regulated activities, with approximately 68% of water, wastewater and stormwater revenues coming from volumetric rates and 32% from base charges.

Operating revenues are budgeted to be $11.8 M more than the 2020/21 budget, based on the following assumptions:

- Volumetric water and wastewater revenues are based on projected actual consumption for 2020/21 with no decrease projected. For the first eight-months of 2020/21, consumption was down 1.70% from the prior year and up 0.06% from budget. This is attributable to many factors including changing consumption patterns due to COVID-19, growth in customers, improved meter accuracy, and weather conditions.

- Fire protection rates have increased as of October 1, 2020 leading to an increase of $0.1 M as compared to the 2020/21 budget.

- Stormwater revenues are budgeted based on 2020/21 stormwater water revenues. Updating of impervious area is on-going. As the project is completed there is an expected increase in the impervious area, however, the impact on revenue cannot be determined.

- Other wastewater service revenue, including septage tipping and dewatering are comparable to the 2020/21 budget.

- The projected increase in new customers is 638 which are allocated to various meter sizes based on a review of connection history.

Operating revenues are very sensitive to changes in consumption. Halifax Water has experienced net metered consumption decreases of 24.9% since 2001/02. On average, the annual reduction is 1.56% which has been managed through changing rate structures, diversifying revenues (stormwater with a different billing determinant), controlling costs, and increasing rates.

Timing of development, form of development and new customer growth is difficult to predict. Water consumption is sensitive to a combination of factors including development activity, customer growth, weather, and economic pricing signals. Halifax Water manages the risk of decreasing consumption by making prudent assumptions when preparing budgets and financial models.

Alternative Revenue: Revenues from unregulated business activities are expected to remain stable in 2021/22. Unregulated revenues help to pay for some expenses which would otherwise be funded by rate-regulated activities and are also used to fund unregulated expenditures.

Unregulated revenues are projected to be $1.1 M in 2021/22, which is comparable to the 2020/21 budget.

EXPENDITURES:

Halifax Water's 2021/22 Operating Budget is reported on a modified accrual basis, except for the liability for future employee benefits (pension) which is excluded from revenue requirements for rate making purposes, which is consistent with prior years.

The utility faces pressure associated with growth, asset renewal, and compliance with regulatory requirements, as described in the IRP. Halifax Water has taken significant steps to reduce risks in these areas with the development of the RDC, an asset management framework and capital projects to upgrade wastewater treatment facilities.

As shown in Table 3 - Operating Budget Summary, operating expenditures are budgeted to increase by $7.3 M to $125.4 M in 2021/22 compared to the 2020/21, representing an increase of 6.2%. Financial and other expenditures are budgeted to increase by $0.3 M or 1.0% to $37.5 M compared to 2020/21.

The largest components of Halifax Water's operating expenditures are salaries and benefits, energy, debt servicing, depreciation, and chemical costs. Key assumptions in each of these areas are outlined below:

Salaries and Benefits: The budget for 2021/22 includes an increase of 20.75 full-time equivalents positions. The net impact of the new positions on the 2021/22 operating budget is $1.7 M, with a portion of the total cost being recovered from capital projects.

The annual increase included in the operating budget for existing employees is based on the non-union salary policy, and unionized wages are based on collective agreements signed in June 2019. Salary and wage assumptions also include an allowance for band adjustments, step increases, and re-classifications of positions.

For the first time, Halifax Water has incorporated a vacancy factor in developing the 2021/22 operating budget. The purpose of the vacancy factor is to reduce operating expenditures to reflect situations where delays are experienced in filling vacant positions. Vacancies result when employees move to other positions within the organization or are terminated or retire. The estimated impact of the vacancy factor related to the 2021/22 operating budget is a cost reduction of $0.4 M (including benefits).

Energy: Assumptions respecting electricity, fuel, oil, and natural gas rate increases are outlined below. The change reflects the change in consumption and an estimate of potential price increases, if appropriate.

- Electricity – 3.0% (2020/21 increase of 3.0%)
- Furnace Oil – 0.0% (2020/21 increase of 3.0%)
- Natural Gas – 10.0% (2020/21 increase of 10.0%)

Debt Servicing: New debt principal and interest payments are budgeted to support the 2021/22 additions to utility plant in service. The amount and timing of the increases will be determined by the completion of the projects, financing rates and options available. It is estimated total debt servicing will decrease to $30.6 M in 2021/22 compared to $30.9 M in 2020/21, representing a $0.3 M or 1.1% reduction. This is reflective of the timing considerations respecting the incurrence of new debt and lower financing rates currently available through the Municipal Finance Corporation. Halifax Water's capital financing strategy is designed to maintain a debt service ratio of 35% or less. The debt service ratio based on the 2021/22 operating budget is 20.3%

Depreciation: As Halifax Water's assets and future capital budgets increase so does depreciation. Depreciation is an integral funding source to support renewal of existing infrastructure, new infrastructure and upgrades to meet future requirements related to servicing demands and changing environmental regulations. Depreciation is projected to increase from $27.4 M in 2021/22 budget to $30.8 M in the 2021/22 budget, an increase of $3.4 M or 12.6%. For the purposes of the 2021/22 operating budget, depreciation is calculated on rate-funded water, wastewater and stormwater assets. Depreciation expenses related to assets funded from other contributions such as Capital Cost Contributions, Regional Development Charges, and external and other is not considered an expense for rate calculation. The NSUARB has approved the phase in of depreciation on contributed stormwater assets, and currently 25% of the depreciation expense related to contributed stormwater assets is include in the stormwater rates. In a future rate application, Halifax Water may request permission to phase in depreciation on contributed water and wastewater assets.

Chemical Costs: Chemicals are tendered annually in January for optimal pricing. Chemical consumption changes and price increases result in a 5.0% increase in chemical costs for 2021/22 (2020/21 increase 5.0%).

ACCUMULATED SURPLUS (DEFICIT):

The accumulated operating surplus (deficit) [based on the NSUARB Accounting and Reporting Handbook for Water Utilities] as at March 31, 2022 is projected to be $15.3 M, which consists of the accumulated operating surplus for the 2019/20 fiscal year, projected results for 2020/21 based on forecasting to December 31, 2020, and a budget deficit of $11.7 M based on the 2021/22 operating budget. Table 4 below summaries the continuity of the accumulated surplus (deficit) year-over-year, by service area.

Table 4 - Continuity Schedule - Accumulated Surplus (Deficit) - NSUARB

	Total	Water	Wastewater	Stormwater
2019/20 Fiscal Year				
Balance, beginning of year	$ 39,616,338	$ 17,230,564	$ 14,717,365	$ 7,668,409
Earnings (loss) for the year	(1,562,011)	5,204,828	(5,037,296)	(1,729,543)
Surplus, end of year	38,054,327	22,435,392	9,680,069	5,938,866
2020/21 Fiscal Year				
Balance, beginning of year	38,054,327	22,435,392	9,680,069	5,938,866
Projected (loss) for the year	(11,113,000)	(1,158,000)	(6,706,000)	(3,249,000)
Projected surplus, end of year	26,941,327	21,277,392	2,974,069	2,689,866
2021/22 Fiscal Year				
Balance, beginning of year	26,941,327	21,277,392	2,974,069	2,689,866
Projected (loss) for the year	(11,651,000)	(5,221,000)	(1,518,000)	(4,912,000)
Projected surplus (deficit), end of year	$ 15,290,327	$ 16,056,392	$ 1,456,069	$ (2,222,134)

Halifax Water targets to maintain an accumulated operating surplus of 3% of total expenditures (operating and financial) to mitigate risk and to help smooth the timing and impact of rate increases. Accumulated operating surplus can be used to offset operating losses, or to fund future additions to utility plant in service, subject to NSUARB approval. Based on the projected financial position as at March 31, 2022, the projected accumulated surplus of $15.3 M represents 9.4% of total expenses.

Halifax Water has a goal to keep rates for combined services below 2% of median household income, well below the rate affordability threshold recommended in several industry best practice studies. The cost of annual combined services for an average household is currently estimated at 1.1% of median household income in 2021/22.

5. STRATEGIC INITIATIVES AND PROGRAMS

5.1 Asset Management and Levels of Service

With the well-established Asset Management Plan (AMP), Halifax Water is focusing asset management (AM) efforts on implementing recommendations, ongoing efforts to enhance supporting data and practices, and expanding the asset classes covered by the Asset Management Implementation Teams (AMITs). 2021/22 will see all designated asset classes participating in the AMIT efforts.

The AMITs are regular meetings with participants from multiple departments and work groups (Operations, Engineering and Regulatory Services) facilitated by AM staff. These meetings are a forum for reviewing the AMP, AMP recommendations, and determining actions needed to inform operational and capital interventions for the asset class. To

support the work of the AMITs, AM staff will continue to improve AMP data, expand efforts for condition assessments, and resolve data discrepancies and gaps in GIS.

Early in 2020/21, the Executive Team began a review of the utility's levels of service (LOS) statements and metrics. The work to date enabled updates to customer values / service criteria (Quality Water, System Performance, Service Value, and Customer Service), development of the Customer/Corporate LOS statements (What the customer/corporation gets) and Technical LOS statements (What we do / How we do it). Future work into 2021/22 will allow staff to further update the Operational Indicators (How we know we perform the service well/how do we know we achieve stated LOS), confirm or define the Service Standards (How we measure our performance), define targets (what must be measured) and data availability (is the data available today). Following this work, the AM team will develop a program for filling the defined any data gaps.

Halifax Water is commencing a reassessment of the overall AM Program. The project will use the Federation of Canadian Municipalities (FCM) Asset Management Readiness Scale (AMRS) assessment tool. This will involve individual assessments of the program by members of the Executive Team followed by group assessments in facilitated workshops. The outcome of the assessment will be benchmarked against assessments completed in 2020 by staff from the PEMAC Certified Asset Management Professional (CAMP) program. The outcome of the project will be an updated AM Roadmap to move us into the next five-year horizon.

2021/22 is mid-cycle for the long-term planning process. Coming out of the 2019 Infrastructure Master Plan (IMP) and the 2019 Integrated Resource Plan (IRP), there were recommended supporting studies identified for completion prior to the next round of master planning. Several of these supporting studies are earmarked for completion in 2021/22.

Key data collection programs will be updated this fiscal year. These include the sewer inspection program and the corporate flow monitoring program. Both of these are in progress for updated contracts that allow for summer 2021 start.

5.2 Climate Resiliency

In recent years, the impacts of climate change have exposed vulnerabilities for Halifax Water assets. Halifax Water has adapted a Climate Change Management Framework to identify vulnerabilities to existing and planned assets, evaluate the risks, plan and implement an adaptation strategy.

Halifax Water is currently undertaking the Vulnerability to Climate Change Risk Assessment pilot project to identify vulnerabilities and risks to the Water Supply Plant and Water Supply Dams asset classes. This project addresses the Assessment Stage of the three-stage Climate Change Management Framework. The pilot will:

- Identify the ISO 31000 compliant risk assessment methodology that Halifax Water will use. This will standardize the language of climate risk that Halifax Water will use across the utility.
- Identify and assess climate risks to existing water supply assets.
- Identify and assess climate risks to future assets (beginning with water supply plants) so they can be incorporated at the earliest possible design stage.

Following successful completion of the pilot, Halifax Water will apply the approach across the remaining water, wastewater and stormwater asset classes.

Halifax Water is also undertaking a Climate Lens project for three capital projects that may be eligible for funding through the Investing in Canada Infrastructure Program (ICIP). Climate Lens requires that applicants consider climate risks to projects as early in the design process as possible. Using the same ISO 31000 methodology identified in the Vulnerability to Climate Change Risk Assessment pilot, Halifax Water will assess climate risks to these proposed projects.

By creating the standardization between asset class level and project level risk assessment methodologies, Halifax Water is promoting vertical integration of climate adaptation throughout the capital planning process. Halifax Water is also promoting horizontal integration of climate adaptation across operating area by promoting the standard language of climate risk assessment.

Halifax Water has a mature Energy Management Program and is committed to creating and ensuring an ongoing focus on sustainability and energy efficiency throughout all operating areas. This program has historically been carried out in relation to Halifax Water's Energy Management Policy through the Energy Management Steering Committee. The Committee is being rebranded to the Climate Resiliency Committee (CRC) with its focus being broadened further to include more emphasis on GHG emission reduction, stormwater management and flood resiliency, vulnerabilities, and risk assessments and development of a Climate Change Action Plan for Halifax Water that will support HalifACT 2050. A report will be presented to the Environment and Safety Committee of the Halifax Water Board in Q1 of 2021-2022 outlining the goals and objectives of the CRC committee. Expansion of the EMS program presents a significant opportunity to reduce Halifax Water's environmental footprint, the two initiatives will compliment and benefit from each other.

The committee structure will span multiple business units and draw success from embedding resilience in the daily activities across the organization with the implementation of key policies, and both capital and operational projects.

For 2021/22 and beyond, initiatives have been identified in the following areas:

Infrastructure / Operational Improvements

Capital projects that will result in improved energy efficiency, energy recovery, GHG reductions and operational cost savings are continually identified throughout Halifax Water's infrastructure. Projects being implemented or considered include:

Table 5

Various WSP/WWTF Process Improvements	*UV Disinfection Upgrades*
HVAC System Re-Commissioning	*Pumping System Upgrades*
HVAC & Building Envelope Upgrades	*Pump/Meter Chamber Upgrades*
Mill Cove WWTF Upgrades	*East/Central Operations Facility*
Biosolids – Enhanced Resource Recovery	*Various Solar PV Projects*

New construction capital projects (e.g. new admin/operations depots, treatment facilities, pumping stations, etc.) are also reviewed at the conceptual and detailed design stages to ensure best-in-class energy efficiency and the lowest life cycle costs throughout the life of the asset.

