EPCOR WATER SERVICES INC.

2022-2026
Performance Based Regulation
Water Application

February 16, 2021

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1.0 APPLICATION OVERVIEW

1.1 Introduction

1. EPCOR Water Services Inc. (EWSI) submits this Water Rate Application (herein referred to as the "Water Rate Application" or "Application") to its regulator, Edmonton City Council, for approval of its water rates as set out within the proposed *EPCOR Water Services Bylaw No. 19626* (the "Bylaw"). This Water Rate Application describes how the forecast revenue requirement and proposed water rates are determined for the fifth five-year term of Performance Based Regulation (PBR) rates for the period April 1, 2022 to March 31, 2027 ("2022-2026"). EWSI provides water services, wastewater treatment services, drainage services, and fire protection infrastructure to residents of the city of Edmonton. In past PBR terms the public fire protection revenue requirement has been recovered through the Fire Hydrant Service Agreement with the City of Edmonton Fire Rescue Services Department, which was funded through the City of Edmonton's (the "City") property tax levy. As directed by Edmonton City Council, the public fire protection revenue requirement has been added to water rates effective April 1, 2022. Separate Drainage and Wastewater Treatment Rate Applications have been prepared to explain EWSI's proposed drainage and wastewater treatment rates.

2. EWSI produces, treats and supplies potable water to city of Edmonton residents. Its prime objective is to reliably supply sufficient potable water while ensuring that the quality exceeds public health requirements. The revenue requirement for EWSI's water operations, as further detailed in this document, reflects the reasonable and prudent costs required to provide high quality potable water to residents of the city of Edmonton. As the same water infrastructure is used to provide fire protection services within the City of Edmonton, fire protection costs are calculated based on the same underlying revenue requirement.

3. In this Application, EWSI is proposing adjustments to its PBR rates for the 2022-2026 PBR term from those currently approved for 2021. In accordance with the calculations in the Bylaw (Schedule 3), these adjustments include annual inflation plus Special Rate Adjustments. EWSI is planning to spend $429.3 million in capital expenditures for water infrastructure projects during 2022-2026 PBR, a decrease of $147.8 million or 26% from the projected 2017-2021 PBR actual spend. The $429.3 million in capital expenditures is contributing to the need for rate increases above inflation over the PBR term. These increases are proposed to occur by way of Special Rate Adjustments as further described in this document.

4. This capital investment plan focuses on efficiencies to reduce the long-term cost to customers, as well as on a robust risk management approach, enabling prioritization of maintenance work that presents the highest risk to the system. EWSI is proposing the Advanced Metering Infrastructure (AMI) Deployment Project in order to ensure EWSI is able to meet its meter reading requirements under the Bylaw, while providing additional water conservation, safety and operational benefits. Also included in this capital investment plan is the new Critical Pipeline Inspection Program, which will enable replacement of targeted sections rather than full scale replacement of transmission mains. EWSI will continue to replace aging transmission and distribution mains, replace other assets that have reached the end of their useful lives including water meters in several Edmonton neighbourhoods, proactively replace the remaining lead service lines and continue EWSI's successful Water Main Cathodic Protection Program. EWSI will continue to respond to growing system demands as a result of population growth and will work closely with the City to relocate water utility infrastructure as required to accommodate City projects such as LRT expansion and Yellowhead Trail freeway conversion. Finally, this capital investment plan focuses on climate resilience through a water treatment plant flood protection project and improving redundancy and reliability at the E. L. Smith water treatment plant, while building the foundation to support future growth in the city of Edmonton.

5. Over half of EWSI's planned $429.3 million investment in the water utility infrastructure over the next five-year period will be in projects to continue to rehabilitate or replace existing assets at the end of their useful lives, to improve redundancy and to ensure risks are acceptable and maintained. Good capital management necessitates a good asset management program that has an appropriate level of maintenance, capital and life cycle replacement spending. EWSI's capital investment plan is based on a robust asset condition assessment approach which ensures that assets are maintained and replaced before dangerous deterioration and failures occur, as explained in Section 4.3.2 of the Application. For example, EWSI's proactive approach to replacing cast iron water mains has been successful in reducing water main breaks in Edmonton to all-time lows.

6. In alignment with the City Plan, EWSI is proposing the Integrated Watershed Management Strategy (IWMS) and Flood Protection Project to help "ensure the safety and security of Edmonton's water supply" and "support long term resilience to flooding, drought and extreme weather events". In addition to the E. L. Smith Solar Farm and Battery Energy Storage System Projects going into service at the start of 2022, EPCOR will also procure renewable electricity certificates to develop and construct a new wind farm in southern Alberta. The combination of

this offtake agreement and the E. L. Smith Solar Farm will result in EWSI utilizing 100% green electricity for all its operations within the city of Edmonton.

7. Residents and businesses of the city of Edmonton are reducing their water use by adopting water conservation practices and by installing more water efficient toilets, washing machines and other devices. Declining per-customer water consumption partially offsets the increases in consumption related to growth in the number of customers. The net impact of these factors results in a trend of low consumption growth which is expected to continue through the 2022-2026 PBR term. As EWSI's water revenues are primarily established upon consumption-based charges, minimal consumption growth coupled with the rising costs of providing high quality potable water (due to inflation and other factors) has resulted in upward pressure on EWSI's water rates.

1.2 Applied-For Water Rates

8. Since 2002, EWSI has been operating under a PBR framework for the provision of water services to customers within the city of Edmonton. The current PBR term ends on March 31, 2022. EWSI is hereby applying to the Edmonton City Council for approval of an extension of the PBR for a fifth five-year period commencing April 1, 2022 to March 31, 2027. As well, EWSI is applying for approval of the Bylaw which provides the applied-for water rates to be charged to customers, the terms and conditions of service and the detailed mechanisms for rate adjustments for the 2022-2026 PBR term.

9. Relative to the current water rates, EWSI's water rates for the 2022-2026 term are based on the following components: (i) a continuation of the existing PBR formula described in the Bylaw to set rates based on Routine and Non-Routine Adjustments; (ii) annual Special Rate Adjustments to the fixed charges and consumption charges to re-base the revenue requirement for the 2022-2026 PBR, which reflect the costs associated with the continued provision of safe and reliable water to its customers; (iii) a Special Rate Adjustment to increase the percentage of fixed revenue EWSI collects from customers; (iv) a special rate adjustment to collect costs incurred in 2020 on the 90 day Deferral Program; and (v) a Special Rate Adjustment to collect the public fire protection revenue requirement through water rates.

10. For the 2022-2026 PBR term, EWSI is proposing to limit the number of changes to the overall metrics program. Certain revisions are made in Schedules 1, 2, 3 and 4 of the Bylaw which pertain to service charges, Terms and Conditions for the provision of water services, Routine Adjustments and Non-Routine Adjustments and performance measures. Refer to Appendix A to

this Water Rate Application for the background and details behind the proposed revisions to the Bylaw. Refer to Part II of the Rates Report for a blacklined version of the Bylaw which details all of the proposed amendments.

11. EWSI has prepared this Water Rate Application to provide its regulator with a comprehensive understanding of the basis for EWSI's proposed water rates, associated revenue requirement and proposed performance measures for the 2022-2026 PBR term. EWSI has prepared this Application in accordance with Minimum Filing Requirements (MFR) approved by Edmonton City Council in March 2013. In addition to implementing the MFR, EWSI has also complied with a number of other motions passed by Edmonton Utility Committee which are addressed in this Water Rate Application. A listing of these motions and an explanation of how EWSI has addressed them is provided in Appendix B to this Application.

12. The following evidence provided in this Application will provide Edmonton City Council with greater visibility and transparency of EWSI's forecast revenue requirement and proposed rates:

- detailed financial schedules underlying the revenue requirement calculations;
- detailed business cases providing supporting rationale for capital projects;
- historical cost variance explanation relative to the amounts approved in the 2017-2021 PBR term including capital cost variances and operating cost variance explanations;
- forecast assumptions and methodologies for consumption volumes, operating and capital costs;
- support for EWSI's proposed cost of capital, capital structure and efficiency factor; and
- a full explanation of the cost of service methodology applied beginning 2022-2026 to allocate costs between EWSI's customer segments and classes.

13. EWSI has also included PBR Progress Reports for 2017, 2018 and 2019 which are provided annually to Edmonton City Council for review of EWSI's operational and financial performance for the prior year. Refer to Appendices E-01 to E-03 for these PBR Progress Reports. EWSI is confident that on the basis of the information provided, Edmonton City Council will conclude that EWSI's applied-for water rates are just, reasonable, prudent and in the public interest.

1.3 Applied-For Performance Measures

14. For the 2022-2026 PBR term, operational performance of EWSI will continue to be assessed under the following five categories: (i) water quality; (ii) customer service; (iii) system reliability and optimization; (iv) environment; and (v) safety. Each of these categories contains individual performance measures that represent the more specific performance standards (or targets) expected. The performance standards are based on historic trending and targeted future performance and where available, aligned with industry benchmarks. With each PBR renewal, EWSI typically revises the PBR performance metrics through updating the standards of performance, where reasonable, and introducing new metrics to better align with operational priorities and strategic goals. For the 2022-2026 PBR term, EWSI is proposing to limit the number of changes to the overall metrics program. Given the focus on moderating rate increases through a rebalance of capital programs and other means, maintaining a relatively consistent metrics program from the current term will assure stakeholders that service levels are being maintained despite the reductions. Where feasible, the standards of performance have been updated to the most recent ten year average of past performance. A detailed explanation of the PBR performance metrics and proposed changes is provided in Section 13 to this Application.

1.4 EWSI Background and Corporate Structure

15. EWSI is a wholly owned subsidiary of EPCOR Utilities Inc. ("EUI"). Through this ownership, EWSI is affiliated with other corporations within the EUI group of companies. EWSI receives services from and provides services to other EPCOR corporations. This structure allows EWSI to benefit from both the extensive experience that resides within the other corporations of EUI, and from economies of scale and scope that arise from the EPCOR group's inter-corporate services approach to its business operations. Services are provided pursuant to inter-corporate services agreements.

16. EWSI's regulated water services are supported by an integrated waterworks infrastructure system to provide the following:

- regulated water services for city of Edmonton customers ("In-City" customers) under a franchise agreement and water rates regulated by Edmonton City Council pursuant to provisions of performance based regulation;
- regulated water services for the Regional Water Customers Group (RWCG) related to the sale of bulk water to regions adjacent to the city of Edmonton. This service is provided pursuant to water supply agreements entered into between EWSI and each

of the water service commissions and communities surrounding Edmonton. The water rates charged to the RWCG are regulated by the Alberta Utilities Commission (AUC) on a complaint basis1 and determined annually on a cost of service basis; and

- Fire Protection services provided to private2 and public users. Public fire protection is provided to the City of Edmonton as outlined in the terms and conditions of the Bylaw.

17. EWSI's waterworks infrastructure system supports the operations of its regulated water operations. As such, EWSI determines its total revenue requirement for regulated water operations based on the operating and capital cost components associated with supporting the entire waterworks system. EWSI then allocates portions of this total revenue requirement across each line of business (or customer segment, i.e., In-City customers, RWCG and Fire Protection) according to the allocation methodologies described in Section 11. The revenue requirement allocated to In-City customers and Fire Protection is recovered through the proposed water rates for the 2022-2026 PBR as set out in Schedule 1 of the Bylaw. Although the public fire protection revenue requirement has been added to water rates, EWSI continues to calculate a separate revenue requirement for fire protection. This ensures that the cost of providing fire protection services is appropriately reflected in rates. The RWCG customers are allocated a portion of the revenue requirement and EWSI recovers these costs through wholesale rates charged to the RWCG under water supply agreements which are outside of this Application.

18. To the extent that technical or support staff services are provided from regulated water services to the commercial or non-regulated water services business units, EWSI utilizes a time tracking system to facilitate appropriate cost recoveries in the regulated water services business unit to ensure no cross subsidization occurs between regulated water services and commercial services. Direct charges, such as consultants and contractors, are directly charged to the commercial services business.

1.5 Forecast Revenue Requirement – In-City and Fire Protection

19. Table 1.5-1 provides a breakdown of the cost components comprising EWSI's In-City revenue requirement based on the forecast costs for the 2022-2026 PBR term. Amounts approved for 2021 (the "2021 Decision") and EWSI's most recent forecast of amounts for 2021

[1] *Municipal Government Act, RSA 2000, cM-26, s.43*

[2] Private fire protection services are charged directly to customers based on a monthly fixed charge under the Schedule 1 of the Bylaw.

(the "2021 Forecast") are provided for comparison. Allocation of EWSI's operating and capital costs between its three regulated customer segments (In-City, Regional and Fire Protection) is explained in Section 12.

Table 1.5-1
EWSI Forecast Revenue Requirement – In-City
Financial Schedule 3-1
2021-2026
($ millions)

		A	B	C	D	E	F	G
	Cost Component	**2021 D**	**2021 F**	**2022 F**	**2023 F**	**2024 F**	**2025 F**	**2026 F**
1	Operating Costs	96.0	87.8	86.8	88.8	90.2	91.2	93.0
2	Franchise Fee	16.9	15.5	16.8	18.1	19.1	20.0	21.0
3	Subtotal: Operating Costs	112.9	103.3	103.7	106.8	109.2	111.3	114.0
4	Depreciation Expense	30.9	32.7	35.5	37.9	40.7	42.6	43.8
5	Interest Expense	31.8	29.1	30.0	30.6	29.8	28.8	29.0
6	Return on Equity	44.8	39.6	47.2	48.9	50.5	51.2	51.3
7	Revenue Requirement before Revenue Offsets	220.4	204.7	216.3	224.1	230.2	233.9	238.2
8	Less: Revenue Offsets	(5.2)	(5.2)	(5.2)	(5.3)	(5.4)	(5.5)	(5.7)
9	**Revenue Requirement – In-City**	**215.2**	**199.5**	**211.1**	**218.8**	**224.8**	**228.4**	**232.5**

20. Table 1.5-2 provides a breakdown of the cost components comprising EWSI's Fire Protection revenue requirement based on the forecast costs for the 2022-2026 PBR term. The fire protection revenue requirement represents the cost of providing both private and public fire protection services.

Table 1.5-2
EWSI Forecast Revenue Requirement – Fire Protection
Financial Schedule 3-2
2021-2026
($ millions)

		A	B	C	D	E	F	G
	Cost Component	**2021 D**	**2021 F**	**2022 F**	**2023 F**	**2024 F**	**2025 F**	**2026 F**
1	Total Operating Costs	5.6	6.6	7.6	7.6	7.8	8.1	8.3
2	Franchise Fee	-	-	1.0	1.3	1.3	1.4	1.4
3	Subtotal: Operating Costs	5.6	6.6	8.6	8.8	9.1	9.5	9.7
4	Depreciation Expense	2.4	3.1	3.4	3.5	3.7	3.8	3.9
5	Interest Expense	3.0	3.5	3.6	3.6	3.5	3.4	3.5
6	Return on Equity	4.3	1.7	5.6	5.8	6.0	6.1	6.2
7	Total Revenue Requirement – Fire Protection	15.3	14.8	21.2	21.8	22.3	22.8	23.3
8	Less: Revenue Requirement - Private Fire Protection	(2.7)	(2.4)	(2.8)	(3.0)	(3.0)	(3.1)	(3.1)
9	**Revenue Requirement - Public Fire Protection**	**12.6**	**12.4**	**18.4**	**18.8**	**19.3**	**19.7**	**20.1**

21. The forecast In-City revenue requirement reflected on line 9 of Table 1.5-1 combined with the revenue requirement applicable to public fire protection shown on line 9 of Table 1.5-2 forms the basis for determining EWSI's proposed water rates for the 2022-2026 PBR term.

22. EWSI is proposing to re-base the revenue requirement based on the forecast costs for 2022-2026. The re-basing is primarily driven by the following factors: (i) higher than forecast capital expenditures during the 2017-2021 PBR term; (ii) operational efficiencies achieved during 2017-2021 resulting in cost savings which will be passed on to EWSI's customers; (iii) capital additions to rate base planned for 2022-2026; and (iv) continued impacts of long-term declines in consumption per customer.

23. For the 2017-2021 PBR term, actual capital expenditures were $577.1 million over the 5-year period. This amount was $61.9 million higher than the forecast submitted and approved for the 2017-2021 PBR renewal application. $28.8 million of the variance is attributable to the construction of a 12MW solar farm and associated Battery Energy Storage System adjacent to the E. L. Smith water treatment plant, which has been funded through the Green Energy Initiative rate rider during the 2017-2021 PBR term. The remaining $33.1 million variance is primarily due to continuation of higher than forecast capital investment needed to support more City growth than expected, including the acquisition of existing water infrastructure required as a result of city-driven annexation, the accelerated construction schedule for the West Valley Line LRT project and higher than forecast expenditures for water plant and linear water assets due to the increasing age and criticality of various water distribution and transmission network assets.

24. The re-basing also reflects a $9.4 million decrease in operating costs from 2021 Forecast approved for the 2017-2021 PBR term to the 2021 Forecast. This decrease is primarily attributable to: capitalization of valve casings and service box replacements which had traditionally been expensed in operations, but are more appropriately capitalized because they are assets that are being replaced; a decrease in Corporate Shared Services primarily as a result of transferring Drainage Services from the City of Edmonton to EPCOR, which was refunded to customers through the Non-Routine Adjustment mechanism; and reductions in billing and meter reading costs. EWSI's PBR structure provides an incentive to reduce its operating costs in order to increase returns during the PBR term. As will be demonstrated below, these operating costs savings are then passed on to EWSI's customers through reductions to water rates in the next PBR term, in this case, beginning in 2022. Additional details of EWSI's historical operating costs during 2017-2021 are provided in Section 5.

25. For the 2022-2026 PBR term, EWSI has forecast relatively stable operating costs, with the only adjustments beyond inflation being power costs associated with EWSI's proposed green power initiative starting 2023, power distribution and transmission costs and federal carbon tax. EWSI forecasts costs savings driven by labour synergies provided by the Real Estate Consolidation

starting in 2023, and costs savings related to the AMI Deployment Project. In preparing its operating and capital cost forecast for the 2022-2026 PBR term, EWSI has maintained all input price increases based on forecast levels of inflation (based on the proposed inflation factors described in Section 1.6.1). Therefore, EWSI bears the risks associated with input price increases above inflation and will be incented to find ways to achieve cost savings if, for example, power prices increase above inflation over the 2022-2026 PBR term. EWSI's operating cost forecasts are detailed in Section 5.

26. Re-basing is also required so that EWSI's water rates are sufficient to ensure continued development of utility infrastructure. For the upcoming 2022-2026 PBR term, EWSI proposes to spend $429.3 million, a reduction to the approved level of expenditures in 2017-2021 of $515.3 million. This reflects a risk-based prioritization within and across EWSI's various programs to ensure that a high level of reliability and safety of its water operations is maintained, that both water plants and the water distribution and transmission system can reliably meet additional customer demands during the five year term and that EWSI can accommodate City-driven projects including water main relocates for LRT expansions and coordination of water main replacements with the City's road rehabilitation projects. For example, the Risk Based Renewals Program consolidates the Reactive, Proactive and Accelerated Renewal programs from the 2017-2021 PBR term into a single risk-based program that targets the highest risk mains within the distribution system. EWSI is also shifting its focus to efficiency, with the full scale deployment of AMI technology to replace current meter reading equipment, reducing long term water and power costs for customers while providing environmental and safety benefits. Refer to Section 6.2 for more information on the 2022-2026 capital expenditures.

27. EWSI has determined its revenue requirement based on its best estimates of the prudently incurred costs to provide water service plus a fair return on its investment of 9.95% based on a 40% equity ratio (refer to Appendix D Return on Equity Memorandum). In previous applications, EWSI contracted an external industry expert to develop the proposed fair return rate (return on equity) who based their analysis on traditional financial approaches and current financial market conditions. EWSI determined that this approach is not viable for the 2022-2026 application given the market conditions resulting from the global COVID 19 pandemic. In late February/early March 2020, investors and share markets reacted negatively to announcements surrounding the pandemic. Many countries, including Canada, began to "lock down" their economies; and federal governments and central banks used fiscal and monetary policy initiatives to diminish the economic devastation of the lockdowns on citizens and businesses.

The resulting changes on market data used to estimate equity rates of return impacted the viability of the traditional approaches.

28. EWSI instead proposes that an update of Grant Thornton's 2016 analysis (used to set the 2017-2021 PBR term's common equity return) be used to establish the 2022–2026 PBR common equity rate of return. A formulaic extension of the previously approved method is seen as the most straightforward approach and best aligns with the City's desire to determine a risk premium to the AUC's generic cost of capital to derive the allowed rate of return on equity for EWSI. EWSI has also provided commentary in the Return on Equity Memorandum (Appendix D) to document the differences in the risk profile of EWSI's businesses in relation to those regulated by the AUC in order to justify the risk premium over the generic allowed return on equity

29. The proposed rate of return on equity of 9.95% reflects a 0.225% decrease from the 10.175% rate of return on equity approved by City Council for EWSI's 2017-2021 PBR. This rate of return, together with EWSI's proposed capital structure of 40% equity to 60% debt and proposed cost of new debt of 3.50% reflects a reasonable and conservative weighted average cost of capital of 6.08% which is fixed for the 5-year PBR term. The proposed cost of new debt of 3.50% is based on EWSI's stand-alone debt rating of A (low) as provided by Dominion Bond Rating Service in September 2020 (refer to Appendix C). Any changes in the cost of capital over the 5-year PBR term as a result of changes in market conditions and interest rates reflects a risk that is borne by EWSI and such changes are not passed onto EWSI's customers through rate increases during the term.

1.6 Annual Water Rate Setting (2022-2026)

30. In accordance with Schedule 3 of the Bylaw, EWSI will submit annual rate filings. In general terms, the annual PBR rates by customer class will be determined by applying the rate adjustment mechanism to the prior year's rates. The annual rate adjustment mechanisms include both Routine Adjustments and Non-Routine Adjustments. The current bylaw determines that the rates in the first year of a given PBR term are a formulaic extension of the rates of the last year of the prior term. For the 2022-2026 PBR term, EWSI is proposing to set the rates for the first year (2022) based on the actual rates as defined in this application rather than the formulaic adjustment of 2021 rates. All other years of the PBR term would follow the formulaic approach.

31. This proposed change in approach is based on two considerations. First, in order to accommodate the City of Edmonton's election cycle, this application is being submitted approximately 6 months earlier than prior applications. This change has increased the forecast

risk associated with determining the inflation rate that comprises the adjustment mechanism. Second, and perhaps most importantly, the turmoil in financial markets caused by the COVID 19 pandemic has compounded that forecast risk. By setting the first year rates at a defined rate, EWSI continues to bear the same risk within a PBR term as currently assumed, but is not exposed to the risk associated by factors beyond its direct control.

32. Routine Adjustments include: (i) inflation factor; (ii) less an efficiency factor; and (iii) Special Rate Adjustments for re-basing, to increase the monthly service connection fee, the 90 Day Deferral Program, and inclusion of the public fire protection revenue requirement in water rates. The proposed inflation factor, efficiency factor and four Special Rate Adjustments for the 2022-2026 PBR term are discussed in the following sections.

33. Non-routine Adjustments are, by their nature, unusual, significant in size or nature and beyond the scope of control of EWSI. Non-Routine Adjustments are comprised of the following nine categories which are described in detail in Schedule 3 of the Bylaw:

- changes to legislation, regulation or taxes;
- consequences of force majeure;
- river water quality;
- deterioration of waterworks systems;
- customer-initiated or City of Edmonton initiated system expansion;
- City of Edmonton initiated relocations of waterworks assets;
- Franchise fees;
- Environmental initiatives; and
- Grant Funding.

34. For the 2022-2026 PBR term, EWSI is proposing two minor changes to the Non-Routine Adjustment criteria. The first is intended to provide greater clarity to the existing clause regarding deterioration to the waterworks system by including unanticipated asset failures or deterioration requiring immediate repair or restoration in the definition. The second change is the addition of a new clause for negative Non-Routine Adjustments related to the receipt of grants. This clause is intended for instances where grant funding is received for projects that are already included in rates. A negative Non-Routine Adjustment would allow a reduction to rates to eliminate duplicate funding of a single project.

1.6.1 Inflation Factor

35. In the 2017-2021 PBR term EWSI utilized an inflation factor based on a weighting of 65% non-labour component and 35% labour component. In the 2022-2026 PBR term, EWSI is proposing a new inflation factor based on a weighting of 60% non-labour component and 40% labour component to represent Water Services' internal cost structure without the inclusion of Wastewater Treatment Services. This weighting is based on the proportion of Water Services' forecast labour costs relative to all other costs.

36. The non-labour component is measured based on the annual percentage increase in the Alberta Consumer Price Index (Alberta CPI) and the labour component is measured based on the annual percentage in the Average Hourly Earnings, Alberta, Industrial Aggregate (herein referred to as the "AHE index"). The labour escalator reflects a readily available and verifiable index provided by a third party (Statistics Canada).

1.6.2 Efficiency Factor

37. Under a PBR rate setting formula, an efficiency factor is generally applied as a reduction to the inflation factor to reduce rates to customers. It represents the minimum amount by which EWSI must improve operational efficiency to maintain its net income. For 2017-2021 PBR Application, EWSI provided evidence prepared by Kaufmann Consulting, a recognized expert in advising utilities and regulatory agencies on efficiency (productivity) factors. Kaufman recommended a negative 0.5% efficiency factor based on the clear evidence that comparable utility industry productivity levels have been less than 0%. In the 2017-2021 PBR Application, EWSI proposed a 0% efficiency factor for the 5-year term in recognition of the continuing commitment to its customers to maintain operational efficiency even through the fourth renewal of its Water PBR while at the same time improving service levels to meet higher regulatory and safety standards and greater expectations for environmental performance. EWSI ultimately proposed to maintain the previous term's 0.25% efficiency factor in order to maintain alignment with City of Edmonton efficiency objectives.

38. EWSI has not contracted an external expert to develop an efficiency study for the 2022-2026 PBR application as it believes it would yield similar results to the previous Kaufmann Consulting report. The underlying industry parameters have not changed since that time. As an alternative, EWSI is proposing to maintain the 0.25% efficiency factor. This will allow EWSI to remain in alignment with City of Edmonton goals.

1.7 Special Rate Adjustments to Water Rates

39. Due to factors outlined in Section 1.5, EWSI will require four Special Rate Adjustments beyond the PBR inflation rate increases: (i) Special Rate Adjustments for Re-Basing to support re-basing of the revenue requirement; (ii) Special Rate Adjustment to Increase Monthly Service Connection Fee; (iii) Special Rate Adjustment for 90 Day Deferral Program, and (iv) Special Rate Adjustment for Fire Protection. These Special Rate Adjustments by rate class are provided in Section 2.3 of Schedule 3 to the Bylaw.

1.7.1 Special Rate Adjustments for Re-Basing

40. EWSI is applying for Special Rate Adjustments for Re-Basing to be applied to water rates as an annual adjustment for purposes of re-basing the revenue requirement. These Special Rate Adjustments are required as the Total In-City Revenue Requirement (as reflected in line 7 of Table 1.7.1-1) exceeds the forecast revenue that would be realized by simply applying the PBR annual inflation adjustment to the prior year's water rates for each year of the 2022-2026 period (as reflected in line 3 of Table 1.7.1-1). The result is a revenue shortfall for the 2022-2026 PBR term and is referred to as Total In-City Revenue Shortfall in line 8 of Table 1.7.1-1, this shortfall is collected through the Special Rate Adjustments for Re-basing. The Special Rate Adjustments for Re-Basing will be applied to the fixed and consumption charges.

Table 1.7.1-1
In-City Revenue Requirement Shortfall
2022-2026
($ millions)

		A **2022 F-2026 F**
1	In-City Revenue Collected at Prior Year's Rates	1,000.1
2	PBR Inflation Impact on In-City Revenue	62.6
3	In-City Revenue Collected at PBR Rates	1,062.8
4	Total In-City Revenue Requirement	1,115.6
5	Public Fire Protection Revenue Requirement	96.3
6	Less: Fire Protection Special Rate Adjustment	(67.3)
7	In-City Revenue Requirement, net of SRA	1,144.7
8	**In-City Revenue Requirement Shortfall to be recovered through Re-basing**	**(81.9)**

41. The Special Rate Adjustments for Re-basing are required in order to eliminate the forecast revenue requirement shortfall over the five year period of $81.9 million for the 2022-2026 PBR term. This shortfall can be broken into five components shown in Table 1.7.1-2: (i) operating cost savings achieved during the 2017-2021 PBR term (row 1); (ii) a revenue shortfall due to adjustments to the starting rate base in 2022 to account for higher than forecast capital

expenditures during the 2017-2021 PBR term (row 2); (iii) a shortfall due to capital additions planned for the 2022-2026 PBR term (row 3), (iv) customer growth over the 2022-2026 PBR term (row 4), and (v) continued impacts of long-term declines in consumption per customer (row 5).

Table 1.7.1-2
Components of the Special Rate Adjustments for Re-Basing
2022-2026
($ millions)

		A **2022 F-2026 F**
1	Operating cost savings achieved during the 2017-2021 PBR Term	37.6
2	Adjustments to starting rate base in 2022 due to actual capital spending during 2017-2021	(15.9)
3	Growth in In-City revenue requirements between 2022 and 2026	(64.4)
4	Customer Growth over the 2022-2026 PBR Term	19.0
5	Declining Consumption over the 2022-2026 PBR Terms	(58.2)
6	**In-City Revenue Requirement Shortfall to be recovered through Re-basing**	**(81.9)**

1.7.2 Special Rate Adjustments to Increase Monthly Service Connection Fee

42. EWSI is applying for Special Rate Adjustments to increase the monthly service connection fee, with a corresponding decrease to variable rates. As capital-intensive businesses with a high level of fixed costs, most utilities cannot adequately adjust their costs to meet revenue variations, at least in the short term. To compensate for this many utilities have adjusted their rate structure to generate higher portions of revenue from the fixed service charge. Some Alberta electric utilities currently collect between 65% and 85% of their revenue through fixed service charges.

43. EWSI completed a comparison of residential water bills for ten communities in western Canada, see Section 12. Of the communities included in the comparison, fixed service charges make up between 0% and 45% of an average residential bill, with most communities in the 30% to 40% range. Based EWSI's 2020 water rates, fixed service charges make up 19% of an average residential bill. The proposed increase to the monthly service connection fee will increase the fixed portion to 31% of the average residential bill, which is comparable to other communities in western Canada.

44. The proposed rebasing adjustment includes a $58.2 million adjustment related to the decline in consumption over the 2022-2026 PBR term, the proposed increase to the monthly service connection fee will help to decrease the long term consumption impacts in future PBR applications.

1.7.3 Special Rate Adjustments for 90 Day Deferral Program

45. On March 18, 2020, Alberta announced "Albertans who are experiencing financial hardship directly related to the COVID-19 pandemic can work with their utility company to defer electricity and natural gas bills until June 19, 2020 without any late fees or added interest payments." The Government of Alberta requested that Alberta municipalities develop similar utility payment deferral programs for municipal utility bills. On March 20, 2020, Edmonton City Council approved a 90-day deferral program for deferral of waste utility bills for customers in need.

46. On March 24, 2020, Mayor Don Iveson, in accordance with a City Council Motion, sent a letter to EPCOR requesting that EPCOR implement a program to allow customers to defer water, wastewater treatment and drainage utility bill payments, without interest or penalty, for a 90-day period from March 18, 2020 to June 18, 2020.

47. On May 12, 2020, Alberta's Utility Payment Deferral Program Act (the Act), received royal assent in the Legislative Assembly of Alberta. The Act sets out the Electricity Utility Payment Deferral Program (Part 1); the Gas Utility Payment Deferral Program (Part 2) and the powers granted to the AUC to implement these programs (Part 3).

48. The Act allows regulated rate service providers to establish a deferral account to track and recover the costs for administering the deferral of customer payments, interest expenses and any incremental bad debts costs. The Act allows carrying charges to be applied to the deferral account balances to be calculated at the regulated rate service provider's weighted average cost of capital.

49. EWSI is applying for a Special Rate Adjustment in 2022 to recover $1.3 million for the incremental bad debt expense, administration, and carrying costs associated with the 90-Day Deferral Program.

Table 1.7.3-1
90 Day Deferral Program
Forecast Revenue Requirement
2020
($ millions)

Item	A Expense
1 Incremental Bad Debt Expense	0.9
2 Late Payment Charges	0.2
3 Carrying Costs	0.2
4 **Total Revenue Requirement**	**1.3**

1.7.4 Special Rate Adjustments for Fire Protection

50. Edmonton City Council directed EWSI to include recovery of the public fire protection revenue requirement through water rates over the 2022-2026 PBR term. EWSI has proposed a Special Rate Adjustment effective April 1, 2022 to begin collection of the public fire protection revenue requirement though water rates. The $67.3 million fire protection Special Rate Adjustment has been calculated using the 2021 Fire Hydrant Agreement amount plus franchises fees. The inclusion of public fire protection in water rates will result in EWSI paying additional franchise fees to the City.

1.8 Customer Bill Impact

51. The proposed annual water rate increases for 2022-2026 will include the special rate adjustments and inflation less the efficiency factor. As shown in Table 1.8-1, the impact of these rate increases on the average residential customer's monthly bill is an increase of $2.09 per month in 2022 with increases beyond 2022 ranging from $1.22 to $1.67 per month. The average customer bill is determined based on EWSI's forecast average monthly residential consumption which is assumed to continue to exhibit a declining trend. Prior to adding public fire protection to water rates, residential water bills are forecast to increase at an average rate of 2.5% per year over the 2022-2026 PBR term based on the proposed rate increases and a declining consumption trend. The average residential bill impact increases to 3.7% per year over the 2022-2026 PBR term with the addition of public fire protection to water rates.

52. Table 1.8-1 also provides the impact on the bill broken into five components: (i) annual rate adjustments for PBR inflation less efficiency factor (i-x); (ii) Special Rate Adjustments for Re-Basing; (iii) Special Rate Adjustment to Increase Monthly Service Connection Fee; (iii) Special Rate Adjustment for 90 Day Deferral Program; and (iv) Special Rate Adjustment for Fire Protection.

Table 1.8-1
Residential Customer Bill Impact
2022-2026
($/month)

		A	B	C	D	E	F
		2022 F	**2023 F**	**2024 F**	**2025 F**	**2026 F**	**Total/ Average**
1	Monthly Consumption per Customer - m^3	13.4	13.2	12.9	12.7	12.5	
2	Prior Year's Bill	41.28	40.78	41.95	43.44	44.98	
3	Impact of Declining Consumption	(3.55)	(0.52)	(0.55)	(0.57)	(0.58)	
4	Monthly bill at prior year's rate	37.73	40.26	41.40	42.87	44.41	
5	PBR Inflation – Eff. Factor (i-x)	0.78	0.83	0.85	0.88	0.91	
6	SRA – Re-basing	1.08	1.16	1.19	1.23	1.28	
7	SRA – Fixed Charge Increase	0.90	-	-	-	-	
8	SRA – 90 Day Deferral	0.30	(0.30)	-	-	-	
9	**Monthly Bill before Fire Protection- $**	**40.78**	**41.95**	**43.44**	**44.98**	**46.60**	
10	Change in Bill - $	(0.50)	1.17	1.50	1.54	1.61	5.32
11	Change in Bill - %[3]	-1.2%	2.9%	3.6%	3.5%	3.6%	2.5%
12	SRA – Fire Protection[4]	2.59	2.64	2.70	2.75	2.81	
13	**Monthly Bill including Fire Protection - $**	**43.37**	**44.59**	**46.14**	**47.73**	**49.41**	
14	Change in Bill - $	2.09	1.22	1.55	1.60	1.67	8.13
15	Change in Bill - %[3]	5.1%	2.8%	3.5%	3.5%	3.5%	3.7%

53. Tables 1.8-2 and 1.8-3 provide the bill impacts for an average multi-residential and commercial customer. Multi-residential water bills are forecast to increase at an average rate of 2.4% per year over the 2022-2026 PBR term, with consumption declining through the period.

[3] The Change in Bill - % Total (column F, row 11 and row 15) is the average of the individual years (columns A- E, row 11 and row 15).
[4] The Fire Protection SRA would be added to rates effective April 1, 2022 and then inflated annually using the i-x formula over the PBR term.

Table 1.8-2
Multi-Residential Customer Bill Impact
2022-2026
($/month)

		A	B	C	D	E	F
		2022 F	**2023 F**	**2024 F**	**2025 F**	**2026 F**	**Total/ Average**
1	Monthly Consumption per Customer - m^3	388.4	386.6	384.7	382.9	381.0	
2	Prior Year's Bill	776.15	721.62	752.68	786.51	821.87	
3	Impact of Declining Consumption	(37.28)	(3.01)	(3.15)	(3.29)	(3.44)	
4	Monthly bill at prior year's rate	738.87	718.60	749.53	783.22	818.43	
5	PBR Inflation – Eff. Factor (i-x)	15.22	14.80	15.44	16.13	16.86	
6	SRA – Re-basing	21.24	20.65	21.54	22.51	23.52	
7	SRA – Fixed Charge Increase	(55.09)	-	-	-	-	
8	SRA – 90 Day Deferral	1.38	(1.39)	-	-	-	
9	**Monthly Bill before Fire Protection- $**	**721.62**	**752.68**	**786.51**	**821.87**	**858.81**	
10	Change in Bill - $	(54.53)	31.06	33.83	35.36	36.94	82.66
11	Change in Bill - %[3]	-7.0%	4.3%	4.5%	4.5%	4.5%	2.2%
12	SRA – Fire Protection[4]	11.80	12.04	12.29	12.54	12.80	
13	**Monthly Bill including Fire Protection - $**	**733.41**	**764.71**	**798.80**	**834.41**	**871.61**	
14	Change in Bill - $	(42.74)	31.30	34.08	35.61	37.20	95.46
15	Change in Bill - %[3]	-5.5%	4.3%	4.5%	4.5%	4.5%	2.4%

54. Commercial customer water bills are forecast to increase at an average rate of 7.1% per year over the 2022-2026 PBR term. The higher increase is attributable to a forecast rebound in consumption per customer in 2022 and 2023 as discussed in Section 4.8.

Table 1.8-3
Commercial Customer Bill Impact
2022-2026
($/month)

		A	B	C	D	E	F
		2022 F	**2023 F**	**2024 F**	**2025 F**	**2026 F**	**Total/ Average**
1	Monthly Consumption per Customer - m^3	90.1	94.0	96.5	93.6	90.7	
2	Prior Year's Bill	167.82	179.55	194.25	208.18	213.11	
3	Impact of Declining Consumption	7.72	6.32	4.14	(5.08)	(5.34)	
4	Monthly bill at prior year's rate	175.54	185.87	198.39	203.09	207.77	
5	PBR Inflation – Eff. Factor (i-x)	3.62	3.83	4.09	4.18	4.28	
6	SRA – Re-basing	5.05	5.34	5.70	5.84	5.97	
7	SRA – Fixed Charge Increase	(5.44)	-	-	-	-	
8	SRA – 90 Day Deferral	0.79	(0.80)	-	-	-	
10	**Monthly Bill before Fire Protection- $**	**179.55**	**194.25**	**208.18**	**213.11**	**218.02**	
11	Change in Bill - $	11.73	14.69	13.93	4.94	4.91	50.20
12	Change in Bill - %[3]	7.0%	8.2%	7.2%	2.4%	2.3%	5.4%
13	SRA – Fire Protection[4]	15.71	16.03	16.36	16.70	17.04	
14	**Monthly Bill including Fire Protection - $**	**195.26**	**210.27**	**224.54**	**229.81**	**235.06**	
15	Change in Bill - $	27.44	15.02	14.26	5.27	5.25	67.24
16	Change in Bill - %[3]	16.3%	7.7%	6.8%	2.3%	2.3%	7.1%

55. Generally, EWSI's increases to water rates reflect continued upward pressure on costs including labour and materials. Further, because EWSI's rates are primarily consumption (volume) based to encourage conservation while its costs are primarily fixed, the continued declining trend in Edmonton's water consumption per customer puts an upward pressure on water rates to ensure EWSI can recover its costs to provide safe and reliable service. In light of these pressures on EWSI's water rates, EWSI is confident that the Edmonton City Council will find its proposed water rate increases for the 2022-2026 PBR term to be just and reasonable and will enable EWSI to continue provide Edmonton customers with safe and reliable water services while improving EWSI's environmental performance.