GHG Emissions Inventory

GHG emissions from all of Halifax Water's operations are being closely monitored and accounted for within Halifax Water's Energy Management Information System (EMIS). In addition to primary fossil fuel (i.e. heating oil and natural gas) emissions from our facility operations, secondary or indirect emissions from electricity use (i.e. NSPI emissions) are also being tracked and reported on an annual basis. Furthermore, a methodology has been implemented to track emissions from our fleet vehicles. GHG emission reductions are now an important operational metric within Halifax Water's annual Corporate Balanced Scorecard/Continuous Improvement system.

Renewable Energy Generation

Halifax Water has identified renewable energy as an important way of offsetting energy costs and increasing revenue that will help the utility to significantly reduce energy use and greenhouse gas emissions in the region. Two key project areas have been identified: renewable energy and energy recovery from both water and wastewater systems.

To date, three renewable energy projects have been completed: the Pockwock Community Wind Farm, located near our JD Kline WSP and operational since 2014; the Orchard In-Line Energy Recovery Turbine, located in Bedford and operational since 2014; and the recently completed Halifax WWTF 75 kW Solar PV system completed under the Solar Energy for Community Buildings Pilot Program. These projects are expected to continue to operate above expectations and generate clean renewable energy, GHG reductions, and revenue for the utility for decades to come.

Energy recovery from process or waste streams are recognized as one of the biggest opportunities available to society. Recoverable energy is everywhere – in solid municipal/residential waste streams, industrial by-products, and water and wastewater effluent streams. Halifax Water has significant recoverable energy resources available in both its water and wastewater streams. Halifax Water is currently focusing efforts on three specific energy recovery projects.

Enhanced Resource Recovery from Biosolids

Halifax Water currently supplies over 35,000 tonnes per year of partially de-watered sewage sludge to its Aerotech Bio-Solids Processing Facility (BPF). Currently, this sludge is turned into a soil amendment that can be used as fertilizer for topsoil manufacturing, sod growing, horticulture, and land reclamation. Energy recovery from biosolids is one of the most developed opportunities for treatment plants. This is commonly achieved through anaerobic digestion of wastewater sludge.

Halifax Water's Mill Cove WWTF and Lakeside Timberlea WWTF are equipped with anaerobic digesters and the gas generated is utilized for digester operation and excess gas is used for space heating in the plants. The HHSP and other small facilities have sludge dewatering equipment on site as the prime resource for biosolids that are utilized as soil amendment for beneficial reuse. Halifax Water expects to continue this practice in the near term considering that the agricultural soil amendment program continues to be very successful. There are several emerging technologies in the industry that show promise for alternative uses of biosolids for energy production; Halifax Water have been reviewing these technologies to determine the best opportunity; however, it must be developed cognizant of the risks that are associated with the complex issue of biosolids management. Halifax Water is currently developing a plan to upgrade the existing Aerotech BPF to enhance resource recovery (energy, water, nutrients) from our biosolids stream.

Halifax Water continues to explore opportunities and options for the alternative re-use of biosolids as an available energy source that can contribute to overall GHG reductions and offset annual energy costs.

Cogswell District Energy System

The HalifACT 2050 program initiated by the municipality identifies the Cogswell District Energy System as a significant climate change mitigation opportunity. A study was completed in 2016 to determine the feasibility and preliminary business case for an Ambient Temperature District Energy System (ATDES) within the Cogswell Redevelopment Area of downtown Halifax. The feasibility of the DES is predicated on the assumption that connection to the DES will be mandatory within the redevelopment area. To that end, HRM has completed amendments to its Charter through the Legislature to facilitate this authorization and has developed and enacted a by-law considering a DES within the Cogswell Redevelopment Area. Halifax Water has also confirmed that the service will be regulated by the NSUARB. Work on the Cogswell ATDES continues with stakeholder consultation, and the completion of preliminary and detailed design work in parallel with the Municipality's effort

to advance the Cogswell Redevelopment project. Halifax Water strategic objectives related to DEC in 2021/22 include finalizing the business case and securing the necessary Halifax Water Board and NSUARB approvals and financing needed to proceed.

Solar Photovoltaic (Solar PV) Systems

An application was submitted to the federal/provincial *Investing in Canada Infrastructure Program (ICIP)* for the deployment of Solar PV systems at several suitable Halifax Water facilities. Conceptual/preliminary engineering work has completed by staff, with detailed design and construction of the systems to be completed pending the outcome of the ICIP application. These projects are expected to generate significant levels of clean renewable energy, and significantly reduce/offset Halifax Water's annual GHG emissions.

5.3 Compliance Plan

The Regulatory Compliance division of Regulatory Services has established a tracking system to monitor trends of non-compliance and associated sources for all of the wastewater treatment facilities (WWTF). A working group has been established between Asset Management, Operations and Design Services staff to track and plan for the upgrades to maintain compliance with Provincial and Federal regulations.
Building on the framework of the basic Compliance Plan from 2012, the plan was updated in 2019 utilizing information Halifax Water has available to create a path forward to maintain or achieve compliance for our wastewater, water and stormwater infrastructure systems over the next 30 years. The Compliance Plan highlights the current state of compliance at our wastewater treatment facilities and water supply plants as well as future compliance requirements. It also includes overall guidance on our wastewater collection system, sanitary and combined sewer overflows and our water distribution system including water reservoirs.

The key objectives of the Compliance Plan included:

- Review of previous work completed that relates to compliance, including the 2012 IRP, 2019 Infrastructure Master Plan and Five-Year Capital Program;
- Understanding current and future compliance requirements as they relate to wastewater, water and stormwater infrastructure;
- Understanding previous compliance trends and exploring potential compliance requirements taken from regional and global examples;
- Reviewing, documenting and analyzing the current performance of infrastructure against compliance requirements;
- Generation of infrastructure needs and costs to meet current and future compliance requirements;
- Incorporating the three drivers behind infrastructure planning (growth, asset management and compliance) through incorporating the impact of future growth

trends and outlining projects that contain compliance components and asset renewal / growth components;

- Developing an action plan that outlines current, medium and long-term projects; and
- Identification of action plan risks and potential mitigation methods.

Halifax Water has been consistently working toward achieving the provincial level of wastewater treatment as stipulated by Nova Scotia Environment (NSE) permits and Federal Wastewater System Effluent Regulations (WSER). Historically, NSE has set compliance standards for each WWTF issuing Approval for Operation which sets the effluent limits, and the Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CSMMW) provided national standards for combined sewer overflows (CSO) and sanitary sewer overflows (SSO). Then in June 2012, the WSER was enacted which set national standards for WWTF effluent discharge and CSO and SSO standards.

Since the introduction of the federal WSER standards, NSE has been reviewing and renewing Halifax Water's operating permits with steady increases in compliance and reporting requirements.

The Compliance Plan is a key input to the Infrastructure Resource Plan (IRP). The IRP provides holistic guidance to understand the current level of compliance and actions required for maintaining compliance. Several initiatives have recently been completed and others underway shall continue. Current compliance initiatives are as follows:

- Compliance Monitoring and Reporting through the Regulatory Services Department;
- Engaging Dalhousie University in compliance research;
- Adopting the Environmental Management System (EMS);
- Environmental Risk Assessments (ERA); and
- WSER Transitional Authorization.

The Compliance Plan was included in the IRP submissions to NSUARB as a part of the Regional Development Charge and Rate Application hearings. The NSUARB has been complimentary of this plan, however suggested to progress this work in more details concerning Halifax and Dartmouth wastewater treatment facilities. The NSUARB directed activities shall get underway in 2021/22 with an ultimate goal of an update Compliance Plan inclusion in next IRP update. Halifax Water entered into a 3-year research agreement with Dalhousie University to conduct specific research and optimization of Halifax Water facilities to stay "ahead of the curve" to meet its compliance requirements. The research program is funded under NSERC's Collaborative Research and Development Grant. The NSERC is in the midst of redesigning its funding programs, Halifax Water and Dalhousie University intend to make a future application for a long-term funding when the new programs are in place. The current 3-year plan has a primary objective to improve effluent quality from chemically enhanced primary systems through bench, pilot and full-scale testing and optimization of coagulation/flocculation processes; the other elements being the application of innovative UV technologies and assessment of contaminants of emerging concern.

5.4 Customer Service Enhancement

The most recent Customer Service (Quality of Service) Survey indicates satisfaction with Halifax Water's overall service delivery remains high at 96%, consistent with the last three years.

A sample of 400 respondents were surveyed, with results expected to be accurate to within plus or minus 4.9 percentage points in 95 out of 100 samples.

New for this year were questions related to satisfaction with wastewater service, Halifax Water's services during the COVID-19 pandemic, and interest in using the new Customer Connect portal. With respect to wastewater service, 91% were very or generally satisfied; and 70% were very or somewhat interested in using a customer portal to manage accounts, monitor water consumption, and pay bills online. For services during COVID-19, 85% rated services as about the same, with 6% rating services as better.

Key highlights:

- The ratings for staff promptness improved to 83% up from 78% in 2019.
- Most customers believe their water is safe and the quality is high.
- Satisfaction with Halifax Water's reliability ranks very high with 97% very or generally satisfied.
- Four in ten customers (42%) report using some form of water treatment device, most commonly for concerns about water quality, removing chemicals, and perceived improved taste.
- Confidence in the safety of water in the Halifax Harbour increased slightly over last year to 48%.
- Residents continue to lack awareness of the source of their municipal tap water.
- Awareness of the lead service line subsidy is low, though 69% of customers with a home built prior to 1960 were very or somewhat interested in using the new LSL program, up from 47% in 2019.
- Awareness of the emergency assistance program (H2O Fund) is low.
- Awareness of which water body receives treated wastewater from their property is moderate.
- One half of respondents reported receiving stormwater service and the vast majority (84%) of those were very or generally satisfied with the service.
- Most customers (7 in 10) believe it is not very or not at all important to be able to visit Halifax Water's offices and speak to representatives in-person.

Strategic objectives for 2021/22 that will help address some of areas of potential improvement are implementation of phase 2 of Customer Connect, enhanced customer communications particularly around stormwater service, a move to monthly billing for residential customers and a redesign of the water bill.

5.5 Employee Development and Satisfaction

Employee satisfaction can have substantial impact on organizational performance. It can influence employee retention, absenteeism and psychological health and wellness. Because of this, each year Halifax Water engages an external consultant to conduct an employee survey and an action plan is developed and implemented to respond to the results of the survey.

The overall rating for 2020 increased slightly to a 3.9 (B+). The corporate balance scorecard target is 4.0 (A-).

There were thirteen areas where there was improvement over the previous year. They are:

- Employees are kept informed of important changes
- Employees look forward to coming to work – up 5%
- Employees feel a sense of pride in the accomplishments of the organization – up 7%
- Employees are satisfied with their job – up 5%
- Employees are recognized for their achievements – up 5%
- There is good cooperation among work teams – up 5%
- Employees are given feedback on their performance – up 8%
- The organization follows up on commitments to staff – up 8%
- Employees are given opportunities for career development – up 6%
- Employees have a sense of accomplishment from their work – up 5%
- Employees feel the organization values their contributions – up 5%
- Employees have a high level of commitment to HW – up 5%
- Halifax Water has a high level of commitment to employees – up 5%

There were two areas that declined slightly. They were:

- Employees are held accountable for their performance – down 2%
- Halifax Water reflects diverse cultural communities – down 1% from last year

Employees believe that the accessibility of the Senior Management team has remained the same as the previous year.

In 2021/22, an action plan will be developed and implemented to respond to the 2020 employee survey results. The next survey will be conducted in November 2021.

We will continue to build a culture that is both Diverse and Inclusive and will be providing Unconscious Bias training to all Managers and Supervisors in 2021-22.

5.6 Enterprise Risk Management Program

In 2019 Halifax Water completed an Enterprise Risk Management (ERM) Framework and approved an ERM Policy, and a risk appetite and tolerance matrix. There are seven broad risk categories outlined in the policy, which align very closely to the Corporate Balanced Scorecard critical success factors. The risk categories and critical success factors may both change over time. In future, there will be consideration of the alignment. The more closely the risk categories and critical success factors align the less opportunity there will be for confusion or goal misalignment.

The ERM Policy rollout planned in 2020 was delayed due to lack of resources and the impact of COVID-19. The ERM Policy will be rolled out in 2021, and Halifax Water will begin risk-based reporting to the Halifax Water Board. It will take 2 to 3 years to fully embed ERM at Halifax Water; and an additional resource will be in place to support enterprise risk management, as well as internal audits in 2021. Compliance with policies and standard operating procedures is important to help manage risk.

Some of the most significant risks facing Halifax Water relate to infrastructure; therefore, there are financial risks also - insufficient revenues to meet the projected operating requirements, and insufficient capital funding to meet the IRP recommended level of spend.

5.7 Environmental Management System Program

ISO 14001 is an international standard for environmental management systems (EMS) essentially it is a system of procedures, records and process to manage environmental issues and assist with regulatory compliance. It also makes day to day operations more sustainable and engages employees in these operational activities. The EMS program can be audited against ISO 14001 standards, and if found to comply, receives a Certification through ISO.