1.9 Stakeholder Engagement

56. EWSI completed a stakeholder engagement process as part of the PBR development to ensure that programs and initiatives remained aligned with stakeholder expectations. The approach taken was consistent with the City's public engagement policy and was reviewed with the Utility Committee. The public engagement process was designed to identify stakeholders' perspectives and preferences related to: Values, Performance Priorities and Rate and Investment level sensitivity.

57. The stakeholder engagement results (see Appendix K) support continuation of the current practices and approaches that place a great deal of emphasis on water quality, safety, customer service and responsiveness as well as the protection of the environment. Further, EWSI believes its planned capital programs are aligned with stakeholder priorities and the proposed rate increases are below the level stakeholders view as acceptable.

Water Values

58. Customers indicated that the most important performance areas for water are maintaining water safety, quality and speed of repair of water main breaks. This is consistent between both residential and commercial customers. Secondary priorities diverge slightly, with residents being more concerned with maintaining public and employee safety, while commercial customers are more concerned with a continued focus on infrastructure integrity and customer support. Overall, across Water, Wastewater and Drainage, customers confirmed that EWSI has identified the main issues of importance in their performance measures.

Performance Priorities

59. Customers are satisfied overall with EWSI services. EWSI is described as reliable & consistent, safe & responsible, trustworthy, and is a company they like – although commercial customers are slightly more critical, with more moderate opinions than their residential counterparts. EWSI is given the most credit for reliability, and criticism for cost among both residential and commercial customers.

60. EWSI is generally seen as a trusted operator that is doing a good job, so many areas such as safety were not given high priority as they feel EWSI would never ignore this. Safe/quality water is so valued by Edmontonians it is seen as worth protecting above all else.

Rate and Investment Levels

61. The infrastructure risks EWSI is managing are viewed to be increasing. Although the nature and source of risk varied by group, the consensus among stakeholders is that the cost associated with failure will in fact be greater with a negative social consequence than spending now to avoid it.

62. To avoid risk, stakeholders support EWSI investing in these services for longer-term benefits and efficiencies. At a minimum, they want to maintain status quo; however, many

stakeholder groups lean toward smart investment with protecting water, protecting the river, and elevating drainage renewal as top priorities for investment.

63. Based on price modelling, the acceptable average monthly price increase for utility services is between approximately $7 and $11, with $8 being optimal.

1.10 Organization of EWSI's Water Rate Application

64. Part A of this Water Rate Application describes the methodology and assumptions used to determine the forecast revenue requirement and explains the forecast revenue requirement by each component (operating costs, capital costs, depreciation expenses, rate base and return on rate base, revenue offsets). In Part B of this Water Rate Application, EWSI describes the methods by which each of the revenue requirement components are allocated between the three regulated customer segments in order to determine the cost of service for each customer segment. Part B also includes an explanation of how the cost of service for EWSI's In-City customers is then used to set EWSI's water rates for the 2022-2026 PBR term. Part C of this Water Rate Application summarizes EWSI's performance measures for 2022-2026 and proposed changes to the terms and conditions and service fees in the Bylaw.

65. Organization of this Water Rate Application is summarized in Table 1.9-1.

Table 1.9-1
Organization of Water Rate Application

	A	
	Section	**Topic**
1	1.0	Application Overview
2	2.0	PBR Background - System Overview and Future Expectations
3	**Part A**	**Revenue Requirement**
4	3.0	Revenue Requirement Summary
5	4.0	Methodology and Key Assumptions
6	5.0	Operating Costs
7	6.0	Capital Expenditures
8	7.0	Depreciation and Amortization
9	8.0	Rate Base
10	9.0	Return on Rate Base
11	10.0	Revenue Offsets
12	**Part B**	**Cost of Service and PBR Rates**
13	11.0	Cost of Service
14	12.0	PBR Rates
15	**Part C**	**Performance Measures and Terms and Conditions of Service**
16	13.0	Performance Measures
17	14.0	Terms and Conditions of Service and Service Fees

2.0 SYSTEM OVERVIEW AND FUTURE EXPECTATIONS

2.1 Water System Overview

66. The following sections provide an overview of the current state of the water system, historical performance and future expectations. Section 2.1 will examine the state of the water system, from its source at the North Saskatchewan River (NSR), the water treatment process at the Rossdale and E. L. Smith water treatment plants, and finally the transmission and distribution system, which transports the potable water to EWSI's customers, both inside and outside the city of Edmonton. Section 2.2 will summarize EWSI's performance over the 2017-2021 PBR term including operational and financial performance. Section 2.3 includes a discussion of some key challenges and potential opportunities that are relevant for EWSI in the upcoming 2022-2026 PBR term and beyond.

2.1.1 Source Water Supply

67. To provide water services to its customers in the city of Edmonton and to its regional customers, EWSI relies on water supply from the NSR Watershed, which covers 28,000 square kilometers of mountains, foothills, forest, muskeg and farm land upstream of Edmonton. It includes the NSR, which flows from the foot of the Columbia Icefields in the Rocky Mountains and is fed by smaller rivers and creeks.

68. EWSI applies a multi-barrier approach to ensure water quality is protected and recognizes watershed protection as a critical first step to protect the quality and quantity of water sources. Awareness of upstream activities also enables EWSI to respond quickly to developing water quality issues within the watershed. Watershed management is complex as there are multiple stakeholders that affect land use and water quality in the upper reaches of the basin, and there are multiple landscape planning initiatives occurring at different levels of government and scales (i.e. large watershed versus municipal boundary). Landscape initiatives determine what kinds of activities can take place on the landscape. These include urban and non-urban municipalities land use plans, lake management plans, forestry plans, agricultural plans, industrial plans and plans developed by independent Non-Governmental Organizations. The Province is also developing the North Saskatchewan Regional Plan and the Land Use Framework that will tie all the planning initiatives together.

69. To protect this water supply, EWSI has developed a Watershed Protection program which has two primary goals: (i) to provide a safe, secure drinking water supply through source water protection principles; and (ii) to ensure EWSI's operations have minimal effects on water quality

and aquatic ecosystem health in receiving water bodies. EWSI partners with like-minded advisory councils and groups to protect water quality and quantity and educate others to do the same. These partners include the North Saskatchewan Watershed Alliance. EWSI supports scientific research and monitoring to protect the communities we serve and has developed a Source Water Protection Plan, which includes: (i) information on the NSR and its watershed; (ii) identified risks to the watershed; and (iii) recommendations on how to mitigate these risks.

70. Water quality in the NSR is generally good with higher concentrations of naturally occurring constituents (i.e., turbidity, colour) and contaminants (i.e., pathogens) occurring during periods of high flow and runoff. Despite inputs of contaminants from watershed and storm runoff, there are no significant declining water quality trends for most parameters of concern in the NSR upstream of EWSI's water treatment plants.

71. Prior to the transition of Drainage Services to EPCOR in 2017, watershed management was done separately within Water Services and Drainage Services. The objective of the IWMS is to manage total loadings to the NSR from all EPCOR discharges in Edmonton, and to ensure drinking water security and source water protection for the Edmonton water supply as well as the health of urban creeks and tributaries in Edmonton in one unified watershed management program. This ensures alignment with broader watershed policy objectives of the Canadian Council of Ministers of the Environment Watershed Management definitions, the Alberta Environment and Parks ("AEP") Water for Life program and the AEP Water Management Framework for the Capital Region and Industrial Heartland.

72. In partnership with Alberta Environment and Parks, the City of Edmonton and the North Saskatchewan Watershed Alliance, the Water: Saskatchewan Headwaters, Edmonton and Downstream ("WaterSHED") Monitoring Program was launched. In 2019, installation and upgrades were completed on a network of 19 monitoring stations along the North Saskatchewan River, from its headwaters in the Columbia Icefields to the Saskatchewan border. As Alberta's most extensive water quality monitoring and sampling program, it will improve understanding of how the river functions, how it is being impacted by land-use decisions and actions, and how it may change in the future;

73. Operational and scientific support is provided by AEP. This program is led by a steering committee, consisting of members of EWSI, EPCOR Drainage, AEP, the North Saskatchewan Watershed Alliance, and the City of Edmonton.

74. The program includes the pursuit of extensive monitoring and sampling of the NSR and its major tributaries and urban creeks in Edmonton as well as enhanced watershed geospatial analysis and modeling to determine impacts of land use and watershed management on water quality and quantity in the river.

75. In addition to these initiatives to protect the NSR water quality, in December 2016 EWSI received approval from AEP to amend EWSI's water withdrawal licenses transferring ownership from the City of Edmonton to EWSI and retaining historic seniority for withdrawal from the NSR. The two water licenses provide ample room for growth of the City and the region for the foreseeable future.

2.1.2 Water Treatment Plant Operations

76. EWSI operates two water treatment facilities that supply the Edmonton distribution system and regions surrounding Edmonton. The Rossdale water treatment plant consists of Plant 1, constructed in 1947, and Plant 2, constructed in 1955. The E. L. Smith water treatment plant was constructed in 1976 with major upgrades completed in 1984 and 2008. Both plants have had numerous modifications since construction to ensure that water demands are met, and that the quality and quantity of water produced meet and exceeds EWSI's approval to operate requirements. EWSI's approval to operate is issued by AEP under the Environmental Protection and Enhancement Act.

77. E. L. Smith has undergone two major upgrades since 1976. The plant initially consisted of only six filters; in 1982-1984 six additional filters (stage 2) were built along with additional reservoirs and chemical storage facilities. In 2002, UV disinfection was added. Between 2004 and 2008, major upgrades occurred on construction of a new intake, raw water pumping, and chemical systems and another six filters were added to meet increasing demand. EWSI won an Alberta Emerald Award for environmental leadership for this upgrade by increasing plant capacity by 150% but only expanding the facility's footprint by 20%. The plant's increased capacity currently supplies about 62% of the total treated water supply for EWSI's three regulated customer segments – In-City customers, Regional customers and Fire Protection.

78. In 2015, the new sodium hypochlorite facility was commissioned at Rossdale (a similar facility was added at E. L. Smith in 2008). This disinfection facility replaced the old chlorine gas system that had been used for many years. Chlorine gas is extremely hazardous. With the new hypochlorite system, that potential risk is essentially eliminated.

79. The water quality in the NSR varies considerably throughout the year (turbidity, colour, pH, temperature, pathogens, etc.). Raw water quality will determine the nature and extent of water treatment required to bring the raw water to an acceptable level for human consumption. The poorer the raw water quality, the more treatment processes required and the amount of treatment chemicals added increases. There is a direct cost impact for each additional treatment process required for chemical addition. There are four fundamental water treatment processes.

- **Clarification** – This involves the removal of particles from the raw water through the use of a coagulant (alum) and a coagulation polymer that promote contact and agglomeration of fine particles present in the water into larger particles that settle more easily. These larger particles, consisting of alum, polymer and particles that were present in the raw water, are removed from the water in large basins called clarifiers. This material is called solids residuals and is discharged to the river.
- **Disinfection** – EWSI uses three types of disinfection: primary chlorine, ultraviolet light and secondary chloramination. The first disinfection process involves the addition of chlorine to kill bacteria and viruses before and after filtration. After filtration, ultra-violet disinfection is used to inactivate any remaining pathogenic (disease-causing) organisms in the water. Caustic soda is used to maintain proper pH balance. Finally, ammonia is added to form chloramines – a longer lasting, more stable disinfectant.
- **Filtration** – This process removes small particles that remain in the water after settling in clarification before the water flows through the reservoirs and water distribution system piping. The filters must be backwashed frequently to remove the particles that accumulate. This material, also a combination of alum, polymer and particles present in the raw water, is another solids residuals stream that is discharged to the river.
- **Aesthetic** – During certain times of year (i.e. spring run-off) powdered activated carbon is added during the clarification step to help remove taste and odour from the water. The powdered activated carbon ends up combined with the alum, polymer and river water particles in the solids residuals stream.

80. Depending on the raw water quality conditions, EWSI is able to switch its water treatment plants between two different operations modes to reduce chemical usage: (i) conventional treatment which includes all four processes; and (ii) direct filtration which excludes the

clarification and aesthetic processes[5]. During periods of good water quality in the fall and winter when turbidity, colour and taste and odour in the raw water are low, the plants convert to direct filtration operation. The major difference in direct filtration relative to conventional filtration is the absence of the settling step between the coagulant addition and filtration. Direct filtration also requires substantially lower alum[6] doses and the coagulation polymer is eliminated. This results in the environmental benefit of a significant reduction in the amount of solids discharged to the river because, under conventional treatment, alum and polymer are discharged to the river as part of the residuals stream.

81. Conventional treatment is employed at the water treatment plants during the spring/summer months of March to August when the NSR water quality is variable. Beginning in the late summer and early fall, river water quality begins to improve as compared to the spring and summer months. This regular occurrence provides EWSI with an opportunity to bypass the conventional clarification step which significantly reduces the amount of alum and polymer added to the raw water. With direct filtration operation, the amount of chemical and solids residuals discharged to the river during the late summer-fall-winter period can be reduced by up to 80% compared to conventional operation. The environmental impact of these chemical and solids discharge to the river is greatest during these times of year because the amount of water and naturally occurring solids material in the river is relatively lower compared to other times of year. However, running the plant in direct filtration mode also reduces plant capacity, a drawback of the direct filtration process. This is because direct filtration puts more strain on the filtration process, significantly increasing the number of filter cleaning cycles required. If river conditions allow, direct filtration operation is started as early as September or October.

82. The discharge of solids residuals to the river is an environmental issue. Several years ago, EWSI evaluated the cost of building facilities to divert the residuals streams from the river for processing and diversion to landfill. The cost of these facilities, required at both treatment plants, was prohibitive (> $500 million in capital cost) and the environmental benefits were not clear. EWSI has been working with AEP to explore alternatives. In June 2011, EWSI was granted Champion status under the AEP EnviroVista program and entered into a 10-year Stewardship agreement with AEP. As part of the Stewardship agreement, EWSI committed to operating both water treatment plants in direct filtration during the winter season (November to February) when

[5] Other than switching between conventional and direct filtration treatment, EWSI uses the same general treatment processes year round. Variability in raw water quality is mostly dealt with through chemical addition.

6 Alum is a chemical takes all the tiny particles in the water and coagulates them into large particles which can be separated from the water through settling and filtration.

water conditions are good enough in order to reduce the discharge of solids residuals to the river during this critical season. EWSI also committed to exploring other options for reducing the discharge of residuals. The main option that EWSI has pursued is extending direct filtration operation to the fall (September and October) and later winter (March) months.

83. EWSI has been successfully operating both plants in direct filtration mode during the winter season (September and October) since 2009 and has substantially reduced both chemical inputs and the mass of solids residuals discharged to the river during this time period. Direct filtration successfully reduces coagulant usage by approximately 75% as compared to conventional mode. This results in a 50% reduction in the total mass of solids residuals discharged to the NSR during the direct filtration operation period. Operation of direct filtration during the fall season (September and October) has met with mixed success due to water quality challenges and capacity limitations. As part of EWSI's commitment to continuous improvement, EWSI's long term plan is to convert 12 of the 18 filters at the E. L. Smith plant to deep bed filters. Eventual conversion of these filters to deep beds will provide additional filtration capacity and will allow the plant to operate in direct filtration mode at higher colour levels with the objective of extending the time the plants can operate in this mode. In recent years the plant was not able to convert to direct filtration mode until October or November due to the water quality conditions.

84. In 2018, conceptual design began for the E. L. Smith Stage 2 and 3 Filter Conversion. The intent of this project was to upgrade Stage 2 and 3 filters (12 of the 18 filters) to deep bed filtration by increasing the filter media depth. In anticipation of the filter conversions, structural inspections were conducted on the stage 1 filters for the first time in 15 years. The inspections identified poor concrete condition and damaged asbestos-containing formwork within the confined space area of the filters. Structural upgrades to stage 1 and stage 2 filters must be completed to support existing plant operation and prior to upgrading filters to deep bed filtration (see the E. L. Smith Filter Upgrade Project described in Appendix F-07). As a result, completion of deep bed filter conversion will be delayed until the 2032-2036 PBR period.

85. In addition to this proposed project at the water treatment plants, EWSI has plans to complete a number of other capital upgrades at the water treatment plants during 2022-2026 based on condition assessments which have identified certain assets for replacement or rehabilitation to ensure reliability is maintained. These upgrades are primarily required for reliability and life-cycle replacements and include flood protection and electrical and mechanical upgrades.

2.1.3 Water Distribution and Transmission System

86. The Edmonton water distribution and transmission network serves two primary purposes: (i) to provide a clean and safe source of potable water to customers; and (ii) to provide an adequate and reliable source of water for use in fire protection services to customers within the City of Edmonton. The distribution and transmission network is comprised of over 4,200 km of water mains, 13 reservoirs, 7 booster (pumping) stations and thousands of valves and hydrants placed throughout the network. This integrated network provides both retail services to City of Edmonton customers (residential, multi-residential and commercial) and wholesale services to regional water customers surrounding Edmonton through a number of supply points primarily located at city of Edmonton boundaries.

87. Once the treated water leaves the water plant reservoirs through the transmission system, it is stored throughout Edmonton in a number of field reservoirs. Water is then pumped from these field reservoirs to customers through the transmission and distribution system. If necessary, booster stations are used to increase the pressure of the water in the transmission system to service those customers at higher elevations. Water leaves the storage reservoirs and is piped into neighbourhoods via transmission and distribution mains and then to individual customers via service lines. The water system in Edmonton has been fully metered since 1914, with customers' water measured by water meters located at individual premises. To ensure that a continuous supply of water is delivered to the various supply points, all of the water mains, booster pumps and reservoirs are operated in an integrated manner.

88. The sections below describe Edmonton's water transmission system, distribution system, reservoirs and meters and explains how EWSI maintains, upgrades, and extends this network.

Water Transmission System

89. The water transmission system in Edmonton consists of more than 560 km of water mains which range in size from 350 mm to 1350 mm in diameter. This network plays a critical role in transporting water to the secondary, tertiary and quaternary pressure zones within the city of Edmonton, supplying regional customers, providing neighbourhoods with high density fire flows, and providing adequate pressures during peak demand periods.

90. EWSI uses a Transmission Main Risk Based Asset Management Plan to identify and prioritize rehabilitation and replacement projects based on a risk assessment. The risk assessment considers all transmission mains in the system and assesses each for the likelihood

and consequence of a failure event. The risk ranking allows for the prioritization of capital and operational expenditure by focusing spending on the highest risk mains. Capital programs to mitigate the risk of transmission main failure include programs to inspect, rehabilitate and replace transmission mains.

91. EWSI has several recurring programs in place to fund capital improvements to the transmission water network. These programs can be driven by external factors including City of Edmonton initiated transmission relocates, private development (customer growth projects) or by internal criteria based on a risk assessment. These various programs are described below.

City-Driven Transmission Relocates

92. Relocation of transmission water infrastructure may be required to accommodate large scale City of Edmonton projects such as bridge rehabilitation and LRT track extensions. Under EWSI's Franchise Agreement, the City can request EWSI to relocate any water infrastructure if it is in conflict with a City-driven project. These relocations are completed at EWSI's cost. To accommodate the LRT construction, EWSI is required to relocate water infrastructure including transmission mains7.

93. EWSI has completed 100% of relocates for the South Valley Line and 65% of relocates for the West Valley Line. To ensure EWSI can meet its Franchise commitments, EWSI's LRT Relocates program is proposed to be continued for the 2022-2026 PBR term to continue to complete the remaining 35% of relocates for the West Valley Line.

Growth Related Transmission Main Programs

94. A number of transmission main extensions will be required to support private development over the PBR period. EWSI analyzes transmission main extensions on a case-by-case basis using hydraulic modelling. The analysis of regional customer demands, and future demand estimates, may trigger need for transmission looping to increase capacity for growth. Based on this analysis, EWSI identifies capital projects which are necessary to improve service in the various pressure zones. Transmission projects related to customer growth are identified by pressure zone and include projects required to service new customers and improve operational efficiency for each pressure zone.

[7] EWSI also has a separate program for city-driven distribution system and hydrant relocates.

95. EWSI and private developers share in the costs of extending EWSI's distribution and transmission network to new subdivisions. EWSI reimburses private developers for the costs of extending the transmission network to new subdivisions. For the 2022-2026 PBR term, EWSI has identified transmission main programs to support customer growth including the Network Private Development Transmission Mains Program.

96. A new transmission main in southeast Edmonton from the Blackmud Booster Station to Ellerslie Industrial (QEII Highway 41 Ave SW Crossing Project) is proposed for the 2022-2026 PBR. This main will provide redundancy, reduce risk of transmission failure, improve fire flows and peak hour pressures, and provide a foundation for growth of the annexation area east of Queen Elizabeth II Highway and south of 41 Avenue Southwest.

Transmission Main Asset Management Plan

97. EWSI has an aging transmission system some of which was first installed in the 1930's. Prior to the 2017-2021 PBR term, EWSI had observed an increasing number of transmission main breaks and, as a result, developed the Transmission Main Risk Based Asset Management Plan to identify critical transmission upgrades to address this issue.

98. As compared with a distribution water main break, a transmission main break carries a much higher potential risk due to:

- higher potential for flood damage and environmental impact due to release of large volume of chlorinated water;
- longer repair times based on failure mode and familiarity with the pipe material;
- location of the transmission mains by water bodies, railways and arterial roads; and
- potential impact to customers and hydraulic impact to the water network.

99. In 2019 and 2020, EWSI conducted a pilot study to inspect 40 km of transmission main at an estimated total cost of $5.0 million. Three leaks were detected and repaired. As a result, the system now has an additional 40 km of low risk transmission main, at less than 5% of the cost of replacement. The overwhelming success of the pilot study led to the decision to introduce a new Critical Pipeline Inspection Program.

100. For the 2022-2026 PBR term, EWSI has combined the replacement and rehabilitation of transmission mains and the refurbishment of valve chambers into a single program, the Transmission Mains and Appurtenances Program. The scope of work will be solely determined

through the new Critical Pipeline Inspection Program, ensuring that transmission main facilities with the highest risk factor will be prioritized for replacement or refurbishment.

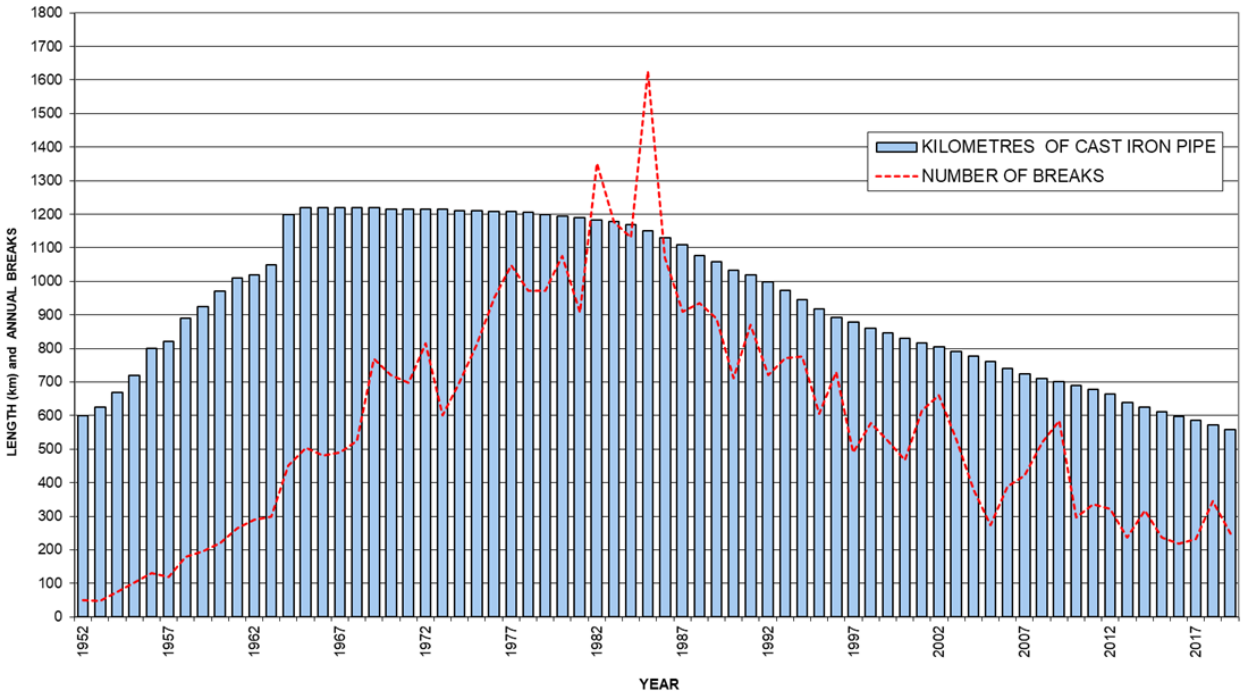
Water Distribution System

101. Edmonton's water distribution system is comprised of 3,600 km of water mains less than 350 mm, 21,726 hydrants, 74,000 valves and 296,000 metered service connections as of the end of 2020.

102. Over recent years, the distribution system has experienced a significant reduction in the number of main breaks. This decrease in breaks on the distribution system is likely attributable to both the increase in infrastructure replacement that EWSI has undertaken over the past few years as well as changing weather patterns. Increased levels of main breaks continue to be experienced when extreme winter events occur.

103. Approximately 90% of all water main breaks occur on the cast iron portion of the distribution system. This trend has been relatively constant over the past decade. Since 1986, EWSI has replaced or rehabilitated approximately 50% (570 kilometers) of the cast iron water main within Edmonton. EWSI took a proactive approach to address an aging water system infrastructure in the 2017-2021 PBR term, targeting especially cast iron pipes, through the Accelerated Water Main Renewal Program, Proactive Water Main Renewal Program and the Cathodic Protection Program. With the combination of the three programs, the number of water main breaks and the length of cast iron water mains continued to decline as shown in Figure 2.1.3-1.

Figure 2.1.3-1
Remaining Length and Breaks of Cast Iron Water Mains
1952–2019



104. In 2019, a desktop condition assessment of the entire pipe network was completed using deterioration models based on historical break data. Likelihood of failure and consequence of failure scores were calculated for each distribution main. The consequence of failure score was developed for each pipe segment by comparing the impact of a pipe failure on six risk categories (Health and Safety, Environment, Reputation, Regulatory, Financial, and Operational). Next, an overall risk score was assigned. As this approach enables risk ranking on a consistent basis across the work previously separated out into the Accelerated, Proactive and Reactive Renewals Programs, those three programs have been combined for the 2022-2026 PBR into a single Risk Based Renewals Program. The new combined program will target the highest risk mains first. Every year, the risk scores will be re-evaluated as part of the selection process for this program. This will ensure optimal return for the investment.

Infill Fire Protection Program

105. The Infill Fire Protection Program replaces the Accelerated Fire Protection program, introduced in 2017-2021 PBR term in response to increased fire protection requirements in neighbourhoods that have experienced increased densities as a result of infill development. Over 2020 to 2021, $2.4 million of the funding for the Accelerated Fire Protection Program was

allocated to fund the Infill Cost Share Pilot. This adjusts the criteria for fire protection upgrades to focus on neighbourhoods targeted for infill development rather than neighbourhood renewal. The Infill Fire Protection Program will extend the infill cost share process beyond the pilot phase and provide funding for the next five-year period. Based on the applications received for the Infill Cost Share pilot, EWSI is proposing the Infill Fire Protection Program at a cost of $20.0 million for the 2022-2026 PBR term which will fund the majority of 'missing middle' developments that need the support of this funding to remain financially viable

Water Reservoirs and Pumping Stations

106. EWSI's water distribution and transmission system relies on 13 reservoirs and 7 booster stations to ensure adequate water storage for Edmonton and that adequate water pressure is maintained across all of the different pressure zones within the system. A number of new reservoirs and booster stations will eventually be required to accommodate growth.

107. In the upcoming PBR, EWSI is taking a risk-based approach to replacing some of the roofs on reservoir cells and pumphouses to prevent the leakage of contaminants from penetrating through the roof of the reservoir resulting in a potential contamination of the potable water supply and to ensure no potential damage is incurred to electrical equipment. Also included in the capital plan is the construction of a new booster station at Winterburn and the decommissioning of the Parkland Booster Station.

Metering

108. Unlike many large cities' water systems, EWSI's water system has been fully metered since 1914. This is critical to the operation of the water system because it not only provides accurate consumption information for the purposes of planning and billing, it also provides customers with accurate and timely feedback on their consumption which promotes water conservation. The metering process requires two distinct sets of equipment: (1) water meters and (2) meter reading equipment and software.

109. EWSI is proposing a change in meter reading technology for the 2022-2026 PBR term, through the deployment of AMI meter reading technology, as discussed below. The deployment of AMI reduces the long term costs of the Meter Change Out Program by 25%, as the meter reading hardware will no longer be retired early when a meter fails and is replaced. This is because the encoder device will no longer be pre-fabricated on to the meter for meter reading purposes.

110. Historically, the meter reading function was conducted by another EPCOR subsidiary, EPCOR Distribution and Transmission Inc. (EDTI), and EWSI was charged by EDTI for these services. Beginning in 2017, the meter reading function transitioned to EWSI as a result of EDTI's plans to proceed with the full scale installation of AMI which eliminates the need for meter readers for power meters. At that time, EWSI decided not to proceed with AMI for water meter reading as a significant net benefit to water customers specifically could not be quantified.

111. The current meter reading technology that is used to read meters is past end of life and likely to fail within the 2022-2026 PBR term. In 2020, EWSI conducted a pilot project to determine the viability of installing AMI water meter reading devices in Edmonton. The purpose of this pilot project was to validate the installation costs associated with AMI water meter reading and therefore the financial viability of a long-term AMI solution based on realistic inputs.

112. EWSI conducted a cost benefit analysis of a number of options, and variations within those options. Based on the results of the pilot study, analysis concluded that deployment of AMI meter reading technology is the lowest cost option that ensures EWSI is able to meet its obligations of reading meters and billing customers based on metered consumption. AMI data will provide water conservation and safety benefits, as well as a number of planning benefits, including improvements to: hydraulic modelling data, cost of service study (water rates), sanitary flow calculations (including inflow/infiltration), over-strength program inspections and monitoring, and the administration of several drainage rebate programs.

2.2 EWSI Performance Summary (2017-2021)

113. The following is a brief overview of EWSI's performance during the 2017-2021 PBR term. Section 2.2.1 provides a summary of EWSI's operating performance metrics relative to targets established in the 2017-2021 PBR. Section 2.2.2 summarizes EWSI's financial performance for the 2017-2021 PBR term. Further discussion of EWSI's 2017-2021 performance is provided in the capital and operating cost sections of the Application and in the Annual PBR Progress Reports for 2017, 2018, and 2019 (Appendices E-01 to E-03 to the Application). Section 2.2.3 provides an overview of EWSI's delivery of its 2017-2021 capital plan.

2.2.1 Operating Performance Review (2017-2021)

114. EWSI's water system service quality is measured by the results of five indices prescribed in the Bylaw. The tracking of these indices is intended to ensure that system service quality is maintained within the PBR regulatory environment. Under a PBR structure, the utility is incented

to reduce its costs to achieve higher returns and therefore, PBR performance measures ensure that service quality is not sacrificed to achieve these cost savings. Each performance index contains individual performance measures that represent the more specific performance standards expected. The performance standard or targets are based on industry benchmarks, and where benchmarks are not available, on historic trending and targeted future performance.

115. During the 2017-2021 PBR term, EWSI exceeded the 100 point standard for performance metrics in each of 2017, 2018 and 2019 as indicated in Table 2.2.1-1. On an individual index basis, EWSI achieved the standard points for all indices for all three years. EWSI continues to place a great emphasis on both safe work practices and activities aimed at continuing to develop a stronger safety culture. Specific activities include: annual safety summits, with attendance by all EWSI staff, safety surveys, safety awards programs and focused safety messaging from front line supervision. To address the environmental incidents, EWSI continues to implement a rigorous incident investigation process to help determine the root cause of the incidents and develop corrective actions.

116. With each PBR renewal, EWSI typically revises the PBR performance metrics through updating the standards of performance (where possible) and introducing new metrics to better align with operational priorities and strategic goals. For the 2022-2026 PBR term, EWSI is proposing to limit the number of changes to the overall metrics program. Given the focus on moderating rate increases through reductions in capital programs and other means, maintaining a relatively consistent metrics program from the current term will enable stakeholders to be assured that service levels are being maintained despite the reductions. Where feasible, the standards of performance have been updated to the most recent 10 year average of past performance.

Table 2.2.1-1
Total Points Earned 2017-2019

	Performance Measure	A Standard Points	B 2017 Actual	C 2018 Actual	D 2019 Actual
1	Water Quality Index	25	25.0	25.0	25.0
2	Customer Service Index	20	21.1	20.6	21.0
3	System Reliability Index	25	28.5	28.5	28.5
4	Environmental Index	15	16.5	16.5	16.5
5	Safety Index	15	16.5	16.5	16.5
6	**Total Points Earned**	**100**	**107.6**	**107.1**	**107.5**

117. Table 2.2.1-2 below provides the detailed results for the underlying measures for 2017-2019. A detailed description of EWSI's performance metrics and changes proposed for the 2022-2026 PBR term is provided in Section 13 of this Application.

Table 2.2.1-2
Performance Measure Results – 2017-2019[8]

	Performance Measure	A Standard	B 2017 Actual	C 2018 Actual	D 2019 Actual	E Average 2017-19
	Water Quality Index					
1	Water Quality	99.7%	99.8%	99.8%	99.8%	99.8%
	Customer Service Index					
2	Post Service Audit	74.9%	72.5%	71.3%	74.5%	72.8%
3	Home Sniffing	94.4%	94.5%	92.8%	95.5%	94.3%
4	Response Time	25	18.3	20.7	20.4	19.8
5	Planned Construction Impact	95.8%	93.3%	96.2%	97.1%	95.5%
	System Reliability and Optimization Index					
6	Water Main Break	419	256	345	298	300
7	Repair Duration	93.7%	95.7%	96.0%	95.2%	95.6%
8	Water Loss	2.00	1.06	0.90	1.19	1.05
9	System Energy Efficiency	309	263	257	250	257
	Environmental Index					
10	Water Conservation (residential)	17.2	16.1	15.8	15.3	15.7
11	Environment Incident Management	6	3	4	3	3
12	Solids Residual Management	120	129	95.8	79	101
	Safety Index					
13	Near Miss Reporting	550	1119	855	894	956
14	Work Site Inspections/ Observations	1032	2036	2720	3217	2658
15	Lost Time Frequency Rate	0.57	0.38	0.38	0.00	0.25
16	All Injury Frequency Rate	1.54	1.33	1.72	0.97	1.34

[8] For some metrics, a lower than standard score represents performance that is better than the standard.

2.2.2 Financial Performance Review (2017-2021)

118. A summary of the financial performance of EWSI in-City over the 2017-2021 period is detailed in Table 2.2.2-1 including actual amounts compared to the amounts approved (decision amounts) by Edmonton City Council for the 2017-2021 PBR term. More detailed financial results and variance explanations are available in the Annual PBR Progress Reports for 2017, 2018 and 2019.

Table 2.2.2-1
In-City Financial Performance 2017-2021
Financial Schedules 3-1, 14-1, 15-5
($ millions)

		A	B	C	D	E	F	G	H	I	J
		2017 D	**2017 A**	**2018 D**	**2018 A**	**2019 D**	**2019 A**	**2020 D**	**2020 F**	**2021 D**	**2021 F**
1	Revenue	190.1	187.4	200.5	192.5	206.6	191.3	213.0	202.0	220.4	204.7
2	Operating Costs	(100.7)	(98.8)	(106.0)	(97.2)	(108.1)	(99.5)	(110.4)	(101.8)	(112.9)	(103.3)
3	Depreciation	(25.6)	(25.9)	(27.1)	(27.1)	(28.4)	(28.4)	(29.6)	(30.5)	(30.9)	(32.7)
4	Interest Expense	(26.6)	(27.0)	(28.3)	(28.1)	(29.4)	(29.1)	(30.4)	(28.9)	(31.8)	(29.1)
5	Net Income	37.1	35.7	39.1	40.2	40.8	34.30	42.6	40.8	44.8	39.6
6	Capex	108.1	98.1	81.2	96.5	87.0	113.0	101.5	124.2	97.9	145.3
7	Rate Base	912.6	910.3	961.7	955.6	1,003.0	1,002.8	1,047.6	1,063.6	1,099.6	1,137.2
8	RoE (%)	10.18%	9.80%	10.18%	10.51%	10.18%	8.55%	10.18%	9.58%	10.18%	8.71%

119. In-City rate revenues were $24.5 million less than forecast over the 2017-2019 period. Lower than forecast inflation resulted in an $11.0 million shortfall variance. The effect is cumulative, so that lower than forecast inflation over the 2017-2019 period will continue to impact revenues throughout the remainder of the 2017-2021 PBR term. Lower than forecast consumption resulted in a $9.3 million decrease over 2017-2019, partially offset by an increase of $1.0 million due to higher than forecast customer counts.

120. In-City Water returns were challenged by lower than forecast revenue driven by lower than forecast inflation adjustments to rates, and lower than forecast consumption, partially attributable to higher than average precipitation over the summer months. Operating expense reductions achieved by In-City Water ($8.9 million) were unable to fully offset reductions to revenue.

121. A negative Non-Routine Adjustment to 2018 water rates decreased 2019 revenues by $3.0 million. This Non-Routine Adjustment fulfills EPCOR's commitment to the City to flow the benefits of any reduction in corporate shared service cost allocations resulting in the transfer of Drainage Services assets to In-City Water and Wastewater customers.

122. The uplift of $1.8 million in other revenue (primarily fees charged to private developers and customer service revenue) was insufficient to offset the above losses. In-City Water achieved a 9.61% rate of return on equity over 2017-2019, compared to its forecast return of 10.175%.

2.2.3 Capital Projects and Programs

123. As shown in the Table 2.2.2-1 above, EWSI's capital expenditures are forecast to exceed base amounts in the 2017-2021 PBR plan by approximately $101.3 million, or $61.8 million as compared against the approved amount including NRAs, which results in higher than expected closing rate base of $42.8 million at end of 2021. A full explanation of the variances in capital expenditures is provided in Section 6.1 of the Application.

124. During the 2017-2021 term, EWSI completed a number of notable capital projects at both the water treatment plants and in the distribution and transmission system which have benefited EWSI's customers through improvements in overall safety and reliability of the water supply, safety improvements for EWSI's employees, improved environmental performance and expansion of the system in response to growing customer demands and City of Edmonton requests. Some notable achievements during 2017-2021 include:

- Significant upgrades at the Rossdale water treatment plant designed to improve the overall condition and increasing operational reliability and redundancy. These included upgrades to clarifiers, stilling basins, filter underdrains and air scour systems within the plant.
- Completion of the E. L. Smith Bypass Main Upgrade Project planned for 2021 to address the serious consequences of a failure of the ring main at E. L. Smith.
- Upgrades of various E. L. Smith and Rossdale chemical systems on a prioritized basis, including sodium bisulphite, sodium hypochlorite, ammonia and fluoride systems.
- Structural, mechanical and electrical upgrades and replacements to end-of-life and deteriorated structural components at Kaskitayo Reservoir.
- Replacement of 70 km of water mains during 2017-2021 through its various water main replacement programs to ensure reliability of the system is maintained. As a result of continued water main replacements, EWSI saw the lowest level of water main breaks since 1960 over the 2017-2021 period.
- Implementation of the Critical Pipeline Inspection program, inspecting critical transmission mains to more efficiently target weak points in the transmission system and further increase the reliability of the system.

- Expansion of the water distribution and transmission system as a result of the significant growth of the city of Edmonton over 2017-2021. This included adding 172 km of water mains by the end of 2020. EWSI has also continued its work with the City to relocate several water mains to accommodate City of Edmonton construction projects such as LRT expansions.
- Completion of the transfer of regional transmission pipelines and booster stations, including the Southwest Pipeline and Booster Station at the end of 2020 and the Parkland Pipeline and Booster Station in the first quarter of 2021.