The benefit of implementing an EMS is that it drives a process of continual improvement towards meeting defined environmental goals and objectives. Minimizing environmental impacts becomes one of the defined primary goals, and standard processes are put in place to identify issues and direct improvements through documented standard operating procedures. The standard pertaining to EMS is 14001- 2015 and requires an organization to:

1. Establish an environmental policy.
2. Identify environmental aspects that can impact the environment.
3. Identify our applicable Compliance obligations legal and regulatory requirements.
4. Set appropriate environmental objectives and targets.
5. Establish programs to implement our policy, achieve objectives and meet targets.
6. Periodically audit and review activities to ensure that the policy is complied with and the environmental management system remains appropriate.
7. Be stewards of the environment and local community.
8. Be capable of adapting to changing circumstances.

Certification has been successfully obtained for the major Water and Wastewater Treatment Facilities and the current focus is a corporate wide expansion phased over three years. Expansion of the EMS program presents a significant opportunity to reduce Halifax Water's environmental footprint.

5.8 Information Strategic Plan

Halifax Water has an IT Strategic Plan which drives the IT Program for 2021/22. The objective of the IT Strategic Plan is to improve organizational efficiency, effectiveness and customer service through technology and organization change.

The Strategic Business Drivers shaping the information technology environment have not changed:

- Provide world class services to our customers and our environment
- Retain leadership position as an integrated water, wastewater and stormwater utility
- Retain position as a top utility in all Lines of Business focused on Public and Employee Safety, Water Quality, Sustainable Infrastructure and Asset Renewal, Regulatory Compliance and Growth, and Environmental Stewardship.
- Follow an Integrated Resource Plan (IRP) Framework

Six Strategic Themes characterize the plan:

- **Customer Experience** – Providing customers with the ability to access most services using online services.
- **Information Integration with Location** - Having all necessary data linked together and tracked through a geographic lens.

- **Analytics Driven Decision Making** – Being able to model customer usage, financial, environmental, and infrastructure data across the Water, Wastewater and Stormwater systems and having the capability to tie data together into business intelligence.
- **Managed Knowledge and Workflow** – Capturing and storing key content in a logical and easy to access place for those who need it.
- **Enable Employees Anywhere** – Providing functionality for employees to access, capture and update the information they need to effectively do their job and support others, wherever they may be working.
- **Secure IT Foundation** – Effectively managing the IT function and providing infrastructure that is resilient, cost effective, well supported, and recoverable within clearly defined requirements.

The IT Strategy Five-Year Roadmap 2021/22 is a high-level snapshot of the sequence of programs to deliver on the approved technology vision and recommended architecture. The plan has an estimated total cost of $28 M.

Table 6

Projects Completed	**Projects Underway**
1. Advanced Metering Infrastructure	18. Analytics Decision Support System Phase One and Phase Two
2. Asset Register	19. Capital Planning
3. Customer-facing website	20. Computerized Maintenance Management System Enhancements
4. Desktop Replacement Program	21. Customer Portal
5. Document management guidelines	22. Disaster Recovery Planning
6. GIS and Cityworks Upgrade	23. Document management pilot
7. GIS Dashboard Replacement	24. Enterprise Resource Planning Solution
8. Internal website (Intranet)	25. Full Enterprise Data Warehouse
9. Telephony	26. Impervious Surface Updates
10. WI-FI Infrastructure in Pockwock	27. IT Help Desk software replacement
Projects Coming Up in 2021/22	28. IT Security assessment and roadmap
11. Analytics and Dashboard Linkage	29. IT Server Hosting
12. Approval Forms Framework	30. Mobile Device Management software installation
13. Asset Condition	

14. Enterprise SharePoint rollout for Document Management 15. General Analytic Tools 16. Electronic Content Management Linkage 17. Team Collaboration	31. New Payroll System 32. Office 365 migration 33. Permit Approvals 34. Quality Data Management and Reporting

5.9 Cyber Security Program

Water systems are a vital part of public infrastructure and it is imperative that these systems be kept safe and secure. Besides the necessary physical security, a utility should also have effective security with regards to its computer systems – i.e. cyber security. Cyber security is a combination of technologies, processes and practices designed to protect networks, computers, programs and data from attack, damage or unauthorized access. The proliferation of "ransom ware" has proven that even major organizations can be quickly "brought down" by a virus.

Information systems are critical to the operations of Halifax Water. Halifax Water has a Cyber Security Program in place to protect these systems and the data they manage; however, it is necessary to make the Cyber Security Program more robust and improve the cyber security posture of Halifax Water. Halifax Water has a cyber-security roadmap which includes seventeen projects being delivered over a three-year time period. Halifax Water's cyber security maturity score and risks will be periodically re-evaluated; and due to the on-going changing nature of cyber security risks and technology, there is a requirement for continual and on-going investment in cyber security.

5.10 Lead Service Line Replacement Program

In 2020, the NSUARB approved a new enhanced service line renewal program. The new enhanced program builds on the successes of the previous program, launched in 2017, while addressing the remaining major barrier preventing customers from renewing the private portion of the lateral; cost.

The new program has two significant features compared to the previous program as follows:

- Halifax Water will be responsible for the cost of renewing the private portion of the lead service line, thus renewing the most significant barrier to customer participation.
- The objective for removal of all Halifax Water lead service lines is moved forward from 2050 to2039.

The new program became effective on October 1, 2020, which will provide for the first replacements under the new program early in the 2021 construction season. Lead Service lines will be renewed based on one of four programs:

- Most renewals each year will be done in conjunction with the municipal street recapitalization program. Each year, subject to funding availability, Halifax Water will seek to renew every lead service line within the bounds of these municipal projects. Integrating with these projects allows Halifax Water to share in the street restoration costs with the city. This reduces the cost of renewal allowing Halifax Water to maximize the use of available funds, thus maximizing the number of renewals each year. This approach also limits community disruption by largely limiting construction to already planned construction projects and preserves municipal pavement quality by minimizing the needs to go back after paving to renew a lead service line.
- Halifax Water will replace a number of lead service lines each year, at utility cost for residents who apply to this program. Priority will be given to at risk populations, namely homes with pregnant mothers or young children.
- In future years, Halifax Water will develop further programs to target other priority groups or communities for LSL replacement.
- Customers who do not qualify for one of the above programs will still be eligible to renew their lead service lines and receive the 25% rebate which has been in place since 2017.

Efforts in 2021/22 will be directed at launching this new program, including the application process, and developing communications tools to educate customers on this new program.

5.11 Water Quality Master Plan

Halifax Water has been operating with a Water Quality Master Plan since 2007, and this is the overarching plan that guides the Water Quality Program. We are currently under WQMPv3 for the period 2017-2022. The WQMP is used to guide our research efforts to support water quality improvements and to identify appropriate capital projects related to water quality.

The current WQMP has the following themes:

- Understanding Lake Recovery
- Adapting to Lake Recovery
- Maintaining Distribution System Water Quality
- Utilizing Data to Ensure Water Quality.

The WQMP has allowed for the following accomplishments in recent years related to drinking water quality:

- Identified the need for improvements at both the J. Douglas Kline and Lake Major water supply plants and informed the development of the enhancement program.
- Developed interim treatment strategies to make the existing plants more resilient to deal with changing source water until the plant enhancements are commissioned.
- Identified the need for an algal toxin monitoring program due to the increasing prevalence of algal activity and taste and odour causing compounds drive by lake recovery and climate change.
- Guided the development of improved protocols and training for utility staff to ensure water quality is preserved while repairing water main breaks.
- Guided the development of tools to monitor water quality changes during events to enable the provision of better information to affected customers.

In 2021/22, efforts will be focused on developing WQMP v4 with a goal of launching it in April of 2022, coincident with the desired renewal of our Industrial Research Chair in Water Quality and Treatment, held by Dr. Graham Gagnon at Dalhousie University.

5.12 Water Loss Control Program

Halifax Water was the first utility in North America to adopt the International Water Association (IWA) methodology for managing leakage in the distribution system. Efforts save $650,000 per year in treatment chemical and electricity costs and have reduced water main breaks by 20%, saving $500,000 in repair costs annually. The program has won several national awards and Halifax Water staff are in demand to share expertise with industry and other utilities.

In 2021/22, Halifax Water will be developing recommendations on next steps for the Water Loss Control Program for presentation to the Halifax Water Board.

5.13 Wet Weather Management Program

Halifax Water maintains approximately 1,425 km of collection pipes, 14 wastewater treatment facilities, and 165 wastewater pumping stations. Like many municipalities and utilities across North America, sections of Halifax Water's sanitary sewer system are subject to dramatic flow increases in response to precipitation events. Wet weather flows in the form of I&I can lead to sanitary sewer overflows, capacity reduction, sewer backups/basement flooding, treatment process upsets and increased operation and maintenance costs.

The negative impacts of wet weather can generally be managed by the following:

1. Peak flow reduction - Reduce the quantity of wet weather generated flows that are collected, pumped and treated by the wastewater collection and treatment systems.

2. Peak flow attenuation - Store wet weather generated flows during wet weather periods and release & treat the flows when the system has capacity.

3. System capacity increase

Since its inception in 2013, Halifax Water has been implementing a proactive approach to address the negative impacts of wet weather events on the sanitary sewer system. The goal of Halifax Water's Wet Weather Management Program (WWMP) has been to develop and refine a long-term framework for cost effectively addressing wet weather generated flows. Through the WWMP, Halifax Water has been systematically identifying opportunities to employ the most cost-effective wet weather management strategies. Where possible, all three methods above are considered based on a cost benefit analysis and the sewershed specific driver for flow reduction, with regulatory compliance being the highest priority. By reducing wet weather flows, the wastewater system will see a reduction in untreated discharges to the environment, effluent noncompliance at WWTFs, operational and maintenance costs, and an increase in available system capacity.

I&I is grouped into two sources, public infrastructure (mains, manholes, laterals up to the property line, etc.) and private infrastructure (laterals from property line up to and including connections within buildings, illegal and cross connections). The program employs a variety of strategies to reduce wet weather impacts. The development of the Decision Matrix provided a consistent process flow beginning with system flow monitoring and moving into Sanitary System Evaluation Surveys (SSES) such as CCTV inspection reports, smoke testing, private side property inspections and public education tools, etc. With the compiled results of these evaluation efforts, effective and financially responsible rehabilitation methods can be recommended by the WWMP.

To effectively address all issues that contribute to the impacts of wet weather, multiple business units within Halifax Water are engaged to work together to achieve the goals of the WWMP. Figure 5 indicates the working relationships and activities between business units.

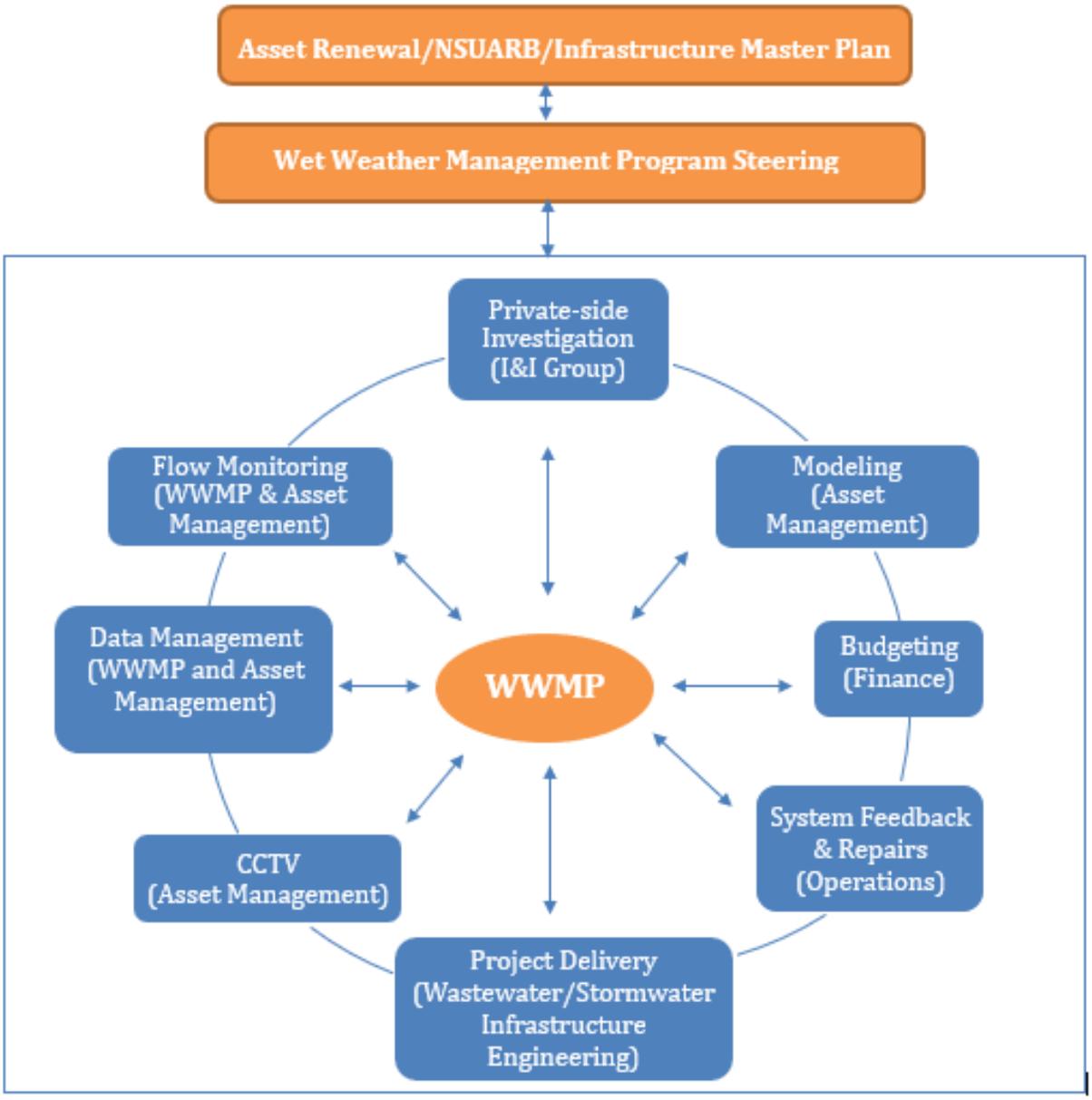


Figure 5 - Contributing Business Activities of the WWMP

The initial phases of the program were to comprehensively pilot the effectiveness and cost of various rehabilitation activities. There were several sewersheds that have undergone pilot activities with an additional pilot currently underway to study the long-term effectiveness of "private side-only" interventions. From the results and reductions observed in the various pilot projects, Halifax Water then delivered its first full scale I/I rehabilitation project (Fairview/Old Clayton Park/Bridgeview Sewersheds – Phase 1, 2018), with overall completion in 2020 (Phase 2). It is expected that a complete post-rehabilitation reduction analysis, of all phases of the project, will be available in next year's WWMP Annual Report.