125. Looking forward to 2022-2026, EWSI's capital plan will continue to include investments to ensure continued supply of safe and reliable water services and to allow the water plants and distribution and transmission system to reliably meet additional customer demands. EWSI's capital plan will also accommodate City-driven projects including water main relocates for LRT expansions and coordination of water main replacements with the City's road rehabilitation projects. Some key focus areas for EWSI in the 2022-2026 term include: (i) large-scale deployment of AMI meter reading technology to ensure reliable metering and billing, water conservation and improved customer service; (ii) rehabilitation and replacement of certain infrastructure to ensure service reliability is maintained (in particular transmission mains and meter replacements); (iii) a new pipeline inspection program to reduce the risk of transmission main breaks and (iv) a flood protection project to increase Edmonton's resilience to flood risk. Refer to Section 6.2 and the Capital Business Cases in Appendices F-02 to F-26 for more information on the 2022-2026 capital expenditures.

2.3 Future Expectations (2022-2026 and beyond)

126. The following sections provide EWSI's view of future water demands in the City of Edmonton (Section 2.3.1), a comparison of future demands with EWSI's water treatment plant production (Section 2.3.2), expected future regulations for public health and environment (Sections 2.3.3 and 2.3.4), environmental sustainability initiatives (Section 2.3.5 to 2.3.7) and synergies across business units (Section 2.3.8).

127. In summary, the continuing trend of declining consumption per customer puts upward pressure on EWSI's rates but at the same time allows EWSI to defer capital spending required to increase water system capacity. System supply is sufficient at this time however additional capacity will be required to meet future potential seasonable peaks. The focus on E. L. Smith

upgrades including the High Lift Pump House Project (Appendix F-10) and the E. L. Smith Filter Upgrades Project (Appendix F-07) lay the foundation for future capacity growth.

128. EWSI water quality is excellent and EWSI consistently performs to higher standards than those set by federal and provincial governments. EWSI keeps track of potential regulatory changes and proactively works to ensure its operations are meeting current and expected future public health regulations. Proposed new regulations by Alberta Environment, if adopted, would not likely result in significant upgrades to water treatment processes or technology.

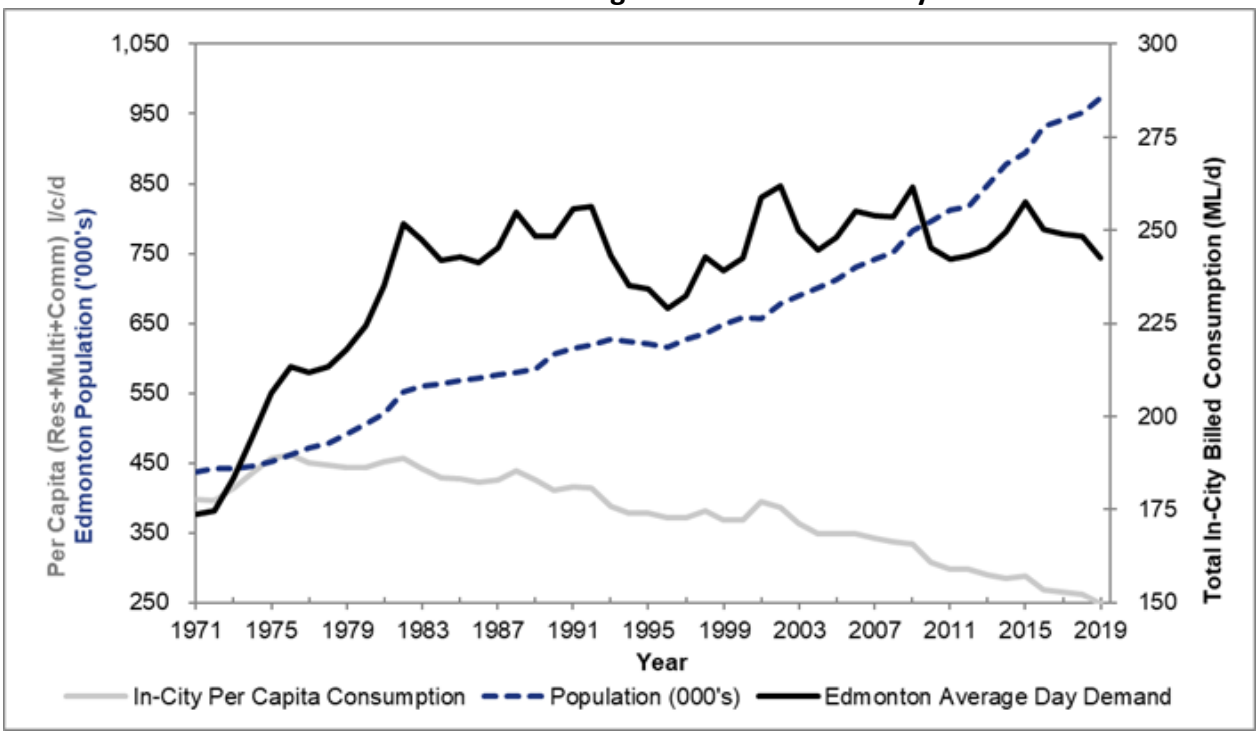
129. Looking forward, EWSI has a number of initiatives to improve water conservation, energy efficiency and mitigate potential risks associated with climate change and flooding which are discussed in Sections 2.3.5, 2.3.6 and 2.3.7 respectively.

130. Finally, a key focus over the 2022-2026 term will be on identifying and implementing synergies between Drainage Services and Water Services, as discussed in Section 2.3.8.

2.3.1 Demand Projection

131. Historically, water demand in Edmonton has grown proportionately with population and economic growth. However, since the 1980s, the water industry has seen a dramatic decoupling of these factors as shown in Figure 2.3.1-1. The link between water use and growth has been broken due to increases in efficiency in homes, businesses and institutions. In-city demand is approximately what is was in the early 1980s, even as the City has added a half million people.

Figure 2.3.1-1
Edmonton Water Usage – Effects of Efficiency



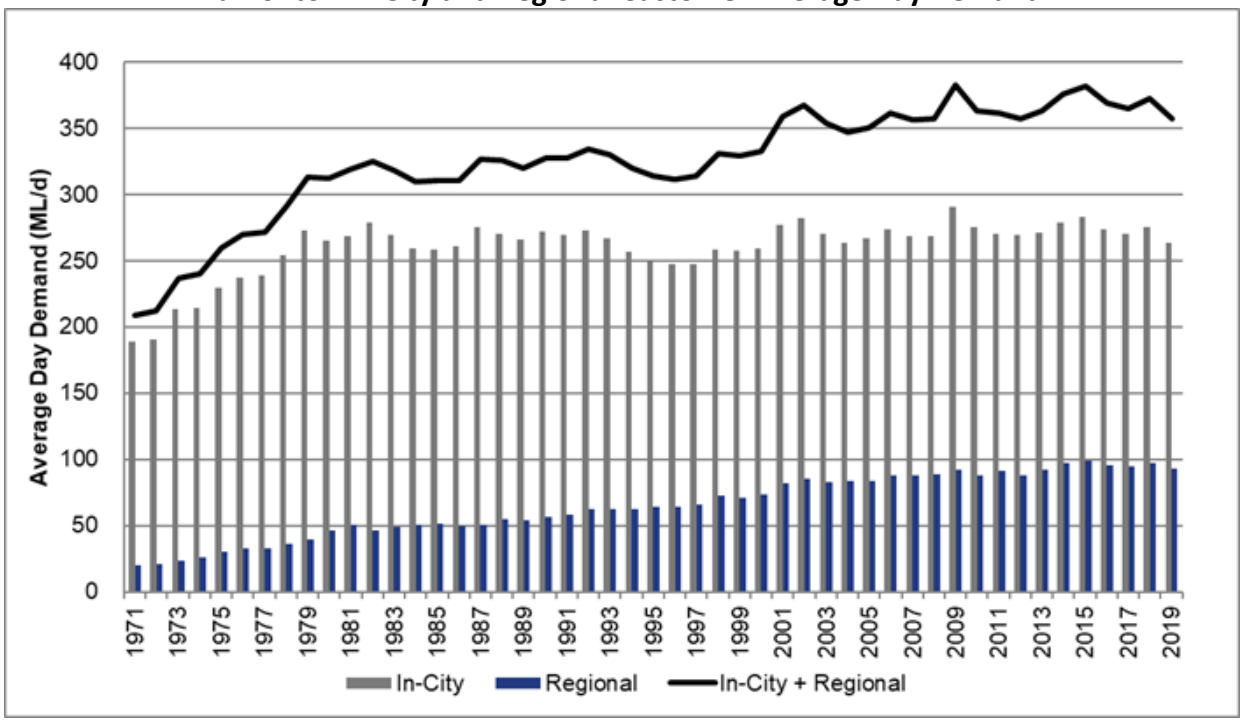
132. Two key metrics used to measure and monitor municipal water use include total per capita water use and residential per capita water use. Total per capita water use is typically calculated on a per day basis and is the volume of water delivered through the water distribution system divided by the municipality's population. Residential per capita water use considers only the water consumption of the residential and multi-residential sector again divided by the municipality's population.

133. In 2019, total per capita consumption was 271 litres per person per day. Residential average per capita water use in Edmonton in 2019 was 176 litres per person per day, however per capita use in some of the newest developing neighbourhoods is below 150 litres per person per day. Efficient fixtures and appliances (primarily high-efficiency toilets and washing machines) have contributed to significant water reductions in indoor residential water usage and there remains much potential for additional savings.

134. Despite water use efficiency improvements, EWSI's long term demand forecast projects an increase in total water demand. Of EWSI's total water demand, approximately 70% is used within Edmonton for residential, multi-residential and commercial purposes, and around 30% is used in the surrounding greater Edmonton regional service area.

135. Combining Edmonton and regional demand shows the total daily water demand for the Edmonton region (reference to Figure 2.3.1-2). It is clear that the segment representing in-city water demand has stayed relatively flat since the 1980s, whereas the regional demand component has shown continual growth due to population growth and an expanding service area. When combined, the result is an increasing water demand. Over the last 20 years, total water demand has grown by approximately 7%.

Figure 2.3.1-2
Edmonton In-City and Regional Customer Average Day Demand



136. The long-term demand forecast is developed for the Edmonton water system by projecting water demand for domestic (residential and multi-residential), commercial, and regional customer classes and estimating system water losses. The demand forecast takes into account the increased efficiency of the in-city and regional customer base, as well as a range of customer growth projections. This forecast is updated annually to ensure capital and operational decisions are being based on most recent trends.

137. The total annual water demand varies with changing weather conditions, which are very difficult to predict. For example, the hot, dry weather in the summer months of 2015 caused elevated demands that had not occurred for over a decade. EWSI's high five-day demand of 547 ML/d (highest demand over a consecutive five day period) was the highest demand reached in thirteen years, exceeding the 2006 and 2009 drought-like years. Comparatively, the cool rainy

summer of 2019, did not produce notable demand peaks, and annual water demand was the lowest since 2012.

138. It is anticipated that total system demand growth will slow due to increased efficiency of EWSI's customer base (In-City and regional) and slower population growth projections due to the combined effects of the COVID-19 pandemic and low energy prices. However increased demands will be a reality in the future as population continues to grow toward 2 million as expected within the City Plan.

139. Over the next five year PBR term, EWSI expects the declining per customer water consumption trends will continue as its customers continue to install new water efficient fixtures and adopt water conserving behaviours. While decreases in water consumption per customer are advantageous for resource management, environmental protection and the deferral of water treatment expansions, they also lead to decreased revenues for EWSI. Under EWSI's PBR structure, the consumption forecast risk is entirely borne by EWSI and variations from forecast within the 5-year PBR term are not passed on to EWSI's customers.

140. In the long-term, as consumption per customer continues to decline, there will be upward pressure on rates with each PBR renewal to ensure the utility can recover its operating and capital expenses which are generally fixed in nature and do not vary with consumption. While corresponding energy and chemical savings result from treating less water per customer, the savings are not enough to offset the lost revenue.

2.3.2 Water Plant Production vs. Demand

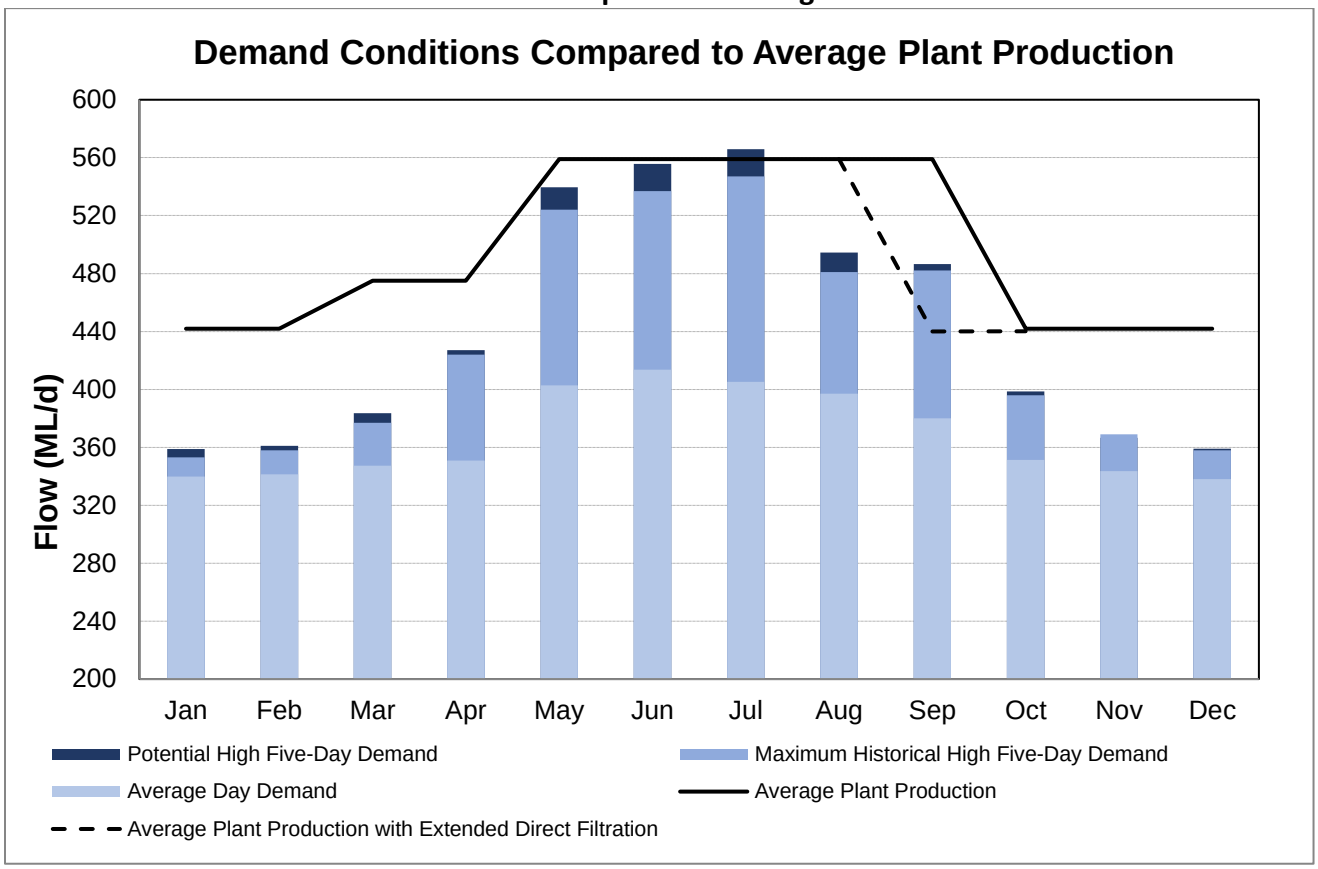
141. The last major expansion of EWSI's water treatment capacity was in 2008 when E. L. Smith water treatment plant was upgraded. The plant expansion upgrades increased the capacity and reliability of the plant by building a new river intake, building a second low lift pump house, retrofitting of an existing clarifier, addition of six filters (stage 3), chemical storage improvements, transmission main upgrades and additional infrastructure to allow future upgrades for more treatment capacity. These plant capacity upgrades also provided the ability to split the treatment processes and conveyance to create two independent treatment trains from the low lift pump houses to the clarifiers and filters. However, the treatment processes and conveyance beyond the filters to the onsite reservoirs can only be operated as a single treatment train. There are also single points of failure related to conveyance infrastructure for the clarifiers, filters and ultra-violet (UV) disinfection.

142. EWSI carefully monitors total water demand in order to ensure that the Rossdale and E. L. Smith water treatment plants have sufficient capacity to serve the maximum demands on the system as well as to provide service when planned and unplanned shutdowns occur.

143. Going forward, EWSI's near-term focus is to enhance system resilience in the water treatment plants while ensuring water treatment plant capacity is sufficient to meet expected demands. While overall demand levels have remained fairly static as explained above, EWSI designs and upgrades the facilities to meet not only average consumption but short-term peak demands. EWSI also must ensure that planned shutdowns (for capital upgrades, maintenance and inspections) and unplanned shutdowns can be accommodated while achieving levels of service.

144. EWSI uses the highest demand over five consecutive days as a measure of short-term peak demands for water treatment design. The system is designed so that reservoir capacity can be utilized in conjunction with water treatment plants at maximum production to supplement peak demands for up to five consecutive days. High five-day demand peaks can be highly variable from year-to-year, depending on weather conditions.

Figure 2.3.2-1
EWSI Demand Conditions Compared to Average Plant Production



145. Figure 2.3.2-1 provides a comparison of average and high five-day demands (maximum historical and potential) compared to average water treatment plant production in total for E. L. Smith and Rossdale water treatment plants. Average plant production reflect that: (i) plants are operating in conventional mode during summer months from March 1 to September 30 and direct filtration mode for remainder of the year which results in lower production levels; (ii) average production can vary with varying raw water quality conditions, particularly during spring and summer months and plant outages.; and (iii) transition to extended direct filtration in the fall has not occurred since 2014 due to water quality issues, therefore this has been shown as a dotted line.

146. Based on monthly average day water demands, average plant production is sufficient throughout the year. However, in July the potential high five-day demand is forecast to exceed production (Figure 2.3.2-1). A combination of reservoir storage and/or demand management measures will mitigate the impact in the near term.

147. To address these seasonal supply issues, deep bed filter conversion at E. L. Smith will increase plant capacity, however this is not planned until the 2032-2036 PBR term. Filter structure upgrades must first be performed between 2017 and 2031.

148. On an average daily basis, E. L. Smith provides 65% of the EWSI system water demand and Rossdale supplies 35%. This production split alone highlights the importance of the long-term resiliency of E. L. Smith. Compounding the disproportionate production split is the fact the E. L. Smith cannot be operated via two independent treatment trains like Rossdale. This affects the ability of E. L. Smith to accommodate extended shutdowns.

149. Full and partial shutdown scenarios were analyzed based on average day demand during seasonal river water conditions and indicated that a full Rossdale shutdown has a maximum duration of 36-44 hours and a full E. L. Smith shutdown has a maximum duration of 21-33 hours. Rossdale has two treatment trains, therefore the frequency of full plant shutdowns is less compared to E. L. Smith. This lack of redundancy is concerning as the shutdowns explored do not account for unplanned shutdowns and reduced plant production events due to poor river water quality. These events may occur more frequently in the future as treatment infrastructure ages and climate change and extreme weather events impacts river conditions.

150. In order to improve operational flexibility and enable the shutdown of sections of the plant for asset maintenance and rehabilitation, EWSI will investigate the options to create two independent treatment trains at E. L. Smith. Design requirements, capacity needs, construction sequence and timelines and associated shutdown and commissioning plans all need to be carefully considered to successfully create two separate trains. This planning work will be undertaken to support long-term planning needs and identify future PBR capital projects. The E. L. Smith High Lift Pumphouse, 5 kV Upgrades/Electrical Room Expansion and other smaller projects, such as the E. L. Smith UV System Expansion project, will be designed to support the future two train creation recommended .

2.3.3 Public Health Regulations

151. EWSI has consistently exceeded the goals set for water quality, and performs to higher standards than those set by federal and provincial governments. Health Canada continuously reviews and updates the Guidelines for Canadian Drinking Water Quality. EWSI keeps track of guidelines under review and proposed review and proactively works to ensure its operations are meeting current and expected future public health regulations.

152. Drinking Water Safety Plans: In 2012, Alberta Environment and Parks introduced the requirement that all drinking water systems in the province develop and maintain a Drinking Water Safety Plan (DWSP). The DWSP is based on a source-to-tap assessment of the drinking water system. The water system is required to develop appropriate measures to control and reduce risks in the water system to acceptable levels. EWSI has maintained a DWSP for the Edmonton System since 2013 and it is reviewed and updated. As part of the DWSP, a key action is developed that prescribes improvements to the system, either operations or capital, which will address system-specific risks to acceptable levels. The DWSP is part of the overall EWSI ISO14001 Environmental Management system and is used to set targets, goals and objectives.

153. In addition to these changes for drinking water regulations in Alberta, EWSI is closely examining other water quality issues including microorganism reduction requirements, lead and aluminum in drinking water, discussed further below.

154. Lead: Lead is an issue that EWSI closely monitors. In early 2010, Health Canada released the Guidance on Corrosion Control for Municipal Water Distribution Systems which focuses on monitoring and reducing lead at the tap. In anticipation of the release of this document, EWSI proactively developed a lead response plan in 2008 focused on homes in the City of Edmonton with lead service lines. The program involved the notification of customers residing in these homes, measurement of lead at the tap, provision of point-of-use filters to reduce lead at the tap, promotion of lead service line replacement and public education.

155. On March 8, 2019, Health Canada released a new Guideline for Canadian Drinking Water Quality (guidelines) that reduced the Maximum Acceptable Concentration for lead in drinking water from the current 10 µg/L (micrograms per Litre) to 5 µg/L and moved the recommended point of compliance to the tap in the home. In response to the change in guidelines, EWSI carried out a pilot project in 2019 that involved testing the effectiveness of different orthophosphate concentrations in the Edmonton drinking water for reducing release of lead from lead-containing materials. Orthophosphate is a corrosion inhibitor that is often used in the water treatment industry for control and reduction of lead release. Based on the experience gained in this pilot, EWSI prepared an Enhanced Lead Mitigation Strategy Business Case, submitted to Utility Committee March 2019, which outlined different options to reduce lead levels at the tap, including the addition of orthophosphate at the water treatment plants, as well as accelerated replacement of lead service lines (LSLs) from the water main to the meter inside the customer's home. On July 16, 2019, EWSI received approval to apply the Non-Routine Adjustments to In-City water rates commencing April 1, 2020 to recover the costs of implementing this strategy.

156. **Enhanced Lead Mitigation Program**: For the 2022-2026 PBR term, EWSI is proposing to continue the Enhanced Lead Mitigation strategy. The strategy will include (1) addition of the corrosion inhibitor orthophosphate to the Edmonton drinking water at both water treatment plants to reduce release of lead from all sources (lead service lines and lead-containing plumbing components, (2) complete (utility and privately-owned sections from main to meter) replacement of targeted high priority lead service lines in homes where the lead concentration at the tap is greater than 5 µg/L after orthophosphate addition, and (3) complete (utility and privately owned sections from main to meter) during water main renewal and other maintenance work and elimination of the practice of partial LSL (utility section only) replacements. The costs for the replacement of the privately-owned sections will be included in water rates. Note: Partial LSL replacements are ineffective at reducing the concentration of lead at the tap.

157. **Aluminum**: In 2019, Health Canada introduced a new drinking water guideline for Aluminum. The proposed new guideline sets a new Maximum Allowable Concentration for dissolved aluminum in drinking water of 2.9 mg/L based on nervous system health effects. EWSI is already compliant with this level. However, the guideline does propose to lower the Operational Goal from the currently 100 µg/L to 50 µg/L. This Operational Goal is based on the potential for occurrence and later release of aluminum and co-occurring contaminants such as arsenic, chromium, manganese and nickel. Aluminum can coat water mains, service lines and water meters, resulting in pressure losses, meter malfunctions or turbid/discoloured water. EWSI can only meet the Operational Goal in the Edmonton water treatment plants about 50% of the time. If the proposed guideline is confirmed in 2020, EWSI may be compelled by regulators or health authorities to meet the Operational Goal. This will likely require chemical adjustment of the treatment process and construction of new chemical feed systems.

2.3.4 Environmental Regulations

158. EWSI strives to ensure that it surpasses current and proposed environmental standards. EWSI is a founding member of the North Saskatchewan Watershed Alliance and participates in a multi-stakeholder Integrated Management Plan for the North Saskatchewan River Basin.

159. Discussions on the requirements of the new AEP approval to operate the Edmonton Drinking Water Systems will continue until the new Approval to Operate is issued by AEP by May 31, 2021. EPCOR will continue to strive to meet the Stewardship Agreement.

160. One of the key issues in the AEP Approval to Operate 2021 Renewal will be the management of the water treatment plant residuals released to the river. The 2012 AEP

Standards for Waterworks Systems states that waste streams generated at water treatment plants shall be treated and handled in a manner approved by AEP. Direct discharged to a stream will only be approved if there is negligible impact and if the aesthetics and downstream users will not be affected. This option should only be considered in the absence of alternative management options. EWSI has completed environmental monitoring on residual waste stream discharges since 2013 and has determined that the environmental impact on the river is marginal. In 2019/2020 EWSI carried out Sustainable Return on Investment study that determined the costs of building large residuals management facilities at the water treatment plants far outweighed the monetized environment benefit. EWSI has developed a long-term strategy for managing water treatment plant residuals that will include on-going direct filtration operation to minimize the residuals generated in the fall and winter, conversion of filters at E. L. Smith to deep bed operation to facilitate direct filtration operation, and increased environmental monitoring to better assess the environmental impact of the residuals discharges.

2.3.5 Water Conservation Initiatives

161. EWSI implements a variety of industry best management practices related to supply and demand to ensure both the long term sustainability of the NSR and to maximize the service life of the water treatment infrastructure. Edmonton residents have historically used less water than other Canadian cities due to EWSI's universal metering practices, increasing block residential rates that discourage high usage, and relatively short summers with low outdoor water usage. Per capita consumption in Edmonton continues to decrease as customers install water efficient fixtures and appliances as well as adopt water efficient behaviours. Distribution system water losses are kept at low levels through EWSI's leak detection program, continual investment in the cast iron replacement program, on-going maintenance activities and the commitment to meet or exceed key performance measures surrounding main break repairs.

162. While the majority of the EWSI's customer base in Edmonton are efficient water users with declining consumption trends, climate change and other broader environmental considerations make efficient water use a priority for EWSI.

163. The deployment of AMI meter reading technology by 2024 will provide EWSI with additional tools to detect and respond to leaks and provide customers with information to better understand their water use. To help support continued conservation efforts across the community, EWSI will continue to focus on identifying and addressing inefficient water use in high use customer segments. As EWSI continues to implement One Water planning strategies

(Section 2.3.8), the efficient use of water will play a key role in both drainage and water system planning, design and operation.

2.3.6 GHG Emissions Reduction Plan

164. EPCOR first established and reported on its greenhouse gas (GHG) emissions more than 20 years ago and continues to maintain an inventory of emissions and an ongoing plan to reduce these emissions at the corporate level. As described in Appendix J, EPCOR will reduce its GHG footprint inside the City of Edmonton by 70% by 2025 and by 85% by 2035, relative to the 2012 baseline. The capital and operating plans contained within this Application will enable EPCOR to meet its 2025 commitments, including the following.

165. **Solar Farm and BESS**: A new solar farm and Battery Energy Storage System (BESS), located at E. L. Smith, are planned to go into service at the start of 2022. In its first year of operations the solar farm is expected to generate 21,500 MWh of clean electricity with an associated CO_2e reduction of 14,000 tonnes. A BESS with a capacity of four megawatts will store energy generated by the solar farm and be capable of releasing energy to supply power to the plant. The BESS will be integrated with the solar farm at the site together with intelligent management controls and is being supported by funding from Natural Resources Canada as part of their Green Infrastructure program.

166. **Green Energy Initiative**: EPCOR Utilities Inc. has signed an agreement with Renewable Energy Systems Canada to develop and construct a new wind farm in southern Alberta. EPCOR will acquire the renewable energy certificates (RECs) from the project for a 20 year term. The combination of this offtake agreement and the E. L. Smith Solar Farm will result in EPCOR Water utilizing 100% green electricity for all its operations within the City of Edmonton. Permitting activities are currently underway and the wind farm is expected to be constructed in summer 2022 with commercial operations commencing in Q4 2022.

167. **Water Treatment Plants and Energy Efficiency:** Electricity consumption is the largest source of GHG emissions associated with EPCOR Water's operations in Edmonton. EPCOR Water has assessed energy saving projects and has developed plans to execute them in the next 5 years, including significant changes in heating, ventilation and air conditioning systems, replacement of lighting and ballasts, and heat recovery systems. Although these projects will reduce the energy consumption of EWSI, it should be kept in mind that the vast majority of water and wastewater treatment processes are inherently energy-intensive, since they involve transfers of liquids using pumps/electric motors.

168. **Fleet:** The overall contribution of all fleet vehicles to the GHG footprint of EPCOR is less than 5%. Still, there are small opportunities regarding adoption of electric, natural gas, or hybrid vehicles in certain applications. While no specific roll-out of fleet vehicle replacements is expected in the PBR timeframe, this will be an important consideration going forward as Alberta's electricity grid incorporates more renewable sources of energy and EPCOR identifies specific tactics to achieve the 2035 GHG reduction target.

2.3.7 Climate Change Adaptation Strategy and Flood Plan

169. Water and wastewater utilities both contribute to climate change, as greenhouse gas producers and emitters, and are also potentially impacted by the effects of climate change. Global climate change will have a long term impact on both availability and quality of source water, such as the NSR, and may result in more extreme weather conditions including increased frequency and magnitude for drought conditions and floods. While the effects of climate change on the NSR are not certain, data shows a general warming trend with a possibility of increased overall precipitation and most likely a slight increase in mean annual flows in the NSR. While there may be slightly higher flows in spring and summer, and more intense rainfall events, it is likely that flows in the late summer and fall will be lower.

170. As part of long term risk management, utilities need to mitigate the range of possible impacts of climate change on their operations. EWSI is pursuing strategies to address the risks of climate change including:

- The Flood Protection Project (Appendix F-08) to improve resiliency at the E. L. Smith and Rossdale water treatment plants to reduce the likelihood of catastrophic damage during a river flood and to resume potable water treatment as quickly as possible afterward.
- Development of a riverine flood protection plan for the facilities in Edmonton to address the need for any infrastructure modifications and improvements to emergency response procedures, based on an updated study of flood hazards being led by Alberta Environment and Parks. The study was released for public engagement at the end of November 2020.
- Development of a stormwater flood management plan to ensure the collection and conveyance systems at the water treatment plants have capacity to convey stormwater offsite, based on the risk assessments completed as part of the Stormwater Integrated Resource Plan (SIRP).

- Assessment of the need for any future research studies to close any knowledge gaps and to better determine potential future climate change scenarios on the river. For example, information will be incorporated from a recently completed research study with University of Regina/Prairie Adaptive Research Collaborative to develop mitigation strategies for flood risk.

2.3.8 Drainage Water Synergies

171. Over the majority of their history, Water and Drainage Services worked closely together as departments of the City and leveraged many of the natural operational synergies that existed between them. With the transfer of Drainage to EPCOR, these synergies can be redeveloped to realize operating and capital efficiencies in both business units.

172. The exploration and analysis of potential opportunities to gain synergies between water and drainage began with the transfer of drainage and will continue to build momentum over the next several years. The initial focus post transfer was on integrating Drainage into EPCOR processes and ensuring appropriate change management practices were utilized to minimize operational disruption. Next, EWSI identified organization efficiencies within existing operations. IT strategies have been identified to merge common systems, in particular GIS. Shared services have been merged where opportunities for efficiency gains were available. One Water Planning was created in 2020 to bring together the common strategic planning functions of Water and Drainage Services. Similarly, development coordination was combined at the same time. The combined unit addresses coordinated planning, growth coordination and common hydraulic modelling and design standards.

173. As further discussed in Appendix F-05, the Real Estate Consolidation Project has been executed with the objective of reducing the overall cost to customers through cost reduction and cost avoidance, while maintaining the service quality level that EWSI currently delivers, both during the transition to the single service center and in the long term. An important driver of cost minimization is synergies between Drainage Services and Water Services, some of which are only possible through consolidation.

174. Cost reduction will be attainable by not having to fill vacancies created through attrition with consolidation. Cost avoidance possible with consolidation included improved and coordinated scheduling and planning of activities to reduce multiple trips to execute work. Additional operational benefits to be achieved over time include improved communications between engineering and field construction with staff being located in the same service centre.

3.0 REVENUE REQUIREMENT SUMMARY

175. EWSI has determined its revenue requirement forecast based on its best estimates of the costs to provide water service plus a fair return on its investment. Table 3.0-1 provides a breakdown of the cost components comprising EWSI's In-City revenue requirement based on the forecast costs for the 2022-2026 term. Table 3.0-2 provides a breakdown of the cost components comprising EWSI's Fire Protection revenue requirement based on the forecast costs for the 2022-2026 term. Approved amounts for 2021 (the "2021 Decision") and the latest forecast amounts for 2021 (the "2021 Forecast") are provided for comparison.

Table 3.0-1
Financial Schedule 3-1
In-City Revenue Requirement
2021-2026 ($ millions)

		A	B	C	D	E	F	G
	Cost Component	**2021 D**	**2021 F**	**2022 F**	**2023 F**	**2024 F**	**2025 F**	**2026 F**
1	Operating Costs	112.9	103.3	103.7	106.8	109.2	111.3	114.0
2	Depreciation, Net of Amortization	30.9	32.7	35.5	37.9	40.7	42.6	43.8
3	Return on Rate Base Financed by Debt	31.8	29.1	30.0	30.6	29.8	28.8	29.0
4	Return on Rate Base Financed by Equity	44.8	39.6	47.2	48.9	50.5	51.2	51.3
5	Revenue Requirement before Revenue Offsets	220.4	204.7	216.3	224.1	230.2	233.9	238.2
6	Less: Revenue Offsets	(5.2)	(5.2)	(5.2)	(5.3)	(5.4)	(5.5)	(5.7)
7	**Revenue Requirement – In-City**	**215.2**	**199.5**	**211.1**	**218.8**	**224.8**	**228.4**	**232.5**

Table 3.0-2
Financial Schedule 3-2
EWSI Forecast Revenue Requirement – Fire Protection
2021-2026
($ millions)

		A	B	C	D	E	F	G
	Cost Component	**2021 D**	**2021 F**	**2022 F**	**2023 F**	**2024 F**	**2025 F**	**2026 F**
1	Operating Costs	5.6	6.6	8.6	8.8	9.1	9.5	9.7
2	Depreciation, Net of Amortization	2.4	3.1	3.4	3.5	3.7	3.8	3.9
3	Return on Rate Base Financed by Debt	3.0	3.5	3.6	3.6	3.5	3.4	3.5
4	Return on Rate Base Financed by Equity	4.3	1.7	5.6	5.8	6.0	6.1	6.2
5	Total Revenue Requirement - Fire Protection	15.3	14.8	21.2	21.8	22.3	22.8	23.3
6	Less: Revenue Requirement - Private Fire Protection	(2.7)	(2.4)	(2.8)	(3.0)	(3.0)	(3.1)	(3.1)
7	**Revenue Requirement - Public Fire Protection**	**12.6**	**12.4**	**18.4**	**18.8**	**19.3**	**19.7**	**20.1**

176. EWSI's waterworks infrastructure system supports the operations of its regulated water operations. As such, EWSI determines its revenue requirement for regulated water operations based on the operating and capital cost components associated with supporting the entire waterworks system. EWSI then allocates the revenue requirement components (operating costs, depreciation, and return on rate base) across each line of business (or customer segment, i.e., In-City customers, RWCG and Fire Protection) according to the allocation methodologies described in Section 11. Although the public fire protection revenue requirement has been added to In-City water rates, EWSI will continue to calculate a separate revenue requirement for fire protection. This ensures that fire protection costs continue to be appropriately determined and that RWCG customers, who do not utilize EWSI's fire protection infrastructure, are not charged for these services.

177. The forecast In-City revenue requirement reflected on line 7 of Table 3.0-1 plus the public fire protection revenue requirement reflected on line 7 of Table 3.0-2 forms the basis for determining EWSI's PBR water rates for the 2022-2026 PBR term.

178. In Section 4 of this Water Rate Application, EWSI describes the methodology and assumptions used to determine the forecast revenue requirement and presents the forecast revenue requirement by component. Since EWSI's regulated operating and capital costs are managed and reported for the total system, costs for the total system are presented and discussed in Sections 5.0 (Operations and Maintenance), 6.0 (Capital Expenditures), 7.0 (Depreciation and Amortization), and 8.0 (Rate Base) of this Application. The return on rate base presented in Section 9.0 is calculated based on the portion of rate base allocated to EWSI's In-City and Fire Protection customer segments. Revenue Offsets attributable to EWSI's In-City operations is presented in Section 10.0.

4.0 METHODOLOGY AND KEY ASSUMPTIONS

179. The following is an overview of the methods and key assumptions used in deriving EWSI's 2022-2026 revenue requirement. Section 4.1 provides an overview of accounting policies. Section 4.2 describes EWSI's cost forecasting process. Section 4.3 describes the methodology for determining the cost of capital. Section 4.4 describes the methodology for determining depreciation and amortization. Section 4.5 provides the contributions and capital overhead methodology. Section 4.6 summarizes EWSI's inter-affiliate transactions. Finally, Section 4.7 provides the consumption volume and customer count forecast methodology.

4.1 Accounting Policies

180. Since January 1, 2011, EUI has prepared its corporate financial information in accordance with International Financial Reporting Standards (IFRS) as required for Canadian publicly accountable enterprises. While EWSI has implemented IFRS to support the public external financial reporting requirements of its parent company, EUI, there are certain IFRS requirements which are not consistent with the accounting treatment historically applied for rate-making and rate-regulated reporting requirements (referred to herein as "regulatory accounting").

181. In 2009, the AUC issued Rule 026 "Rule Regarding Regulatory Account Procedures Pertaining to the Implementation of the International Financial Reporting Standards" ("AUC Rule 026") to provide guidance to AUC-regulated utilities transitioning to IFRS. In preparing its regulatory applications, EWSI has looked to existing regulatory accounting practices as well as guidance from AUC Rule 026 to assess IFRS requirements that may be applied for rate-making purposes. Though EWSI's In-City water rates are not regulated by the AUC, EWSI considers AUC Rule 026 as a source for guidance for two reasons: 1) to ensure relative consistency in practice with other regulated utilities in Alberta and 2) to promote administrative efficiency and effectiveness by minimizing the differences between regulatory accounting for both In-City and regional water customers which are regulated by the AUC on a complaint basis.

182. For EWSI, the most significant differences between IFRS and regulatory accounting relate to property, plant and equipment and associated accounts. Key differences between IFRS and regulatory accounting for EWSI are described in Table 4.1-1 below.

Table 4.1-1
Regulatory vs. IFRS Accounting Treatment

	A **Accounting Policy Item**	B **IFRS Accounting Treatment**	C **Regulatory Accounting Treatment used by EWSI**
1	**Capitalized Interest** – this item relates to financing related charges which are included in the capital cost for projects during construction.	For IFRS accounting, EWSI uses Interest During Construction (IDC). IDC is charged to capital projects lasting longer than 6 months and only has a debt component to the charge.	For regulatory accounting EWSI uses Allowance for Funds Used During Construction (AFUDC). AFUDC is charged to capital projects lasting longer than 12 months and has both debt and equity components to the charge.
2	**Abandonments** – this item relates to the treatment of expenses incurred to abandon, demolish, or decommission an asset which is no longer in use.	For IFRS accounting, EWSI expenses abandonments as incurred.	For regulatory accounting, EWSI charges abandonment costs to capital as incurred.
3	**Retirements** – this relates to losses incurred when an asset with remaining net book value is taken out of service and proceeds when assets are sold.	For IFRS accounting, EWSI records gains and losses on retirement as net expense in the period the retirement occurs.	For regulatory accounting, depending on the nature of the transaction, EWSI may charge gains and losses on retirement to capital and amortize the gain/loss over the remaining life of the asset at the time of disposal.
4	**Leases** – this item relates to the use of assets held under rental or lease agreements where control of the asset for the lease term resides with the lessee	For IFRS accounting, unless the lease is a short term rental, EWSI records a right of use asset and a related obligation to the lessor and depreciates the right over the period of the lease term	For regulatory accounting, no right of use asset or obligation is recognized and the lease cost continues to be treated as an operating expense.

4.2 Cost Forecasting Process

183. To determine rates for the 2022-2026 PBR term under EWSI's PBR structure, EWSI first develops a forecast of its revenue requirement for 2022-2026 for the total regulated Edmonton water system, excluding costs related to any of EWSI's commercial operations. The revenue requirement is based on bottom-up forecasts of operating costs and capital expenditures prepared by managers in each of EWSI's operating areas for 2022, 2023, 2024, 2025 and 2026. These forecasts are initially prepared in 2022 dollars. The operating cost and capital expenditure forecasts are then escalated at "i-x" (weighted average inflation factor of 2.31% less the productivity factor of 0.25%) to arrive at the forecast costs in nominal dollars for 2022 to 2026. The weighted average inflation factor is calculated based on a weighting of 60% Alberta CPI for the non-labour component and 40% Alberta Hourly Earnings Index for the labour component as further described in Section 4.2.1. Refer to Financial Schedules 5.2 and 15.5 for a summary of EWSI's annual operating and capital cost forecasts.

184. As part of its operating cost forecast process, EWSI initially prepares a bottom-up forecast of its operating costs for 2022 based on the best available information in respect of expected work activity and cost levels for 2022. To develop its operating cost forecast for 2023 and 2024, operating cost variances from 2022 amounts are limited inflation less the efficiency factor (2.06% per year) with the following exceptions: (i) forecast cost increases or decreases that are largely outside EWSI's control including customer growth (customer billing and metering), the carbon levy increase, regulatory costs charged by the City of Edmonton, franchise fees (calculated as a percentage of revenues) and electricity distribution and transmission charges; (ii) forecast operating cost savings associated with new capital projects (including the Real Estate Consolidation Project and the AMI Deployment Project); (iii) forecast costs associated with the Green Power Initiatives to align EPCOR's and the City's goals; and (iv) inflation. Refer to Section 5 for details.

185. EWSI forecasts capital expenditures for each of 2022, 2023, 2024, 2025 and 2026 based on its planned capital projects and programs for each year. EWSI's capital planning is completed on a 5-year horizon to align with PBR renewals and is completed under a comprehensive and well defined capital management process described below.

186. EWSI then calculates the forecast revenue requirement for 2022 to 2026 based on (i) forecast operating costs, (ii) calculated depreciation expenses related to both existing assets and forecast capital additions, and (iii) financing costs (cost of debt and equity). EWSI's financing costs (cost of capital) are based on its forecast of the cost of debt (interest rates) and cost of equity (or return on equity). Forecast interest rates and return on equity for the 2022-2026 PBR term are based on EWSI's forecast rate base (cost of utility assets) multiplied by its proposed capital structure (proportion of debt and equity), weighted average cost of debt and proposed return on equity respectively. EWSI's interest rate on new debt issuances is fixed over the 5-year PBR term as explained in Section 4.3.2. Similarly, EWSI's return on equity is fixed for the 5-year PBR term.

187. By setting rates in this manner, it ensures that EWSI will collect sufficient revenues to support its capital infrastructure investment for the upcoming PBR period. Other than these exceptions to operating cost increases noted above, EWSI bears the risk of any other cost increases above inflation such as those related to power, natural gas, chemicals, labour and materials and other input price increases. Similarly, fixing interest rates on new debt issuances at 2022 rates and by fixing its return on equity at 9.95% for the 2022-2026 PBR term, ensures that EWSI bears the risk of variations in its cost of debt and equity during the 5 year period.

Customers benefit from having stable rates and are shielded from rate impacts associated with higher input prices (above inflation) and any increases in EWSI's cost of debt and equity.

188. Section 4.2.1 provides the inflation factor methodology and forecast. Section 4.2.2 summarizes EWSI's operating cost forecasts process. Section 4.2.3 summarizes EWSI's capital cost forecast process.

4.2.1 Inflation Factor Forecast

189. Consistent with the approved approach in the 2017-2021 PBR, the forecast value of escalators (inflation) is calculated as a composite between two Statistics Canada series:

- CANSIM Series V1808689: Annual Growth in Average Hourly Earnings (AHE), Alberta, Industrial Aggregate (excluding unclassified businesses).
- CANSIM Series V41694625: Annual Growth in Consumer Price Index (CPI), All Items, Alberta.

190. For the 2022-2026 PBR term, EWSI has proposed a new inflation factor for Water Services with weighting of 60% CPI (non-labour component) and 40% AHE (labour component), based on Water Services forecast cost structure. Weightings of 65% CPI and 35% AHE have been applied since EWSI's 2012-2016 PBR Applications for Water Services and Wastewater Treatment Services. The weightings of 65% CPI and 35% AHE were based on the combined operating expenses for Water Services and Wastewater Treatment. For the 2022-2024 and 2022-2026 PBR Applications EWSI has applied separate weight factors for Water Services, Wastewater Treatment, and Drainage Services, based on each operations proportion of labour costs relative to all other costs over the PBR term.

191. EWSI purchased a five year forecast (2020-2025) for the two data series from The Conference Board of Canada in November 2020. The values and calculations are shown below in Table 4.2.1-1.

192. As the Water Services PBR Application covers the 2022-2026 period, EWSI has used The Conference Board's 2022-2025 forecast to calculate the Water Services forecast escalator. Forecast data for 2026 was not available at this time.

Table 4.2.1-1
Water Services Inflation Factor Forecast
(%)

	A **CPI**	B **AHE**	C **Total**
1 2022	2.3	1.5	
2 2023	2.0	2.8	
3 2024	2.2	3.0	
4 2025	2.1	2.9	
5 Average	2.2	2.5	
6 Weighting	0.60	0.40	
7 Result	1.3	1.0	**2.31**

193. Consequently, EWSI has used 2.31% for the forecast escalator for each year in the Water Services 2022-2026 PBR Application.

194. In accordance with Schedule 3 of the Bylaw, each year, the inflation factor will be updated based upon a forecast of the rate of inflation supported by The Conference Board of Canada's forecast inflation for the upcoming year. Once the calendar year is complete and the actual rate of inflation is known, the charges for the subsequent year will include an adjustment to correct for the difference between the forecast and actual rate of inflation for the calendar year. As the index utilized for the actual Labour Cost component may not be available for the complete calendar year, the consecutive 12 month period for which the index utilized for the Labour Cost component is most recently available is used as a substitute for the calendar year for purposes of the Labour Cost component inflation adjustment.

4.2.2 Operating Cost Forecast Process

195. The following summarizes the operating forecast process for some of EWSI's major operating cost categories:

Staff Costs and Employee Benefits

196. This category represents approximately 30% of EWSI's total operating costs and is comprised of direct salaries, employee benefits, overtime and incentive and is partially offset by labour recoveries for employee time spent on capital and commercial projects. EWSI's structure for compensating its management employees includes a base level of compensation (including benefits) and an incentive component which is paid when specified financial, safety, customer, operational and individual performance targets are met. Salaries for non-bargaining unit staff are reviewed annually and adjusted based on market assessments. Wages for union staff are determined based on the provisions of current collective bargaining agreements.

197. EWSI developed its 2022 salaries and benefits cost forecast in 2022 dollars based on its best estimates of work levels in 2020. Beyond 2022, there are no increases in operating costs related to additional staff. EWSI then applies the inflation factor to obtain a forecast of salaries and benefits costs in nominal dollars for 2023-2026.

198. Under the 2022-2026 PBR structure, EWSI bears the risk of staff costs and employee benefits increasing at a rate higher than the inflation factor. For example, salaries and wages for EWSI union staff are determined based on negotiated collective bargaining agreements with the International Brotherhood of Electrical Workers Local 1007 employees, Civic Service Union 52 and Canadian Union of Public Employees Local 30 employees with two agreements set to expire on December 19, 2020 and the third agreement set to expire December 18, 2021. EWSI will bear the risk if the new collective agreements contain salary and wage increases higher than the rate of inflation.

Power, Other Utilities and Chemicals

199. This cost category represents approximately 9% of EWSI's total operating costs and is comprised of both power and natural gas.

200. Power costs represent approximately 93% of the power and other utilities category and are generally based on the amount of power consumed multiplied by the power price per unit consumed.

201. EWSI developed its 2021 power cost forecast based on indicative pricing from potential suppliers into its competitive procurement process. Beyond 2021, no increase in power volumes is assumed due to relatively stable consumption levels. The inflation factor is applied to 2021 power prices to obtain a power price forecast in nominal dollars for 2022-2026.

202. The Solar Power Farm Project, expected to go into service at the beginning of 2022, will generate 29% of the annual electricity consumption required for the water treatment plants. The electricity volume forecast for Water Services has been reduced accordingly starting in January 2022.

203. As discussed in Section 2.3.6, under its Green Energy Initiative, EUI will be purchasing green RECs starting in 2023. The costs will be allocated to each business unit based on that business unit's electricity consumption. A forecast of the green REC costs has been included in EWSI's power cost forecast.

204. Natural gas costs represent approximately 5% of the power and other utilities category and are generally based on the amount of natural gas consumed multiplied by the price per unit consumed. EWSI developed its 2022 natural gas cost based on consultant forecast expectations and its best estimates of natural gas volumes required in 2022. Beyond 2022, an increase in natural gas costs at the inflation factor is assumed, plus an annual increase related to the federal carbon tax which is forecast to increase from $50 per tonne to $110 per tonne over the 2022-2026 period

Chemicals

205. This cost category represents approximately 10% of EWSI's total operating costs. Chemical costs are impacted by four main variables: raw water quality, water flow or production, chemical dosage and chemical price. Market analysis indicates that increased cost of chemical production, including variations in material and transportation costs and the influence of energy market prices, will result in increased chemical prices in the near future. In addition, chemical prices for most chemicals are influenced by foreign exchange price variances. EWSI developed its 2022 chemical cost forecast based on its best estimates of chemical prices for 2022 factoring in increases due to foreign exchange rates and its estimates of 2022 chemical volumes based on an average of the past 5 years of historical data. Beyond 2022, no increase is applied to chemical volumes due to relatively stable consumption levels. The inflation factor is applied to 2022 chemical prices to obtain a chemical cost forecast in nominal dollars for 2023-2026.

206. Under the 2022-2026 PBR structure, EWSI bears the risk of chemical prices increasing at a rate higher than the inflation factor.

Contractors and Consultants

207. Contractor and consultant costs, materials and supplies and vehicle costs together represent approximately 11% of EWSI total operating costs over the 2022 to 2026 period. Contractor and consultant costs include hydrovac services, paving services, utility locating costs, barricading services, and contracted services to provide specific skills that are either not available within Water or when workloads increase beyond the capacity of internal resources. Beyond 2022, EWSI has assumed contractor and consultant costs increase at the inflation factor with the exception of a reduction in contractor and consultant costs in 2023 related to one-time asset management plan development costs included in the 2022 forecast.

208. The remaining forecast operating costs for EWSI for 2022-2026 are described further in Section 5.0.

4.2.3 Capital Cost Forecast Process

209. EWSI's 2022-2026 capital cost forecasts are established based on a capital management process which governs the identification, evaluation, approval, execution and monitoring of capital projects. EWSI's Capital Steering Committee, the Project Management Office, and the Financial Review Council, consisting of EPCOR executive leadership, provides ongoing capital management oversight.

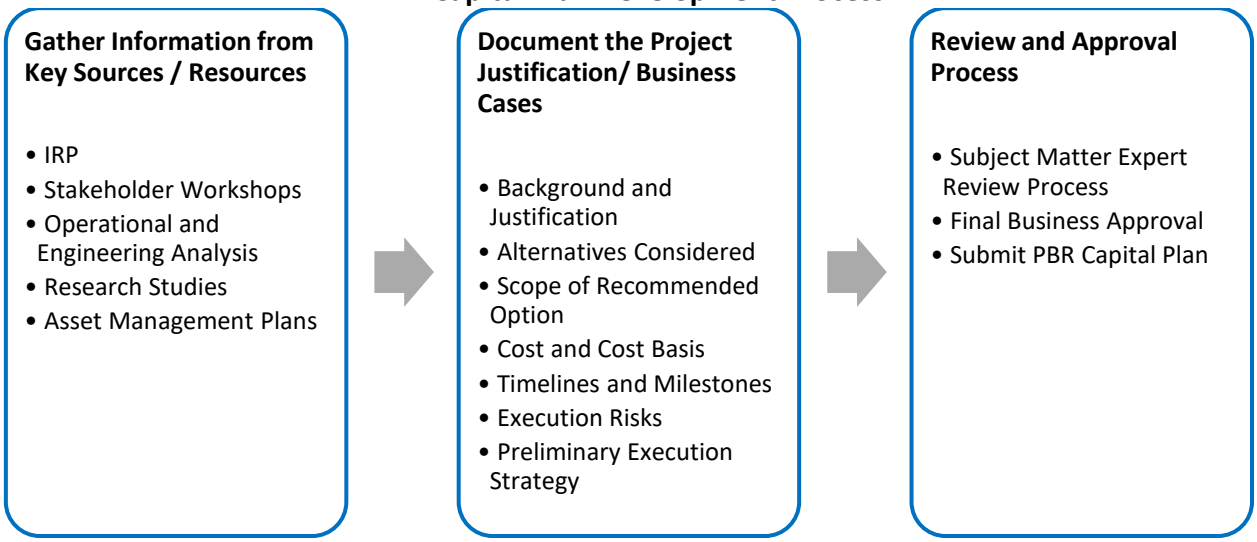
210. An organizational project management initiative with representatives of each EPCOR business unit was also started to help align, develop and share project management best practices across the organization. One of the results of this initiative was the design and implementation of a standardized Capital Delivery Model. Adjustments to EWSI mapped processes were made to align with the developed Model. At a high level, the Capital Delivery Model is a standardized yet flexible model that clarifies how Capital Projects and Programs are delivered at EPCOR. Aligned with industry best practices, it divides projects and programs into four major phases: initiate, plan, execute and closeout, that are further broken down into up to 7 stages, such as Investment Justification, Detailed Design or Construction, depending on a project scope complexity and requirements. Accordingly, through a project lifecycle, projects will move through Stage Gates by completing defined requirements to demonstrate operational readiness before moving to the next stage. The model was developed with scalability in mind to ensure that the appropriate level of governance is applied to different project types. Therefore, although minimum gate requirements have been established, not all projects and programs will need to complete the same (or any) requirements at each stage gate. Through this initiative, tools and templates are also being developed or improved. For example, once a standardized structure is established to manage standard project documents, forms and workflows can then be used to automate the creation or dissemination of information. Similarly, by using standardized Work and Cost Breakdown Structures, performance data can then be compared and analyzed to identify additional efficiency opportunities. Other tools are also being aligned and improved to support scheduling, estimating, cost control and reporting. Together, the objective of these initiatives are to improve clarity, efficiency and risk reduction for the delivery of capital projects, while also improving predictability, resources management and reducing project costs.

211. The sections below describe the following processes: (i) PBR capital plan development process and (ii) the internal capital governance and management processes used to manage to the PBR capital plan.

4.2.3.1 PBR Capital Plan Development Process

212. EWSI utilizes a three step approach for the preparation of the capital program for the five year PBR period. This approach is illustrated in the process diagram in Figure 4.2.3.1-1 and discussed further below.

Figure 4.2.3.1-1
PBR Capital Plan Development Process



Step 1: Gather Information from Key Information Sources

213. While PBR submissions generally occur only once every five years, EWSI continually assesses its operations and assets, maintaining a detailed understanding of its upcoming priorities and challenges. The following external processes and sources of information help form the foundation of this work:

- **City of Edmonton** - EWSI collaborates with the City of Edmonton at the working level on an ongoing basis, including through the City of Edmonton / EPCOR Capital Working Committee. Strategic documents from the City of Edmonton, including the City Plan, the Reimagine plan and ConnectEdmonton are monitored to ensure alignment with the City of Edmonton's growth projections and strategic objectives.

- **External expert resources** – External engagements such as engineering studies, risk mitigation analyses and inspections are performed on EWSI's assets and incorporated into EWSI's capital plans.
- Industry – EWSI monitors trends occurring within the industry and collaborates frequently with other Canadian municipalities to address common challenges through research projects and active industry working group participation. EWSI is represented on the Board of the Canadian Water Network and is an active participant in the Canadian Water Network municipal consortium leadership group that meets regularly to collaborate on programs to improve the operation of the major utilities across Canada. Recent examples include the COVID-19 response initiatives and the multiple research programs conducted jointly with the Insurance Bureau of Canada and CWN to address the risks of flooding due to Climate Change. Through the SIRP initiative EWSI has also been an active participant and case study on numerous reports from the Intact Center on Climate Adaptation and the National Research Council of Canada, highlighting best practices in flood water management. EWSI is also a member of the Water Research Foundation where it collaborates with other municipalities to share best practices and participate in research initiatives for the water, wastewater and drainage systems. EWSI is also an active participant with the Canadian and American Water Works Association (CWWA/AWWA) with one employee serving as President of CWWA in 2020. EWSI also participates in the Canadian National Benchmarking initiative across the water, wastewater and drainage system as do many other municipalities across Canada.

214. Internally, EWSI regularly engages its staff from all areas to participate and contribute towards the development of the PBR capital plan through its Capital Planning Workshops. Through these workshops, EWSI staff collectively review each project's goals, rate its priority based on risk and justification, help determine viable alternatives, and recommend optimum timing for the project's execution.

215. EWSI documents the new priorities and challenges identified through a number of reports and plans, including the following:

- **Integrated Resource Plan (IRP) –** EWSI prepares a summary document, the EWSI Integrated Resource Plan, which looks forward at least 15 years to determine the longer term capital infrastructure requirements for the water utility. The plan considers the raw water conditions, operational capacities of the water utility treatment, reservoir and transmission systems during all seasons and identifies the

capital and operational requirements for demand conditions experienced throughout the city of Edmonton and surrounding area.

- **Operational and Engineering Analysis –** Operational analysis includes conducting system analysis and performance evaluation. Modeling tools are also utilized in the analysis to help identify any significant deficiencies as well as opportunities for improving efficiency. Much of the capital work is also related to lifecycle replacement or rehabilitation of aging assets. Aging assets are assessed through inspection or engineering analysis to determine the optimum timing of rehabilitation or replacement work.
- **Research Studies –** EWSI has an in-house process development team and a pilot water treatment plant to conduct practical research and simulations leading to results that can be directly transferred to the full-scale treatment plants.
- **Asset Management Approach and Plans** – EWSI's asset management planning approach is a systematic process to:
  - structure and document asset inventory;
  - measure, monitor and maintain asset performance;
  - minimize exposure to risk; and
  - guide and optimize the sustainable investment of funds.

  The general asset management methodology, developed by the United States Environmental Protection Agency (EPA) consists of five core questions:

  1. What is the current state of my assets?
  2. What is my required level of service?
  3. Which assets are critical to sustained performance?
  4. What are my best operating and capital improvement plan investment strategies?
  5. What is my best long-term funding strategy?

  The asset management approach is the mechanism that can address and answer these questions.

  The overall objective of asset management is to optimize whole life costs of the asset while minimizing asset related risks that have the potential to impact business objectives. In essence, asset management imposes a risk based approach to determining the cost and benefits of extending an asset's life through continued maintenance versus replacing that asset. Each asset is assessed to determine its

potential to impact operating permit requirements, health and safety of employees, public health, environment, capacity requirements and finances. This approach has led to the identification and ranking of the most critical assets. These critical assets are given higher priority in projects/programs so that sustained performance can be maintained at all times (an example is the Low Lift Pump Assemblies). This asset management approach has also identified systems that upon failure would create significant downtime and loss of service for an extended period (an example is the Chemical System Upgrades Program).

EWSI pursues continual improvement to its asset management approach. There has been an improvement to the ability to deliver on the objectives of the asset management approach. This includes an enhanced focus on the creation of Asset Management Plans, which enables better anticipation of required spending and timelines, better understanding of the risks associated with asset failures in order to determine the best mitigation strategies, and the focusing of maintenance time on higher-criticality assets. Moreover, EWSI will continue to seek improvements to its asset management approach by identifying new tools and processes to support the capital decision making process.

216. These many sources of information, supplemental additional PBR specific assessments as well as internal and external expert resources, are brought together when a PBR submission for capital is prepared. This approach facilitates a consolidated perspective of the entire system's requirements.

Step 2: Project and Program Categorization and Business Case Preparation

217. EWSI categorizes capital projects and programs to assist with the prioritization, justification and analysis process. For the 2017-2021 PBR term, the following six categories are used to classify projects and programs:

- **Regulatory** – projects specifically identified to address current and upcoming regulatory requirements from regulatory bodies such as Alberta Environment.
- **Growth / Customer Requirements** – projects specifically identified to manage growth in the City of Edmonton, to relocate water utilities due to changes made by the City departments and to meet any other requirement stipulated in the franchise agreement that EWSI has with the City of Edmonton such as water service to new customers and fire protection.

- **Health, Safety and Environment** – projects specifically identified to ensure the health and safety of employees and public.
- **Reliability / Life Cycle** – projects specifically identified to rehabilitate or replace existing assets at the end of their useful life, to improve reliability and to ensure acceptable risk levels are maintained.
- **Performance / Efficiency Improvement** – projects which result in operational efficiency or improvement to lower future costs.
- **Accelerated Programs** – include both the Accelerated Water Main Renewal and Accelerated Fire Protection programs.

218. During the course of the 2017-2021 PBR term, EWSI determined that many of the capital projects under the Accelerated Program category can be better categorized based on the need or justification for the project and thereby better placed in categories such as Reliability / Life Cycle. Moving forward to the 2022-2026 PBR term, the Accelerated Program category has been eliminated. The remaining five project categories, noted above, will continue to be used for the 2022-2026 PBR term.

219. Following the extensive review, analysis, and establishment of capital priorities, EWSI documents every proposed project and program using a project charter and detailed costing spreadsheet. For projects that exceed $5.0 million in total or for programs that exceed $5.0 million in the PBR term, a formal business case is also prepared for the PBR Application. EWSI applies a rigorous and consistent approach to the documentation of each project and program, which is underpinned with various tools and guidelines to support cost estimation and other critical components of project justification. Water Services project and program business cases are provided in Appendix F.

220. The key components of the business cases include (i) project/program background and justification; (ii) project/program description; (iii) project justification; (iv) alternatives analysis, where applicable; (v) cost forecast; and (vi) risk mitigation.

i. Project/Program Background and Justification
   - History and background, including identification of the problem
   - Justification based on how the project or program addresses key risks

ii. Project/Program Description

- problem or opportunity identification
- proposed project/program scope and out of scope items
- goals - anticipated outcomes and benefits

iii. Alternatives Analysis

- analysis of viable alternatives
- rationale behind the proposed solution
- discussion of costs and benefits of each alternative
- financial analysis (net present value analysis) where cost is the major factor to decide between alternatives

iv. Cost Forecast

- annual capital expenditure forecasts including direct and indirect cost and contingency;
- costing assumptions;

v. Risk Mitigation

- Identification of the key risks associated with project or program execution
- Steps EWSI will take to mitigate the identified risks identified.

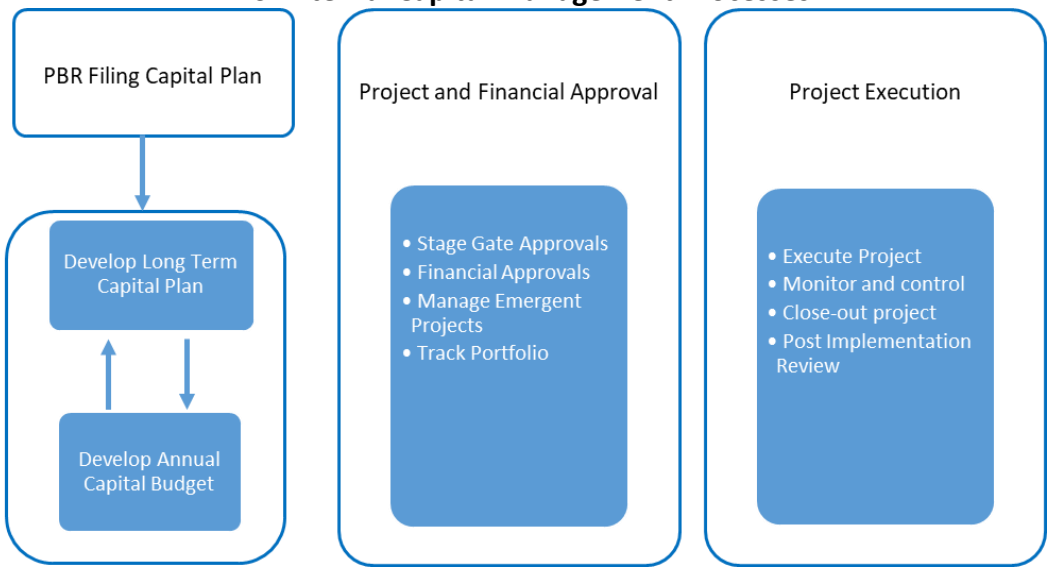
Step 3: Review and Approval Process

221. A prioritized review of the project charter, detailed costing spreadsheet and risk matrix (for projects) is performed by operations, finance and regulatory staff to ensure accuracy, provide guidance on the application of corporate contingency guidelines and to identify any impacts between interdependent projects and programs. Senior reviews occur on a prioritized basis at the project and program level, as well as at the consolidated level to ensure a consistent risk-based approach is applied across operational areas. Final approval of the PBR capital plan is given by EWSI Executive leadership based on review and discussion with operations, finance and regulatory. The review ensures a clear understanding of the risks associated both with delivering the project or program, and mitigated by its delivery.

4.2.3.1 Capital Management and Governance Processes (Managing to the PBR Plan)

222. Once the PBR capital plan is approved, EWSI's capital management processes provide the governance and gating (approval) stages through which project execution occurs. These processes also include the annual budgeting of capital projects. The capital management processes are well-established and are illustrated in Figure 4.2.3.1-1:

Figure 4.2.3.1-1
EWSI Internal Capital Management Processes



- EWSI prepares a capital plan for the five year PBR term, as detailed above. This plan is ultimately approved by EWSI's regulator, Edmonton City Council, and, as a result, it establishes the baseline against which all capital activities are determined and measured.
- **Annual Capital Budget -–** The PBR capital plan provides the starting point for the annual capital budget. An extensive process is undertaken where all projects identified for that year are reviewed, project justifications updated, and each project is vetted and prioritized by the Capital Steering Committee before inclusion in the annual budget. Prior to any project identified in the PBR plan commencing, the cost estimate is updated using the most current understanding of the scope and work breakdown and using the most current labour and material costs. The project is also assessed to ensure it remains viable from both technical and priority perspectives. Once approved by the EWSI executive, the annual capital budget is then reviewed by EUI executive (Financial Review Council). Once approved by EUI executive, the annual budget is submitted for approval to EUI's Board of Directors. Any projects that were not identified in the PBR plan (referred to as unbudgeted projects) are occasionally

required due to unforeseen circumstances or occurrences such as equipment failures, emergencies, safety hazards or process changes. These projects are identified through the annual capital budget process where the need for the project is evaluated and considered for approval. Unbudgeted projects over $2 million require additional review and approval at EUI executive level.

- **Long Term Plan –** EWSI prepares a 10-year plan for capital expenditures on an annual basis as part of EUI's Long Term Plan (LTP) development. The LTP provides a longer term review of the PBR Capital Plan and takes into account any major changes from that original plan. It also forms some of the basis for capital expenditures to be considered for inclusion in the next PBR renewal application.
- **Project and Financial Approvals –** In this process, the projects are approved through the stage gate process. The project justifications prepared during the annual budget are updated for any new information and a formal request is sent to approvers to review for financial approval to execute the projects. The approvers include members of the Capital Steering Committee.
- **Project Execution and Monitoring –** At this stage, it is the project manager's responsibility to execute the project. Monitoring, control, quality and safety are critical aspects of this phase. Oversight of the execution is maintained by both the Project Management Office and the Capital Steering Committee. The Capital Steering Committee meets monthly to review the status of projects, including review of budget variances. The Controller, Water Services Finance, is responsible for ensuring appropriate internal controls around capital financial accounting and reporting. Project close-out includes formal approval from asset owners and operations that the assets can be turned over to Operations to run and maintain. Depreciation of the assets then commences. PIRs are undertaken for projects over $5 million where the variance between the final completion costs and the originally approved budget is more than 20%. At a minimum, the documentation will include:
    - Actual Capital Expenditures versus the original budget;
    - Preliminary scope versus final scope;
    - Timing of completion;
    - Actual benefits realized versus expected; and
    - Process improvements/corrective action identified during the project that may be incorporated in future capital projects (i.e. learnings from the project).

4.3 Capital Structure and Cost of Capital

223. The cost of capital is comprised of EWSI's cost of debt, cost of equity (return on equity or ROE) and its capital structure or proportion of debt and equity financing. EWSI is applying for a deemed capital structure of 60% debt and 40% equity for the 2022-2026 PBR term. This is consistent with EWSI`s historical actual capital structure. EWSI's methodologies for determining its return on equity and cost of debt are described below. Calculations of EWSI`s weighted average cost of capital and return on rate base are provided in Section 9.

4.3.1 Rate of Return on Equity

224. To establish its proposed return on equity, EWSI recommends that an update of Grant Thornton's 2016 analysis (used to set the 2017-2021 PBR term's common equity return) be used to establish the 2022 – 2026 PBR common equity rate of return. A formulaic extension of this prior methodology is seen as the most straightforward approach under current economic conditions. The current turmoil in financial markets resulting from the COVID 19 global pandemic and the resulting fiscal and monetary policy initiatives used by governments and central banks to diminish economic devastation has impacted the viability of traditional approaches to determine equity rates of return. A formulaic extension eliminates these concerns and also best aligns with the City's desire to determine a risk premium to the AUC's generic cost of capital to derive the allowed rate of return on equity for EWSI.

225. EWSI has prepared a Memorandum with the assistance of an industry recognized expert to provide a detailed review of the proposed methodology and the specific adjustments required to update the Grant Thornton 2016 approach. This analysis, entitled the Return on Equity Memorandum is provided in Appendix D. In Section 9.2 to the Application, EWSI provides a summary of the specific updates required to adjust the Grant Thornton approach as well as commentary on the differences in the risk profile of EWSI's businesses in relation to those regulated by the AUC in order to justify the risk premium over the generic allowed return on equity. Based that analysis, EWSI is proposing a rate of return on common equity of 9.95 % for the 2022-2026 PBR term. The analysis also proposes the continuation of the current capital structure of 60% debt and 40% equity.

226. As shown in Table 4.3.1-1, a proposed rate of return of 9.95% on common equity for the 2022-2026 PBR term reflects a 0.225% decline from EWSI's approved rate of return on equity of 10.175% in the 2017-2021 PBR term.

Table 4.3.1-1
EWSI Forecast Return on Equity
Financial Schedule 14.1, line 33
2021-2026

		A **2021D**	B **2022F**	C **2023F**	D **2024F**	E **2025F**	F **2026F**
1	Return on Equity	10.175%	9.95%	9.95%	9.95%	9.95%	9.95%

4.3.2 Cost of Debt

227. EWSI reflects new debt issuances from its parent company, EUI, through deemed inter-company loans. Consistent with regulated business units within the EUI group of companies, debt rates on long-term inter-corporate loans issued by EUI to EWSI are based on EWSI's regulated services on a stand-alone basis. On September 3, 2020, Dominion Bond Rating Service issued a one-time private rating advising EWSI that its private rating is A (low) (equivalent to S&P rating of A-). EUI currently has an A (low) rating from DBRS and A- rating from S&P.

228. EWSI forecasts its cost of new issues of inter-company debt based on published Government of Canada long-term bond yield forecasts and indicative credit spreads from major Canadian banks. For the 2022-2026 PBR term, EWSI is proposing to fix the forecast cost of new debt issuances at the 2022 forecast cost of debt of 3.50% as shown in Table 4.3.2-1. This reflects a 1.32% decline in EWSI's approved cost of debt of 4.82% relative to the 2017-2021 PBR term.

229. Under EWSI's PBR Framework, the risk of interest rate fluctuations is entirely borne by EWSI and is not passed on to its customers. Acceptance of the interest rate risk is another significant risk factor that differentiates EWSI's PBR approach from the AUC PBR approach. Under the AUC PBR, Alberta electric and gas utilities pass on interest rate risk to their customers through rate adjustments. As such, this risk factor represents another component of the EWSI risk premium above the AUC's Generic Cost of Capital as further discussed in Section 9.2 to the Application.

Table 4.3.2-1
EWSI Forecast Cost of New Debt Issues
Financial Schedule 17-3
2021-2026
(%)

	A **2021 D**	B **2022 F**	C **2023 F**	D **2024 F**	E **2025 F**	F **2026 F**
1 Cost of Debt for New Debt Issues	4.82	3.50	3.50	3.50	3.50	3.50

230. This 2022 forecast cost of debt for EWSI is determined as follows:

- the 2022 average yield on 30-year[9] Government of Canada bonds of 1.83% based on the average forecasts from three Canadian banks published in October 2020; plus
- EUI's indicative 30-year credit spread of 1.62% based on the average forecasts from six Canadian banks published Q4 2020; plus
- a 0% risk premium for EWSI over EUI's cost of debt reflecting that EWSI and EUI have the same credit rating; plus
- a transaction cost of 0.05%.

231. EWSI also reviewed the Consensus Economics Forecasts (October 2020 Report) to confirm its proposed stand-alone cost of new debt issuances. This report confirmed the reasonability of the proposed 3.5% cost of debt for EWSI.

4.4 Depreciation and Amortization

232. Utility assets are depreciated over the shorter of the assets' physical, technological, commercial or legal lives. Depreciation and amortization of EWSI's capital assets are determined on a straight-line basis over the estimated service lives. When the asset is no longer used or useful, the assets are retired. Assets that are similar in the way they function and have similar useful lives are grouped together and depreciated (referred to as "group asset"). When a group asset is retired or disposed of, its original costs are charged to accumulated depreciation with no loss or gain reflected in income. Gains or losses on the retirement of other assets such as buildings and vehicles are reflected in income.

[9] Historically EWSI's cost of new debt calculation relied on 20-year Government of Canada bond yields and 20-year EUI credit spreads. For this PBR term, EWSI has adjusted the methodology to use the 30-year yields to calculate the stand-alone cost of debt which is more appropriate given that its long-term debt is used to fund assets with lives that generally far exceed 30 years. As indicated in table 4.4.1, the composite average asset life for all of EWSI's Water assets is 49 years.

233. In 2014, for the 2017-2021 PBR Application, EWSI engaged depreciation experts, Gannett Fleming, to prepare a depreciation study to review the average service life for each of the componentized service categories and to recommend updates to these service lives. The service life estimates developed in the Depreciation Study were based on expert judgment and incorporated statistical analysis of retirement data, discussions with EWSI management and consideration of estimates made for other water utilities. EWSI adopted these rates effective January 1, 2017 on a prospective basis to new capital additions unless specific knowledge of actual expected retirements are known. The average service lives for certain asset categories is detailed in Table 4.4-1.

234. EWSI did not undertake a new depreciation study for the 2022-2026 PBR Application as there have been no significant or wholesale changes in accounting policy or attributed useful lives across the plant in service since the previous 2014 depreciation study. However, there have been some minor changes to asset lives for new circumstances moving forward as described in the following paragraphs.

235. New assets have been added as a result of the Solar Power Farm and Battery Energy Storage Systems Projects. The solar assets have been added in with an asset life of 35 years which is similar to existing electrical assets. Battery assets have been added in with a 10 year life under a new sub-category. These projects are set to be in service at the end of 2022.

236. EWSI has added major inspection costs of critical assets to its asset base. These inspections vary in frequency and are amortized based upon the frequency of the required inspection rather than on the depreciation rate of the underlying asset. EWSI feels that amortizing inspections over the time period between required inspections is a reasonable and logical way to amortize these costs. These assets have an average life of 10.0 years.

237. Beginning in 2020 EWSI began to capitalize on a go forward basis, certain operating activities related to valves and services. These costs are more appropriately amortized over their useful life rather than expensed as operating expenses. These assets belong to existing asset categories.

238. Average depreciation rates for EWSI's major asset categories as well as the overall composite depreciation expense rate are provided in Table 4.4-1. EWSI's depreciation expense for 2022-2026 is provided in detail in Section 7 of the Application.

Table 4.4-1
Annual Depreciation Rates
Financial Schedule 12-2

		A	B	C	D
		Annual Depreciation Rate	**Service Life (years)**	**Annual Depreciation Rate**	**Service Life (years)**
	Asset Category	**2017-2021**		**2022-2026**	
1	Water treatment Plant	2.50%	40.0	2.50%	40.0
2	Reservoirs and Pump houses	2.50%	40.0	2.50%	40.0
3	Distribution Mains	1.25%	80.0	1.25%	80.0
4	Transmission Mains	1.25%	80.0	1.25%	80.0
5	Hydrants	1.82%	55.0	1.82%	55.0
6	Meters	5.00%	20.0	5.00%	20.0
7	Services	1.54%	65.0	1.54%	65.0
8	General Plant (composite rate)	9.28%	10.8	9.76%	10.3
	General Plant includes:				
9	Computer Equipment	25.00%	4.0	25.0%	4.0
10	Laboratory Equipment	10.00%	10.0	10.00%	10.0
11	Machinery and Equipment	10.00%	10.0	10.00%	10.0
12	Office Furniture and Equipment	12.50%	8.0	12.50%	8.0
13	Software Intangibles	10.00%	10.0	10.00%	10.0
14	Structures and Improvements	2.22%	45.0	2.22%	45.0
15	Vehicles	10.00%	10.0	10.00%	10.0
16	Inspections	-	-	10.00%	10.0
17	**EWSI Composite Rate**	**1.91%**	**52.4**	**2.03%**	**49.4**

4.5 Contributions in Aid of Construction

239. Certain EWSI assets may be acquired or constructed with funding referred to as contributions in aid of construction (CIAC) from developers or customers. Contributions are provided under the following categories: (i) Contributions from Developer-Built Assets; and (ii) Other Contributions from Customers.

4.5.1 Contributions from Developer-Built Assets

240. Certain EWSI infrastructure, referred to as private installations, are built and financed by property developers under a development servicing agreement between the developers and the city of Edmonton. Under the provisions of the servicing agreement and upon issuance of a construction final acceptance certificate, the developers will transfer ownership and title of private installations to the city of Edmonton. In accordance with private installation provisions under a franchise agreement between the city of Edmonton and EWSI, the city of Edmonton will then transfer ownership of the private installation assets related to the public utility and EWSI will record the transferred assets at cost with an equal offsetting entry to contributed assets.

These private installations include those assets related to water mains and associated appurtenances such as hydrant infrastructure.

4.5.2 Other Contributions from Customers

241. EWSI charges fees to customers to install a new water distribution main, new water service connection from the distribution main to the private property line, and to inspect private developer service connections. EWSI Drainage Services administers the application process on behalf of Water Services as customers apply for both water and sewer servicing at the same time.

4.5.3 Capitalized Overhead Methodology

242. Capitalized overhead includes the cost of certain supporting functions which are charged to capital projects (capitalized). These functions include, among others, senior management oversight, supervision, project governance, accounting, supply chain and dedicated health and safety resources. Capitalized overhead reflects a transfer from EWSI's operating expenses to capital projects as indirect costs. The methodology for charging Capital overhead is to apply a percentage rate to the direct regular labour costs charged to a project. The rate is determined annually based on estimated total capital overhead costs as a ratio of the estimated total capitalized labour costs.

4.6 Inter-Affiliate Transactions Summary

243. As a member of the EPCOR group of corporations, EWSI obtains corporate services from its parent corporation, EUI. Corporate Shared Services are comprised of activities that are centrally managed within the EPCOR group due to their nature and/or for the purpose of realizing economies of scale and scope. EWSI receives certain services from, and provides certain services to, other members of the EPCOR group.

244. For ease of reference, EWSI refers to the services provided by EUI to EWSI as "Corporate Shared Services", and the services provided by EWSI to other affiliates and services provided by other affiliates to EWSI as "Affiliate Services". Revenues received by EWSI for Affiliate Services provided by EWSI are included in the cost recoveries in EWSI's regulated operating costs. Costs charged to EWSI for Affiliate Services provided by EWSI's affiliates are also included in EWSI's regulated operating costs and certain regulated capital projects. Table 4.6-1 highlights all Affiliate transactions for EWSI.

245. Corporate Shared Services costs are recovered by EUI from EWSI through either the direct assignment of the costs to EWSI or through an allocation process. The direct assignment or allocation of these costs from EUI is with each of the regulated and non-regulated operations within EWSI. Appendix L-1 provides a detailed description of the Corporate Shared Service costs methodology used to allocate Corporate Shared Services costs to EUI's business units including EWSI.