As a result of varied sewershed characteristics throughout Halifax Water's wastewater systems and the importance of considering this variability when evaluating a rehabilitation methodology, a common approach to implementing wet weather-related investigation tools was needed. This tool, the WWMP Decision Matrix applies a consistent framework to the priority areas of the program when determining flow monitoring and condition assessment requirements, necessary sewershed investigations and rehabilitation techniques.

Recognizing the importance of flow monitoring and infrastructure condition assessments as the basis of prioritization data for the WWMP, Halifax Water enhanced the service delivery of the flow monitoring and CCTV programs. Both programs have performance-based contracts to ensure accurate and dependable data delivery to the industry standard.

Building on experience from WWMP projects, an enhanced prioritization methodology has been developed with the addition of the Decision Matrix to assist in identifying priority areas for the WWMP. Figure 6 below shows the updated sewershed prioritization map by incorporating recommended criteria from the IMP documents.

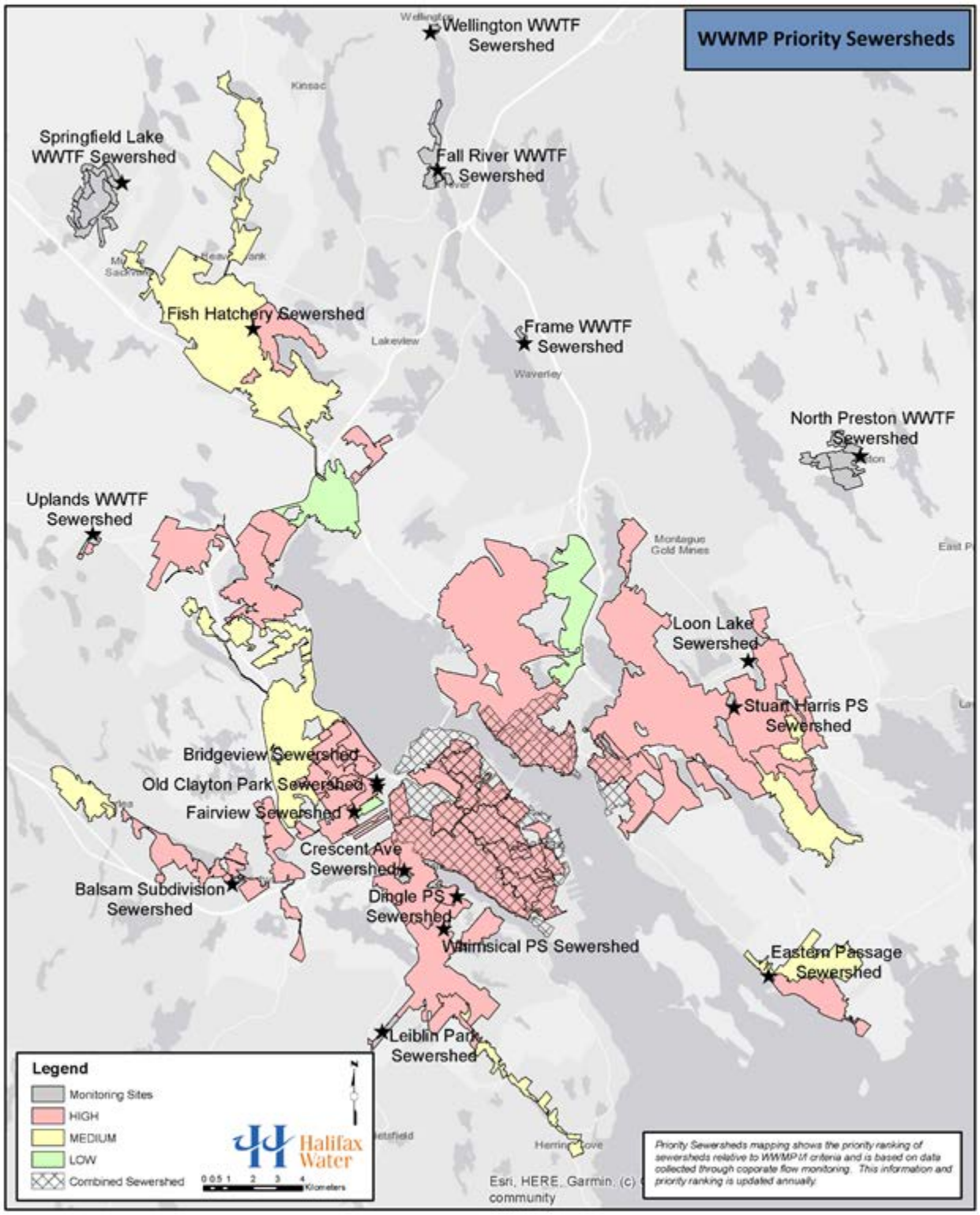


Figure 6 - Wet Weather Management Program Priority Map

The near term (2021/2022) goals for Halifax Water's Wet Weather Management Program include:

1. Rehabilitation Pilot Projects: The WWMP has completed 7 pilot projects. These pilot areas were chosen to enable Halifax Water to assess the effectiveness of the various wet weather management strategies and collect rehabilitation cost information. Wet weather management strategies for these sewersheds included mainline, manhole, and lateral CIPP, new stormwater mains, and public-side repairs. 2021/22 will see continued flow monitoring and data analysis on pre and post activity for some of the pilot areas to confirm measured results. Table 7 below illustrates the reduction in rainfall derived I&I (RDII) peak flows for the various pilot projects.

Table 7 - WWMP Pilot Project Summary

WWMP Pilot Project Summary								
Sewershed	Rehabilitation Activity					Private-side Inspections	Peak Flow Reduction (L/sec)	Peak Flow RDII Reduction (%)
	Mainline Lining	Lateral Lining	Manhole Lining	Deep Storm	Public-side Repairs			
Stuart Harris PS	✓	✓				✓	13	37%
Leiblin Park	✓	✓					40	33%
Balsam Subdivision					✓		1	8%
Uplands Park					✓	✓	0	0%
Wanda Lane				✓		✓	*TBD*	*TBD*
Crescent Ave (MH182)	✓	✓	✓			✓	43	74%
Crescent Ave (MH174)	✓	✓	✓			✓	41	92%

**shows overall reductions for each project*

As an example, Figure 7 below illustrates the reduction in RDII peak flow for the Crescent Ave – MH182 pilot project. This pilot underwent a three-phase rehabilitation including mainline, manhole, and lateral renewal activities.

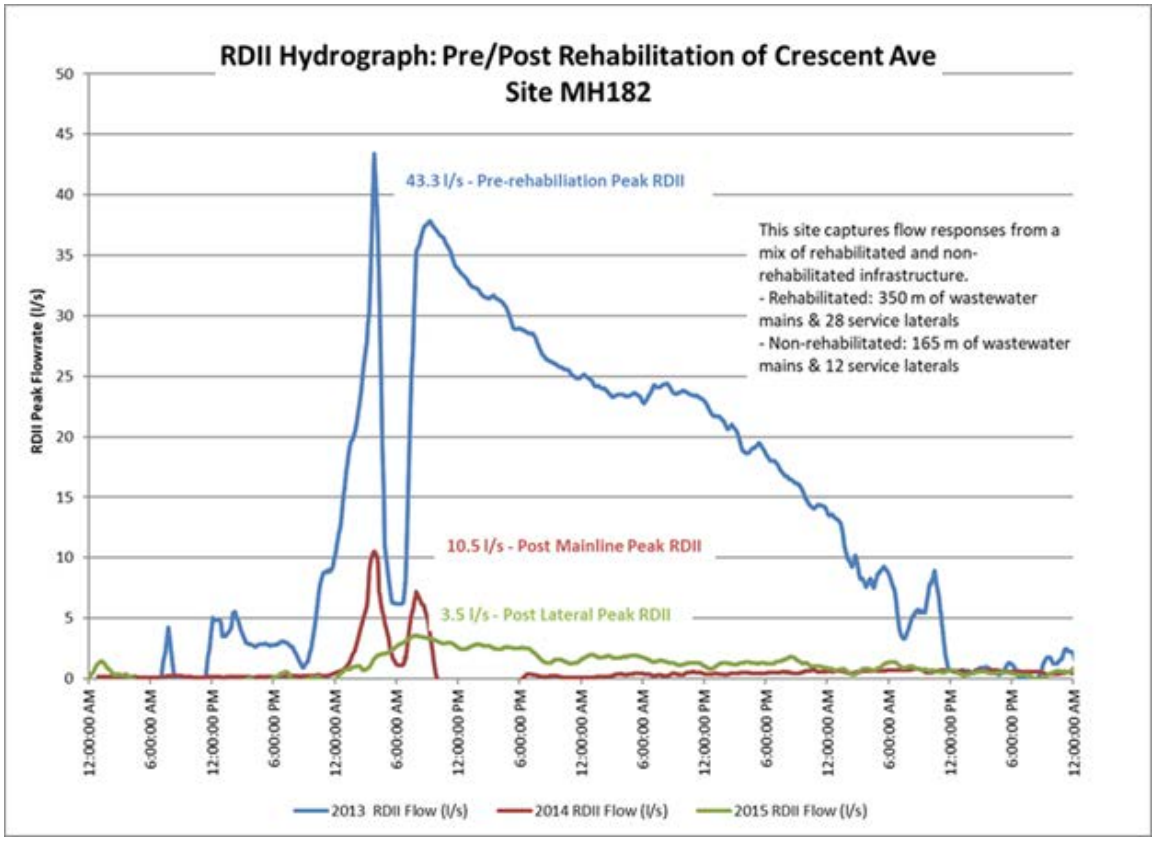


Figure 7 - Quantifying Rehabilitation Effectiveness

An area identified for wet weather management opportunities typically follows a systematic project lifecycle as shown in Figure 8 below. The overall timeline can vary depending on sewershed size, service connection density and rehabilitation method employed but typically spans multiple years from start to finish.

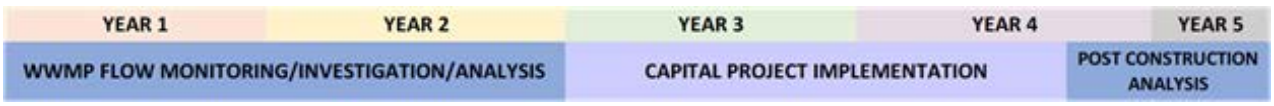


Figure 8 - Project Lifecycle

2. **Refinement of Cost Benefit Analysis:** Applying a cost benefit analysis of the various strategies to manage wet weather flows will be crucial to the long-term fiscal responsibility of the program. As expected, the pilot and full scale sewersheds demonstrated a significant reduction in RDII as the various wet weather management strategies were implemented. The financial cost of the RDII reduction was normalized so that the information can be applied to other sewersheds and compared to more traditional approaches to wet weather management such as flow attenuation (storage) and capacity increases. Additional data from various sewersheds is continually analyzed as it becomes available. In addition to flow data, cost information is available for application to larger scale rehabilitation projects.

The cost and reductions in RDII have been compiled since the inception of the formalized WWMP. The program is structured to evaluate all wet weather management activities using the same methodology to ensure consistent application across identified areas. This enables Halifax Water to employ the most cost-effective strategy to future areas. It has become evident that the RDII reduction cost has significant dependence on the sewershed characteristics; however, it provides essential guidance for the future projects. The Program continues to augment this information and its application to future projects.

3. Fairview / Old Clayton Park / Bridgeview: The analysis of flow monitoring data was undertaken as part of the direction from Halifax Water's West Region Wastewater Infrastructure Plan. The plan identified the potential for significant reductions in RDII in the Fairview, Old Clayton Park and Bridgeview areas. With the sewershed target of reducing peak flows by approximately 200 L/s, a phased I&I reduction program was initiated in 2017. In 2018/19, approximately 11 km of CIPP lining was completed as part of Phase I and 2019/20 & 2020/21, Phase 2 had 15 km completed. 2019/20 included smoke testing within areas of Phase 1 and 2, the results of which are being used to identify public side repair opportunities for Halifax Water Operations. Flow monitoring and data analysis will continue to quantify RDII reductions for the project area and assess the effectiveness of the asset renewal after completion of all phases of the project.