246. The costs associated with Affiliate Services provided by EWSI to other corporations are recovered by EWSI through either the direct assignment or invoicing of the costs to the affiliate or using an appropriate cost allocation method. Included in the Affiliate Services is EWSI Shared Services which allocates costs to the three regulated business units operating within the legal entity EWSI: Water Services, Wastewater Treatment Services and Drainage Services. These EWSI Shared Services include financial, administrative and other services provided on a shared basis in order to achieve cost efficiencies within the businesses supported by EWSI. Appendix L-2 provides a detailed description of the EWSI Shared Service costs methodology used to EWSI Shared Services costs to the three regulated business units operating under EWSI: Water Services, Wastewater Treatment Services and Drainage Services.

247. The allocated costs for Corporate Shared Services provided by EUI to EWSI have been approved for recovery in EWSI's revenue requirement over the years by EWSI's regulator, Edmonton City Council. Tariff Applications filed by AUC-regulated members of the EPCOR group [including EDTI and EPCOR Energy Alberta (EEA)] over the past decade have provided detailed explanations of the Corporate Shared Services provided by EUI, their associated costs and the allocation methods used to determine the charges for those services to each EUI subsidiary. In that context, the scope of the Corporate Shared Services, EUI's cost allocation methods and the resulting charges have been carefully scrutinized by the AUC. With only a few exceptions over the years, the AUC has approved the recovery of Corporate Shared Services charges as applied-for in the forecast revenue requirements of EPCOR's AUC-regulated entities. Each year, EUI undertakes a rigorous cost allocation process to ensure that the charges for Corporate Shared Services to its subsidiaries are reasonable.

248. Table 4.6-1 provides a summary of EWSI's transactions with the City of Edmonton and EWSI's affiliates including EUI, EEA, EWSI Water Services, EWSI Drainage Services and EPCOR Technologies Inc. (ETECH).

Table 4.6-1
Financial Schedule 18-1
Forecast Affiliate Transactions
($ millions)

	Affiliate and Service	A 2021 F	B 2022 F	C 2023 F	D 2024 F	E 2025 F	F 2026 F
	Revenues from the provision of services to the CoE						
1	Public Fire Protection	12.4	3.1	-	-	-	-
2	Water Sales	3.4	3.5	3.5	3.6	3.6	3.7
3	Total	15.9	6.6	3.5	3.6	3.7	3.7
	Services provided by (recovered from):						
4	City of Edmonton						
5	Franchise Fees	15.5	16.8	18.1	19.1	20.0	21.0
6	Property Taxes	0.7	0.8	0.8	0.9	0.9	0.9
7	Mobile Equipment Services	2.4	2.5	2.5	2.6	2.6	2.7
8	Other Services	0.8	0.7	0.7	0.7	0.7	0.8
9	Total	19.4	20.9	22.2	23.2	24.2	25.3
	EPCOR Utilities Inc.						
10	Corporate Shared Service Costs	13.7	13.8	14.1	14.3	14.6	14.9
11	Interest on Intercompany Loans	36.4	38.0	38.5	37.4	36.6	36.9
12	Interest on Short-term Debt	1.0	0.9	0.9	0.9	0.9	0.9
13	Other Services	0.4	0.4	0.4	0.4	0.4	0.4
14	Total	51.5	53.0	53.8	53.1	52.5	53.1
	EPCOR Technologies Inc.						
15	Hydrovac and Other Services	1.6	1.7	1.7	1.7	1.8	1.8
16	Total	1.6	1.7	1.7	1.7	1.8	1.8
	EPCOR Energy Alberta LP						
17	Customer Billing and Collection Services	8.0	8.2	8.3	8.5	8.7	8.9
18	Trouble Call Support Services	0.5	0.5	0.5	0.6	0.6	0.6
19	Total	8.5	8.7	8.9	9.1	9.2	9.4
	EPCOR Commercial Services						
20	Other Services	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
21	Total	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
	Other EWSI Business Units						
22	Water Shared Services	10.3	10.5	10.7	10.9	11.2	11.4
23	Water sales to Wastewater Treatment Services	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
24	Meter Reading Services (Recoveries) from Wastewater Treatment Services	(2.5)	(2.8)	(2.7)	(2.4)	(2.0)	(2.1)
25	Meter Reading Services (Recoveries) from Drainage Service	(2.5)	(2.8)	(2.7)	(2.4)	(2.0)	(2.1)
26	Drainage Services Rent (Recoveries)	(0.3)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)
27	Other services	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
28	Total	4.2	3.8	4.2	5.0	6.0	6.2
	Expenditures on capital projects arising from services provided by:						
29	City of Edmonton	0.5	0.5	0.5	0.5	0.5	0.5
30	EPCOR Technologies Inc.	4.4	4.5	4.5	4.6	4.7	4.8
31	EPCOR Corporate IT	1.4	1.4	1.5	1.5	1.5	1.5
32	EPCOR Drainage Services	2.7	2.8	2.8	2.9	2.9	3.0
33	EPCOR Distribution and Transmission Inc.	0.2	0.2	0.2	0.2	0.3	0.3
34	Other EPCOR Business Units	0.1	0.1	0.1	0.1	0.1	0.1
35	Total	9.3	9.5	9.6	9.8	10.0	10.1

4.7 Consumption Volume and Customer Count Forecast Methodology

249. EWSI forecasts its revenues for the 2022-2026 PBR term based on its forecast of water consumption and customer counts for the next six year period from 2021 to 2026. EWSI's water rates structure includes both monthly charges per cubic metre of metered water consumption ("variable" or "consumption" charge) and a flat monthly service charges per customer ("fixed" charge).

250. Assumptions regarding customer growth and consumption per customer are described further below.

4.7.1 Impacts of the COVID-19 Pandemic

251. EWSI's forecast anticipates a general return to pre-pandemic trends by 2023, as supported by external forecasts. The City of Edmonton predicts a return to pre-pandemic levels of output by 2022[10] or 2023, while the Government of Alberta and ATB Financial predict a return to pre-pandemic levels of output by 2023[11].

252. As further described in the sections below, EWSI is forecasting a return to long term trends in customer count and consumption per customer for all rate classes by 2023. The exception is commercial consumption per customer, which is forecast to return to the long term trend line by 2024.

4.7.2 Customer Count Forecasting Process

253. EWSI prepares its forecasts of customer growth separately for its residential, multi-residential and commercial customer classes.

254. **Residential Customer Count Forecast** – The residential customer category accounts for the 36% of total consumption, 53% of revenues and 91% of total customer accounts.

255. Customer growth rate assumptions in the 2017-2021 PBR Application were based on a review of historical customer growth trends, review of third party forecasts of Edmonton population growth and judgement. With the objective of improving the accuracy of the forecast and ensuring alignment across EPCOR, EWSI has adopted a new forecast methodology for

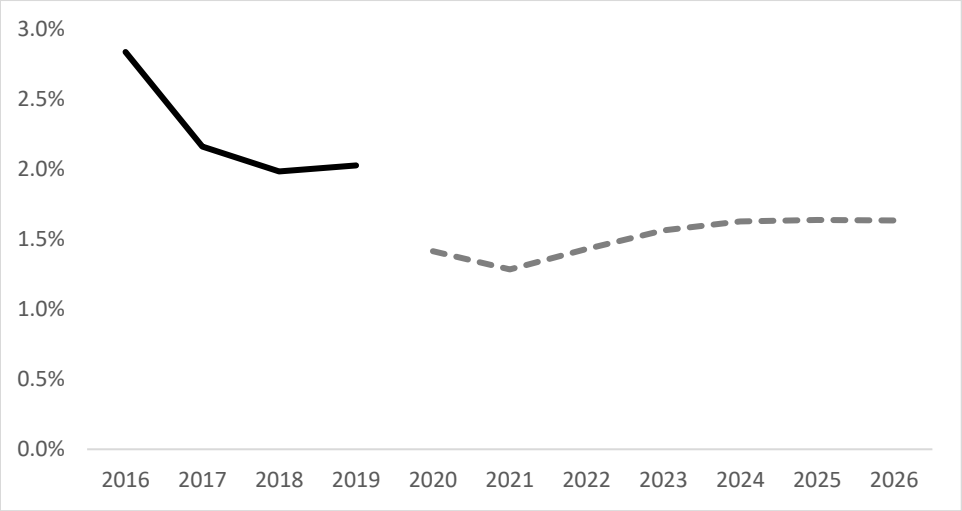
[10] https://www.edmonton.ca/business_economy/documents/Fall_2020_Forecast_Update.pdf
[11] https://www.atb.com/siteassets/pdf/company/insights/outlook/alberta-economic-outlook-october-2020.pdf https://www.alberta.ca/economic-outlook.aspx (retrieved February 12, 2021)

residential customer count. This methodology is based on the approach approved by the AUC for Energy Services' 2016-2017 Regulated Rate Application.

256. The revised methodology utilizes forecasts of housing starts from three independent sources: the City of Edmonton, The Conference Board of Canada and the Canada Mortgage and Housing Corporation (CMHC). The City of Edmonton provides a housing starts forecast for the Edmonton census subdivision, while CMHC and the Conference Board of Canada provide housing starts forecasts for the Edmonton census metropolitan area. Thus, the City of Edmonton forecast data is adjusted upward based on the observed historical percentage difference.

257. Figure 4.7.2-1 displays the historical annual growth in Edmonton housing starts from 2016-2019, as well as the average forecast across the three external sources. Slower population growth is anticipated due to the combined impacts of the COVID-19 pandemic and depressed energy prices.

Figure 4.7.2-1
Actual Housing Starts (2016-2019) and Average Forecast Growth Rate (2020-2026)



258. The results are based on a regression, with the monthly change in EWSI residential Active Customer Counts as the dependent variable and monthly housing starts as the explanatory variable. The constant is set equal to zero. The results of the t-test for significance of the explanatory variable and the results of the F-test for overall significance of the model are all significant at the 99% confidence level. The R-squared of 0.7356 is reasonably high for a model with a single explanatory variable. The coefficient on the explanatory variable is 0.408.

259. The average of the three housing starts forecasts is calculated for each future month, and multiplied by the coefficient of 0.408 to develop the forecast of growth in EWSI's residential site count.

260. **Multi-Residential Customer Count Forecast** – Generally multi-residential customer counts are forecast based on historical trending. However, EWSI anticipates that the economic trends dampening growth of residential sites over the next few years will extend to growth in multi-residential sites as well. Over the 2018-2019 period, growth in this customer class averaged 0.36%. A slow start to the recovery is forecast for 2021 and 2022, with 0.20% growth annually. Growth in the years 2023 and beyond is expected to return to near-historical levels, forecast at 0.30%

261. **Commercial Customer Count Forecast** – Two major changes to the forecast methodology for commercial customers have been incorporated. First, separate forecasts were developed for regular commercial customers and for the University of Alberta. The University of Alberta functions as an In-City bulk water customer, similar to regional water customers and, besides accounting for approximately 11% of commercial consumption, has consumption characteristics that differ from all other commercial customers. Therefore, developing separate forecasts leads to more consistent and reliable trending.

262. The second change to the methodology for the Commercial class forecast relates specifically to incorporating expectations of the COVID-19 pandemic impact, which results in the need for more weight placed on judgement about the future rather than historical trending.

263. Historically Commercial Growth has been increasing at a rate of 1.14% annually. EWSI is forecasting 0.03% growth in Commercial Customer Count for 2021 and 0.47% increase for 2022. From 2023 and beyond, EWSI is forecasting 0.91% growth in Commercial Customer Count, which is slightly lower than the 1.14% historical average due to global economic uncertainty and a decline in the energy sector in Alberta.

264. During the implementation of its new billing system in 2020, EWSI identified a difference in the determination of average monthly customer counts between the old and new billing systems. This difference relates to customer moves. When a customer moves out and another customer moves into the same premises during the month, the old billing system counts two customers for that month, whereas the new billing system correctly counts one customer in that month. The new billing system correctly bases the number of customers on the number of sites. Implementation testing showed that EWSI calculated that the difference in the determination of

customer counts meant that customer counts in the old billing system were inflated by approximately 1,000 customers per year. Beginning with the 2020 forecast, EWSI has applied an adjustment to its forecast customer counts for each of the three rate classes.

265. Table 4.7.2-1 provides EWSI's forecast of customer count by class for 2022 to 2026. Please note that since 2018 and 2019 customer counts are based on the old billing system's methodology, whereas 2020 and 2021 are based on the new billing system's methodology. EWSI estimates that, had the new methodology been used, average monthly customer counts in Column A, would be approximately 1,000 less than shown.

Table 4.7.2-1
Financial Schedule 4-1
Average Monthly Customer Count
(2012-2026)

		A	B	C	D	E	F	G
		2012-2016 Average	**2017-2021 F Average**	**2022 F**	**2023 F**	**2024 F**	**2025 F**	**2026 F**
1	Residential	233,858	268,052	278,978	283,342	287,954	292,671	297,458
2	% annual avg. growth	2.68%	2.02%	1.43%	1.56%	1.63%	1.64%	1.64%
3	Multi-Residential	3,528	3,770	3,789	3,800	3,811	3,823	3,834
4	% annual avg. growth	1.95%	0.62%	0.20%	0.30%	0.30%	0.30%	0.30%
5	Commercial	18,100	19,891	19,920	20,101	20,283	20,468	20,654
6	% annual avg. growth	1.46%	1.23%	0.47%	0.91%	0.91%	0.91%	0.91%
7	Total Customers	255,485	291,713	302,687	307,243	312,048	316,962	321,947

4.7.3 Volume Per Customer Forecasting Process

266. **Residential Consumption per Customer Forecast** - A declining trend in residential consumption is prevalent across North America, as validated in the 2016 Water Research Foundation Residential End Uses of Water, Version 2 (DeOreo, B. & Mayer, P., 2016). As indicated by the study, the reductions per residential customer have primarily been due to water savings as customers have installed water efficient appliances and fixtures (primarily toilets and washing machines) that require no behavioral changes to reduce water consumption.

267. A declining trend of water consumption per residential customer is observed in Edmonton over the past four decades. Residential per service consumption in Edmonton reached a high in 2002 of 21.4 m^3/month. Since this time, this number has fallen to 13.8 m^3/month in 2019 (a reduction of 36%). Water reductions per customer are anticipated to continue into the future due to passive water savings.

268. Prior to 2017, EWSI aggregated all Edmonton-wide residential users into one per-service consumption forecast value and multiplied by an aggregate city growth value for PBR renewal terms. Beginning in 2017, in an effort to more accurately forecast residential consumption, EWSI started using a disaggregated geographic-based approach. This approach recognizes that per-service consumption trends are different for different neighbourhoods. Through its analysis, EWSI has determined that the age of neighbourhood tends to correlate with extent of installation of water efficient fixtures. EWSI's methodology uses age of the home as a proxy for the presence of water efficient appliances and fixtures and the predicted rate of future renovations.

269. The revised residential consumption per customer forecast methodology provided a five-year forecast for each of the core, mature, established, and developing neighbourhood classification areas. The forecast accuracy of this revised consumption per customer forecast demonstrated significant improvement over the 2017-2021 period. Over this period, the mean percentage error of the forecast was -2.63% compared to -5.77% over the 2012-2016 period. This reduced to just -0.90% over the 2017-2019 period. Based on the performance of the new methodology, EWSI decided to utilize the same approach to forecast residential consumption per customer for the 2022-2026 PBR Application. The disaggregated forecasts for the four classification areas are broken out into base and seasonal consumption, then aggregated to obtain a total consumption per customer forecast. As a validation, a theoretically low base consumption is estimated as described in Appendix M. The results of that validation analysis confirm the validity of this approach.

270. Although residential consumption per customer is higher during the COVID-19 pandemic as Edmontonians spend more time in their residences, EWSI is predicting a return to normal once the restrictions are lifted. As EWSI expects the pandemic restrictions to be fully lifted by April 2022, no COVID-19 impacts were incorporated into the forecast of residential consumption per customer.

271. **Multi-Residential Consumption per Customer Forecast** - Due to differences in the different sizes of multi-residential properties, it has been determined that a more appropriate approach is to forecast multi-residential consumption based on historical trending for the entire rate class. As a result, the forecast is developed based on historical trending of total consumption for this rate class. Historically over the years 2014-2019 total consumption has declined 0.18% for this customer class. As a result, EWSI is forecasting a decline of 0.18% from 2023 and beyond. The validation study presented in Appendix M provides similar results, thus improving EWSI's

confidence in this forecast. Consumption per customer for the multi-residential rate class is thus calculated by dividing the total consumption forecast by the customer count forecast.

272. **Commercial Consumption per Customer Forecast** – Historically over the years 2009-2019 commercial consumption per customer has been declining at a rate of 3.10% annually. Based on observations of the impact of the COVID-19 pandemic on EWSI's commercial customer base, EWSI's forecast reflects a decline in 2020 of 24.05% in commercial consumption per customer.

273. EWSI is forecasting 0% change in commercial consumption per customer for 2021, 5.00% increase for 2022 and 5.00% increase for 2023. From 2024 and beyond, EWSI is forecasting a return to the long term trend line for commercial consumption per customer. EWSI has forecast an extended recovery for commercial consumption per customer due to the macroeconomic challenges in Alberta that existed prior to the pandemic, including low energy prices. EWSI forecasts total consumption for the University of Alberta to decline by 11.00% in 2020, with activity beginning to slowly resume in 2021 at 3.00%. An additional recovery of 5.00% is forecast for 2022, with total consumption generally returning to the historically observed 1.00% decline thereafter.

274. Table 4.7.3-1 provides EWSI's forecast monthly consumption per customer for each customer class for 2022-2026 compared to historical trends since 2012.

Table 4.7.3-1

Average Monthly Consumption per Customer
2012-2026
(m^3 per customer per month)

		A **2012-2016 Average**	B **2017-2021 F Average**	C **2022 F**	D **2023 F**	E **2024 F**	F **2025 F**	G **2026 F**
1	Residential	16.0	14.5	13.4	13.2	12.9	12.7	12.5
2	% change	(1.7%)	(0.3%)	(10.0%)	(1.7%)	(1.8%)	(1.8%)	(1.7%)
3	Multi-Residential	414.9	399.7	388.4	386.6	384.7	382.9	381.0
4	% change	0.0%	0.1%	(5.3%)	(0.5%)	(0.5%)	(0.5%)	(0.5%)
5	Commercial	131.9	101.8	90.1	94.0	96.5	93.6	90.7
6	% change	(1.8%)	(7.0%)	5.3%	4.3%	2.6%	(3.0%)	(3.0%)

4.7.4 Consumption Volume Forecast

275. The consumption volume forecast is a product of the forecast customer count and the forecast consumption per customer for the residential and commercial customer classes. EWSI

has developed the consumption forecast for the multi-residential customer class on a total consumption basis.

276. EWSI's consumption volume forecast is provided in Table 4.7.4-1, which shows forecasted volumes for the full five year PBR period based on the consumption per customer and customer count forecasts. Water consumption for the PBR term is expected to decrease moderately as customer growth is insufficient to fully offset the trend of declining consumption per customer.

Table 4.7.4-1

Total Consumption Volume by Customer Class
2021-2026
(ML)

		A **2021 F**	B **2022 F**	C **2023 F**	D **2024 F**	E **2025 F**	F **2026 F**
	Residential						
1	0 m^3 – 10.0 m^3	27,760.8	25,338.2	25,289.6	25,248.9	25,202.8	25,168.2
2	10.1 m^3 – 35.0 m^3	18,931.6	17,279.5	17,246.3	17,218.6	17,187.2	17,163.6
3	Over 35.0 m^3	2,467.8	2,252.5	2,248.2	2,244.5	2,240.5	2,237.4
4	Sub-total	49,160.2	44,870.3	44,784.1	44,712.0	44,630.5	44,569.1
	Multi-Residential						
5	0 m^3 – 100.0 m^3	4,163.8	3,951.9	3,944.9	3,937.8	3,930.8	3,923.7
6	100.1 m^3 – 1000.0 m^3	11,349.0	10,771.5	10,752.3	10,733.2	10,714.0	10,694.8
7	Over 1000.0 m^3	3,092.1	2,934.8	2,929.6	2,924.3	2,919.1	2,913.9
8	Sub-total	18,604.9	17,658.3	17,626.8	17,595.3	17,563.9	17,532.4
	Commercial						
9	0 m^3 – 25.0 m^3	2,180.8	2,325.5	2,451.5	2,541.3	2,490.5	2,438.3
10	25.1 m^3 – 100.0 m^3	2,817.1	3,004.0	3,166.7	3,282.8	3,217.1	3,149.7
11	100.1 m^3 – 1000.0 m^3	6,278.1	6,624.3	7,024.4	7,309.8	7,148.2	6,982.7
12	1000.1 m^3 – 5000.0 m^3	3,742.9	3,947.1	4,183.0	4,351.2	4,255.9	4,158.3
13	Over 5000.0 m^3	5,350.6	5,639.7	5,851.4	5,991.1	5,878.3	5,763.2
14	Sub-total	20,369.5	21,540.6	22,677.0	23,476.3	22,990.0	22,492.3
15	**Total Consumption**	**88,134.6**	**84,069.1**	**85,087.9**	**85,783.6**	**85,184.3**	**84,593.7**
16	% Change		(4.6%)	1.2%	0.8%	(0.7%)	(0.7%)

5.0 OPERATING COSTS

277. This section describes total regulated operating costs for Edmonton Water Services for the 2022-2026 PBR term. The 2021 approved and 2021 forecast operating costs are provided for comparison. This section provides two different views of Water Services' regulated operating costs for purposes of explaining year-over-year variances: (i) by cost category (Section 5.1) and (ii) by operational function (Section 5.2).

278. In Section 5.1, Water Services' total regulated operating costs are categorized and explained based on the following eleven cost categories:

1. Staff Costs and Employee Benefits;
2. Power, Other Utilities and Chemicals;
3. Contractors and Consultants;
4. Materials and Supplies;
5. Vehicles;
6. Customer Billing and Collections;
7. Meter Reading Services / (Recoveries);
8. Franchise Fees and Property Taxes;
9. EWSI Shared Services Allocation;
10. Corporate Shared Services and
11. Other.

279. Section 5.1 provides operating costs by cost category, a discussion of the proportion of total operating costs represented by each cost category and the cost drivers unique to each cost category which explain the annual variations.

280. In Section 5.2, Water Services' operating costs are categorized and explained based on the following nine operational functions:

1. Power, Other Utilities and Chemicals;
2. Water Treatment Plants;
3. Water Distribution and Transmission;
4. Operational Support Services;
5. Capitalized Overhead;
6. Billing, Meters and Customer Service;
7. EWSI Shared Services;
8. Corporate Shared Services; and
9. Franchise Fees and Property Taxes.

281. These nine operational functions can be further broken down into responsibility centres. It is at the responsibility centre level where authority and accountability for the management of costs takes place and is overseen at the senior manager level or higher. While Water Services manages the operations of its waterworks system through several responsibility centres and develops forecast costs at this level, for purposes of this section, certain responsibility centres have been grouped together based on the operational function.

282. Section 5.2 provides a description of each of the responsibility centres within each operational function and year-over-year variance explanations. Water Services forecast operating costs by operational function are provided for 2022-2026 and 2021 approved amounts. In addition, 2021 forecast amounts are provided for comparison. Water Services prepares its forecast operating costs according to the methodologies described in Section 4.2.1 which incorporates the inflation factor, also provided in Section 4.2.1. For additional information on actual operating costs for Water Services for the years 2017 through 2020, refer to the Annual PBR Progress Reports attached in Appendices E-01 – E-03 to the Application.

5.1 Operating Costs by Cost Category

283. Table 5.1-1 provides Water's total regulated operating costs by cost category forecast for 2022-2026. The 2021 approved and 2021 forecast amounts are provided for comparison.

Table 5.1-1
Financial Schedule 5-2
Operating Costs by Cost Category
2021-2026
($ millions)

	Cost Category	A 2021 D	B 2021 F	C 2022 F	D 2023 F	E 2024 F	F 2025 F	G 2026 F
1	Staff Costs and Employee Benefits	47.0	42.4	42.6	41.9	41.6	41.3	42.1
2	Contractors and Consultants	9.1	8.3	9.9	10.2	10.3	10.5	10.7
3	Chemicals	7.7	11.5	12.5	12.8	13.1	13.3	13.6
4	Power and Other Utilities	15.0	11.4	10.5	12.3	12.7	13.0	13.3
5	Materials and Supplies	3.3	3.6	3.7	3.8	3.9	4.0	4.0
6	Other	5.5	6.7	6.6	6.7	6.8	6.9	7.0
7	Customer Billing and Collections Services	9.1	8.0	8.2	8.3	8.5	8.7	8.9
8	Meter Reading Services (Recoveries)	(5.0)	(5.1)	(5.7)	(5.5)	(4.9)	(4.1)	(4.2)
9	Franchise Fees and Property Taxes	17.4	16.2	17.7	18.9	19.9	20.9	21.9
10	Corporate Shared Services	16.2	13.7	13.8	14.1	14.3	14.6	14.9
11	EWSI Shared Services Allocation	10.7	10.3	10.5	10.7	10.9	11.2	11.4
12	Vehicles	1.3	0.8	0.7	0.7	0.6	0.6	0.6
13	**Total Water Operating Costs**	**137.3**	**127.8**	**131.0**	**134.9**	**137.9**	**140.8**	**144.3**
14	**Total for In-City only**	**112.9**	**103.3**	**103.7**	**106.8**	**109.2**	**111.3**	**114.0**
15	**Total for Fire Protection only**	**5.6**	**6.6**	**8.6**	**8.8**	**9.1**	**9.5**	**9.7**

284. Staff costs and employee benefits reflect wages, salaries and benefits including incentive compensation and overtime for employees. These costs represent approximately 30% of Water's total regulated operating costs over the 2022 to 2026 period. The salaries and benefits amounts above are reported net of salary recoveries for the employee time spent on capital projects and non-regulated activities, as well as capitalized overhead. Time spent for work on capital projects is directly charged to the capital project and time spent for work on non-regulated activities is directly charged to the non-regulated activity. Capitalized overhead represents the cost of certain functions required to support capital projects such as senior management oversight and project governance. Capitalized overhead recoveries vary from year to year based on the amount of capital expenditures and the direct labour charged to capital projects.

285. There are two broad categories of employees: unionized and non-unionized. Unionized employees make up approximately 81% of the total workforce while non-unionized employees make up the remaining 19%. For both unionized and non-unionized employees, the compensation structure includes a base level of compensation, including benefits, and an incentive component which is paid when performance targets are met. Salaries and wages for union staff are determined based on negotiated collective bargaining agreements with the International Brotherhood of Electrical Workers Local 1007 employees, Civic Service Union 52

and Canadian Union of Public Employees Local 30 employees. Salaries for non-union staff are determined based on job-related skills, experience and market competitiveness.

286. Year over year changes to salaries and benefits (net of labour recoveries) are primarily influenced by annual salary and wage escalations and the changes in the number of employees depending on workload. Variations from year to year in salaries and benefits are also influenced by overtime requirements related to fluctuations in operational activities resulting from factors such as the timing and number of water main break and frozen services repairs occurring during the year. Occasionally, internal organizational changes may also influence changes in salaries and benefits. Refer to Section 5.2 for further discussion on 2021 approved to 2021 forecast and 2021 to 2026 forecast variances.

287. Power and other utilities represent approximately 9% of Water's total regulated operating costs over the 2022 to 2026 period. The total power costs are formed by two components: cost of energy and cost of delivery. EWSI procures its power and gas contracts through a competitive process. The contract cost is minimized by combining consumption requirements across water, wastewater and drainage into a single portfolio order to reduce total variability and increase buying power. The current long term power contract is set to expire at the end of 2021 and EWSI has entered into a new contract with a load following price structure in which the supplier bears hourly volume risk. The electricity delivery charges are independent of the service provider and EWSI has minimal control over their growth. These wires charges have increased at a greater rate than the energy charges through the term of the current PBR and are projected at the historical rate of growth for Water. The amount charged is based on the energy used, therefore operating in an energy efficient manner will reduce the delivery charge. The only other way this component of the total power costs can be reduced is to smooth out the energy usage on the multiple (redundant) power feeds coming into the various facilities – this will limit and over time reduce the 'system access' (similar to a peaking charge) fees charge by the wires provider.

288. Power consumption for Edmonton Water has remained relatively flat during the 2017 to 2021 PBR term. In addition to fixed price power contracts, Water has been able to manage its power costs by optimizing reservoir operations and pump scheduling, training operators on energy efficient procedures, and by moving to energy efficient equipment over time. A new Pump Health Monitoring program has been implemented to assist the operator optimize the pump operation. In the last ten years, despite a growing City of Edmonton footprint, power consumption to produce and deliver water on a per capita basis has decreased indicating that

Water is managing its power use effectively. Once the Solar Power Farm goes into service (projected for the start of 2022), a reduction to grid power consumption is projected for the water treatment plants.

289. For the 2022-2026 PBR term, the 2021 power cost forecast was developed based on indicative pricing from potential suppliers into its competitive procurement process, and applied inflation to the price thereafter. For the 2022-2026 PBR term, Water's power costs will also include an increase of approximately $0.7 million starting in 2023 for the Green Power Initiative, which includes green power renewable energy certificates procured at the corporate level and allocated to Water. Refer to Section 5.2.1 for further discussion on 2021 approved to 2021 forecast and 2022 to 2026 forecast variances.

290. Chemicals represent one of the largest components of water treatment costs and approximately 10% of Water's total regulated operating costs for 2022-2026. Major treatment agents include aluminum sulphate (alum), powdered activated carbon, caustic soda and salt (for sodium hypochlorite generation). The quantity of chemicals used in the treatment process varies from year to year depending on the raw water quality conditions of the North Saskatchewan River and other seasonal factors such as level of snow pack, drought, rainfall, and spring run-off. Generally, the greater the amount of turbidity (suspended sediment) or colour (organics) in the river water, the greater the use of chemicals to treat the water. In addition to the current chemicals used in the water treatment process, in response to updated Canadian Drinking Water Quality Guidelines on March 8, 2019, which lower the maximum allowable concentration of lead in drinking water, EWSI will begin adding a lead corrosion inhibitor (phosphoric acid) to the water treatment process in late 2021. Chemical prices are influenced by costs associated with chemical production, including variations in material and transportation costs and the influence of energy market prices. Additionally, prices for most chemicals are influenced by foreign exchange price variances. Chemical suppliers rarely offer fixed pricing so EWSI is exposed to the market fluctuations in chemical costs. This could have a significant impact on chemical costs from year to year, particularly for the three largest dollar chemicals: alum, carbon and caustic soda. Increased chemical costs are mitigated through chemical use optimization strategies such as direct filtration. In determining its 2022 to 2026 forecast revenue requirements, Water has assumed chemical dosage based on an average of the past 5 years of historical chemical use and estimated changes in chemical prices based on market estimates while taking into account price increases arising from inflation and foreign exchange rates.

291. Contractor and consultant costs, materials and supplies and vehicle costs together represent approximately 11% of Water's total regulated operating costs over the 2022 to 2026 period. Contractor and consultant costs include hydrovac services, paving services, utility locating costs, barricading services, and contracted services to provide specific skills that are either not available within Water or when workloads increase beyond the capacity of internal resources. These three cost categories vary from year to year based on:

1. The number of water main breaks and frozen services;
2. The number of broken hydrants;
3. The number of leaking valves and service line repairs and replacements;
4. The requirements for contract services to support distribution and transmission and plant maintenance;
5. The timing and type of major operating maintenance projects; and
6. The need to complete operational studies to support regulatory or industry initiatives or directives.

292. Customer billing and collections services costs represent approximately 6% of Water's total regulated operating costs over the 2022 to 2026 period. These costs are comprised of services provided by EWSI's affiliate, EEA, as well as bad debt expense. EEA provides Water with billing and customer care services for Water's In-City customers. These billing and customer care services costs include:

- Customer service management;
- Call centre;
- Billing;
- Collections; and
- Information systems;

293. EEA charges EWSI for these services based on a unit price applied to the number of site counts (customers) served by EEA. These costs and the allocation to EWSI are approved by the AUC through EEA's rate filings to the AUC.

294. For 2022-2026, meter reading services represents the meter reading costs net of a recovery charged by Water to Wastewater Treatment and Drainage. For 2022-2026 meter reading recoveries are approximately 4% of Water's total regulated operating costs over the period. Refer to Section 5.2.6 for further discussion on 2021 approved to 2021 forecast and 2021 to 2026 forecast variances.

295. Franchise fees and property taxes represent approximately 14% of Water's total regulated operating costs over the 2022 to 2026 period. Water pays the City of Edmonton a franchise fee for the exclusive rights to distribute water within the city of Edmonton boundaries, based on 8.0% of total revenues from In-City customers. Refer to Section 5.2.9 for further discussion on 2021 approved to 2021 forecast and 2021 to 2026 forecast variances.

296. EWSI Shared Services Allocation represents approximately 8% of Water's total regulated operating costs over the 2022 to 2026 period and is comprised of EWSI's shared services costs allocated to the regulated Edmonton water operations. Refer to Section 5.2.7 for further discussion of these costs and on 2021 approved to 2021 forecast and 2021 to 2026 forecast variances.

297. Corporate Shared Services represent approximately 11% of Water's total regulated operating costs over the 2022 to 2026 period and are comprised of costs associated with corporate shared services provided to Water's regulated Edmonton water operations by its parent company, EUI. Refer to Section 5.2.8 for further discussion of these costs and on 2021 approved to 2021 forecast and 2021 to 2026 forecast variances.

298. Other costs represent approximately 5% of Water's total regulated operating costs over the 2022 to 2026 period and are comprised of insurance, building rental charges, third party claims, water transmission charges, grounds maintenance, telecommunication charges and other miscellaneous items.

5.2 Operating Costs by Function

299. Table 5.2-1 provides an overview of Water's total regulated operating costs by operational function for 2022-2026. The 2021 approved amounts and 2021 forecast amounts are provided for comparison.

Table 5.2-1
Financial Schedule 5-1
Operating Costs by Function
2021-2026
($ millions)

	Operational Function	A 2021 D	B 2021 F	C 2022 F	D 2023 F	E 2024 F	F 2025 F	G 2026 F
1	Power, Other Utilities and Chemicals	22.7	23.0	23.0	25.2	25.7	26.3	26.9
2	Water Treatment Plants	20.4	22.6	24.0	24.1	24.6	25.1	25.6
3	Water Distribution and Transmission	26.7	23.0	22.9	22.8	23.2	23.7	24.2
4	Operational Support Services	14.7	12.6	12.7	12.9	13.1	13.4	13.7
5	Capitalized Overhead	(7.8)	(8.8)	(9.1)	(9.3)	(9.5)	(9.7)	(9.9)
6	Billing, Meters and Customer Service	12.9	11.4	11.6	11.6	11.4	11.2	11.4
7	EWSI Shared Services	14.0	14.2	14.4	14.7	15.0	15.3	15.6
8	Corporate Shared Services	16.2	13.7	13.8	14.1	14.3	14.6	14.9
9	Franchise Fees and Property Taxes	17.4	16.2	17.7	18.9	19.9	20.9	21.9
10	**Total Water Operating Costs**	**137.3**	**127.8**	**131.0**	**134.9**	**137.9**	**140.8**	**144.3**
11	**Total for In-City only**	**112.9**	**103.3**	**103.7**	**106.8**	**109.2**	**111.3**	**114.0**
12	**Total for Fire Protection only**	**5.6**	**6.6**	**8.6**	**8.8**	**9.1**	**9.5**	**9.7**

300. For the 2021 approved to 2021 forecast, the cost decrease is approximately $9.5 million. The cost decrease is primarily due to:

- A net $3.7 million decrease in Distribution and Transmission primarily due to the capitalization of costs previously considered operating expenses, as explained below in Section 5.2.3;
- A $2.5 million decrease in Corporate Shared Services primarily as a result of transferring Drainage Services from the City of Edmonton to EPCOR. This was refunded to customers through the NRA mechanism;
- A $1.5 million decrease in Billing, Meters and Customer Service mainly due to a lower than forecast unit price charged by EEA to EWSI for billing and customer care services as explained below in Section 5.2.6; and
- A $1.2 million decrease in Franchise fees and Property Taxes primarily due to lower forecasted consumption and lower inflation adjustments leading to lower forecast revenues and franchise fees collected.

301. These decreases are partially offset by increase in operating costs primarily due to:

- A $2.2 million increase in Water Treatment Plant offset by a $2.1M decrease in Operational Support Services mainly due to 12 custodians being transferred from the Supply Chain Management group to the Water Treatment Plant Maintenance group.

302. For 2021 forecast to 2022 forecast, the cost increase is approximately $3.2 million. The cost increase is primarily due to:

- A $0.9 million increase due to inflation and other minor items;
- A $0.6 million increase in Water Treatment Plants from an increase in inspections and engineering studies; and
- A $1.4 million increase in Franchise Fees due to increases in Water's regulated Edmonton water revenues.

303. For the 2022 to 2026 forecast period, in most cases, year over year cost increases are due to applying the inflation factor as explained in Section 4.2. In addition, there are a few notable exceptions described below:

- A $1.6 million increase in power costs starting in 2023 from incorporating the proposed Green Power Initiative along with an annual 6% increase in distribution and transmission charges;
- An increase of approximately $0.1 million per year in natural gas costs to account for federal carbon tax increases above inflation. The federal carbon tax is forecast to increase from $50 per tonne to $110 per tonne over the 2022-2026 period; and
- A $0.9 million average annual increase in Franchise Fees due to increases in Water's revenues from Edmonton regulated operations.

304. These increases are partially offset by a decrease in costs due to:

- A $0.7 million decrease in operating costs starting in 2023, driven by operational synergies gained by Water D&T and Drainage Operations operating out of a shared facility, as discussed in the Real Estate Consolidation Project business case (Appendix F-05);
- A $0.4 million decrease in Water Treatment Plant Engineering starting in 2023; the 2022 forecast includes $0.4 million in one-time asset management plan development costs; and
- A $0.4 million decrease in meter reading costs starting in 2024. These savings increase to $0.9 million by 2026, as the AMI Deployment Project (Appendix F-03) is implemented over the PBR term and additional costs savings are realized.

305. For purposes of explaining Water's total Edmonton regulated operating costs and the year-over-year variances, operating costs have been grouped into the nine operational functions shown in Table 5.2.1, consistent with the organizational structure in which Water operates. Each

operational function is subsequently broken down by each responsibility centre (where applicable) and their costs are described in detail in the following sections.

5.2.1 Power, Other Utilities and Chemicals

306. Power, Other Utilities and Chemical costs are comprised of three cost areas:

1. Power costs are one of the single largest operating costs incurred by Water in the production of water. The majority of costs are incurred due to pumping requirements and actual power costs tend to vary from year to year based on changes in annual water production levels and in line with EWSI's long-term power contract;
2. Chemical costs represent the single largest expense in the water treatment process. Chemical costs are highly variable from year to year based on raw water quality conditions, other seasonal factors such as spring run-off and Water's exposure to the market fluctuations in chemical costs and foreign exchange rates; and
3. Other utilities include natural gas costs associated with maintaining heat for both water treatment facilities and reservoirs and pump stations in the field.

307. The Power, Other Utilities and Chemicals operating costs forecast for 2022-2026 are provided in Table 5.2.1-1. The 2021 approved amounts and 2021 forecast amounts are provided for comparison.

Table 5.2.1-1
Financial Schedule 6-1
Power, Other Utilities and Chemicals Costs
2021-2026
($ millions)

	Category	A **2021 D**	B **2021 F**	C **2022 F**	D **2023 F**	E **2024 F**	F **2025 F**	G **2026 F**
1	Power	14.4	10.8	9.8	11.6	11.8	12.0	12.3
2	Natural Gas	0.6	0.7	0.7	0.8	0.9	1.0	1.0
3	Chemicals	7.7	11.5	12.5	12.8	13.1	13.3	13.6
4	**Total**	**22.7**	**23.0**	**23.0**	**25.2**	**25.7**	**26.3**	**26.9**

2021 Approved to 2021 Forecast

308. The $0.3 million increase in Power, Other Utilities and Chemical costs from 2021 approved to 2021 forecast is primarily due to:

- A $3.6 million increase in chemical costs reflecting an increase in chemical usage caused by lower than average raw water quality conditions (high colour and turbidity),

and chemical prices increasing at a rate higher than the forecasted inflation factor in the 2017-2021 PBR Application; and

- A $0.2 million increase due to the addition of phosphoric acid (lead Inhibiter) starting in late 2021.

309. This increase is partially offset by decreases in costs primarily due to:

- A $3.6 million decrease in power costs reflecting a $2.0 million in savings associated with the green energy premium that was included in the 2017-2021 PBR forecast, combined with a $1.6 million due to lower contract rates.

2021 Forecast to 2022 Forecast

310. The net variance in Power, Other Utilities and Chemical costs is zero from the 2021 forecast to 2022 forecast, however there are two variances to note:

1. A $1.0 million decrease in power costs due to partial replacement of grid power purchase with renewable energy produced by the Solar Power Farm Project starting January 2022, partially offset by annual forecast increases in distribution and transmission charges; and
2. A $1.0 million increase in chemicals due to full year of phosphoric acid injection for lead control in 2022 comparing to only the fourth quarter in 2021 as well as higher chemical prices in 2022 which is based on market expectations for the various chemicals and impacts of foreign exchange rates.

2022 Forecast to 2026 Forecast

311. For the 2022 to 2026 forecast period, year over year cost increases are based on the inflation factor provided in Section 4.2.1. The two exception in this category include:

1. A $1.6 million increase in power costs in 2023 incorporating Water's proposed Green Power Initiative as described in Section 2.3.6, along with an annual 6% distribution and transmission charges increase; and
2. An annual increase of approximately $0.1 million in natural gas costs to account for federal carbon tax increases above inflation. The federal carbon tax is forecast to increase from $50 per tonne to $110 per tonne over the 2022-2026 period.

5.2.2 Water Treatment Plants

312. Water Treatment Plants is comprised of five responsibility centres:

1. Water Treatment Plants and Reservoir Maintenance;
2. Water Treatment Plants Operations;
3. Water Treatment Plants Engineering;
4. Water Treatment Plants Capital Project Management; and
5. Water Treatment Plants Plant Control and Automation (PC&A).

Water Treatment Plants and Reservoir Maintenance

313. Water Plants and Reservoir Maintenance is comprised of two main functions: plant maintenance and plant facilities.

314. Plant maintenance is responsible for maintenance and repairs at the Rossdale and E. L. Smith Water Treatment Plants and at Edmonton water reservoir sites and pump stations. Water carries out these functions primarily using internal resources comprised of millwrights, welders, electricians, instrument mechanics, plumbers, HVAC technicians, building operators, and utility workers. In addition, contractors are used to provide specialized services to compliment staff as required for plant maintenance. Plant facility staff are responsible for providing site support services to the plants such as building and grounds maintenance. Contractors are also used for larger projects such as snow removal, waste hauling and painting services.

Water Treatment Plants Operations

315. Water Treatment Plants Operations is responsible for the production of potable water through treatment of raw water obtained from the North Saskatchewan River at Rossdale and E. L. Smith. This group is also responsible for operating the potable water storage reservoirs and pumping facilities. Water carries out these functions utilizing internal resources comprised of certified water treatment operators and operations engineers to monitor the treatment process and manage the supply and demand of water, and make adjustments to the system to ensure treated water quality objectives and customer demands are met.

316. The operating costs for Water Plant Operations are primarily comprised of salaries and benefits costs for Water's plant operators and operations engineers who operate and monitor water production at both water treatment facilities.

Water Treatment Plants Engineering, Capital Project Management and PC&A

317. This group is comprised of three main groups: Water Treatment Plant Engineering, Capital Project Management and PC&A. The Water Treatment Plants Engineering group provides engineering expertise, management of change and front-end design work (engineering work packages) for water treatment plant projects. They also support operations and maintenance for trouble shooting of plant equipment and processes. In addition, this group is responsible for the management of EWSI's utility costs through power and natural gas contracts, implementing operating and capital strategies to optimize and promote efficiency and the integration of these components and their subsequent impact on Water. In addition, this group manages and updates the record drawings and Water Plants Engineering standards. The Capital Project Management group is responsible for planning, coordinating and managing the approval and execution of capital projects. PC&A is a specialized engineering group responsible for designing and maintaining the cybersecurity systems, process computers and communication network that allows for automation of the water treatment plants and reservoirs and monitoring by Operations. In addition, this group provides support to many operational and capital projects.

318. The Water Treatment Plant operating costs forecast for 2022-2026 are summarized in Table 5.2.2-1. The 2021 approved and 2021 forecast amounts are provided for comparison.

Table 5.2.2-1
Financial Schedule 7-1
Water Treatment Plants Costs
2021-2026
($ millions)

	Category	A 2021D	B 2021F	C 2022F	D 2023F	E 2024F	F 2025F	G 2026F
1	WTP Reservoir Maintenance	8.8	10.1	10.7	10.9	11.2	11.4	11.6
2	WTP Operations	7.8	8.1	8.3	8.5	8.7	8.9	9.1
3	WTP Engineering, Projects & PC&A	3.7	4.5	4.9	4.6	4.7	4.8	4.9
4	**Total**	**20.4**	**22.6**	**24.0**	**24.1**	**24.6**	**25.1**	**25.6**

2021 Approved to 2021 Forecast

319. The $2.2 million increase in Water Treatment Plant operating costs from the 2021 approved to 2021 forecast was primarily due to:

- A $1.2 million increase in staff costs, of which $0.8 million related to 12 custodians transferred from the Supply Chain group to the Water Treatment Plant Maintenance

group, the remaining $0.4 million related to additional resources mainly to support the increase in capital project work; and

- A $1.0 million increase in costs for the setup of an asset management plan as well as increased snow removal costs.

2021 Forecast to 2022 Forecast

320. The $1.3 million increase in Water Treatment Plant operating costs from the 2021 forecast to 2022 forecast is primarily due to:

- A $0.6 million increase in contractors and consultants mostly due to additional costs for inspections and engineering studies, as well as increased chemical room cleanings and reliability studies; and
- A $0.7 million increase due to inflation.

2022 Forecast to 2026 Forecast

321. For the 2022 to 2026 forecast period, year over year cost increases are based on the inflation factor provided in Section 4.2.1. The one exception is a $0.4 million decrease in costs in 2023 related to removing costs related to the setup of an Asset Management Plan in 2022.

5.2.3 Water Distribution and Transmission

322. Distribution and Transmission is organized into six functional groups:

1. Distribution Construction and Maintenance;
2. Distribution Operations;
3. Distribution Technical Services;
4. Distribution Infrastructure;
5. Dispatch, Locating & Staking; and
6. Fleet Management.

Distribution Construction and Maintenance

323. Distribution Construction and Maintenance is primarily responsible for underground construction and maintenance activities related to Water's distribution and transmission system including repairs to the water mains as well as distribution and transmission system appurtenances (valves, hydrants, services, etc.). This group also:

- Undertakes small capital replacement/refurbishment of water mains and appurtenances;
- inspects transmission mains;
- provides leak detection services; and
- undertakes maintenance of shop and the yards to ensure materials and supplies are available in a timely manner for both the Distribution Maintenance and Distribution Operations teams.

324. Distribution maintenance represents the largest area within Water Distribution and Transmission. Distribution maintenance is primarily comprised of staff related to work crews, materials and supplies, vehicle fleet and equipment and external contractors. Work crews include labourers, foreman and supervisory staff in a number of positions including equipment operators, truck drivers and other underground waterworks construction positions. Vehicle fleet and equipment include those costs associated with operations, repair and maintenance on trucks, hydrovac trucks, backhoes and other construction related equipment. The largest component of external contractors costs are hydrovac costs when excavating, paving services and barricades costs. Costs in this area tend to vary from year to year with changes related to the level of construction activity required for water main break repairs and other underground construction work.

Distribution Operations

325. Distribution Operations includes the following:

- Distribution Operations;
- Preventative Maintenance; and
- Procedures and Training.

326. Distribution Operations is responsible for above ground construction and maintenance activities related to Water's distribution system. All transmission main shutdowns are coordinated by this group to ensure minimal impact to the customers. This group consists of labour foremen and valve and hydrant crews. These individuals provide operational support to construction contractors by providing necessary valve isolations and they complete all hydrant and valve repairs that can be completed without requiring an excavation.

327. The Preventative Maintenance group is responsible for distribution water quality maintenance programs including the uni-directional flushing and hydrant purging programs. Hydrant painting is also managed through this group. The group also supports the new

subdivision development process by providing inspection acceptance at the Cross Connection Control (CCC) and Final Acceptance Certificate project phases. Water trouble, which provides the 24x7 emergency services to isolate water mains after a break is also managed by this group.

328. The Procedures and Training group is responsible for:

- Development and update of construction and maintenance procedures related to water distribution assets;
- provision of post incident investigation services;
- provision of training services on water distribution operation including valve and hydrant operation, main break repair and water quality sampling; and
- provision of fire hydrant usage training to all hydrant permit holders and to the City of Edmonton Fire Rescue services.

Distribution Technical Services

329. The Distribution Technical services group is responsible for technical support services for the other areas in water distribution and transmission. This includes services such as design standards development, product testing and approvals to confirm suitability for use in the water distribution network. All customer insurance claims are reviewed and managed within this group. Any new processes being proposed for operations are reviewed with the group to optimize requirements before full scale implementation. This functional group is primarily comprised of engineers, drafting technologists and engineering technologists and contractor and consultant costs associated with utility line locates. Distribution Technical Services includes the following:

- Planning;
- Private Development;
- Claims and Escalations;
- Distribution Technical Services;
- Geographic Information Systems (GIS); and
- Modeling.

330. Planning is responsible for the holistic planning of the distribution and transmission systems infrastructure and reservoir needs. Important work activities include the coordination of Water's integrated resource plan, demographic studies and water conservation programs. Water consumption forecasting and analysis is also completed by this group.

331. Private development is responsible for planning and review of new subdivision developments to ensure appropriate installation of water mains and ancillary waterworks equipment by private developers.

332. Claims and Escalations works directly with customers impacted by the operations of the water utility. A formal process is used to collect information from the customer on the nature of the damages sustained and in conjunction with an external claims adjuster these are reviewed to determine Water's liability. Each year all damages and claims paid out are reviewed with the entire team to identify process improvements to avoid similar damages in the future. This team represents Water on the Edmonton Locates Consortium and takes a lead role in broadening the awareness in the construction community of working around pressurized water systems.

333. The Distribution Technical Services group provides all pricing and contracts for commercial services provided by the water distribution group. A cost analytics group specifically focuses on reviewing operational costs and identifying alternative construction and operational methods to reduce costs to the utility for activities such as barricading, paving, and job execution.

334. GIS is responsible for the development and maintenance of the geographic information systems used to maintain asset information on the underground water infrastructure facilities. This includes the development and utilization of software tools for water main design, as-built recording and inspection results. This group supports the development of numerous software applications that are used by the field crews and provides training on the use of the technology across the group.

335. Modeling is responsible for the development of hydraulic modeling tools that support all capital and operational planning. This includes energy usage analysis that optimizes the operation of the water distribution and transmission network. GIS and hydraulic modeling tools provide online information with respect to the specific locations of water mains, reservoirs, hydrants and other waterworks facilities. In addition, the information is used by operations and maintenance groups for planning and scheduling purposes.

Distribution Infrastructure

336. Distribution Infrastructure is responsible for waterworks infrastructure design and construction management work, including water main renewal and transmission main upgrades. This includes design and construction associated with water main relocations required for City of Edmonton projects including road widening, and LRT relocations. The waterworks infrastructure

design team is primarily comprised of engineers and engineering technologists who undertake design and construction supervision activities affecting the waterworks system with the City of Edmonton. This includes the management and coordination of the construction contractors who undertake this work. This group is also responsible for the inspection of all water infrastructure constructed by land developers in new subdivisions throughout Edmonton. These inspection activities are critical because this infrastructure ultimately becomes a contributed asset to Water that it must manage and maintain once it has been turned over.

Dispatch, Locating & Staking

337. This group is composed of two groups:

1. Dispatch
2. Locating & Staking

338. The Dispatch group provides 24x7 phone service for the water utility to respond to all customer inquiries related to water main breaks and water quality concerns.

339. The Locating & Staking includes costs associated with locating and marking utilities. This activity is required for Water to work safely during construction and repair of water facilities. It also includes the cost related to funding the Alberta one call service to which all utility companies contribute.

Fleet Management

340. Fleet Management is responsible for the administration of operating, maintenance and repair costs for vehicles and other construction equipment primarily utilized by Water Distribution and Transmission work crews. Fleet Management reviews and analyses maintenance requirements for existing fleet, provides analysis and recommendations of future fleet requirements and coordinates fleet maintenance as well as the administration of driver and vehicle permits. This group also coordinates all driver-training for Water and Wastewater. All costs are recovered by Fleet Management from the groups that use the vehicles for operations, repair and maintenance or capital work. Included in the costs recovered by Fleet Management is an amount for vehicle depreciation, which ranges in value from $1.8 million to $2.1 million during the 2022-2026 PBR term. This depreciation amount is reflected as a recovery per Table 5.2.3-1 below with the offsetting cost included in the amount identified as depreciation expense in Section 7.1, Table 7.1-1. The Fleet Management group performs the following functions:

- Administration of maintenance on existing fleet vehicles and equipment;

- Analysis and recommendations of future fleet requirements;
- Administration of driver and vehicle permits; and
- Coordination of driver-training for Water and Wastewater staff.

341. The Distribution and Transmission operating costs forecast for 2022-2026 are summarized in Table 5.2.3-1. The 2021 approved and 2021 forecast amounts are provided for comparison.

Table 5.2.3-1
Financial Schedule 7-1
Water Distribution and Transmission Costs
2021-2026
($ millions)

	Category	A **2021D**	B **2021F**	C **2022F**	D **2023F**	E **2024F**	F **2025F**	G **2026F**
1	Distribution Construction and Maintenance	12.7	11.2	11.3	11.4	11.7	11.9	12.2
2	Distribution Operations	10.2	5.4	5.2	4.9	5.0	5.1	5.2
3	Distribution Technical Services	3.8	1.9	1.8	1.8	1.8	1.8	1.9
4	Distribution Infrastructure	1.2	1.0	1.1	1.1	1.1	1.2	1.2
5	Dispatch, Locating & Staking	-	5.2	5.3	5.4	5.5	5.6	5.7
6	Fleet Management	(1.2)	(1.7)	(1.8)	(1.8)	(1.9)	(1.9)	(2.0)
7	**Total**	**26.7**	**23.0**	**22.9**	**22.8**	**23.2**	**23.7**	**24.2**

2021 Approved to 2021 Forecast

342. The $3.7 million decrease in Distribution and Transmission operating costs from 2021 approved to 2021 forecast was primarily due to:

- A $3.0 million decrease due to capitalization of costs previously considered as an operating expense. The change relates to replacements of valve casings and service boxes which used to be expensed in operations but are more appropriately capitalized because they are assets that are being replaced;
- A $0.5 million higher recovery of fleet costs due to change in mix of fleet in service; and
- A $0.5 million decrease in locating and staking costs due to successful negotiation of a lower cost contract in 2019. Dispatch, locating and staking was included in Distribution Technical Services and Distribution Operations in the 2017 – 2021 PBR.

These decreases are partially offset by:

- A $0.3 million increase in materials and supplies due to actual costs increasing at a rate higher than the forecast inflation factor in the 2017-2021 PBR.

2021 Forecast to 2022 Forecast

343. The $0.1 million decrease in Distribution and Transmission operating costs from 2021 forecast to 2022 forecast consists of numerous small items.

2022 Forecast to 2026 Forecast

344. For the 2022 to 2026 forecast period, year over year cost increases are based on the inflation factor provided in Section 4.2.1. The one exception is a $0.6 million decrease in costs in 2023 as operational synergies are realized from Water D&T and Drainage Operations operating out of a shared facility.

5.2.4 Operational Support Services

345. Operational Support Services is organized into four functional groups:

1. Quality Assurance and Environment;
2. Water Operations Management;
3. Project and Asset Management; and
4. Supply Chain Management & Security.

Quality Assurance and Environment

346. Quality Assurance and Environment is responsible for:

- Monitoring and testing water quality to ensure that quality standards are maintained;
- Quality assurance and auditing of operational water quality data;
- Management of EWSI's Cross Connection Control program;
- EWSI's watershed and source water protection program;
- Environmental services that include monitoring, tracking and reporting of environmental and public health incidents within EWSI and providing support to operation for incident management;
- Supporting EWSI's Environmental Management Systems;
- Supervision of the Process Development Team's applied research and process optimization work;

- Monitoring and tracking of developing regulations and industry concerns and determining impact EWSI strategies and plans;
- Working with environmental regulators and ensuring EWSI's reporting requirements to these regulators are met; and
- Maintaining relationship with public health authorities (e.g. Alberta Health, Alberta Health Services, and Health Canada) and to ensure EWSI is well positioned for ensuring customer health—for example, overseeing the Lead Management Program.
- Management and administration of the North Saskatchewan River Monitoring Project.

347. Quality Assurance and Environment maintains a water quality monitoring plan and internal water quality standards that exceed both the Health Canada guideline and Alberta requirements. These prescribed requirements for EPCOR Edmonton waterworks system (water treatment plants, reservoirs and distribution system) are ensured by testing of the treated drinking water at EPCOR's ISO 17025 accredited laboratory. There are also more than 150 on-line analyzers that monitor the drinking water continuously at the two water treatment plants for key parameters such as chlorine residual, turbidity, colour, pH, conductivity. Verification of drinking water quality provides an assessment of the overall performance of the system and the ultimate quality of drinking water being supplied to consumers.

348. Quality Assurance and Environment develops and maintains Drinking Water Safety Plans (DWSP), as required by Alberta Environment and Parks since 2013. A DWSP involves a system source-to-tap assessment of the risks to the safety of drinking water, along with actions to address the highest risks and process for reviewing and updating the plan.

349. The Quality Assurance and Environment department also includes the Process Development Team and CCC program. The Process Development Team carries out studies related to testing potential treatment process improvements and optimization at the Edmonton water treatment plants. The purpose of the Cross Connection Control program is public health protection from inadvertent and unauthorized backflow of material from customers' premises into the potable water system. The CCC program ensures that high risk industrial, commercial and institutional customers have backflow prevention devices installed, registered and tested regularly according to the requirements of the Bylaw.

350. The costs for this area are primarily comprised of salaries and benefits which account for approximately 68% of the annual operating cost budget for Quality Assurance and Environment. The remaining 32% is comprised of contractor and consultant costs required to provide

consulting on watershed studies, water quality testing provided by third party laboratories, and material and supply costs related to in-house water quality testing. A significant component of the contractor and consultant costs is dedicated to the WaterSHED river monitoring program that was introduced in 2018. This program involves operation of monitoring stations at 22 locations in the North Saskatchewan River watershed. The information from this monitoring will help us to better assess the source of water quality challenges in the river (like high colour events), to predict long term trends in water quality and evaluate the effectiveness of landscape management on water quality.

Water Operations Management

351. Water operations management provides support services to ensure that Water can efficiently and effectively handle operations and maintenance functions. Water Operations Management is comprised of the following responsibility centres:

1. Water Operations Leadership – provides general water operations leadership to the Water Treatment Plants and Distribution and Transmission and includes costs for insurance and third party claims; and
2. Leased Transmission Facilities – includes costs to supply potable water to Water customers outside of the City of Edmonton through transmission mains owned and operated by a regional provider.

Project and Asset Management

352. Project and Asset Management is comprised of the following responsibility centres:

1. Project Management Office (PMO); and
2. Asset Management Methods Office (AMMO);

353. The PMO includes development, documenting and delivering of annual and long term capital plans, project and portfolio related processes, templates and tools in order to bring consistency and efficiency to the project management function. Providing training and support to the project and program managers, along with annual capital program oversight, are also key components of the PMO's deliverables.

354. The AMMO provides policy, standards, processes, tools and templates, including asset management software, to support EWSI in managing its assets consistently with a focus on maximizing the asset lifecycle while meeting the required level of service. This includes providing

expertise, support and training to the business in development of asset management plans and in facilitation of risk analysis and maintenance and capital optimization workshops.

355. Supply Chain Management & Security

356. Supply Chain Management (SCM) and Security is responsible for the following functions:

- Management and support the warehousing, inventory and reverse logistics functions;[12]
- management of the purchasing function for the acquisition of goods or services from outside vendors;
- maintenance of onsite safety and security;
- development of procedures related to adverse events, emergencies and disasters; and
- management of all real estate related functions such as, title searches, leases, land purchases/sales, crossing agreements and registration of any utility right-of-ways required. In conjunction with the Private Development group, this group reviews all land rezoning requests to determine the impacts on the existing water infrastructure.

357. The Operational Support Services costs forecast for 2022-2026 are summarized in Table 5.2.4.-1. The 2021 approved and 2021 forecast amounts are provided for comparison.

Table 5.2.4-1
Financial Schedule 7-1
Operational Support Services Costs
2021-2026
($ millions)

	Category	A 2021D	B 2021F	C 2022F	D 2023F	E 2024F	F 2025F	G 2026F
1	Quality Assurance and Environment	6.9	6.9	6.7	6.8	7.0	7.1	7.3
2	Water Operations Management	3.4	3.1	3.4	3.4	3.5	3.6	3.6
3	Project and Asset Management	2.6	1.5	1.6	1.6	1.6	1.7	1.7
4	Supply Chain Management & Security	1.9	1.1	1.1	1.0	1.1	1.1	1.1
5	**Total**	**14.7**	**12.6**	**12.7**	**12.9**	**13.1**	**13.4**	**13.7**

[12] Reverse logistics functions refers to the recovery of salvage value of assets at the end of their useful life through such things as disposal, reuse, recycle and donation.

2021 Approved to 2021 Forecast

358. The $2.1 million decrease in Operational Support Services costs from 2021 approved to 2021 forecast was primarily due to:

- A $0.8 million decrease in Supply Chain Management & Security costs related to 12 custodians transferred to Water Treatment Plant Maintenance group.
- A $0.6 million decrease in Project and Asset Management costs due to staff reduction.
- A $0.4 million decrease in Project and Asset Management costs due to the Knowledge Information Services group being transferred to Corporate.

2021 Forecast to 2022 Forecast

359. The $0.1 million increase in Operational Support Services costs from 2021 forecast to 2022 forecast was primarily due to inflation.

2022 Forecast to 2026 Forecast

360. For the 2022 to 2026 forecast period, year over year cost increases are based on the inflation factor provided in Section 4.2.1. The one exception is a $0.1 million decrease in SCM costs in 2023 as operational synergies are realized from Water D&T and Drainage Operations operating out of a shared facility.

5.2.5 Capitalized Overhead

361. Capitalized overhead recoveries represents labour and labour-related expenses of capital support functions such as senior management oversight, supervision, project governance, capital accounting, supply chain and health and safety resources that are directly attributable to capital expenditures. For further details on how Water determines capital overheads, refer to Section 4.6 of the Application.

362. The Capitalized Overhead cost recoveries forecast for 2022-2026 are summarized in Table 5.2.5-1. The 2021 approved and 2021 forecast amounts are provided for comparison.

Table 5.2.5-1
Financial Schedule 7-1
Capitalized Overhead Costs
2021-2026
($ millions)

	A **2021 D**	B **2021 F**	C **2022 F**	D **2023 F**	E **2024 F**	F **2025 F**	G **2026 F**

1	Capitalized Overhead	(7.8)	(8.8)	(9.1)	(9.3)	(9.5)	(9.7)	(9.9)
2	**Total**	**(7.8)**	**(8.8)**	**(9.1)**	**(9.3)**	**(9.5)**	**(9.7)**	**(9.9)**

2021 Approved to 2021 Forecast

363. The $1.0 million increase in Capitalized Overhead recoveries from 2021 approved to 2021 forecast was primarily due to:

- A $0.7 million increase as a result of adding supply chain and health and safety costs to the overhead pool;
- A $0.3 million increase in other various overhead costs;

2021 Forecast to 2022 Forecast

364. The $0.3 million increase in Capitalized Overhead recoveries from the 2021 forecast to 2022 forecast is primarily due to annual inflation ($0.2 million) as well as an increase in capitalized project management costs ($0.1 million).

2022 Forecast to 2026 Forecast

365. For the 2022 to 2026 forecast period, year over year cost increases are rising at the rate of inflation.

5.2.6 Billing, Meters and Customer Service

366. Billing, meters and customer service is comprised of the following three functional groups:

1. Customer Billing Services;
2. Meter Services; and
3. Customer Service.

Customer Billing Services

367. This cost category is comprised of costs for services, which are regulated by the AUC, provided by EWSI's affiliate EEA pursuant to a service level agreement. For further details, refer to Section 5.1 above.

Meter Services

368. This functional group consists of two main functions:

1. Metering Operations; and
2. Metering.

369. The Metering Operations group:

- Installs water meters for new customers;
- installs replacement meters when they reach their end of life;
- conducts an annual quality assurance program, testing a sample set of all small water meters;
- conducts annual performance testing of all large meters to ensure meters are measuring to the industry accuracy standards;
- manages the issuance of hydrant permit meters for contractors, landscapers and water haulers; and
- manages truckfill operations and meter test benches.

370. The Metering group is responsible for the planning, execution and optimization of meter reading services in the city of Edmonton on behalf of Water, Wastewater and Drainage. For further details, refer to Section 5.1.

Customer Service

371. The Customer service group includes customer agents who assist with scheduling appointments for water meter installations and provide technical support to assist customers understanding their consumption patterns. This team also supports customers to identify internal leaks that could be contributing to higher water bills.

372. The Customer Billing, Meter and Customer Service costs forecast for 2022-2026 are summarized in Table 5.2.6-1. The 2021 approved and 2021 forecast amounts are provided for comparison.

Table 5.2.6-1
Financial Schedule 8-1
Billing, Meters and Customer Service Costs
2021-2026
($ millions)

	Category	A 2021 D	B 2021 F	C 2022 F	D 2023 F	E 2024 F	F 2025 F	G 2026 F
1	Customer Billing Services	9.1	8.0	8.2	8.3	8.5	8.7	8.9
2	Meter Services	3.0	3.3	3.3	3.2	2.9	2.4	2.5
3	Customer Service	0.9	0.1	0.1	0.1	0.1	0.1	0.1
4	**Total**	**12.9**	**11.4**	**11.6**	**11.6**	**11.4**	**11.2**	**11.4**

2021 Approved to 2021 Forecast

373. The $1.5 million decrease in Billing, Meters and Customer Service costs from the 2021 approved to 2021 forecast was primarily due to:

- A $1.1 million decrease in Customer Billing Service costs due to a lower than forecast unit price charged by EEA to EWSI for billing and customer care services pursuant to the Service Level Agreement between the parties. This reduction in charges from EEA followed a review of EEA's cost allocations;
- A $0.8 million decrease in salaries and benefits costs (net of labour recoveries) due to fewer forecast positions in Meter Services and Customer Services; and
- A $0.5 million decrease in Customer Service costs due to the elimination of Infill Development group fees from EPCOR Drainage Services. In 2020 the Infill Development group transferred from EPCOR Drainage Services to Water Distribution Technical Services.

374. This decrease is partially offset by:

- A $0.9 million increase in operating costs associated with moving and ongoing operating costs related to the Real Estate Consolidation Project.

2021 Forecast to 2022 Forecast

375. The $0.2 million increase in Billing, Meters and Customer Service costs from the 2021 forecast to 2022 forecast is primarily due to:

- A $0.3 million increase in Meter Service costs due to implementation of the AMI Deployment Project beginning in 2022; and
- A $0.1 million increase in costs due to annual inflation.

376. This increase is partially offset by a decrease in costs due to:

- A $0.2 million decrease in costs related to the one-time move costs partially offset by an increase in operating costs associated with the Real Estate Project, which occurred in 2021 only.

2022 Forecast to 2026 Forecast

377. For the 2022 to 2026 forecast period, the majority of year over year cost increases are rising at the rate of inflation (as described in Section 4.2.1). The one exception is a reduction in meter reading costs as the AMI Deployment Project is implemented over the 2022-2026 period. Cost savings of $0.4 million are expected in 2024, with the cost savings increasing by $0.5 million in 2025.

5.2.7 EWSI Shared Services

378. EWSI Shared Services are comprised of allocated charges to the Edmonton Water operations for shared services provided by EWSI and direct charges for specific functional areas partially embedded in Edmonton Water operations. The services provided and the allocation methods used to determine the shared service charges to the Edmonton Water operations are described in Appendix L-02. The services provided through direct charges from specific functional areas include Finance, Public and Government Affairs, Legal, and Health, Safety and Environment and also includes Incentive costs directly related to Edmonton Water operations employees.

379. EWSI Shared Services charges forecast for 2022-2026 are summarized in Table 5.2.7-1. The 2021 approved and 2021 forecast amounts are provided for comparison.

Table 5.2.7-1
Financial Schedule 9-1
EWSI Shared Services Costs
2021-2026
($ millions)

	Category	A 2021 D	B 2021 F	C 2022 F	D 2023 F	E 2024 F	F 2025 F	G 2026 F
1	EWSI Shared Services	14.0	14.2	14.4	14.7	15.0	15.3	15.6
2	**Total**	**14.0**	**14.2**	**14.4**	**14.7**	**15.0**	**15.3**	**15.6**

2021 Approved to 2021 Forecast

380. The $0.2 million increase in EWSI Shared Services charges from the 2021 approved to 2021 forecast is primarily due to:

- A $0.5 million increase in Public & Government Affairs as the embedded portion of these costs ($0.4 million) was included in the Operational Support Services cost category in the previous application; and
- Increases in several other EWSI Shared Service groups totaling $0.3 million.

381. This increase is partially offset by a decrease in costs due to:

- A $0.6 million decrease in Technical Training as a result of a reorganization of the group from EWSI to Corporate.

2021 Forecast to 2022 Forecast

382. The $0.2 million increase in EWSI Shared Services charges from the 2021 forecast to 2022 forecast is primarily due to annual inflation totaling $0.3 million, partially offset by several decreases in EWSI Shared Service groups totaling $0.1 million.

2022 Forecast to 2026 Forecast

383. For the 2022 to 2026 forecast period, year over year cost increases are based on the inflation factor provided in Section 4.2.1.

5.2.8 Corporate Shared Services

384. Corporate Shared Services are comprised of allocated charges to EWSI for corporate services provided by EUI. The services provided and the allocation methods used to determine the corporate service charges to Water and Wastewater are described in Appendix L-01.

385. The Corporate Shared Services charges forecast for 2022-2026 are summarized in Table 5.2.8-1. The 2021 approved and 2021 forecast amounts are provided for comparison.

Table 5.2.8-1
Financial Schedule 10-1
Corporate Shared Services Costs Allocated to Edmonton Water Operations
2021-2026
($ millions)

		A	B	C	D	E	F	G
	Shared Service Unit	**2021 D**	**2021 F**	**2022 F**	**2023 F**	**2024 F**	**2025 F**	**2026 F**
1	Board and Executive	1.0	0.8	0.8	0.8	0.8	0.8	0.9
2	Corporate Finance	1.1	0.6	0.6	0.6	0.6	0.6	0.6
3	Treasury	0.8	0.4	0.4	0.4	0.4	0.5	0.5
4	Risk Assurance & Advisory Services	0.3	0.5	0.5	0.5	0.5	0.5	0.5
5	Human Resources	1.8	1.8	1.9	1.9	1.9	2.0	2.0
6	Information Services	2.1	1.9	2.0	2.1	2.1	2.2	2.2
7	Supply Chain Management	2.1	1.2	1.3	1.3	1.4	1.4	1.4
8	Public and Government Affairs	1.3	1.1	1.1	1.1	1.1	1.2	1.2
9	Legal Services	0.7	0.4	0.4	0.4	0.4	0.4	0.4
10	Health, Safety & Environment	0.2	0.2	0.2	0.2	0.2	0.2	0.2
11	At-Risk Compensation	1.2	1.0	1.0	1.0	1.1	1.1	1.1
12	Other Corporate Services	-	-	-	-	-	-	-
13	**Subtotal**	**12.7**	**10.0**	**10.2**	**10.4**	**10.6**	**10.8**	**11.0**
14	Asset Usage Fees	3.5	3.8	3.6	3.7	3.8	3.8	3.9
15	**Total Corporate Shared Services Costs**	**16.2**	**13.7**	**13.8**	**14.1**	**14.3**	**14.6**	**14.9**

2021 Approved to 2021 Forecast

386. The $2.5 million decrease in Corporate Shared Services charges from the 2021 approved to 2021 forecast is primarily due to the reduction in cost allocations resulting from the transfer of Drainage from the City of Edmonton to EPCOR. This decrease is partially offset by an increase in asset usage fees related to a new billing system placed into service in November 2020 and an increase in charges for Human Resources as a result of a reorganization of the Technical Training group from EWSI to Corporate.

2021 Forecast to 2022 Forecast

387. The $0.1 million increase in Corporate Shared Services charges from the 2021 forecast to 2022 forecast is primarily due to annual inflation totaling $0.3 million, partially offset by decreases in several Corporate Shared Service groups totaling $0.2 million.

2022 Forecast to 2026 Forecast

388. For the 2022 to 2026 forecast period, year over year cost increases are based on the inflation factor provided in Section 4.2.1.

5.2.9 Franchise Fees and Property Taxes

389. In accordance with the Franchise Fee Agreement, EWSI pays the City of Edmonton a franchise fee for the exclusive rights to distribute water within the City boundaries, based on 8.0% of total water sales revenue from In-City customers, less the municipal portion of property taxes.

390. Property taxes include property and business taxes assessed by, and payable to the City of Edmonton with respect to the various properties owned by Water.

391. The Franchise Fees and Property Taxes costs forecast for 2022-2026 are summarized in Table 5.2.9-1. The 2021 approved amounts and 2021 forecast amounts are provided for comparison.

Table 5.2.9-1
Financial Schedule 11-1
Franchise Fees and Property Taxes
2021-2026
($ millions)

	Category	A 2021 D	B 2021 F	C 2022 F	D 2023 F	E 2024 F	F 2025 F	G 2026 F
1	Franchise Fees	16.9	15.5	16.8	18.1	19.1	20.0	21.0
2	Property Taxes	0.5	0.7	0.8	0.8	0.9	0.9	0.9
3	**Total**	**17.4**	**16.2**	**17.7**	**18.9**	**19.9**	**20.9**	**21.9**

2021 Approved to 2021 Forecast

392. The $1.2 million decrease in Franchise Fees and Property Taxes from 2021 approved to 2021 forecast is primarily due to lower than forecast water consumption, resulting in lower than forecast revenues leading to lower franchise fees collected in 2021.

2021 Forecast to 2022 Forecast

393. The $1.5 million increase in Franchise Fees and Property Taxes from the 2021 forecast to 2022 forecast is primarily due to:

- A $1.4 million increase in Franchise Fees due to forecast increases in revenues from EWSI's regulated water operations primarily due to inclusion of the public fire

protection revenue requirement in water rates, water rate increases, and customer growth.

- A $0.1 million increase in Property Taxes, primarily related to the expansion of facilities for the Water Distribution and Transmission group and inflation.

2022 Forecast to 2026 Forecast

394. For the 2022 to 2026 forecast period, the year over year increases in Franchise Fees are due to forecast increases in revenues from EWSI's regulated water operations primarily due to water rate increases and customer growth and partially offset by the deduction of the municipal portion of the property taxes.

6.0 CAPITAL EXPENDITURES

395. Capital expenditures for EWSI's water operations reflect both capital projects and programs to support ongoing operations reliability, safety and efficiency, and to meet customer growth and regulatory requirements. Capital expenditures in this section are reported in total for the regulated Edmonton water system. Details regarding EWSI's capital planning process are provided in Section 4.2.2. Section 6.1 provides an explanation of EWSI's capital expenditures over the 2017-2021 PBR term compared to the approved amounts. Section 6.2 provides EWSI's capital plan for water operations for the 2022-2026 PBR term.

6.1 Capital Expenditures 2017-2021 PBR Term

396. EWSI provides the City with a five year plan of capital expenditures for the total water system at the beginning of each PBR term. Over the PBR term, actual capital expenditures, both on individual projects and in aggregate, may differ from the PBR forecasts as projects are advanced, delayed, or changed. As well, in some circumstances, projects will be added to or removed from capital programs to address the challenges of aging infrastructure, to better respond to growth, or to meet changing City or regulatory requirements.

397. Accordingly, over the PBR term, differences will arise between actual and approved capital expenditures. These are communicated annually to the City through Annual PBR Progress Reports attached to this Application in Appendices E-01 to E-03 for the years 2017, 2018 and 2019. This section provides an overview of key capital projects completed over the 2017-2021 PBR term and a comparison of the actual capital expenditures to the approved amounts in total for 2017-2021. Table 6.1-1 provides a comparison of EWSI's total actual/forecast capital expenditures for 2017-2021 PBR term compared to the approved amounts. The approved projects/programs over $5.0 million are separated into six categories: (i) regulatory, (ii) growth/customer requirements, (iii) health safety and environment, (iv) reliability and life cycle improvements, (v) performance / efficiency improvement, and (vi) accelerated programs.

Table 6.1-1
Financial Schedule 15.5
Total Capital Expenditures by Category Net of Contributions
2017-2021
($ millions)

	Category	A 2017-2021 Approved Total	B 2017-2021 Approved NRAs	C 2017-2021 Actual/ Forecast Total	D 2017-2021 Variance
	Regulatory				
1	Phosphoric Injection for Lead Control Project	-	9.8	11.8	2.0
2	Water Services Replacement and Refurbishment Program	10.2	-	12.1	1.9
3	Accelerated Lead Service Replacement Program	-	5.9	6.0	0.0
4	Projects < $5 million	1.5	-	2.2	0.7
5	**Sub-total: Regulatory**	**11.6**	**15.7**	**32.0**	**4.6**
	Growth/Customer Requirements				
6	Network Private Development Transmission Mains Program	14.4	-	25.6	11.2
7	Water Service Connections Program	-	-	9.7	9.7
8	Water Main Cost Sharing Program	3.0	-	6.5	3.4
9	LRT Relocates Program	10.4	14.5	26.4	1.5
10	Distribution System Modifications Program	6.0	-	7.0	1.0
11	Discovery Park Reservoir Annexation Project	-	7.7	7.8	0.1
12	Private Development Construction Coordination Program	13.5	-	11.9	(1.6)
13	New Meter Purchases and Installations Program	13.2	-	11.9	(1.3)
14	Projects < $5 million	2.6	1.6	12.1	8.0
15	**Sub-total: Growth/Customer Requirements**	**63.2**	**23.8**	**118.9**	**32.0**
	Health, Safety and Environment				
16	Solar Power Systems (including BESS) Project	-	-	28.8	28.8
17	Stage 2 and 3 Filter Conversion to Deep Bed Project	22.3	-	0.3	(22.0)
18	Projects < $5 million	4.3	-	3.3	(1.0)
19	**Sub-total: Health, Safety and Environment**	**26.6**	**-**	**32.5**	**5.8**
	Reliability and Life Cycle Improvements				
20	E. L. Smith Structural Rehabilitation Program	2.0	-	10.1	8.1
21	Obsolete Valve Replacements Program	4.1	-	11.1	6.9
22	Obsolete Hydrant Replacements Program	4.4	-	9.7	5.3
23	Rossdale Chemfeed Upgrade Program	4.0	-	8.8	4.8
24	E. L. Smith Chemfeed Upgrades Program	4.0	-	8.4	4.4
25	E. L. Smith Bypass Main (Ring Main) Project	7.0	-	11.0	4.0
26	Rossdale Filter Underdrains Project	4.7	-	8.1	3.4
27	E. L. Smith HVAC Upgrades Program	3.4	-	5.1	1.7
28	E. L. Smith Mechanical Reliability Program	4.9	-	6.4	1.5

	Category	A 2017-2021 Approved Total	B 2017-2021 Approved NRAs	C 2017-2021 Actual/ Forecast Total	D 2017-2021 Variance
29	Rossdale C1-2 Clarifier Upgrade Project	4.3	-	5.5	1.1
30	Transmission Mains Replacement / Refurbishment Program	13.3	-	14.2	0.9
31	Water Main Proactive Renewal Program	18.0	-	18.7	0.8
32	Water Main Reactive Renewal Program	54.7	-	55.3	0.7
33	Network Valve Chamber Refurbishment Program	5.6	-	6.0	0.4
34	Vehicle and Fleet Additions Program	11.8	-	11.9	0.1
35	Water Meter Change Outs Program	25.6	-	13.9	(11.8)
36	Reservoir Cell and Pumphouse Roof Replacement Program	6.3	-	3.2	(3.1)
37	Reservoir Electrical Upgrades Program	5.3	-	2.7	(2.6)
38	SCADA System Upgrade Program	5.7	-	4.5	(1.2)
39	Rossdale Electrical Upgrades Program	5.2	-	4.3	(0.9)
40	Projects < $5 million	68.0	-	75.6	7.6
41	**Sub-total: Reliability and Life Cycle Improvements**	**262.4**	**-**	**294.3**	**32.0**
	Performance Efficiency and Improvement				
42	Water Distribution and Transmission Facility Project	16.0	-	22.1	6.1
43	Water Main Cathodic Protection Program	21.0	-	17.8	(3.3)
44	Projects < $5 million	7.1	-	6.7	(0.4)
45	**Sub-total: Performance Efficiency and Improvement**	**44.1**	**-**	**46.6**	**2.4**
	Accelerated				
46	Accelerated WM Renewal Program	51.9	-	42.9	(9.0)
47	Accelerated Fire Protection Program	15.9	-	9.9	(6.0)
48	Projects < $5 million	-	-	-	-
49	**Sub-total: Accelerated**	**67.8**	**-**	**52.8**	**(15.0)**
50	**Total Capital Expenditures**	**475.8**	**39.5**	**577.1**	**61.9**

398. Over the 2017-2021 PBR term, EWSI forecasts that capital expenditures for the Edmonton regulated water operations will exceed the approved PBR forecast, including approved Non Routine Adjustments by $61.9 million (12.0%). A breakdown of the variance as shown in Table 6.1-1 indicates that the higher than forecast level of expenditures is largely related to the Growth/Customer Requirements ($32.0 million) and Reliability and Life Cycle Improvements ($32.0 million) project categories, along with significant capital expenditures related to the Solar Power System projects ($28.8 million).