4. Program Expansion (Central and East Region Infrastructure Master Plan): Wet weather flow management is a part of the overall wastewater strategy for the Infrastructure Master Plan (IMP). Work on the IMP for the East and Central regions was completed in 2019, and respective priority areas for the WWMP have been incorporated into the long-term planning strategy. In 2020/21, the WWMP will continue with SSES activities in the Fish Hatchery Park Pump Station and Eastern Passage sewersheds by collecting flow data and installing additional flow monitors to isolate flows within these priority areas.

The planned WWMP activities for the next year are listed in Table 8 below:

Table 8 – WWMP Activities

SSES Activity (Flow Monitoring, CCTV, Smoke Testing, Private Side Education & Inspection)
Fish Hatchery PS Sewershed (FMZ07 & FMZ10) Hornes Rd Sewershed - Private-side Pilot Project (WWMP24 within FMZ37) Eastern Passage Sewershed (FMZ37) Loon Lake Sewershed (FMZ24)
Rehabilitation: Capital Projects
Crescent Ave PS Sewershed - Crescent Ave East CIPP Main Lining Old Clayton Park Lateral Connection Repairs (WWMP16 within FMZ04)

5.14 New Service Account Compliance Program

It is estimated that 50% of I&I is from private property sources. Halifax Water has over 85,000 customers and is achieving approximately 100 inspections/year. To further enhance the management of private side I&I reduction the Environmental Engineering group is introducing the New Service Account Compliance (NSAC) Program. The program will require a person becoming a new customer to produce a certificate of compliance for their connection(s) to the Halifax Water system(s). Initially in determining compliance, the property will be inspected for sources of stormwater connection(s) to the wastewater system, presence of a lead water lateral if located in the area of lead boundary and consider expansion of the certification to identifying encroachments of utility service easements. This coming year will involve formalizing the framework, communications with the Real Estate Association and other stakeholders and planning of the implementation of the program.

5.15 Resource Recovery

The Biosolids Processing Facility (BPF) processes the sludge from all HW's wastewater treatment facilities. The BPF is operated by Walker Environment Group with overall responsibility for operating the facility to produce a soil amendment in conformance with Canadian Food Inspection Agency (CFIA) regulations and marketing the product for beneficial reuse. This product has been beneficially serving the local agricultural farms with essential nutrients, lime and carbon. The current IMP identifies the need to upgrade the BPF. With population growth and the improvement in performance of treatment plants, the WWTFs are producing an increased quantity of sludge. The operating contract agreement with Walker Environmental expires at the end of March 2021. Staff are currently reviewing the overall operation, while simultaneously working on the capacity upgrade requirements and a new operating contract. The future BPF could utilize different technology to further reduce HW's greenhouse gas footprint through energy/gas production. In light of the recent industry trends with focus on resource recovery from Biosolids, Halifax Water is exploring

all aspects of resource recovery when considering alternatives for biosolids processing. Since this will potentially be a long-term contract, there is a medium level of risk with potential changes, considering the complexities associated with the management of biosolids.

5.16 Safety and Security Program

Safety: Halifax Water's Occupational Health and Safety Program is based on the Internal Responsibility System (IRS), which is the foundation of the Nova Scotia Occupational Health and Safety Act. The IRS is an internal system that provides for direct responsibility for health and safety for all staff in an organization.

The Safety and Security group of Regulatory Services has principal duties and responsibilities as part of the IRS as follows:

- Assist in formulating and supervising the execution of the utility's Occupational Health and Safety Program, and assist management to fulfill, to the greatest degree possible, its responsibilities for safety.
- Co-ordinate and/or provide safety training to staff in an effort to prevent accidents, minimize losses, increase productivity and efficiency, and ensure compliance with safety legislation and policies.
- Conduct safety audits in the workplace to identify safety hazards and recommend control measures.
- Assist in the development and maintenance of a system of accident investigation, reporting, and follow-up.
- Provide program education for job safety.
- Act as a resource to the Joint Occupational Health and Safety Committee (JOHSC).
- Maintain liaison with federal, provincial, and local safety organizations by taking part in the activities and services of these groups.

Halifax Water has established and maintains an Occupational Health and Safety Program in consultation with the Joint Occupational Health and Safety Committees.

Halifax Water is a signatory of the Nova Scotia Health and Safety Leadership Charter which represents a commitment from industry leaders across Nova Scotia to the continuous growth of a positive workplace safety culture. Mental health and psychological health and safety are increasingly being recognized as an important component of occupational health and safety.

To enhance the safety culture, Safety Audits are being conducted both on Halifax Water Operation projects and the Capital Infrastructure Program, where Halifax Water engages

third party contractors. The outcomes are being used as guidance on improvements to safety policies and training initiatives. Halifax Water continues to advance our Contractor Safety Program which will include improved contract language, orientation and monitoring pertaining to job site safety.

As part of the commitment to the Incident Command System (ICS), Halifax Water continued to provide enhanced training to managers for roles related to General and Command staff under the ICS structure.

Halifax Water tracks safety indicators as part of the Corporate Balance Scorecard, which is described in Section 6.

Security: Halifax Water's Security Program is based on enterprise asset protection and is designed to protect three types of assets: people, property, and information. It also considers intangible assets such as the organization's reputation, relationships, and creditworthiness. The program has been developed to take an all-hazards approach, be it from natural, intentional, or accidental hazards, when reviewing risks to the organization.

Halifax Water uses the three basic elements of a physical security system to protect its assets to ensure it accomplishes its mission.

> ***Protection:*** The protection element is the physical barrier that delays the determined adversary and the opportunist in accomplishing their goals. Halifax Water uses barriers such as building fabric, fences, doors, door hardware, and containers to protect its assets.
>
> ***Detection:*** The detection element indicates and may also verify an actual or attempted overt or covert penetration. Halifax Water uses intrusion alarms, access control systems, CCTV, guards, and patrols to protect its assets.
>
> ***Response:*** This element is the reaction to an attempted or actual penetration. Halifax Water uses internal staff and police forces as required, to protect its assets.

Vulnerability: Facility assessments are conducted in partnership with Public Safety Canada through the Regional Resilience Assessment Program (RRAP) utilizing the Critical Infrastructure Resilience Tool (CIRT). All major water and wastewater treatment facilities have now been evaluated. The CIRT is a voluntary and non-regulatory vulnerability assessment tool that estimates the resilience and protective posture of critical infrastructure facilities in support of the National Strategy and Action Plan for Critical Infrastructure.

Emergency Management Planning: Safe and reliable drinking water, sanitation and environmental protection are vital to the sustainability of communities within Halifax Regional Municipality. In recognition of this, Halifax Water maintains an EMP, as required by the provincial Emergency Management Act.

The purpose of the EMP is to establish an organizational structure and procedures for response to water wastewater, and stormwater incidents. It assigns roles and responsibilities for the activation and implementation of the plan during an emergency, using the Incident Command System (ICS). The preparation and exercising of an EMP can save lives, reduce risk to public health, enhance system security, minimize property damage, and lessen liability.

6. PERFORMANCE MEASUREMENT

At the end of the 2021/22 fiscal year, Halifax Water's overall performance will be assessed against the Corporate Balanced Scorecard (CBS). Halifax Water has been utilizing a corporate balanced scorecard (CBS) to measure utility performance since 2001, so this year marks twenty years of formal performance measurement at Halifax Water. Each year the Halifax Water Board sets organizational indicators and reviews performance results. The CBS targets for 2021/22 will be presented for approval at the March 2021 meeting of the Halifax Water board, prior to the start of the new fiscal year on April 1, 2021.

There are eight Critical Success Factors (CSFs) derived from Halifax Water's vision statement (shown in Appendix A) and under each of the CSFs, there are organizational indicators to track performance and allow for the establishment of targets. The following lists the current CSFs and corresponding results for the organizational indicators under each category.

1. **High Quality Drinking Water**
    - Adherence with Water Quality Master Plan - Percentage of sites achieving targets
    - Bacteriological tests - Percentage free from Total Coliform
    - Customer satisfaction about water quality - Percentage from customer survey

2. **Service Excellence**
    - Customer satisfaction with service - Percentage from customer survey
    - Water service outages - Number of connection hours/1000 customers
    - Wastewater service outages – Number of connection hours/1000 customers
    - Average speed of answer – Percentage of calls answered within 20 seconds

3. **Responsible Financial Management**
    - Operating expense/revenue ratio percentage
    - Annual cost per customer connection – Water
    - Annual cost per customer connection – Wastewater

4. Effective Asset Management

- Water leakage control – target leakage allowance of 160 litres per service connection per day
- I&I reduction - Number of inspections on private property for discharge of stormwater into the wastewater system
- Peak flow reduction from wet weather management capital projects
- Hours of unplanned outages in GIS and Cityworks
- Capital budget expenditures - Percentage of budget spend by end of fiscal year

5. Workplace Safety and Security

- Average score on internal safety audits
- NS Labour and Advanced Education compliance - Number of incidents with written compliance orders
- Lost time accidents -Number of accidents resulting in lost time per 100 employees
- Safe driving - Number of traffic accidents per 1,000,000 km driven
- Training - Number of employees trained or re-certified before due date
- Percentage of completed safety talks

6. Regulatory Compliance

- Percentage of public health and environmental regulatory infractions resulting in an environmental warning report, summary offense ticket, ministerial order, or prosecution
- Percentage of WWTFs complying with NSE approval permits

7. Environmental Stewardship

- Number of ICI properties inspected by Pollution Prevention each year
- Energy management kwh/m^3 reduction associated with capital projects
- Bio-solids residual handling - Percentage of sludge meeting bio-solids concentration targets

8. Motivated and Satisfied Employees

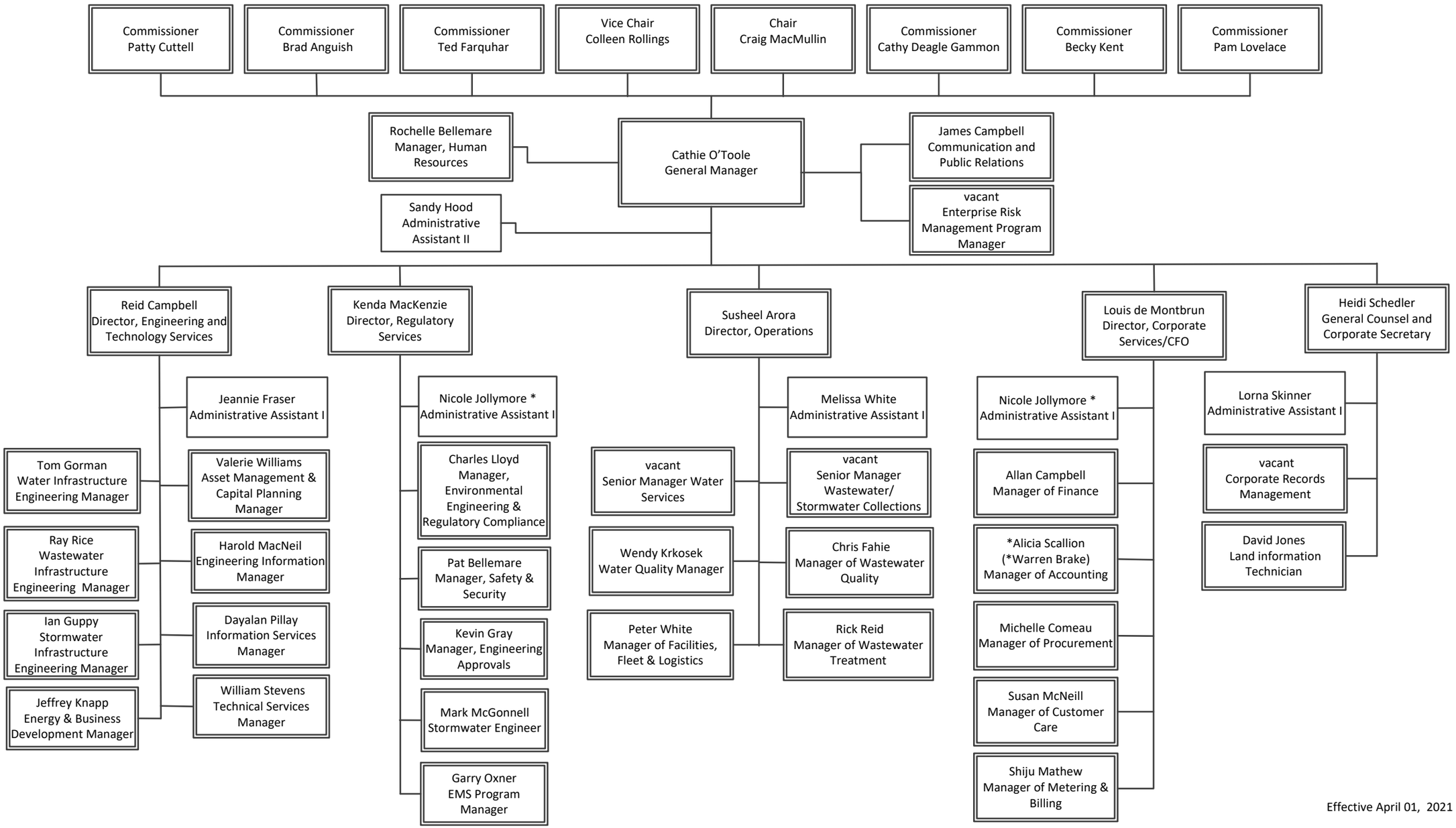
- Percentage of grievances resulting in arbitration
- Percentage of jobs filled with internal candidates
- Employee satisfaction survey result
- Average number of days absenteeism

Halifax Water

Appendix A

Organizational Structure

HALIFAX WATER ORGANIZATIONAL STRUCTURE



Effective April 01, 2021

Halifax Water

Appendix B

2021/22 Capital Budget

HALIFAX WATER

Capital Budget 2021/22

Summary

Asset Category	Project Costs
Water - Land -- T O T A L	$100,000
Water - Transmission -- T O T A L	$3,375,000
Water - Distribution -- T O T A L	$6,455,000
Water - Structures -- T O T A L	$9,688,000
Water - Treatment Facilities -- T O T A L	$6,392,000
Water - Energy -- T O T A L	$200,000
Water - Security -- T O T A L	$50,000
Water - Equipment -- T O T A L	$50,000
Water - Corporate Projects - T O T A L	$10,230,000
TOTAL - Water	**$36,540,000**

Wastewater - Trunk Sewers -- T O T A L	$17,225,000
Wastewater - Collection System -- T O T A L	$21,826,000
Wastewater - Forcemains -- T O T A L	$3,295,000
Wastewater Structures -- T O T A L	$8,974,000
Wastewater - Treatment Facility -- T O T A L	$12,515,000
Wastewater - Energy -- T O T A L	$600,000
Wastewater - Security -- T O T A L	$200,000
Wastewater - Equipment -- T O T A L	$145,000
Wastewater - Corporate Projects -- T O T A L	$12,075,500
TOTAL - Wastewater	**$76,855,500**

HALIFAX WATER

Capital Budget 2021/22

Summary

Asset Category	Project Costs
Stormwater - Pipes -- T O T A L	**$3,154,000**
Stormwater - Culverts -- T O T A L	**$3,295,000**
Stormwater - Structures -- T O T A L	**$4,315,000**
Stormwater - Corporate Projects -- T O T A L	**$2,049,500**
TOTAL - Stormwater	**$12,813,500**

G R A N D T O T A L	**$126,209,000**

HALIFAX WATER

Capital Budget 2021/22

Water

Project Number	Project Name	Project Cost
	Water - Land	
3.033	Watershed Land Acquisition	$100,000
	Water - Land -- T O T A L	**$100,000**
	Water - Transmission	
3.042	Critical Valve Replacement Program	$200,000
3.587	Prince Albert Road Transmission Main Replacement	$45,000
3.554	North End Feeder Replacement - Design	$500,000
3.571	Highway 118 Crossing - Shubie Park to Dartmouth Crossing	$80,000
3.631	Transmission Main Upgrades - Churchill Drive Corridor	$50,000
3.632	Condition Assessment - Cobequid Road Transmission Main	$250,000
3.293	Peninsula Transmission Main Replacement-Windsor Street to Superstore Property	$475,000
3.503	Chain Control Valve Upgrade Program	$45,000
3.574	Cobequid Looping - Windgate Drive Extension	$1,500,000
3.504	Bedford to Burnside Transmission Main Phase 1 Pipe	$200,000
3.045	Bedford West CCC - Various Phases	$5,000
3.260	Morris (Russell) Lake Estates CCC	$15,000
3.261	Lakeside Timberlea CCC	$10,000
	Water - Transmission -- T O T A L	**$3,375,000**
	Water - Distribution	
3.022	Water Distribution - Main Renewal Program	$3,800,000
3.648	Spring Garden Road Watermain Renewal	$1,300,000
3.067	~ Valves Renewals	$125,000
3.068	~ Hydrants Renewals	$75,000
3.069	~ Service Lines Renewals	$100,000
3.390	Lead Service Line Replacement Program	$1,000,000
3.285	Versa Valve Removal	$25,000
3.294	Automated Flushing Program	$20,000
3.296	Water Sampling Station Relocation Program	$10,000
	Water - Distribution -- T O T A L	**$6,455,000**
	Water - Structures	
3.601	PRV Valve Replacement Program	$50,000
3.602	PRV Chamber - Electrical Panel Replacement Program	$40,000
3.603	DMA - Meter Replacement Program	$50,000
3.455	Reservoir Mixing and Residuals Management Upgrade Program	$225,000

HALIFAX WATER

Capital Budget 2021/22

Water

Project Number	Project Name	Project Cost
3.623	Booster Station Building Envelope	$30,000
3.607	Condition Assessment - Miscellaneous Structures	$75,000
3.634	Lake Major Dam - Shoreline Improvements for Old German Road Properties	$250,000
3.595	New Orchard Control Chamber Study	$100,000
3.624	Robie Control Reservoir Meter Replacement	$16,000
3.597	Aerotech Booster Station - Pump Repairs	$17,000
3.528	Beaver Bank Booster Station - Pump Upgrades	$180,000
3.605	Silverside Pumping Station Upgrades Construction	$240,000
3.626	Eastern Passage Rechlorination Station	$30,000
3.309	Cowie Hill Reservoir Replacement	$7,610,000
3.288	Akerley Reservoir Rehabilitation	$200,000
3.561	Prince Albert PRV Chamber Replacement	$25,000
3.379	New Aerotech Reservoir - Preliminary Design	$100,000
3.641	Dam Safety Review - Chain Lake Dam - Capital Work	$200,000
3.642	Dam Safety Review - Pockwock Lake Dam - Capital Work	$50,000
3.640	Dam Safety Review - Capital Implementation Program	$200,000
	Water - Structures -- T O T A L	**$9,688,000**
	Water - Treatment Facilities	
	J D Kline Water Supply Plant:	
3.604	JD Kline WSP - Pretreatment and Clarification - WSEP JDK-800.10	$2,273,000
3.608	JD Kline WSP - Clearwell, reservoir and storage - WSEP JDK-800.25	$342,000
3.611	JD Kline WSP - Service Water System Upgrade - WSEP JDK-800.50	$885,000
3.617	JD Kline WSP - Advanced Treatment for Taste, Odour and Algae-WSEP JDK-800.8	$369,000
3.633	Program Management Fess and Expenses - WSEP JDK-MAJ	$153,000
3.338	JD Kline WSP - Upgrades to the Process Wastewater Lagoons	$30,000
3.341	JD Kline WSP - Roof Replacement - Vent House	$50,000
3.628	JD Kline WSP - Purchase Spectrophotometer	$16,000
3.629	J D Kline WSP - Replace Diesel Generator Day Tank at the Low Lift Station	$9,000
3.627	JD Kline WSP - Purchase New Scales for Lime and Polymer	$15,000
3.639	J D Kline WSP - Fluoride Storage Room Ventilation System Upgrades	$150,000
3.351	J D Kline WSP - Replace Westinghouse Electrical Panels	$32,000
3.463	J D Kline WSP - New Fluoride Supply Line	$15,000
3.431	J D Kline WSP - Fluoride Tank Liner Replacement	$19,000

HALIFAX WATER

Capital Budget 2021/22

Water

Project Number	Project Name	Project Cost
	Lake Major Water Supply Plant:	
3.618	Lake Major WSP - Clarification/Pretreatment - WSEP MAJ 800.15	$826,000
3.619	Lake Major WSP - Intake/low lift Pump Station - WSEP MAJ-800.20	$483,000
3.526	Lake Major WSP - Roof Replacement	$125,000
	Bennery Lake Water Supply Plant:	
3.589	Aerotech Booster Station Replacement - Design	$50,000
3.636	Bennery Lake WSP - MCC Splash Protection	$50,000
3.637	Bennery Lake WSP - MCC Electrical Upgrades	$150,000
	Non-Urban Core WSP	
3.212	Rechlorination System Upgrades	$25,000
3.638	Middle Musquodoboit WSP - Pumping System Upgrades	$250,000
3.643	Silver Sands - New water storage tank	$35,000
3.630	Purchase Algal Analytical Equipment for Raw Water Quality Assessment	$40,000
	Water - Treatment Facilities -- T O T A L	**$6,392,000**
	Water - Energy	
3.635	Energy Management Capital Program (Water)	$100,000
3.107	Chamber HVAC Retro-Commissioning Program	$100,000
	Water - Energy -- T O T A L	**$200,000**
	Water - Security	
4.009	Security Upgrade Program	$50,000
	Water - Security -- T O T A L	**$50,000**
	Water - Equipment	
3.101	Miscellaneous Equipment Replacement	$50,000
	Water - Equipment -- T O T A L	**$50,000**
	Water - Corporate Projects - T O T A L	**$10,230,000**
	GRAND TOTAL - WATER	**$36,540,000**

HALIFAX WATER

Capital Budget 2021/22

Wastewater

Project Number	Project Name	Project Cost
	Wastewater - Trunk Sewers	
2.881	Combined Sewer Replacement - Chisholm Avenue	$100,000
2.584	Fairview Cove Trunk Sewer	$17,125,000
	Wastewater - Trunk Sewers - -- T O T A L	**$17,225,000**
	Wastewater - Collection System	
2.168	Wastewater System - Trenchless Rehabilitation Program	$2,000,000
2.883	Vernon Street Sewer Replacement	$96,000
2.882	Lady Hammond Road Sewer Replacement	$50,000
2.884	Foundry Lane Manhole Replacement	$62,000
2.357	Manhole Renewals WW	$31,000
2.358	Lateral Replacements WW (non tree roots)	$1,750,000
2.563	Lateral Replacements WW (tree roots)	$555,000
2.223	Wet Weather Management Program	$350,000
2.052	Integrated Wastewater Projects - Program	$1,200,000
2.905	Windsor Street Exchange	$100,000
3.885	Harbourview Drive Sewer Main Renewal - Integrated	$350,000
2.937	Coles Road Sewer Replacement	$315,000
2.935	Renfrew Street Sewer Replacement	$650,000
2.938	Howland Drive/Howland Court Sewer Replacement	$175,000
3.692	Cogswell Redevelopment - Sewer Relocation	$302,000
2.949	Allison Drive PS Elimination	$75,000
2.557	Punch Bowl PS Elimination	$2,820,000
2.946	SSP - Bayers Road Pocket - Engineering Analysis	$250,000
2.950	Joseph Howe/Dutch Village Road Catchbasin Disconnections	$190,000
2.852	Maynard Lake and Clement Street Wetland Separation	$642,000
2.836	Wyse Road Separation Phase 1	$3,214,000
2.838	Albro Lakes Watershed Separation	$5,589,000
2.742	Windsor - Almon - Sewer Separation	$250,000
2.944	Whimsical/Dingle/Crescent Mainline Lining	$500,000
2.943	Old Clayton Park Lateral Lining - Top Hat Pilot	$310,000
	Wastewater - Collection System -- T O T A L	**$21,826,000**
	Wastewater - Forcemains	
2.823	Akerley Blvd Forcemain Replacement	$735,000
2.819	Pumping Station Oil Tank Replacements	$60,000

HALIFAX WATER

Capital Budget 2021/22

Wastewater

Project Number	Project Name	Project Cost
2.820	Morris Lake Forcemain Investigation and Rehabilitation	$2,500,000
	Wastewater - Forcemains -- T O T A L	**$3,295,000**
	Wastewater - Structures	
2.42	Emergency Pumping Station Pump replacements	$250,000
2.442	Wastewater Pumping Station Component Replacement Program - West Region	$200,000
2.443	Wastewater Pumping Station Component Replacement Program - East Region	$200,000
2.444	Wastewater Pumping Station Component Replacement Program - Central Region	$250,000
2.877	Pier A Pump Station - Drop Chamber HVAC Interconnection	$125,000
2.920	Herring Cove Pumping Station - Pump Replacements	$50,000
2.818	Jamieson Pumping Station - Automatic Bar Screen	$840,000
2.824	Bruce Street Pumping Station Relocation	$1,380,000
2.825	First Lake Pumping Station Upgrades	$640,000
2.660	Bissett PS Component Upgrade	$1,000,000
2.088	Russell Lake PS Upgrade	$1,920,000
2.891	Beaverbank Pumping Stations - Mechancial and Electrical Rehabilitation	$200,000
2.665	CSO Upgrade Program	$300,000
2.846	Quigley Corner Pumping Station Upgrade	$1,301,000
2.847	Quigley Corner Pumping Station Optimize	$318,000
	Wastewater Structures -- T O T A L	**$8,974,000**
	Wastewater - Treatment Facility	
2.056	Plant Optimization Audit Program	$125,000
2.522	Emergency Wastewater Treatment Facility equipment replacements	$450,000
	Halifax Wastewater Treatment Facility:	
2.532	Duct Work Replacement	$100,000
2.765	Raw Water Pump Refurbishment	$50,000
2.863	SS Pipe Replacement Program	$200,000
2.778	Densadegs - Mixer Gearbox Rebuilds	$70,000
2.762	Fine Screens - Replace with Perforated Plate Screens	$1,750,000
2.773	Industrial Water System - Replacement	$175,000
2.777	Densadegs - Sludge Scraper Rebuilds (x2)	$100,000
2.866	New Truck Bay Door	$30,000
2.867	New Densadeg Drain Lines	$75,000
2.868	New Wet Scrubber Internal Components	$55,000
2.870	Densadeg Inlet Gate Actuators	$75,000