399. A detailed variance explanation is provided later in this section, but the higher level of expenditures is primarily attributable to the following circumstances:

i. continuation of higher than forecast expenditures needed to accommodate more city growth than expected, including the acquisition of existing water infrastructure as a result of city-driven annexation, and the accelerated construction schedule for the West Valley Line LRT project. EWSI responds accordingly to these changes, but does not have full control over the final costs;

ii. higher than forecast expenditures for water plant and linear water assets due to the increasing age and criticality of various water distribution and transmission network assets, along with the inability to perform further repair and/or maintenance activities on an increasing number of water plant assets; and

iii. the construction of a 12MW solar farm and associated BESS adjacent to the E. L. Smith water treatment plant, which has been funded through the Green Energy Initiative rate rider during the 2017-2021 PBR term.

400. These increases were partially offset by the deferral of the E. L. Smith WTP Stage 2 and 3 Filter Conversion to Deep Bed project ($22.0 million) to a future PBR period and lower than forecasted water meter change out expenditures ($11.8 million) due to longer than expected lives of the batteries used in water customer meters. As a result of EWSI's efforts to find cost savings where prudent and without adversely impacting city growth, system performance and safety, additional capital expenditure reductions were also applied to other water plan and linear asset projects.

401. As illustrated in Table 6.1-1 a large portion (approximately 60%) of the total system capital program expenditures relate to Reliability/Life Cycle Improvements and Accelerated programs, including all City of Edmonton requirements. These projects include:

- construction projects to accommodate private development growth within the City;
- rehabilitation and revitalization projects primarily driven by City branches;
- rehabilitation and replacement of existing assets at the end of their useful lives to maintain system reliability and manage risk;
- relocation of transmission and distribution mains as requested by the City to accommodate LRT; and
- the Accelerated Water Main Renewal and Accelerated Fire Protection programs.

402. The remainder of EWSI's capital program includes projects needed to:

- address current and upcoming regulatory requirements;

- meet health and safety requirements;
- fulfill environmental (green energy) initiatives;
- improve operational efficiency and lower future costs; and
- upgrade key facilities used by EWSI operations staff.

403. For each capital category identified in Table 6.1-1, a detailed capital expenditure variance is provided below.

Regulatory Category Capital Projects

404. EWSI expects expenditures within the Regulatory projects category to be $4.6 million higher than the approved amount, including Non-Routine Adjustments, of $27.4 million for the 2017-2021 PBR term. This forecasted increase in capital expenditures is due to the following:

405. The **Phosphoric Injection for Lead Control Project** is expected to be $2.0 million greater than the approved amount of $9.8 million in the 2017-2021 PBR term, which was provided via Non-Routine Adjustment. The project is for the introduction of orthophosphate into drinking water to inhibit corrosion in order to meet Health Canada's 2019 Guideline for Canadian Drinking Water Quality that reduced the maximum acceptable concentration for lead in drinking water from the current 10 µg/L (micrograms per Litre) to 5 µg/L.

406. The **Water Services Replacement and Refurbishment Program** is expected to be $1.9 million greater than the approved amount of $10.2 million in the 2017-2021 PBR term. This program covers capital construction investment in non-contributed water service line assets. The program includes relocation of water service lines that do not meet current servicing standards, reactive replacements of service box and components, and customer-initiated lead service replacements (EPCOR portion of water service lines only). The increased expenditure in the 2017-2021 PBR term is primarily due to a high than expected number of qualifying service replacements received to date and expected to the end of the current PBR term.

407. The remaining variance is attributable to the **Blow-Off Cross Connection Control Program**, which is expected to be $0.7 million greater than the approved amount of $1.5 million. The increased program costs relate to a higher than expected number of opportunistic replacements expected to be completed during the current PBR period. The opportunistic refits now occur in conjunction with other transmission work planned for each pipe segment.

Growth/Customer Requirements Category Capital Projects

408. The total capital expenditures for the Growth/Customer Requirements category are expected to be $32.0 million higher than the approved amount, including Non-Routine Adjustments, of $86.9 million for the 2017-2021 PBR term. This forecast increase in capital expenditures is due to the following:

409. The **Network PD Transmission Mains Program** is expected to be $11.2 million greater than the approved amount of $14.4 million in the 2017-2021 PBR term. This program represents the reimbursement of the costs incurred by private developers to extend the transmission network (450 mm and larger in diameter) to new subdivisions. Since developers determine both the timing of projects and the areas to be developed, expenditures on this program have proven difficult to forecast. Significant additions to this program during the 2017-2021 PBR term include transmission main projects for Ellerslie Road, 28th Avenue Southwest, and the Horse Hills/Marquis industrial area. EWSI continues to work with developers to identify their upcoming subdivision plans to better predict the program cost.

410. The **Water Service Connections Program** is expected to be $9.7 million higher than the approved net nil amount included in the 2017-2021 PBR term. This program provides for the construction of new water services for infill developments and redevelopments. While gross program costs were $2.8 million greater the approved amount of $23.6 million over the 2017-2021 PBR term due to a combination of higher than expected infill development and offsetting contributions providing a recovery of less than 75% of the cost of new services during the current PBR term. These water service connections are charged on a cost of service basis in accordance with Part III Schedule 1 of the Bylaw. Previously EWSI's costs for completing service connections were recovered through a fee schedule outside the Bylaw and did not reflect EWSI's full cost of service for these activities. The changes to charge on a cost of service basis for each service connection will ensure that EWSI achieves 100% recovery in the 2022-2026 PBR term.

411. The **Water Main Cost Sharing Program** is expected to be $3.4 million greater than the approved amount of $3.0 million in the 2017-2021 PBR term. This program provides private developers with a partial rebate for the construction of water mains 300 to 400 mm in diameter. Similar to the Network PD Transmission Mains Program, the costs of this program are driven by developer activity. The increase in the costs of this program result from higher than forecast developer activity during the current PBR term.

412. The **LRT Relocations Program** is expected to be $1.5 million greater than the approved amount, including Non-Routine Adjustments, of $24.9 million in the 2017-2021 PBR term. Changes to track alignments, as well as the accelerated construction schedule for the West Valley Line LRT project have resulted in increases to the projected costs of water main, hydrant and sewer relocations for this project.

413. The **Distribution System Modifications Program** is expected to be $1.0 million greater than the approved amount of $6.0 million in the 2017-2021 PBR term. This program includes relocating or modifying existing water mains and appurtenances to eliminate conflicts arising from City of Edmonton projects, primarily related to road or sidewalk widening. The increase in program expenditures relates to higher than forecasted City of Edmonton modification requests during the current PBR term.

414. The **Private Development Construction Coordination Program** is expected to be $1.6 million less than the approved net amount of $13.5 million in the 2017-2021 PBR term. EPCOR Water Services is responsible for the orderly, functional, and efficient expansion of the water supply system in Edmonton through private development. This is achieved through ongoing activities such as drawing reviews and approvals, circular responses, construction inspections, and recording water infrastructure. The decreased program costs relate to efficiencies EWSI was able to implement in completing drawing reviews and inspections.

415. The **New Meter Purchases and Installations Program** is expected to be $1.3 million less that the approved amount of $11.6 million in the 2017-2021 PBR term. The purpose of this program is to comply with the Bylaw which requires that all water consumed by customers must be metered. The decreased program costs relates primarily to lower activity during the COVID-19 pandemic period, during which home visits have been minimized.

416. For the remaining projects in the Growth/Customer Requirements category, all of which individually are less than $5.0 million, capital expenditures are expected to be $8.0 million greater than the approved amount of $4.1 million in the 2017-2021 PBR term. The remaining increase over the capital expenditures approved for the 2017-2021 PBR term is due to the following:

- $2.7 million increase in the final cost of the new meter chamber related to the **Capital Region Northeast Water Service Commission (CRNWSC) Water Pipeline Acquisition** which is a 12 kilometer water transmission pipeline that EWSI acquired from the CRNWSC in 2015. The originally-forecasted costs of the new meter chamber, which was expected to be completed during the 2012-2016 PBR did not sufficiently account

for the increased construction costs due to geotechnical conditions and additional infrastructure requirements at the final site.

- $1.7 million in unbudgeted capital expenditures for the **Laurel Booster Station Project** which was required to supply adequate pressure to parts of the Laurel and future Aster neighborhoods. The Laurel neighbourhood reaches an elevation where the current Tertiary Pressure Zone cannot supply the required pressure to meet design and construction standards.
- $1.6 million in unbudgeted capital expenditures for the **Southwest Reservoir and Booster Station Land Acquisition Project** which acquired the land necessary to construct a future reservoir to supply future water customers between 41 Avenue Southwest and the Edmonton International Airport.
- $1.3 million net increase in capital expenditures for the **New Water Distribution Mains Program** which completes modifications to the existing water network requested by third parties, at their cost. While gross program costs were $1.8 million greater the approved amount of $8.8 million in the 2017-2021 PBR term due to the number and cost of the modification requests received, offsetting contributions are providing a recovery of less than 90% of the modification costs incurred by EPCOR. A full recovery of the new water distribution mains is anticipated for the 2022-2026 PBR term due to a change in the collection process.
- other smaller capital expenditure overages totaling $0.7 million in aggregate.

Health, Safety and Environment Category Capital Projects

417. The Health, Safety and Environment category expenditures are expected to be $5.8 million less than the approved amount of $26.6 million for the 2017-2021 PBR term. This forecasted decrease in capital expenditures is due to the following:

418. The **Solar Power Farm Project**, including the **BESS** and net of contributions, are expected to be $28.8 million for the 2017-2021 PBR term. Instead of purchasing renewable power at an annual cost of $1.9 million, EWSI plans to construct a Solar Power Farm at the E. L. Smith water treatment plant at a net cost of $26.8 million during the current PBR term. The solar farm is expected to include a battery energy storage system that would be almost entirely grant-funded ($2.0 million net cost). These projects are in response to the Green Energy Initiative approved in EWSI's 2017-2021 PBR term which provided funding of $1.9 million per year (commencing in 2018). This annual funding represented the cost to replace approximately 10% of Water's conventional power with "green power" purchased from a third party. The solar farm will include

approximately 45,000 solar panels on 51 acres of land to the southwest of the Plant. This land is owned by EWSI and being held for future Plant expansion, which is not anticipated during the 30 year life of the solar farm.

419. The **E. L. Smith Stage 2 and 3 Filter Conversion to Deep Bed Project** is expected to be $22.0 million less than the approved amount of $22.3 million in the 2017-2021 PBR term. This project includes the conversion of the E. L. Smith Stage 2 and 3 Filters from regular bed filters (750 mm of media) to deep bed filters (2000 mm of media) with the objective of increasing conventional and direct filtration water treatment capacity at the plant. During engineering inspections in 2018, EWSI identified immediate needs for structural rehabilitation of the E. L. Smith filter chambers. All twelve filters in Stage 1 and Stage 2 are planned for upgrades, however the upgrades cannot be performed concurrently, and each filter upgrade will take approximately 6-8 months. Accordingly, the conversion to deep bed has been postponed to the 2032-2036 PBR term so that the required structural rehabilitation and upgrades can be completed first.

420. For the remaining projects in the Health, Safety and Environment category, all of which individually are less than $5.0 million, capital expenditures are expected to be $1.0 million lower than the approved amount of $4.3 million in the 2017-2021 PBR term. The remaining increase over the capital expenditures approved for the 2017-2021 PBR term is due to the following:

- a $0.7 million decrease in capital expenditures for the **Lighting Replacement Program** which includes the replacement of all PCB fixtures at all EPCOR reservoirs, booster stations and water plants. The decreased program costs primarily relate to the reprioritization of other higher priority water plant projects during the current PBR term.
- other smaller capital expenditure reductions totaling $0.3 million in aggregate.

Reliability and Life Cycle Improvement Category Capital Projects

421. The Reliability and Life Cycle Improvement category expenditures are expected to be $32.0 million higher than the approved amount of $262.4 million for the 2017-2021 PBR term. This forecasted increase in capital expenditures is due to the following:

422. The **E. L. Smith WTP Structural Rehabilitation Program** is expected to be $8.1 million higher than the approved amount of $2.0 million in the 2017-2021 PBR term. This program includes the upgrade or replacement of end-of-life and deteriorated structural components. During engineering inspections in 2018, EWSI identified immediate needs for structural

rehabilitation of the E. L. Smith filter chambers, which were not previously anticipated and account for the majority of the forecasted program overage during the current PBR term.

423. The **Obsolete Valve Replacement Program** is expected to be $6.9 million higher than the approved amount of $4.1 million in the 2017-2021 PBR term. This program provides for the proactive and reactive life cycle replacement of distribution main valves, where the associated break history has not indicated overall replacement of the related water main section for an extended period of time. Higher than expected rates of valve deterioration have led to an increased number of priority replacements, requiring significant adjustments to the valve replacement schedules.

424. The **Obsolete Hydrant Replacements Program** is expected to be $5.3 million higher than the approved amount of $4.4 million in the 2017-2021 PBR term. The purpose of this program is to replace hydrants without available replacement parts and/or those hydrants noted to be out of service during inspection. Similar to the obsolete valve replacement program, higher than expected rates of deterioration have led to increased backlogs. EWSI has adjusted its hydrant replacement schedule to clear backlogs and ensure fire protection service levels maintained.

425. The **Rossdale Chemfeed Upgrades Program** is expected to be $4.8 million higher than the approved amount of $4.0 million in the 2017-2021 PBR term. This program includes the upgrade and/or replacement of various Rossdale chemical systems on a prioritized basis. During the current PBR term, EWSI identified significant health, safety and environmental needs, requiring extensive upgrades to the sodium bisulphite room, which accounts for the majority of the program overage during the current PBR term.

426. The **E. L. Smith WTP Chemfeed Upgrades Project** is expected to be $4.4 million higher than the approved amount of $7.0 million in the 2017-2021 PBR term. This project includes the upgrade and/or replacement of various E. L. Smith chemical systems on a prioritized basis. The primary factors contributing to the increase in the cost of this program include higher than estimated costs for a large fluoride room upgrade to replace end-of-life equipment and unanticipated upgrades to the sodium hypochlorite room, including new generation cells.

427. The **E. L. Smith WTP Bypass Main (Ring Main) Project** is expected to be $4.0 million higher than the approved amount of $7.0 million in the 2017-2021 PBR term. The scope of this project includes the construction of a new bypass primary feeder to help ensure redundancy and uninterrupted service to North and West Edmonton. In 2019, a historical resource impact assessment confirmed the presence of cultural materials within the proposed construction area,

requiring archaeological mitigation. Further design also identified the requirement for additional manual isolation valves to improve operational flexibility and isolation redundancy. In order to enable a portion of the work to proceed in 2020, the project was split into two construction phases. Cultural mitigation activities for the second phase area have been completed. The mitigation involves archaeological excavation using defined best practices to locate, uncover, and log historical artefacts, which are then sent to the Royal Alberta Museum. The second phase of construction will proceed in the spring of 2021.

428. The **Rossdale Filter Underdrain Upgrades Program** is expected to be $3.4 million higher than the approved amount of $4.7 million in the 2017-2021 PBR term. The primary purpose of this program is to upgrade and/or replace filter underdrain and air scour systems within the plant. Both the scope and cost of this project have increased following an inspection of the filter underdrain system that identified unforeseen needs for upgrades to air scour systems.

429. The **E. L. Smith HVAC Upgrades Program** is expected to be $1.7 million higher than the approved amount of $3.4 million in the 2017-2021 PBR term. This purpose of this program is to address poor air quality and circulation issues within the E. L. Smith plant. The increase in forecasted program costs primarily relates to scope increases and higher than expected costs within the Clarifier and Filter Building HVAC Upgrade subproject, which was required to address insufficient heating and ventilation issues related to equipment that was original to the facility.

430. The **E. L. Smith Mechanical Reliability Program** is expected to be $1.5 million higher than the approved amount of $4.9 million in the 2017-2021 PBR term. The purpose of this program is to improve plant reliability and reduce maintenance downtime via the replacement of equipment reaching end of life and/or requiring upgrades. The increase in forecasted program costs primarily relates to the unanticipated E. L. Smith Boiler Room Upgrades subproject, which replaced the boiler de-aerator vessel that was identified as having reached its end of service life ($1.2 million). Given the criticality of the boiler system it was determined that this project could not be delayed beyond the 2017-2021 PBR period.

431. The **Rossdale C1-2 Clarifier Upgrade Project** is expected to be $1.1 million higher than the approved amount of $4.3 million in the 2017-2021 PBR term. The purpose of this project was to improve the reliability of the Rossdale clarifiers by replacing or rehabilitating most major clarifier structures and components. During the project, an unanticipated requirement to complete emergency roof column structural modifications was identified, which accounts for the majority of the project overage during the PBR term.

432. The **Transmission Mains Replacement/Refurbishment Program** is expected to be $0.9 million higher than the approved amount of $13.3 million in the 2017-2021 PBR term. The scope of this program includes the rehabilitation of high risk transmission mains, 350 mm in diameter or greater, that show either signs of deterioration, are made of a highly susceptible material (certain vintages of cast iron), or have a history of breaks but do not yet qualify for the reactive renewal program. The increased program costs relate to the combination of the sub-project selections and associated replacement/refurbishment costs, which continue to evolve on an annual basis.

433. The **Water Main Proactive Renewal Program** is expected to be $0.8 million higher than the approved amount of $18.0 million in the 2017-2021 PBR term. This project is very closely tied to Reactive Renewal and includes replacements or upgrades of water mains in older areas where water mains do not conform to current design standards for water quality, fire protection, and system reliability. Total expenditures on this program over the PBR term are expected to be within 5% of the approved target.

434. The **Water Main Reactive Renewal Program** is expected to be $0.7 million higher than the approved amount of $54.7 million in the 2017-2021 PBR term. Actual-to-forecast variances for this program generally correlate with the number of main breaks occurring, which is dependent upon weather conditions. Although the ongoing decrease in cast iron water main breaks has resulted in a decrease in the total length of candidates to be replaced, the unit cost of construction for water main replacements has increased due to changes in the City's road restoration standards, increased traffic accommodation requirements, and an increase in transmission mains (350 mm or larger) that qualify for replacement. Total expenditures on this program over the PBR term are expected to be within 2% of the approved target.

435. The **Network Valve Chamber Refurbishment Program** is expected to be $0.4 million higher than the approved amount of $5.6 million in the 2017-2021 PBR term. This annual program provides funds for the replacement and refurbishment of transmission main appurtenances including valves, air vents, blow offs, pressure-reducing valves and check valves. The increase in program expenditures relates to higher than anticipated number of critical valve replacements required during the current PBR term.

436. The **Water Meter Change Outs Program** is expected to be $11.8 million lower than the approved amount of $25.6 million in the 2017-2021 PBR term. Every year, EWSI replaces water meters based on a planned life-cycle replacement schedule or due to burst, damaged, or defective meters. The decrease in the forecasted cost of this program is primarily due to the

actual lives of the batteries used in the Automatic Meter Reading (AMR) devices exceeding their manufacturer-estimated lives of 12 years. These devices are pre-fabricated onto the meters, thus the meter must be replaced at the same time as the AMR device. Based on manufacturer's useful life, it was expected that the first significant replacement of first generation AMR devices would occur in 2019; however, the first significant year of replacement has been extended to coincide with the initiation of the AMI Deployment Project in 2022. As a result, fewer meters will require replacement during the current PBR term.

437. The **Reservoir Cell and Pumphouse Roof Replacement Program** is expected to be $3.1 million lower than the approved amount of $6.3 million in the 2017-2021 PBR term. The decrease is due to changes in the scope of this program, which has resulted in reclassifying reservoir roof replacement projects to the **Reservoir Structural Upgrades Project** (see paragraph 46 below). This change allows for more efficient project delivery and improvements to project management and coordination

438. The **Reservoir Electrical Upgrades Program** is expected to be $2.6 million lower than the approved amount of $5.3 million in the 2017-2021 PBR term. The decreased program expenditures primarily relate to the reprioritization of other higher priority water plant projects during the current PBR term.

439. The **SCADA System Upgrades Program** is expected to be $1.2 million lower than the approved amount of $5.7 million in the 2017-2021 PBR term. The primary objective of this program is to maintain the reliability, accuracy, and availability of the Supervisory Control and Data Acquisition (SCADA) system through hardware upgrades based on product life-cycles. The decrease in program expenditures is due to cancelled software upgrades originally expected from the vendor and reduced costs for replacement costs overall for the program.

440. The **Rossdale Electrical Upgrades** Program is expected to be $0.9 million lower than the approved amount of $5.3 million in the 2017-2021 PBR term. The program objective is to improve reliability by upgrading end-of-life, poor condition and obsolete equipment to prevent unnecessary scheduled and unscheduled downtime. The decrease in forecasted program costs is due to the combination of delays in design finalization and the deferral of lower priority electrical upgrades to a future PBR period.

441. For the remaining projects in the Reliability and Life Cycle Improvement category, all of which individually are less than $5 million, capital expenditures are expected to be $7.6 million higher than the approved amount of $68.0 million in the 2017-2021 PBR term. The remaining

increase over the capital expenditures approved for the 2017-2021 PBR term is due to the following:

- $3.3 million in unbudgeted capital expenditures for the **CRNWSC Transmission Main Inspection** and **NW Transmission Main Inspection Projects** which are collectively being completed to inspect, evaluate the condition and mitigate the risk of major breaks on EPCOR's high and medium-risk transmission mains. An annual Critical Pipeline Inspection capital program has been identified and included within the 2022-2026 PBR.
- $2.9 million increase in capital expenditures for the **Rossdale Stilling Basin Drain Valve Upgrade Project**, which provides for the replacement of the aging drain and foot valves within the stilling basins. In 2019, engineering inspections of the stilling basis and adjacent concrete structures identified several deficiencies, including water leaks in several locations. The unanticipated stilling basis structural rehabilitation work was completed in parallel with the drain valve replacements, which accounts for the program overage during the current PBR term.
- $2.7 million in unbudgeted net capital expenditures for the **Flood Protection Project** which includes various capital expenditures at both the Rossdale and E. L. Smith water treatment plants with the primary objective of protecting both water plants from overland flooding and groundwater migration to a 1:500 return-period probability high water event in the North Saskatchewan River. The project will be partially funded through grants from the provincial Alberta Community Resilience Program and the federal Disaster Mitigation and Adaptation Fund.
- $2.5 million increase in capital expenditures for the **Reservoir Structural Upgrades Program** which now includes reservoir roof replacement projects (see paragraph 42 above). This change allows for more efficient project delivery, and improvements to project management and coordination.
- $5.7 million decrease in the combined capital expenditures for the **Rossdale Roof Replacement Program** ($2.0 million) and **E. L. Smith High Lift Pump #5 Upgrades Project** ($3.7 million), which were deemed lower priority projects and deferred to a future PBR period.

442. Capital expenditures for the remaining projects in the Reliability and Life Cycle Improvement category are collectively expected to be $1.9 million lower than the approved amount $68.0 million. They are mainly programs to rehabilitate or replace on a life-cycle basis the electrical, mechanical, structural, piping, analyzers, instrumentation and control, and heating

and ventilation systems at the water treatment plants, reservoirs and within the water distribution and transmission network. Within each of these programs, the most critical work was prioritized for completion within the current PBR term and deferrable projects were rescheduled for future periods, which has resulted in an aggregate decrease to the forecasted Reliability and Life Cycle Improvement capital expenditure overage within the current PBR term.

Performance Efficiency and Improvement Category Capital Projects

443. The Performance Efficiency and Improvement category expenditures are expected to be $2.4 million higher than the approved amount of $44.1 million for the 2017-2021 PBR term. This forecasted increase in capital expenditures is due to the following:

444. The **Water Distribution and Transmission (D&T) Facility Project** is expected to be $6.1 million higher than the approved amount of $16.0 million in the 2017-2021 PBR term. This project has been re-scoped following the transfer of Drainage Services from the City to EPCOR and the completion of an EWSI-wide real estate review. Instead of a stand-alone Water D&T facility, the review concluded that a consolidated solution for Water Services and Drainage Services would provide long-term synergies and operational efficiencies that would outweigh its additional capital costs as discussed in Section 2.3.8. In August 2020, EWSI finalized the purchase of a developed property on Aurum Road in North East Edmonton, which is ideally suited to EWSI long term needs. Site renovations will be required before large scale moves can occur in late 2021 and are included within the projected capital expenditure overage for this project. The costs for the project have been allocated 40% to Water Services and 60% to Drainage Services based on estimated headcount. Refer to Appendix F-05 for more information.

445. The **Water Main Cathodic Protection Program** is expected to be $3.3 million lower than the approved amount of $21.0 million in the 2017-2021 PBR term. The purpose of this program is to install cathodic protection on cast iron or steel mains that are showing signs of reoccurring breakage and are not scheduled for replacement in the near future. Cathodic protection of metallic water mains is a proven and effective method of reducing break frequency and extending the useful life of those pipes. The reduction in the forecasted program costs relates to the adoption of a more efficient anode installation process during the current PBR term.

446. For the remaining projects in the Performance Efficiency and Improvement category, all of which individually are less than $5.0 million, capital expenditures are expected to be $0.4 million less than the approved amount of $7.1 million in the 2017-2021 PBR term. The

remaining decrease over the capital expenditures approved for the 2017-2021 PBR term is due to the following:

- $2.5 million decrease in capital expenditures for the Hydraulic Debottlenecking Project which identifies, designs and eliminates flow restrictions in an effort to maximize E. L. Smith plant hydraulic capacity. The first debottlenecking initiative, completed in 2017, reduced flow restrictions in the UV effluent flume and increased the overall hydraulic capacity of the plant to the project objective. This result negated the requirement to complete any other debottlenecking work and significantly reduced the overall cost.
- $2.8 million in unbudgeted capital expenditures for the Water Canada's portion of the EPCOR-wide GeoFIT project that establishes a single custom-built, web-based application that provides asset and crew project information across multiple EPCOR Business Units and operational areas. The GeoFIT program, allows teams in Water Canada, Drainage Services, Power and Technologies to collectively pull important data that helps organize and manage future work.
- other smaller capital expenditure reductions totaling $0.7 million in aggregate.

Accelerated Capital Projects

447. The Accelerated capital project category expenditures are expected to be $15.0 million lower than the approved amount of $67.8 million for the 2017-2021 PBR term. This forecasted decrease in capital expenditures is due to the following:

448. The **Accelerated Water Main Renewal** program is expected to be $9.0 million less than the approved amount of $51.9 million in the 2017-2021 PBR term. The expenditures within this program are dependent upon the City paving program plans and the water main break frequency. The reduction in the forecasted program is primarily due to the reprioritization of other more critical lifecycle and reliability programs.

449. The **Accelerated Fire Protection** program is expected to be $6.0 million less than the approved amount of $15.9 million in the 2017-2021 PBR term. The scope of this program includes the upgrading of water mains and associated appurtenances, such as fire hydrants, to bring fire protection capabilities across the City within agreed-to minimum standards. The reduction in the forecasted program expenditures is due to a smaller number of potential sub-projects meeting the established Accelerated Fire Protection Program criteria.

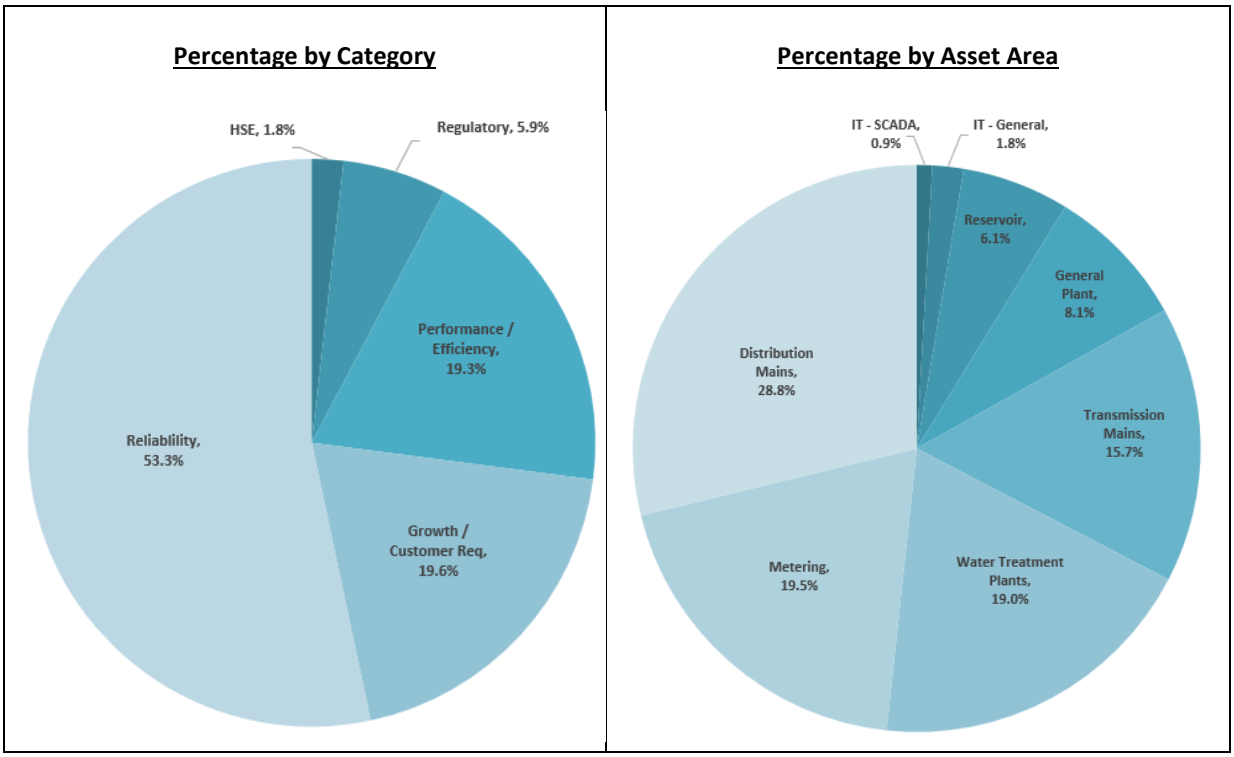
6.2 Forecast Capital Expenditures 2022-2026 PBR Term

450. EWSI has developed its five-year plan for capital expenditures based on the methodologies described in Section 4.2. EWSI is forecasting capital expenditures of $429.3 million net of contributions for 2022-2026 period which is a decrease of $147.8 million from the actual spend over the 2017-2021 PBR period. This decrease is in excess of the $52.6 million in inflation of the Actual 2017-2021 PBR capital expenditure of $577.1 million.

451. In order to minimize rate increases over the 2022-2026 term, significant capital constraints were applied in forecasting capital expenditures. $114.8 million was reduced from Distribution and Transmission Mains alone. A new Risk Based Renewals Program is introduced, which combines accelerated, proactive and reactive work into a single program, enabling consistent risk-ranking to ensure that the limited funding is directed toward the Distribution main assets with the highest risk. On the transmission side, a new Critical Pipeline Inspection Program will enable EWSI to inspected and repaired for less than 5% of the cost of full replacement.

452. Consistent with the 2017-2021 PBR term, EWSI continues to place significant focus for this PBR term on projects and programs related to reliability and life-cycle replacements. As illustrated in Figure 6.2-1, the reliability category represents 53% of planned spending over the PBR term, which is very similar to the 55% allocated to reliability in the 2017-2021 PBR term.

Figure 6.2-1
Total Capital Expenditure Percentages by Category and Asset Area
2022-2026



453. For greater insight into the capital plan, Table 6.2-1 provides the total forecast capital expenditures for the Edmonton regulated water system for 2022-2026 by PBR category and asset area. Within these tables, specific projects and programs equal to or greater than $5.0 million each have been separately identified. Additional details for each of these projects are provided in water capital business cases in Appendices F-02 to F-26. The entire list of projects and programs with forecasted costs for the PBR term 2022-2026 is provided in Appendix F-01.

454. For planning purposes and depending on priorities, it is expected that in certain years over the PBR term, EWSI's annual capital spending may be higher than the average value of $85.86 million but offset by lower spending in other years to manage to the total of $429.3 million forecast for the five-year term.

455. During the course of the 2017-2021 PBR term, EWSI determined that many of the capital projects under the Accelerated Program category can be better categorized based on the need or justification for the project and thereby better placed in categories such as Reliability / Life Cycle. Moving forward to the 2022-2026 PBR term, the Accelerated Program category has been eliminated. Table 6.2-1 displays the proposed capital programs and projects with projected

capital expenditures of $5.0 million and higher, organized by the remaining five capital project categories.

Table 6.2-1
Total Forecast Capital Expenditures by PBR Category
2017-2026 Net of Contributions
($ millions)

	Category	A 2017-2021 Actual/ Forecast Total	B 2022-2026 PBR Plan	C Variance
	Regulatory			
1	Water Services Replacement and Refurbishment Program		24.7	
2	Projects < $5 million		0.8	
3	**Sub-total: Regulatory**	**32.0**	**25.5**	**(6.5)**
	Growth/Customer Requirements			
4	Network PD Transmission Mains Program		15.0	
5	QEII Highway 41 Ave Crossing Project		14.1	
6	New Meter Installations Program		13.9	
7	Franchise Agreement Relocates Program		11.0	
8	LRT Relocates Program		10.3	
9	Private Development Construction Coordination Program		8.7	
10	Winterburn Booster Station Project		6.7	
11	Projects < $5 million		4.4	
12	**Sub-total: Growth/Customer Requirements**	**118.9**	**84.1**	**(34.8)**
	Health, Safety and Environment			
13	Projects < $5 million		7.7	
14	**Sub-total: Health, Safety and Environment**	**32.5**	**7.7**	**(24.7)**
	Reliability and Life Cycle Improvements			
15	Risk Based Renewals Program		29.0	
16	Infill Fire Protection Program		20.2	
17	Flood Protection Project		16.1	
18	E. L. Smith Filter Upgrades Project		15.6	
19	Obsolete Valve Replacements Program		11.6	
20	Transmission Mains and Appurtenances Program		10.7	
21	Structural Rehab and Roof Replacement Program		9.6	
22	Obsolete Hydrant Replacements Program		8.4	
23	Fleet and Vehicle Additions Program		7.0	
24	Critical Pipeline Inspection Program		6.8	
25	Meter Change Outs Program		5.8	
26	High Lift Pump House Project		5.0	

	Category	A 2017-2021 Actual/ Forecast Total	B 2022-2026 PBR Plan	C Variance
27	5kV Upgrades Project		5.0	
28	Projects < $5 million		78.2	
29	**Sub-total: Reliability and Life Cycle Improvements**	**347.2**	**229.0**	**(118.2)**
	Performance Efficiency and Improvement			
30	AMI Deployment Project		62.9	
31	Water Main Cathodic Protection Program		15.1	
32	Projects < $5 million		5.1	
33	**Sub-total: Performance Efficiency and Improvement**	**46.6**	**83.0**	**36.5**
34	**Total Capital Expenditures**	**577.1**	**429.3**	**(147.8)**

456. The following provides a description of the nature of projects and programs included in each of the five capital project categories. A detailed description of each category is provided in Section 4.2.3.1.

Regulatory Category Capital Projects

457. Regulatory includes projects specifically necessary to address current and upcoming regulatory requirements from regulatory bodies such as AEP. The only project over $5.0 million in this category for the 2022-2026 PBR term is the Water Services Replacement and Refurbishment Program ($24.67 million), which includes lead service line replacements. EWSI will continue to proactively replace lead service lines to reduce the potential health effects associated with lead in drinking water. The cost forecast for this recurring program is based on historical trend of the number of obsolete and non-compliant replacements of services and unit costs, as well as the addition of curb cock and full service box replacements into the program.

Health, Safety and Environment ("HSE")

458. HSE projects include projects specifically identified by EWSI to address health, safety and environmental considerations of employees and the public. No projects over the $5.0 million threshold are proposed for this category in the 2022-2026 PBR term.

Growth/Customer Requirements

459. These projects are necessary to accommodate growth in the City of Edmonton, to relocate water utilities due to changes made by the City departments such as LRT relocates and

to meet any other requirement stipulated in the franchise agreement that EWSI has with the City of Edmonton such as water service to new customers and fire protection. It also includes significant additions or expansions to buildings to accommodate maintenance activities or staffing. The Growth/Customer Requirements category is the second largest of the five main categories occupying 20% of the entire 2022-2026 capital plan. The following are major projects/programs in the Growth/Customer Requirements category:

- **Network PD Transmission Mains Program ($15.0 million)** –The scope and cost forecast for this recurring program is based on expected customer growth and transmission development over the next 5 years and historical unit costs for transmission work.
- **QE II Highway 41 Ave Crossing Project ($14.1 million)** –This project is for the construction of a transmission main to provide redundancy to customers within newly annexed land in portions of Leduc County, as well as improved fire flows and pumping capacity to customers in the base tertiary zone.
- **New Water Meter Installations ($13.9 million)** –The scope and cost forecast for this recurring program is based on forecast customer growth and the expected cost of purchasing and installing each meter.
- **Franchise Agreement Relocates Program ($11.0 million)** –As described in the business case, EWSI`s analysis indicates the base cost of the program will be consistent with the 2017-2021 amount of $6.0 million, with an additional $5.0 million projected for the Yellowhead Trail relocates.
- **LRT Relocates Program ($10.3 million)** –The scope and cost of the relocations is based on the number of water main relocations identified to complete the remaining 35% of the West Valley Line LRT by 2023.
- **Private Development Construction Coordination Program ($9.7 million, of which $1.0 million is funded by developers)** –The cost of this program is mostly for internal labour to process applications. The program budget has been based on analysis of historical trends to forecast activity in the private development area.
- **Winterburn Booster Station Project ($6.7 million)** –The construction of a new booster station to replace the Parkland Booster Station, owned 100% by EPCOR after the transfer of assets from the Capital Region Parkland Water Services Commission (CRPWSC) to EPCOR, will improve system reliability while supporting long term growth.