HALIFAX WATER

Capital Budget 2021/22

Wastewater

Project Number	Project Name	Project Cost
2.775	UV Disinfection System - New Automatic Level Controls	$550,000
2.779	Densadegs - Lamella Tube Settler Upgrades	$1,100,000
	Dartmouth Wastewater Treatment Facility:	
2.502	Duct Work Replacement	$100,000
2.858	Roof Replacement	$580,000
2.859	Replace Generator	$290,000
2.871	SS Pipe Work Replacement Program	$200,000
2.873	New Inlet Isolation Gate	$180,000
2.874	Sludge Extraction Solids Analyzers	$150,000
2.875	New Densadeg Drain Lines	$85,000
2.855	Industrial Water System Replacement	$175,000
	Herring Cove Wastewater Treatment Facility:	
2.639	Duct Work Replacement Program	$50,000
2.800	Densadegs - Lamella Tube Settler Upgrades	$575,000
2.801	Fine Screens - New Perforated Plate Screens	$150,000
2.802	UV Disinfection System - New Automatic Level Controls	$400,000
2.879	Building Sealing	$100,000
2.880	Densadeg Launder Weir Levelling	$50,000
2.893	Alum Storage Containment Upgrades	$100,000
2.894	Epoxy Seal Truck & Poly Bay Floors	$50,000
2.896	New Hoist Over Sludge Tank Mixers	$15,000
2.897	UV Hoist Upgrades	$25,000
2.899	Densadeg Inlet Gate Actuators	$75,000
2.900	Densadeg Gate Cover Modifications	$10,000
	Mill Cove Wastewater Treatment Facility:	
2.864	Admin Building Roof Replacement	$75,000
2.901	Carbon Scrubbers - New Carbon Media	$125,000
2.902	Headworks - Compactor Conveyor Spares	$50,000
2.903	Dewatering - Centrifuge Rebuild Program	$30,000
2.904	South RAS Pump Relocation	$100,000
2.640	Process Upgrades - Preliminary & Detailed Design	$1,000,000
	Eastern Passage Wastewater Treatment Facility:	
2.906	Paving Behind Secondary Clarifiers	$30,000
	Aerotech Wastewater Treatment Facility:	

HALIFAX WATER

Capital Budget 2021/22

Wastewater

Project Number	Project Name	Project Cost
2.909	Road Repairs	$20,000
	Timberlea Wastewater Treatment Facility:	
2.509	Asset Renewal Program	$100,000
	Community Wastewater Treatment Facilities:	
2.916	Middle Musquodoboit WWTF - Primary Treatment RBC Upgrades	$450,000
2.917	Springfield Lake WWTF - New Overflow System	$25,000
	Biosolids Processing Facility:	
2.919	Gas Sensor Upgrade Program	$30,000
2.921	Biofilter Media Replacement	$60,000
2.922	Serpentix Conveyor Refurbishment	$30,000
2.923	Old Loader Electrical Upgrades	$25,000
2.568	Biosolids Management Plan	$200,000
2.929	Facility Upgrade & Enhanced Resource Recovery-Preliminary Engineering	$400,000
2.930	Facility Upgrade - Preliminary and Detailed Design	$1,500,000
	Wastewater - Treatment Facility -- T O T A L	**$12,515,000**
	Wastewater - Energy	
2.362	Energy Management Capital Program (Wastewater)	$500,000
2.491	Pump Station HVAC Retro-Commissioning Program	$100,000
	Wastewater - Energy -- T O T A L	**$600,000**
	Wastewater - Security	
4.008	Security Upgrade Program	$200,000
	Wastewater - Security -- T O T A L	**$200,000**
	Wastewater - Equipment	
2.161	I&I Reduction (SIR) Program Flow Meters and Related Equipment	$25,000
2.451	Miscellaneous Equipment Replacement	$120,000
	Wastewater - Equipment -- T O T A L	**$145,000**
	Wastewater - Corporate Projects -- T O T A L	**$12,075,500**
	GRAND TOTAL - WASTEWATER	**$76,855,500**

HALIFAX WATER

Capital Budget 2021/22

Stormwater

Project Number	Project Name	Project Cost
	Stormwater - Pipes	
1.038	Integrated Stormwater Projects - Program	$1,200,000
1.248	Prince Albert Road Integrated - Stormwater System Renewal (CSP)	$375,000
1.102	Manhole Renewals SW	$16,000
1.103	Catchbasin Renewals SW	$63,000
1.135	Lateral Replacements SW	$25,000
1.259	Lady Hammond Road Storm Replacement	$40,000
1.204	National Disaster Mitigation Program	$50,000
1.145	Sullivan's Pond Storm Sewer System Replacement - Plase 2 Irishtown Rd to Harbour	$350,000
1.247	Penhorn Lake Stormwater System Renewal	$25,000
1.245	Tobin Drive Stormwater System Renewal - Preliminary Engineering	$50,000
1.243	Bayne St Stormwater System Upgrade - Preliminary Engineering	$75,000
1.710	Kempt Road Stormwater System Upgrade - Preliminary Engineering	$75,000
1.249	Miller Lake Rd and Hwy 2 Stormwater System Renewal	$50,000
1.250	Dartmouth Rd and Elgin Lane Stormwater System Renewal	$25,000
1.252	Sackville Drive and Beaverbank Cross Road Stormwater System Renewal	$25,000
1.201	Stormwater Pipe Condition Inspections (CSP)	$50,000
1.224	Thistle Street Storm Drainage System Upgrade - Preliminary Engineering	$660,000
	Stormwater - Pipes -- T O T A L	**$3,154,000**
	Stormwater - Culverts/Ditches	
1.104	Driveway Culvert Replacements	$1,000,000
	Street Specific Culvert Replacements:	
1.147	Cole Harbour Rd (near #1560) - Culvert Replacement	$350,000
1.183	St Margaret's Bay Rd, near Civic 2797 - Culvert Replacement	$80,000
1.238	Betty Drive, near civic 1	$350,000
1.239	Robert Lane, near civic 10	$350,000
1.208	Yankeetown Road, near civic 16	$350,000
1.234	18 Melville Ave, Halifax	$28,000
1.234	3 Melville Ave, Halifax	$28,000
1.236	32 Melville Ave, Halifax	$28,000

HALIFAX WATER

Capital Budget 2021/22

Stormwater

Project Number	Project Name	Project Cost
1.237	Lockview Road, near civic 450	$75,000
1.255	Kinclaven Street	$75,000
1.256	Culvert Replacement - Glendale, at Raymond	$96,000
1.257	Culvert Replacement - Glendale, at Metropolitan	$135,000
1.258	Culvert Replacement - Lucasville Road, near Yankeetown Road	$350,000
	Stormwater - Culverts/Ditches -- T O T A L	**$3,295,000**
	Stormwater - Structures	
1.226	Ellenvale Run Retaining Wall - Phase 5 (Section 5 & 6)	$4,025,000
1.240	Ellenvale Run Retaining Wall - Phase 6 (Section 4)	$100,000
1.251	Larry Uteck Stormwater Management Pond Slope Stabilization	$25,000
1.130	Glen Forrest Retention Pond Rehab	$165,000
	Stormwater - Structures -- T O T A L	**$4,315,000**
	Stormwater - Corporate Projects -- T O T A L	**$2,049,500**
	GRAND TOTAL - STORMWATER	**$12,813,500**

HALIFAX WATER

Capital Budget 2021/22

Corporate Projects

Project Number	Project Name	Project Cost
	Corporate - Information Technology	
4.097	Analytics Decision Support System	$350,000
4.157	Asset Condition	$190,000
4.151	Capital Planning	$500,000
4.105	Cityworks Upgrade	$200,000
1.011	Computer Replacement Program	$400,000
4.147	Document Management Sharepoint Rollout	$300,000
4.126	Full Enterprise Data Warehouse	$600,000
4.153	General Analytic Tool	$400,000
4.131	HR Training and Benefits	$500,000
4.012	Network Upgrades	$280,000
4.095	New CRM with Integration	$100,000
4.15	Enterprise Resource Planning Solution	$8,300,000
4.107	Customer Portal	$100,000
4.091	Permit Approvals	$500,000
	Security Awareness	$340,000
	Encryption	$60,000
	Network Protection	$320,000
	Endpoint Protection	$70,000
	Monitoring	$1,150,000
	Governance	$220,000
	Identity and Access Management	$445,000
	Corporate - Information Technology -- T O T A L	**$15,325,000**
	Corporate - GIS	
4.04	GIS Data Program	$250,000
4.115	GIS Data Build - Services (ICI)	$150,000
4.01	Sewer Service Entry	$150,000
4.116	GIS Data Project (CAD schematic retirement)	$50,000
4.038	GIS Hardware/Software Program	$50,000
4.039	GIS Application Support Program	$150,000
4.059	GIS Data Modelling	$250,000
4.118	Engineering Drawing Database	$50,000
	Corporate - GIS -- T O T A L	**$1,100,000**

HALIFAX WATER

Capital Budget 2021/22

Corporate Projects

Project Number	Project Name	Project Cost
	Corporate - Asset Management	
4.156	Asset Management Program Roadmap Update - Implementation	$250,000
2.872	Wastewater Sewer Condition Assessment	$250,000
1.254	Storm Sewer Condition Assessment	$110,000
2.043	Corporate Flow Monitoring Program	$2,220,000
4.158	Condition Assessment Program	$300,000
4.159	Performance Assessment Program	$25,000
4.16	Asset Renewal Strategies Optimiation	$30,000
4.161	Asset Renewal Management Program Reporting	$15,000
4.162	Level of Service Implementation Program	$100,000
4.163	Annual Asset Management Plan Update	$10,000
4.165	Asset Management Awareness Program	$20,000
4.166	Asset Management and Infrastructure Planning Communications	$15,000
2.862	CSO Reporting Enhancement	$40,000
1.253	Asset Management Implementation Team - Stormwater Management Structures	$50,000
4.168	Model Enhancements	$50,000
4.113	Climate Change Management Program	$200,000
4.173	Population / Planning Projections and Analysis	$100,000
4.175	Establish Design Cost Factors - Vertical Assets	$50,000
4.179	Long-term Planning Framework Review	$20,000
4.181	Future Regulatory Scenarios Study	$75,000
4.183	Annual Unit Rates Review	$10,000
4.185	Regional Development Charge Program Implementation	$300,000
4.177	Annual Model Calibration Report	$10,000
4.18	Springfield Lake Servicing Study	$150,000
4.182	LIDS/SUDS Study	$50,000
2.878	Wastewater Treatment Facilities Compliance Plan	$150,000
2.562	Outfall Assessment Project	$100,000
4.14	SSO Management Program	$1,220,000
4.167	Real-time Control Project	$60,000
3.644	Water Efficiency Study	$100,000
3.625	Lake Major Water Levels Forecasting	$70,000
3.645	Backup Supply Feasibilty Study	$50,000
3.646	Mt Edward Booster Fire Pump Assessment	$25,000
3.647	Robie Emergency Booster Assessment	$25,000
4.144	New Hydraulic Water Model (InfoWater)	$200,000
	Corporate - Asset Management -- T O T A L	**$6,450,000**

HALIFAX WATER

Capital Budget 2021/22

Corporate Projects

Project Number	Project Name	Project Cost
	Corporate - Facility	
4.077	Building Capital Improvements	$110,000
3.221	Energy Management Capital Program	$100,000
	Corporate - Facility -- T O T A L	**$210,000**
	Corporate - SCADA & Other Equipment	
4.093	GPS Units - Replacement	$40,000
4.174	SCADA System Security Assessment Update	$80,000
4.186	AMI Comunications Upgrade	$30,000
4.154	Customer Meters - New and Replacement	$415,000
	Corporate - SCADA & Other Equipment -- T O T A L	**$565,000**
	Corporate - Fleet	
4.006	Fleet Upgrade Program Stormwater	$82,000
4.006	Fleet Upgrade Program Wastewater	$328,000
4.007	Fleet Upgrade Program Water	$295,000
	Corporate - Fleet -- T O T A L	**$705,000**
	GRAND TOTAL - Corporate Projects	**$24,355,000**

	ALLOCATION BREAKDOWN:	
	Water - Corporate Projects - T O T A L	$10,230,000
	Wastewater - Corporate Projects -- T O T A L	$12,075,500
	Stormwater - Corporate Projects -- T O T A L	$2,049,500
	GRAND TOTAL - Corporate Projects	**$24,355,000**

HALIFAX WATER

Capital Budget 2021/22

Summary of Routine Capital Expenditures included within Capital Budget

Project Number	Project Name	Project Cost	Asset Class
3.067	Valves Renewals	$125,000	Water
3.068	Hydrants Renewals	$75,000	Water
3.069	Service Lines Renewals	$100,000	Water
3.390	Lead Service Line Replacement Program	$1,000,000	Water
3.101	Miscellaneous Equipment Replacement (W)	$50,000	Water
4.007	Fleet Upgrade Program Water	$610,000	Water
2.357	Manhole Renewals WW	$25,000	Wastewater
2.358	Lateral Replacements WW (non-tree roots)	$1,720,000	Wastewater
2.563	Lateral Replacements WW (tree roots)	$541,000	Wastewater
2.161	I&I Reduction (SIR) Program Flow Meters and Related Equipment	$25,000	Wastewater
2.451	Miscellaneous Equipment Replacement (WW)	$120,000	Wastewater
4.006	Fleet Upgrade Program Wastewater	$1,076,000	Wastewater
1.102	Manhole Renewals SW	$15,000	Stormwater
1.103	Catchbasin Renewals SW	$60,000	Stormwater
1.135	Lateral Replacements SW	$12,000	Stormwater
4.006	Fleet Upgrade Program Stormwater	$269,000	Stormwater
4.011	Desktop Computer Replacement Program	$350,000	Corporate
4.093	GPS Units - Replacement	$70,000	Corporate
4.154	Customer Meters - New and Replacement	$500,000	Corporate
4.012	Network Upgrades	$280,000	Water & Wastewater
	GRAND TOTAL - Routine Capital Projects	**$7,023,000**	

Halifax Water

Appendix C

2021/22 Operating Budget

HALIFAX WATER
STATEMENT OF EARNINGS - ALL SERVICES - NSUARB
PROPOSED OPERATING BUDGET
APRIL 1, 2021 to MARCH 31, 2022
(in thousands)

	ACTUAL APR 1/19 MAR 31/20	APPROVED BUDGET (1) APR 1/20 MAR 31/21	**PROPOSED BUDGET APR 1/21 MAR 31/22**	Variances Year-over-Year $ 2020/21	$ 2021/22	% 2020/21	% 2021/22
Operating revenues	$ 137,750	$ 138,618	**$ 150,466**	$ 868	$ 11,849	1%	9%
Operating expenditures	109,326	118,110	**125,379**	8,784	7,269	8%	6%
Earnings from operations before financial and other revenues and expenditures	28,424	20,508	**25,087**	(7,916)	4,579	(28%)	22%
Financial and other revenues							
Interest	512	86	**173**	(426)	86	(83%)	100%
Other	699	532	**549**	(167)	17	(24%)	3%
	1,211	619	**722**	(592)	103	(49%)	17%
Financial and other expenditures							
Interest on long term debt	7,144	8,823	**7,603**	1,679	(1,221)	24%	(14%)
Repayment on long term debt	18,719	21,880	**22,717**	3,161	838	17%	4%
Amortization of debt discount	187	228	**258**	41	31	22%	14%
Dividend/grant in lieu of taxes	5,078	6,113	**6,836**	1,035	723	20%	12%
Other	67	32	**46**	(35)	14	(52%)	45%
	31,195	37,076	**37,461**	5,881	385	19%	1%
Loss for the year	$ (1,560)	$ (15,949)	**$ (11,651)**	$ 14,389	$ (4,297)	922%	(27%)

1. 2020/21 Operating Budget approved by the Halifax Water Board of Commissioners, January 30, 2020.

HALIFAX WATER
STATEMENT OF EARNINGS - WATER - NSUARB
PROPOSED OPERATING BUDGET
APRIL 1, 2021 to MARCH 31, 2022
(in thousands)

	ACTUAL APR 1/19 MAR 31/20	APPROVED BUDGET (1) APR 1/20 MAR 31/21	**PROPOSED BUDGET APR 1/21 MAR 31/22**	Variances Year-over-Year $ 2020/21	$ 2021/22	% 2020/21	% 2021/22
Operating revenues							
Water	$ 47,918	$ 48,083	**$ 48,424**	$ 165	$ 341	0%	1%
Public fire protection	7,074	7,074	**7,628**	0	553	0%	8%
Private fire protection	881	884	**1,312**	3	428	0%	48%
Bulk water stations	300	303	**337**	3	34	1%	11%
Late payment and other connection fees	207	238	**236**	31	(2)	15%	(1%)
Miscellaneous	162	163	**276**	1	113	1%	69%
	56,542	56,746	**58,212**	204	1,466	0%	3%
Operating expenditures							
Water supply and treatment	9,573	10,590	**10,778**	1,017	188	11%	2%
Water transmission and distribution	10,843	12,311	**11,876**	1,468	(435)	14%	(4%)
Engineering and technology services	3,230	4,162	**5,654**	932	1,491	29%	36%
Regulatory services	859	1,195	**1,201**	336	6	39%	0%
Corporate services	6,056	6,870	**4,565**	814	207	13%	3%
Administration			**2,511**				
Depreciation and amortization	9,818	10,993	**12,052**	1,175	1,059	12%	10%
	40,379	46,121	**48,637**	5,742	2,516	14%	5%
Earnings from operations before financial and other revenues and expenditures	16,163	10,625	**9,576**	(5,538)	(1,050)	(34%)	(10%)
Financial and other revenues							
Interest	222	39	**96**	(183)	57	(82%)	147%
Other	544	394	**399**	(150)	5	(28%)	1%
	766	432	**495**	(334)	63	(44%)	14%
Financial and other expenditures							
Interest on long term debt	1,828	3,127	**2,616**	1,299	(512)	71%	(16%)
Repayment on long term debt	4,722	6,465	**6,696**	1,743	232	37%	4%
Amortization of debt discount	64	84	**100**	20	16	31%	19%
Dividend/grant in lieu of taxes	5,078	5,654	**5,863**	576	209	11%	4%
Other	32	2	**16**	(30)	14	(94%)	712%
	11,724	15,332	**15,292**	3,608	(40)	31%	(0%)
Earnings (loss) for the year	$ 5,205	$ (4,275)	**$ (5,221)**	$ 9,480	$ 946	182%	22%

1. 2020/21 Operating Budget approved by the Halifax Water Board of Commissioners, January 30, 2020.

HALIFAX WATER
STATEMENT OF EARNINGS - WASTEWATER - NSUARB
PROPOSED OPERATING BUDGET
APRIL 1, 2021 to MARCH 31, 2022
(in thousands)

	ACTUAL APR 1/19 MAR 31/20	APPROVED BUDGET (1) APR 1/20 MAR 31/21	**PROPOSED BUDGET APR 1/21 MAR 31/22**	Variances Year-over-Year $ 2020/21	$ 2021/22	% 2020/21	% 2021/22
Operating revenues							
Wastewater	$ 70,494	$ 70,365	**$ 80,619**	$ (129)	$ 10,254	(0%)	15%
Leachate and other contract revenue	453	473	**484**	20	11	4%	2%
Septage tipping fees	514	505	**505**	(9)	0	(2%)	0%
Overstrength surcharge	14	30	**15**	16	(15)	114%	(50%)
Airplane effluent	98	105	**76**	7	(29)	7%	(28%)
Late payment and other connection fees	123	176	**221**	53	45	43%	25%
Miscellaneous	141	136	**247**	(5)	111	(4%)	82%
	71,837	71,790	**82,166**	(47)	10,376	(0%)	14%
Operating expenditures							
Wastewater collection	13,963	13,499	**12,604**	(464)	(894)	(3%)	(7%)
Wastewater treatment	20,633	21,413	**22,071**	780	658	4%	3%
Engineering and technology services	4,478	3,769	**5,881**	(709)	2,113	(16%)	56%
Regulatory services	1,432	1,537	**1,587**	105	50	7%	3%
Corporate services	5,301	5,757	**3,840**	456	163	9%	3%
Administration			**2,079**				
Depreciation and amortization	14,038	15,072	**16,775**	1,034	1,703	7%	11%
	59,845	61,045	**64,838**	1,200	3,793	2%	6%
Earnings from operations before financial and other revenues and expenditures	11,992	10,745	**17,329**	(1,247)	6,584	(10%)	61%
Financial and other revenues							
Interest	191	39	**46**	(152)	7	(80%)	19%
Other	155	139	**150**	(16)	12	(10%)	8%
	346	178	**197**	(168)	19	(49%)	11%
Financial and other expenditures							
Interest on long term debt	4,706	4,772	**4,196**	66	(576)	1%	(12%)
Repayment on long term debt	12,522	13,442	**13,864**	920	422	7%	3%
Amortization of debt discount	110	124	**133**	14	9	13%	7%
Dividend/grant in lieu of taxes	0	398	**820**	398	422	#DIV/0!	106%
Other	35	30	**30**	(5)	0	(14%)	0%
	17,373	18,766	**19,043**	1,393	278	8%	1%
Loss for the year	$ (5,035)	$ (7,843)	**$ (1,518)**	$ 2,808	$ (6,325)	56%	(81%)

1. 2020/21 Operating Budget approved by the Halifax Water Board of Commissioners, January 30, 2020.

HALIFAX WATER
STATEMENT OF EARNINGS - STORMWATER - NSUARB
PROPOSED OPERATING BUDGET
APRIL 1, 2021 to MARCH 31, 2022
(in thousands)

	ACTUAL APR 1/19 MAR 31/20	APPROVED BUDGET (1) APR 1/20 MAR 31/21	**PROPOSED BUDGET APR 1/21 MAR 31/22**	Variances Year-over-Year $ 2020/21	$ 2021/22	% 2020/21	% 2021/22
Operating revenues							
Stormwater site generated service	$ 5,361	$ 6,047	**$ 6,051**	$ 686	$ 3	13%	0%
Stormwater right of way service	3,835	3,835	**3,835**	0	0	0%	0%
Late payment and other connection fees	81	106	**104**	25	(2)	31%	(2%)
Miscellaneous	94	92	**97**	(2)	5	(2%)	5%
	9,371	10,081	**10,087**	710	6	8%	0%
Operating expenditures							
Stormwater collection	4,808	5,821	**5,885**	1,013	64	21%	1%
Engineering and technology services	728	1,273	**1,396**	545	123	75%	10%
Regulatory services	1,490	1,627	**1,684**	137	56	9%	3%
Corporate services	854	857	**555**	3	36	0%	4%
Administration	0	0	**338**				
Depreciation and amortization	1,222	1,365	**2,046**	143	681	12%	50%
	9,102	10,943	**11,905**	1,841	961	20%	9%
Earnings from operations before financial and other revenues and expenditures	269	(862)	**(1,817)**	(1,131)	(955)	(421%)	111%
Financial and other revenues							
Interest	99	9	**31**	(90)	22	(91%)	256%
Other	0	0	**0**	0	0	#DIV/0!	#DIV/0!
	99	9	**31**	(90)	22	(91%)	256%
Financial and other expenditures							
Interest on long term debt	610	924	**791**	314	(133)	51%	(14%)
Repayment on long term debt	1,475	1,973	**2,156**	498	184	34%	9%
Amortization of debt discount	13	20	**25**	7	5	51%	26%
Dividend/grant in lieu of taxes	0	62	**154**	62	92	#DIV/0!	149%
Other	0	0	**0**	0	0	#DIV/0!	#DIV/0!
	2,098	2,978	**3,126**	880	148	42%	5%
Loss for the year	$ (1,730)	$ (3,832)	**$ (4,912)**	$ 2,102	$ 1,081	121%	28%

1. 2020/21 Operating Budget approved by the Halifax Water Board of Commissioners, January 30, 2020.

HALIFAX WATER
STATEMENT OF EARNINGS - REGULATED AND UNREGULATED ACTIVITIES - NSUARB
PROPOSED OPERATING BUDGET
APRIL 1, 2021 to MARCH 31, 2022
(in thousands)

	ACTUAL APR 1/19 MAR 31/20	APPROVED BUDGET (1) APR 1/20 MAR 31/21	**PROPOSED BUDGET APR 1/21 MAR 31/22**
REGULATED ACTIVITIES			
Operating revenues			
Water	$ 47,918	$ 48,083	**$ 48,424**
Wastewater	70,494	70,365	**80,619**
Stormwater	9,196	9,882	**9,886**
Public fire protection	7,074	7,074	**7,628**
Private fire protection	881	884	**1,312**
Other	1,084	1,207	**1,495**
	136,647	137,496	**149,363**
Operating expenditures			
Water supply and treatment	9,541	10,556	**10,740**
Water transmission and distribution	10,843	12,310	**11,876**
Wastewater collection	13,939	13,374	**12,503**
Stormwater collection	4,808	5,821	**5,885**
Wastewater treatment	19,892	20,571	**21,274**
Engineering and technology services	8,436	9,184	**12,910**
Regulatory services	3,781	4,359	**4,471**
Corporate services	12,135	13,346	**8,887**
Administration			**4,859**
Depreciation and amortization	25,060	27,349	**30,872**
	108,435	116,869	**124,278**
Earnings from operations before financial and other revenues and expenditures	28,211	20,627	**25,086**
Financial and other revenues			
Interest	512	86	**173**
Other	144	39	**31**
	656	126	**204**
Financial and other expenditures			
Interest on long term debt	7,144	8,807	**7,592**
Repayment on long term debt	18,719	21,860	**22,693**
Amortization of debt discount	187	227	**258**
Dividend/grant in lieu of taxes	5,078	6,113	**6,836**
Other		1	**1**
	31,128	**37,009**	**37,381**
Loss for the year	$ (2,261)	$ (16,256)	**$ (12,091)**
UNREGULATED ACTIVITIES			
Operating revenues			
Septage tipping fees	$ 514	$ 505	**$ 505**
Leachate and other contract revenue	453	473	**484**
Airplane effluent	98	105	**76**
Miscellaneous	38	38	**38**
	1,103	1,121	**1,103**
Operating expenditures			
Water supply and treatment	32	28	**32**
Wastewater collection	24	111	**88**
Wastewater treatment	741	842	**798**
Sponsorships and donations	76	68	**73**
Depreciation and amortization	18	81	**0**
Administration		110	**110**
	891	1,240	**1,101**
Earnings from operations before financial and other revenues and expenditures	213	(119)	**2**
Financial and other revenues			
Other	555	493	**518**
Financial and other expenditures			
Other	67	67	**80**
	67	67	**80**
Earnings for the year	$ 701	$ 307	**$ 440**
Total earnings (loss) for the year (Regulated and Unregulated)	$ (1,560)	$ (15,949)	**$ (11,651)**

1. 2020/21 Operating Budget approved by the Halifax Water Board of Commissioners, January 30, 2020.