Reliability/Life Cycle

460. Reliability/Life Cycle projects are those projects specifically identified to rehabilitate or replace existing assets at the end of their useful lives, to improve redundancy and to ensure risks are acceptable and maintained. EWSI continues to focus on ensuring the reliability of its critical water system assets in the 2022-2026 PBR term and has allocated 53% of its entire capital plan towards it. Major projects planned in this category over 2022-2026 include:

- **Risk Based Renewals Program ($29.0 million)** –Spending on this program over the 2022-2026 term is projected at just 25% of the projected spend over the 2017-2021 term. This program consolidates the Reactive, Proactive and Accelerated Renewal programs from the 2017-2021 PBR term into a single risk-based program that targets the highest consequence of failure (COF) and probability of failure (POF) mains within the distribution system to ensure optimal return for the investment. Historically this program included approximately $10.0 million annually for the accelerated renewal of mains in coordination with City work. The shift in focus from coordination to COF and POF risk ranking has enabled the significant reduction in projected cost for this program.
- **Infill Fire Protection Program ($20.2 million)** – This program helps to fund fire protection upgrades that provide neighborhood benefits in established areas. Developer applications that EWSI has received for the 2020-2021 Infill Cost Share Pilot Program indicates that this is a reasonable forecast of the future costs of anticipated fire protection upgrades associated with qualifying infill developments during the 2022-2026 PBR term.
- **Flood Protection Project ($16.1 million)** – This project is required to protect Edmonton's potable water supply in the event of a 1:500 year return period flood. $11.4 million in federal and provincial grant funding will partially offset the total project cost of $36.9 million, spread over three PBR terms.
- **E. L. Smith Filter Upgrades Project ($15.6 million)** – This project addresses deficiencies including poor concrete condition and damaged formwork in the stage 1 and stage 2 filters, and will enable EWSI's long term plan to convert the filters to deep bed filtration and is required to support existing plant operation.
- **Obsolete Valve Replacements Program ($11.6 million)** – The cost of this recurring program has increased by $7.5 million from the 2017-2021 PBR forecast as the result of higher per-valve costs, a higher number of replacements and an increase in scope to include valve casing replacements.

- **Transmission Mains and Appurtenances Program ($10.7 million)** -This program combines the Transmission Mains Replacements and Refurbishment and Network Valve Chamber Replacements Programs from the 2017-2021 PBR term at just 53% of the cost. The significant reduction in capital expenditure for this program is the result of targeted replacement identified through the Critical Pipeline Inspection Program.
- **Obsolete Hydrant Replacements Program ($8.4 million)** – The cost of this recurring program has increased by $4.1 million from the 2017-2021 PBR forecast, which was based on a projection of 50 replacements annually. Actual hydrant replacements, which EWSI does not control, have averaged 76 replacements annually between 2017 and 2020. EWSI's cost forecast for the 2022-2026 PBR term is based on replacing an average of 75 hydrants annually.
- **Fleet and Vehicle Additions Program ($7.0 million)** – Spending on this program over the 2022-2026 term is projected at just 58% of the projected spend over the 2017-2021 term due to financial constraints. Where possible, units will be rented rather than purchased in order to manage rate increases to customers over the 2022-2026 term. This is a temporary change in scope to the program.
- **Critical Pipeline Inspection Program ($6.8 million)** –This is a new program identifying specific sections of transmission mains with distressed material, which enables replacement of targeted sections rather than full scale replacement of transmission mains.
- **Structural Rehab and Roof Replacement Program ($9.6 million)** - Spending on this work is similar to that included in the 2017-2021 PBR Application.
- **Meter Change-Outs Program ($5.8 million)** –The costs of meter change outs over the years 2022-2024 have been included under the AMI Deployment Project, while the long term cost has been reduced by 25% as a result of the AMI Deployment Project.
- **5kV Upgrades Program ($5.0 million)** – This project is for the replacement of the 5kV electrical switchgear line-up which has surpassed end of life.

Performance / Efficiency Improvement

461. This category includes projects which result in operational efficiency or improvement to lower future costs and comprises 19% of the total proposed capital expenditures for the 2022-2026 PBR term. The major projects planned in this category are:

- **AMI Deployment Project ($62.9 million)** – This project is for the full deployment of AMI technology to replace current meter reading equipment, which is no longer manufactured or supported by the vendor and as a result is at risk of failure within the 2022-2026 PBR term. The cost of this project is partially offset by a reduction of $8.06 million in the Meter Change Out Program over the 2022-2026 term.
- **Water Main Cathodic Protection Program ($15.1 million)** –The cost of this recurring program has decreased by $5.93 million relative to the approved amount in the 2017-2021 PBR term primarily as a result of a reduction in scope from 150 km to 75 km of cathodic protection over the five year term. As discussed in Section 2.1.3, robust investment in this program as well as main renewal programs has led to a continual decline in the number of water main breaks in EWSI's distributions system. This has enabled a temporary slowing of investment in this program for the 2022-2026 term in order to manage rate increases, without material impacting customers.

7.0 DEPRECIATION AND AMORTIZATION

462. EWSI's methodology and assumptions for determining depreciation and amortization of its capital assets are provided in Section 4.4 of the Application. EWSI's forecast depreciation expenses and amortization of contributions (for the total regulated Edmonton water system and In-City) for the period 2022 to 2026 is provided in Table 7.0-1. The 2021 approved amounts and 2021 forecast amounts are provided for comparison.

Table 7.0-1
Net Depreciation Expense
Financial Schedule 12-1
2021-2026
($ millions)

		A **2021D**	B **2021F**	C **2022F**	D **2023F**	E **2024F**	F **2025F**	G **2026F**
1	EWSI Depreciation Expense	49.2	53.8	58.9	62.7	66.6	69.6	71.7
2	Less: Amortization of Contributions	(10.1)	(12.0)	(13.1)	(14.2)	(14.8)	(15.4)	(16.0)
3	**Net EWSI Depreciation Expense**	**39.1**	**41.8**	**45.8**	**48.5**	**51.8**	**54.2**	**55.7**
4	**Allocated to:**							
5	In-City	30.9	32.7	35.5	37.9	40.7	42.6	43.8
6	Fire Protection	2.4	3.1	3.4	3.5	3.7	3.8	3.9

463. For the 2021 approved to 2021 forecast, the $2.7 million increase in net depreciation expense is mainly due to higher than forecast capital additions to support Growth/Customer Requirements, Reliability and Life Cycle improvements (see Section 6.0). The overall increase is mitigated in part by additional amortization of higher than forecast contributed assets.

464. For the 2021 forecast to 2022 forecast, the $4.0 million increase in net depreciation expense is due to:

- A $ 3.9 million increase due to new capital expenditures in 2022;
- A $1.9 million increase due to a full year of depreciation on 2021 capital expenditures; and
- A ($0.7) million decrease as a result of assets becoming fully-depreciated partially offsets the increases above.

465. For the 2022 to 2026 forecast period, the annual increases in net depreciation expense is due to capital additions to rate base over the 2022-2026 period based on the capital expenditure forecast presented in Section 6.2 of the Application.

8.0 RATE BASE

8.1 EWSI Rate Base

466. Table 8.1-1 provides EWSI's forecast rate base for the total regulated Edmonton water for 2022-2026. The 2021 approved and 2021 forecast amounts are provided for comparison. The rate base allocated to In-City customers and to Fire Protection through the cost allocation models is provided in line 18 and line 20 respectively.

Table 8.1-1
Financial Schedule 15-1
EWSI Rate Base
2021-2026
($ millions)

		A **2021D**	B **2021F**	C **2022F**	D **2023F**	E **2024F**	F **2025F**	G **2026F**
1	Prior Year Property, Plant and Equipment	2,541.0	2,699.1	2,911.2	3,052.2	3,207.0	3,353.2	3,461.6
2	Additions	117.2	212.1	140.9	154.8	146.2	109.8	110.9
3	Retirements	-	-	-	-	-	(1.4)	-
4	Current Year Property, Plant and Equipment	2,658.2	2,911.2	3,052.2	3,207.0	3,353.2	3,461.6	3,572.5
5	Mid-Year Property, Plant and Equipment	2,599.6	2,805.2	2,981.7	3,129.6	3,280.1	3,407.4	3,517.0
6	Prior Year Accumulated Depreciation	698.4	684.2	738.0	796.9	859.5	926.1	995.7
7	Depreciation Expense	49.2	53.8	58.9	62.7	66.6	69.6	71.7
8	Retirements	-	-	-	-	-	-	-
9	Current Year Accumulated Depreciation	747.6	738.0	796.9	859.5	926.1	995.7	1,067.4
10	Mid-Year Accumulated Depreciation	723.0	711.1	767.4	828.2	892.8	960.9	1,031.6
11	Mid-Year Net Property	1,876.6	2,094.1	2,214.3	2,301.4	2,387.3	2,446.5	2,485.5
12	Add: Working Capital	24.5	24.2	13.2	11.6	4.9	(4.8)	(6.8)
13	Add: Materials and Supplies	2.9	3.9	4.0	4.1	4.2	4.3	4.4
14	**Gross Mid-Year Rate Base**	**1,904.0**	**2,122.2**	**2,231.5**	**2,317.1**	**2,396.3**	**2,446.0**	**2,483.0**
15	Mid-Year Net Contributions	(512.0)	(658.8)	(696.4)	(733.8)	(766.7)	(796.3)	(826.7)
16	**Net Mid-Year Rate Base**	**1,392.0**	**1,463.4**	**1,535.1**	**1,583.3**	**1,629.6**	**1,649.7**	**1,656.4**
	Allocated to:							
17	In-City	**1,099.6**	**1,137.2**	**1,185.4**	**1,227.5**	**1,269.3**	**1,286.3**	**1,289.9**
18	% of Net Rate Base	79.00%	77.71%	77.22%	77.52%	77.89%	77.97%	77.87%
19	Fire Protection	**105.2**	**135.1**	**141.9**	**146.1**	**149.8**	**152.6**	**155.5**
20	% of Net Rate Base	7.56%	9.23%	9.25%	9.23%	9.19%	9.25%	9.39%

467. The annual increases in EWSI's rate base over the 2022 to 2026 period reflect capital additions less depreciation expense plus the change in working capital and average materials and supplies. Details of the changes to the rate base components are disclosed in Financial Schedules 15-1 to 16-1. Section 6.0 provides discussion of EWSI's capital additions forecast for 2022-2026.

The capital additions for projects over $5 million are provided in capital business cases attached as Appendices F-02 to F-26. Section 7.0 discusses EWSI's forecast depreciation expense for 2022.

8.2 Working Capital

468. The working capital component of EWSI's rate base is an allowance for the working capital needed to finance the lag between the time that EWSI provides a service and the time it is paid for the service (referred to as a "revenue lead"), and the timing differences between the time that expense is incurred and subsequently paid (referred to as an "expense lag").

469. EWSI has undertaken a lead-lag study (Appendix O-1) to support its working capital allowance. In this study, lags are derived from analysis of each revenue and expenses stream and are broken down into their individual components in order to more precisely determine the total lag. An overall operating expense lag is then calculated on a weighted average and netted against the appropriate revenues. Net lags are also calculated for individual capital expenses including debt interest, retained earnings and depreciation. The working capital ratio (net lag/365) is then applied against the corresponding expense amount in order to determine the portion of necessary working capital related to each component (see Financial Schedule 16-1).

8.3 Average Materials and Supplies

470. The materials and supplies component of EWSI's rate base represents the three-year average value of inventories used to maintain plant in service, as well as certain deposits and other prepaid expenses required for EWSI's utility operations.

9.0 RETURN ON RATE BASE

471. The following sections include a calculation of EWSI's forecast return on rate base (Section 9.1), explanations of EWSI's proposed return on equity (Section 9.2), cost of debt (Section 9.3) and capital structure (Section 9.4).

9.1 Return on Rate Base Calculation

472. Table 9.1-1 shows the forecast return on rate base for both In-City and Fire Protection for the years 2022-2026. The 2021 approved and 2021 forecast amounts are shown for comparison.

Table 9.1-1
Return on Rate Base
Financial Schedule 14-1
2021-2026
($ millions)

		A **2021D**	B **2021F**	C **2022F**	D **2023F**	E **2024F**	F **2025F**	G **2026F**
1	Mid-Year Rate Base, net	1,392.0	1,463.4	1,535.1	1,583.3	1,629.6	1,649.7	1,656.4
	Return on In-City Rate Base							
2	In-City Portion	79.00%	77.71%	77.22%	77.52%	77.89%	77.97%	77.87%
3	In-City Mid-Year Rate Base	1,099.6	1,137.2	1,185.4	1,227.5	1,269.3	1,286.3	1,289.9
	Mid-Year Capital Structure							
4	Debt Capital	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%
5	Common Stock Equity	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%
	Cost Rates							
6	Debt Capital	4.82%	4.27%	4.22%	4.15%	3.91%	3.74%	3.75%
7	Common Stock Equity	10.18%	8.71%	9.95%	9.95%	9.95%	9.95%	9.95%
8	WACC	6.96%	6.04%	6.51%	6.47%	6.33%	6.22%	6.23%
	Return on Rate Base							
9	Debt Capital	31.8	29.1	30.0	30.6	29.8	28.8	29.0
10	Common Stock Equity	44.8	39.6	47.2	48.9	50.5	51.2	51.3
11	**Total Return - In-City**	**76.5**	**68.7**	**77.2**	**79.4**	**80.3**	**80.0**	**80.4**
	Return on Fire Protection Rate Base							
12	Fire Protection Portion	7.56%	9.23%	9.25%	9.23%	9.19%	9.25%	9.39%
13	Fire Protection Mid-Year Rate Base	105.2	135.1	141.9	146.1	149.8	152.6	155.5
	Mid-Year Capital Structure							
14	Debt Capital	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%
15	Common Stock Equity	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%
	Cost Rates							
16	Weighted Avg Cost of Debt	4.82%	4.27%	4.22%	4.15%	3.91%	3.74%	3.75%
17	Cost of Common Stock Equity	10.18%	3.11%	9.95%	9.95%	9.95%	9.95%	9.95%
18	WACC	6.96%	3.81%	6.51%	6.47%	6.33%	6.22%	6.23%
	Return on Rate Base							
19	Debt Capital	3.0	3.5	3.6	3.6	3.5	3.4	3.5
20	Common Stock Equity	4.3	1.7	5.6	5.8	6.0	6.1	6.2
21	**Total Return - Fire Protection**	**7.3**	**5.1**	**9.2**	**9.5**	**9.5**	**9.5**	**9.7**

473. The 2021 forecast return on equity in Table 9.1-1 reflects the difference between EWSI's forecast revenues less expenses in 2021 for the In-City and Fire Protection customer segments.

474. The basis of EWSI's forecast of capital structure, rate of return on equity and cost of debt for the 2022-2026 PBR period is described below.

9.2 Rate of Return on Equity

475. The rate of return approved by EWSI's regulator, Edmonton City Council, must meet the fair return standard which states that the utility must be allowed to earn a fair return which is (i) sufficient to ensure its financial integrity; (ii) adequate to attract capital at reasonable terms; and (iii) commensurate with returns on investments in enterprises having corresponding risks. Based on the fair return standard, EWSI recommends that the return on equity and cost of capital as illustrated in Table 9.2-1 be approved for EWSI for the 2022-2026 PBR term:

Table 9.2-1
Recommended Cost of Capital for EWSI 2022-2026 PBR

	Category	A Proportion	B Rate	C Weighted Rate
1	Long-Term Debt	60%	3.50%	2.10%
2	Equity	40%	9.95%	3.98%
3	**Total**	**100%**		**6.08%**

476. EWSI is proposing a rate of return on common equity of 9.95% based on an extension of Grant Thornton's (GT) analysis presented in their *EPCOR Performance Based Regulation Filing Review* (GT Report) developed for the 2017-2021 PBR application for Water and Wastewater Services. A formulaic extension of this prior method is seen as the most straightforward approach under current economic conditions. The turmoil in financial markets resulting from the COVID-19 global pandemic and the resulting fiscal and monetary policy initiatives used by governments and central banks to diminish economic devastation has resulted in virtually no financial ratios, interest rates or other capital cost inputs or indicia remaining stable throughout 2020.

477. EWSI has not completed a Cost of Capital Study, as it has in the past, as reliance on this "roller coaster" 2020 data is problematic in applying traditional methods for estimating capital cost rates. The formulaic extension of a prior approach eliminates these concerns and best aligns with the City's desire to determine a risk premium to the AUC's generic cost of capital to derive the allowed rate of return on equity for EWSI. EWSI has prepared a Return on Equity Memorandum (Appendix D) to provide the background and analysis that led to these conclusions.

478. In the 2017-2021 PBR application for Water and Wastewater, both EWSI and GT recognized that: 1) EWSI's business risks are greater than the average Alberta electric and gas utility, and 2) it is reasonable to add a risk premium to the Alberta Utility Commission's generic cost of capital to derive the allowed return on equity for EWSI. Risk in a regulated utility encompasses both business risk and financial risk. In combination, these risks result is variability in both cash flow and earnings that impact the utility's ability to recover costs and earn the awarded fair return. The following summarizes the major risk factors as detailed in Appendix D that contribute to EWSI being riskier than an electricity of gas utility regulated by the AUC:

- **Water is a Consumable Product Risk** - As water is ingested by the end user, it is incumbent upon EWSI to ensure that appropriate processes and procedures are maintained to establish proper treatment. Ensuring that the product remains safe and within strict regulatory guidelines represents considerably higher risk to EWSI than is seen in other utilities.
- **Health and Environmental Regulations Risk** - Increasingly stringent health and environmental standards necessitate additional capital investment to meet the new requirements in addition to process and reporting changes to ensure adherence to the standards. EWSI faces additional risk due to higher frequency of regulatory changes for both environmental and public health standards placing increased pressure to cash flow to fund new infrastructure as well as complete upgrades to existing assets to meet regulation changes.
- **Revenue Risk** – Demand for water is subject to considerable variation, particularly in the summer months. Additionally, water demand has declined on a per capita basis over a considerable period resulting in increased risk associated with recovering historic infrastructure costs. EWSI's rate structure is comprised of a very high portion of volumetric rates indicating that revenue fluctuates with changes in consumption. In contrast, eclectic and gas utilities have a lower percentage of volumetric rates implying that their revenue fluctuates less for a given level of consumption change. Overall, EWSI experiences higher revenue volatility than is seen in a gas or electric utility.
- **Capital Recovery Risk - Depreciation** - Water and wastewater utility assets typically have longer lives than electric and gas utilities. The resulting lower depreciation rates means that reliance on depreciation as one of the sources of internal cash flow is lower. In addition, the longer capital recovery period results in water and wastewater utilities facing greater risks from inflation which results in a higher replacement cost per dollar of net plant.

- **Level of Contributed Assets Risk** – EWSI utilities, particularly drainage, have a greater percentage of contributes assets (or assets not paid for by ratepayers though rates). As EWSI does not earn a return on these assets yet is required to maintain and assume operational responsibility for the assets, this represents a risk not seen to the same level in electric and gas utilities.
- **Determination of Return on Equity Risk** - The City's PBR process is based on 5 year terms (with 3 year terms in this application as a one-time measure to stagger future application) with EWSI's rate of return on equity fixed for that entire period. In contrast, the AUC's rate of return is adjusted more frequently based on their generic cost of capital proceedings. As EWSI is effectively "locked in" to the established return on equity irrespective of changes to the underlying financial market drivers and conditions, this represents an additional risk to EWSI.
- **Debt Risk -** Under EWSI's PBR Framework, the risk of interest rate fluctuations is entirely borne by EWSI and is not passed on to its customers. Under the AUC PBR, Alberta electric and gas utilities pass on interest rate risk to their customers through rate adjustments. As such, this risk factor represents another component of the EWSI risk premium above the AUC's Generic Cost of Capital.

479. To develop the proposed 9.95% ROE, EWSI updated the GT 2016 Report to reflect the 2019 pre-pandemic generic cost of capital determined by the Alberta Utilities Commission and bond yield changes, having regard for the compression and expansion of risk premiums. In the 2017-2021 application, EWSI proposed an ROE of 10.5%[13]. GT noted that an ROE of 10.5% represented a risk premium of 2.20% above the AUC generic of 8.3% in place at that time. Their perspective was that an appropriate risk premium would be in the range of .08% to 0.66% lower than the 2.20%[14]. This would result in a risk premium range of 1.54% to 2.12% with a mid-point of 1.83%. The Utility Committee ultimately determined a risk premium of 1.875% for the 2017-2021 PBR term, the same risk premium as was determined for the 2012-2016 PBR term.

480. For the 2017-2021 update of the GT approach, EWSI has used a risk premium of 1.83% as it was based on three formal methods and is more supportable than carrying a single point

[13] Three methods were applied to determine the rate of return include Capital Asset Pricing Model (CAPM), Discounted Cash Flow (DCF) and Risk Premium Model (RPM). The recommendations for EWSI's return on equity were derived from the results of applying each of these methods to both the US water utility proxy group and the Canadian utility proxy group.

[14] GT Report, page 145.

estimate from a prior period forward. EWSI believes, however, that the risk of the overall business has increased since the 2017-2021 period and a 1.83% risk premium represents the low end of an acceptable range. The inclusion of the Drainage business in the 2022 - 2026 PBR period with the same 40% common equity ratio as the Water and Wastewater businesses implies that EWSI's investment risks are higher today than they were in 2016. Thus, the appropriate premium *vis-à-vis* the Commission's generic cost of capital is no less than 1.83% today.

481. In *Decision 22570-D01-2018*, the Commission found that an 8.5% common equity rate of return was reasonable for test years 2018, 2019 and 2020.[15] All things equal, the indicated common equity rate of return for EWSI based on the GT Report and the 8.5% for generic Alberta utilities is therefore 10.33% (= 8.5% + 1.83%). However, the Commission's 8.5% in *Decision 22570-D01-2018* was predicated on a 2.3% yield on long-term Government of Canada bonds.[16] In contrast, the 2019 pre-pandemic yield on long-term Government of Canada bonds is 1.8%.[17] The lower 2019 bond yield suggests that a downward adjustment of 0.38% should be made to the 10.33% common equity rate of return but with recognition given to the fact that risk premiums expand as bond yields decline. This adjustment then results in the proposed 9.95% ROE.

482. Given the economic situation faced by rate payers as a result of the pandemic and EWSI's desire to moderate rate increases, EWSI proposes that the common equity rate of return for "Base" Drainage operations be established at 5.50% for 2022 and "ramped up" to 9.95% in a linear fashion over the 2022 – 2026 period. Based on this plan, the forecast five-year average common equity rate of return for EWSI's consolidated operations is 9.05%. The 9.05% is materially less than the 9.95% proposed common equity rate of return from the updated GT analyses and represents the forecast level at which EWSI will earn over the term. Table 9.2-2 illustrates the ROE across all three EWSI utilities:

[15] Alberta Utilities Commission, *Decision 22570-D01-2018*, August 2, 2018, Paragraph 500, page 104. In its recently-released *Decision 24110-D01-2020*, the Commission did not provide a detailed rate of return analysis. Nevertheless, the 8.5% common equity rate of return from *Decision 22570-D01-2018* was extended through 2021 on a final basis. See *Decision 24110-D01-2020*, Paragraphs 14 and 20.

[16] Alberta Utilities Commission, *Decision 22570-D01-2018*, August 2, 2018, Paragraph 299, page 65.

[17] The average of the daily 2019 yields reported by the Bank of Canada for Series V39056 is 1.80%.

Table 9.2-2
Business Unit and Consolidated Rates of Return on Common Equity
2022 – 2026

	Year	A Water	B Wastewater	C Drainage Base	D Drainage SIPR/CORe	E Drainage Consolidated	F Total Consolidated
1	2022	9.95%	9.95%	5.50%	9.95%	5.85%	7.97%
2	2023	9.95%	9.95%	6.61%	9.95%	7.09%	8.52%
3	2024	9.95%	9.95%	7.73%	9.95%	8.13%	9.01%
4	2025	9.95%	9.95%	8.84%	9.95%	9.07%	9.48%
5	2026	9.95%	9.95%	9.95%	9.95%	9.95%	9.95%
6	2022-2026	9.95%	9.95%	7.83%	9.95%	8.19%	9.05%

Note: Calculations are based on forecast 2022 – 2026 annual rate bases and Drainage rates of return calculated using the method described above.

483. Three conclusions are drawn from the data in Table 9.2-2. First, with the exception of the 2026 rate of return, each of the forecast consolidated rates of return in the final column are less than the 9.95% indicated common equity rates of return. Second, the average consolidated rate of return of 9.05% is materially less than the 9.95% and provides a premium above the Commission's 8.50% generic cost of capital of approximately 50 basis points, whereas the premium for EWSI's risks from the GT Report is 1.83%.

9.3 Cost of Debt

484. Consistent with regulated business units within the EUI group of companies, debt rates on long-term inter-corporate loans issued by EUI to EWSI are based on EWSI's regulated services on a stand-alone basis. EWSI is forecasting a cost of new debt issuances of 3.50% for the 2022-2026 PBR term based on the methodology described in section 4.3.2. The new cost rate of 3.50% is based on an estimated stand-alone debt rating for EWSI of A (low) provided by Dominion Bond Rating Service as at September 3, 2020. See Appendix D for EWSI bond rating.

485. EWSI's weighted average cost of debt shown in Table 9.3-1 below reflects the weighted average of the cost of debt of prior years' long-term fixed rate debentures and long-term inter-corporate loans issued by EUI, the 2022 forecast cost of debt of 3.50% for new debt issues and a small component of short-term debt.

Table 9.3-1
EWSI Weighted Average Cost of Debt
2021-2026
Financial Schedule 14-1, line 32

		A	B	C	D	E
		2022F	**2023F**	**2024F**	**2025F**	**2026F**
1	Weighted Average Cost of Debt	4.22%	4.15%	3.91%	3.74%	3.75%

9.4 Capital Structure

486. WSI is proposing a deemed capital structure of 60% debt and 40% equity for the 2022-2026 PBR term as supported by the Return on Equity Memorandum. This is consistent with EWSI's proposed method of updating the ROE as well as the historical capital structure.

10.0 REVENUE OFFSETS (NON-RATE REVENUES)

487. Revenue Offsets include revenues for various service charges and fees, penalties and miscellaneous revenues. Revenue Offsets are deducted from EWSI's expenses for purposes of determining EWSI's revenue requirement for regulated operations.

488. Table 10.0-1 provides the Revenue Offsets (or non-rate revenues) for EWSI's regulated operations for the 2022-2026 PBR term. The 2021 approved and 2021 forecast amounts are provided for comparison. EWSI's revenue offset forecast for 2022-2026 is initially based on EWSI's bottom up forecast of 2022 amounts based on best available information and then escalated by the inflation factor to determine the forecast revenue offsets for 2023-2026.

Table 10.0-1
Revenue Offsets
(Financial Schedule 13-1)
2021-2026
($ millions)

		A	B	C	D	E	F	G
		2021D	**2021F**	**2022F**	**2023F**	**2024F**	**2025F**	**2026F**
1	Late Payment Penalty	0.6	0.5	0.5	0.5	0.6	0.6	0.6
2	Connection Fees	1.4	1.1	1.1	1.1	1.1	1.1	1.2
3	Temporary Services	1.5	1.5	1.6	1.6	1.6	1.7	1.7
4	Water Permit Revenue	0.4	0.2	0.2	0.2	0.2	0.2	0.2
5	Water Truck Fill Revenue	0.4	0.5	0.5	0.5	0.5	0.5	0.5
6	Customer Service Revenue	0.2	0.3	0.3	0.3	0.3	0.3	0.3
7	Miscellaneous Revenue	0.7	1.1	1.1	1.1	1.1	1.1	1.1
8	**Total**	**5.2**	**5.2**	**5.2**	**5.3**	**5.4**	**5.5**	**5.7**

489. Each of the categories of Revenue Offsets is described below.

490. Late payment penalty revenues are charges applied to customer invoices for amounts unpaid beyond the prescribed customer payment terms.

491. Connection fees are charged to all customers who apply for a new account or change accounts for water services within the City of Edmonton boundaries.

492. Temporary services revenue is collected under the hydrant water permit program. These customers are charged an annual permit set-up fee, monthly meter rental fee, and metered consumption fee based on the metered use of hydrant water.

493. Water permit revenue is collected through construction service charges from customers who obtain water at a site during the construction period, prior to the premises going into account for billing.

494. Water truck fill revenue is collected from customers who obtain water from a truck fill site within the City of Edmonton municipal boundaries. These customers pay an initial account set-up fee and subsequently pay a consumption charge. EWSI has reviewed truck fill rates of surrounding communities to ensure that market dynamics with rural communities and their customers are not adversely affected by EWSI's proposed truck fill rates.

495. Customer service revenue includes requests for water services to be turned on and off and charges for remote meter installations.

496. Miscellaneous revenue includes: revenues collected from customers who do not allow access to their property for meter reads, charges for repairing damages to meters located on a customer's property and charges for tampering. Revenue from the recoveries relating to damaged hydrants is included in miscellaneous revenues, which are based on EWSI's cost to repair the hydrant; and recoveries from developers for flushing costs incurred during flushing of private development assets.

PART B – COST OF SERVICE AND RATE DESIGN

11.0 COST OF SERVICE

497. The sections below provide an overview of EWSI's cost of service methodology and practices, including a discussion of the principles supporting the development of cost-based rates, how these principles are incorporated into the cost of service methodology, and how the application of this methodology affects the assignment of cost responsibility to customer segments and customer classes.

11.1 Cost of Service Methodology

498. A fundamental principle of rate-making is that water services rates should recover the costs of providing service to the customers using the water system in a manner that is both fair and equitable. EWSI determines the costs of providing service to its customers in accordance with the principles and methodologies advocated by the AWWA. In its M1 Manual: Principles of Water Rates, Fees and Charges, the AWWA recommends the use of cost-based rates that generate revenues from each segment and class of customer in proportion to the cost to serve each segment and class of customer, ensuring that cross-segment and cross-class subsidies are avoided. The AWWA's approach to assigning cost responsibility to customer segments and classes (the cost of service methodology), consists of the following steps:

11.1.1 Functionalization

499. In this step, the annual revenue requirements, including operating costs (see Section 5.0), depreciation and amortization (see Section 7.0) and return on rate base (see Section 9.0), are categorized and assigned to system functions. Consistent with the AWWA's M1 Manual, EWSI has defined its system functions as: (1) water treatment plant; (2) reservoirs and pumphouses; (3) transmission; (4) distribution; (5) hydrants; (6) meters; (7) services; (8) customer billing; and (9) general administration.

500. In EWSI's accounting system, property, plant and equipment are categorized in accordance with its system functions (except for transmission and distribution mains as explained in Section 11.2 below). Therefore, the components of EWSI's annual revenue requirements related to these items, including depreciation, amortization and return on rate base, are assigned directly to the related system functions (e.g., depreciation of water treatment plant assets is assigned to the water treatment plant function).

501. Functionalization of operating costs requires an additional step to assign costs to system functions. Many operating expenses, for example, Distribution Construction and Maintenance costs, apply to more than one system function. In these cases, EWSI uses a combination of direct assignment (for costs attributable to a single system function) and allocation (for costs attributable to more than one system function) to assign operating costs to the system functions needed for cost of service analysis. Where allocation factors are used, the basis of allocation follows cost causation principles, with allocation factors reviewed and updated annually to ensure that the basis of allocation remains appropriate and that the allocators reflect the most current information available.

11.1.2 Allocation

502. In this step, EWSI uses a base-extra capacity methodology to allocate functionalized costs to cost components. EWSI's cost components include: (1) base costs, which vary with the total quantity of water used; (2) extra-capacity costs, which are associated with peak demands and are further divided into maximum day peak (Max Day), and maximum hour peak (Max Hour) usage; (3) customer costs, which are the costs of serving customers irrespective of the rate or amount of water, such as meter reading, billing and collections, accounting, and administration; and (4) direct fire protection costs, which apply solely to the fire protection function, including maintenance and repairs of hydrants and the related branch mains.

503. The base-extra capacity methodology recognizes that the cost of serving customers depends not only on the total volume of water used, but also on the rate of use, referred to as peak demand or extra capacity requirements. For example, EWSI's water treatment plants not only treat and pump water (base demand), but have sufficient storage capacity to meet regularly recurring (Max Day) demands. Therefore, costs functionalized to water treatment plants are allocated to the Base and Max Day cost components. Allocation of other functionalized costs follows similar processes, so that cost componentization reflects the specific service requirements or cost drivers imposed on the system by its customers.

11.1.3 Distribution

504. In this step, componentized costs are distributed to customer segments and customer classes, based on their share of demand for water, measured by average daily demand, peak day demand and peak hour demand. Water rates are then determined by dividing the forecast consumption volumes into the costs allocated to the customer segment and class. In accordance

with its cost of service methodology, EWSI's customers are categorized into three customer segments:

- **In-City Water**. EWSI provides potable water to customers within the boundaries of the City of Edmonton ("In-City customers") pursuant to a franchise agreement with the City of Edmonton. In-City customers are further categorized into residential, multi-residential and commercial customer classes. The rates and terms of service for In-City water services are regulated by Edmonton City Council under a performance-based regulation framework in accordance with the Bylaw.
- **Fire Protection**. EWSI provides fire hydrant services for both public and private users. These services are provided on a standby basis, where EWSI guarantees that required water quantities and pressures will be available at all times throughout its distribution network. Charges for fire hydrant services are determined on a forecast cost of service basis, over the five year PBR term, with service requirements for both public and private defined in the Bylaw; and
- **Regional Water Sales**. EWSI provides potable water to regional water customers pursuant to bulk water sales agreements with water services commissions and communities surrounding Edmonton (referred to as the Regional Water Customers Group or RWCG). The rates for water services to the RWCG are forecast for the upcoming year and then adjusted to reflect the actual cost of service in the prior year. These services are regulated on a complaint basis by the AUC and are beyond the scope of this Application.

11.2 HDR Cost of Service Study (COSS)

505. On October 10, 2014, EWSI, the City of Edmonton and the RWCG signed and approved a memorandum of understanding summarizing a new Jointly Accepted Water Cost of Service Methodology. This methodology was developed by EWSI, the RWCG and the City of Edmonton, with an external consultant, HDR Engineering Inc. (HDR), engaged by EWSI to assist in resolving technical and regulatory issues and to construct a new cost of service study, (COSS) incorporating the new methodology and the agreements summarized in the memorandum of understanding. These agreements are as follows:

- EWSI will continue to use the base-extra capacity methodology, as generally defined by the AWWA M-1 Manual, for determining cost of service;

- Water mains will be differentiated between transmission mains and distribution mains based on the function of the water main, rather than by the diameter of the water main;
- EWSI's water treatment plant will be allocated to the base and max-day cost components for all customer segments because the expansion of reservoir storage means that EWSI's water treatment plant is no longer required to meet max-hour demands;
- Since the members of the RWCG have sufficient storage space on their own networks, they no longer rely on EWSI's reservoir storage to meet peak demands. As well, EWSI found that reservoir storage is no longer required to meet max-day demands. Accordingly, reservoirs and pump houses will be allocated only to the In-City Max Hour and Fire Protection cost components;
- EWSI will use the basic framework described in the AWWA M-36 Manual for determining water losses. In accordance with this framework, the water loss factor for the RWCG will only include water losses attributed to water treatment plant and transmission functions; and
- EWSI will continue its existing approach for determining Regional Peaking Factors, with load factors calculated using coincidental flows at the time of the system coincident peak and the use of five year average max day peaking factors for allocating costs among customer segments.

506. The COSS also incorporates these changes from the memorandum of understanding and is also in compliance with directions from the AUC which were issued in response to complaint applications filed by the RWCG pertaining to the wholesale water rates charged by EWSI to RWCG for the period 2004, 2005, 2006 and 2007[18]. The COSS represented the most significant update to the EWSI's cost of service methodology since 1999, when the City of Edmonton transferred the assets and liabilities of its water utility to Aqualta (which would later become part of EPCOR Utilities Inc.).

507. The COSS and corresponding cost of service model was used to determine the In-City and Fire protection revenue requirement for the 2017-2021 PBR period, and has also been used to determine and settle the RWCG revenue requirement for the 2012-2019 period.

[18] AUC Decision 2011-281, Decision 2012-102 and Decision 2012-208.

11.3 2022-2026 Cost of Service Model Updates

11.3.1 Overview of Updates

508. Since the development of the COSS methodology, EWSI's water works system has remained relatively consistent. As a result, a new COSS was not completed for the 2022-2026 PBR Application. This approach is also consistent with the memorandum of understanding with the RWCG which indicates a new COSS is only required if major changes to the system are completed. However, for the 2022-2026 PBR Application EWSI has updated the methodology used to assign and allocate operating costs to system functions.

509. In 2019, EWSI undertook a project to review the responsibility and activity centres used to track costs in its Oracle General Ledger accounting system. As a result of this chart of accounts initiative, EWSI implemented multiple new responsibility and activity centres which provide EWSI with a more detailed reporting of costs. The chart of accounts initiative had the largest impact in the Distribution & Transmission operating areas where new activity centers were implement to directly track costs by function (Distribution Mains, Transmission Mains, Hydrants, Service, and Meters).

510. Table 11.3-1 provides a summary of the 2022 operating costs by function based on the existing methodology and the updated methodology. The biggest change in cost allocations are in the functions supported by Distribution & Transmission operations. These costs are now directly assigned to functions in the General Ledger, rather than the historic approach of allocating costs to functions based on the value of plant in service. This change has resulted in a shift of costs from Transmission Mains and Services to Distribution Mains, Hydrant, and Meters, based on the actual level of effort required to support each function. The updated methodology provides a more accurate representation of the level of effort or costs required to support each function.

Table 11.3-1
2022 Operating Costs
By Function
($ millions)

		A	B	C	D	E	F	G
		Existing - Methodology			Updated - Methodology			
		Direct Assigned Costs	Allocated Costs	Total	Direct Assigned Costs	Allocated Costs	Total	Increase/ (Decrease)
	Water Treatment Plant:							
1	Power & Other Utilities	-	8.9	**8.9**	-	8.9	**8.9**	-
2	Chemicals	12.5	-	**12.5**	12.5	-	**12.5**	-
3	Lab component	6.7	-	**6.7**	6.7	0.6	**7.2**	0.5
4	All Other Costs	19.0	2.3	**21.3**	18.8	3.3	**22.1**	0.8
	Reservoirs:							
5	Power & Other Utilities	-	1.6	**1.6**	-	1.6	**1.6**	-
6	All Other Costs	0.8	0.3	**1.2**	1.0	0.3	**1.3**	0.1
	Distribution & Transmission:							
7	Distribution	0.4	10.7	**11.1**	6.2	5.3	**11.5**	0.4
8	Transmission	-	4.5	**4.5**	1.9	1.1	**3.0**	(1.4)
9	Hydrants	2.4	0.5	**2.9**	2.5	1.3	**3.7**	0.8
10	Meters	2.9	0.2	**3.1**	2.9	2.5	**5.4**	2.3
11	Services	-	2.7	**2.7**	0.4	0.5	**0.9**	(1.8)
12	Administration[1]	28.5	(0.2)	**28.3**	26.4	-	**26.4**	(2.0)
13	Customer Billing	9.4	-	**9.4**	9.4	0.2	**9.6**	0.2
14	**Total[2]**	**82.7**	**31.4**	**114.1**	**88.7**	**25.5**	**114.1**	-

[1] Existing methodology insurance costs are allocated to administration, updated methodology insurance costs are allocated to the operating functions.
[2] Does not include franchise fees.

11.3.2 COSM Update Impacts

511. The impacts of applying the updated functionalization methodology in terms of changes to the proportionate share of EWSI's total revenue requirement by customer segment and class is presented in Table 11.3.2-1. Table 11.3.2-1 illustrates that shifts in these proportions have been minimal (less than 0.5%) with the implementation of the updated functionalization methodology.

Table 11.3.2-1
Distribution of Revenue Requirement
to Customer Segments and Classes
2022-2026

	Customer Segment and Class	A Existing Methodology	B Updated Methodology[1]
1	In-City		
2	Residential	50.0%	49.9%
3	Multi-Residential	12.5%	12.4%
4	Commercial	17.0%	16.9%
5	Total In-City	79.5%	79.2%
6	RWCG	13.5%	13.4%
7	Fire Protection	7.0%	7.4%
8	**Total**	**100.0%**	**100.0%**

[1] For comparison purposes this allocation of revenue requirement is prior to adding franchise fees to the Fire Protection revenue requirement as discussed in Section 12.2.4.

11.4 Public Fire Protection

512. In past PBR terms the public fire protection revenue requirement has been recovered through the Fire Hydrant Service Agreement with the City of Edmonton Fire Rescue Services Department, which was funded through the City's property tax levy. EWSI has been directed by Edmonton City Council to include the recovery of the public fire protection revenue requirement through water rates over the 2022-2026 PBR term.

11.4.1 Public Fire Protection Allocation

513. Using guidance from AWWA's M1 Manual EWSI has developed a methodology to allocate the public fire protection revenue requirement between customer classes. The allocation methodology is based on the potential demand that each customer class places on the fire system. This methodology utilizes peak litre per second ("L/s") fire follow requirements, which are driven by zoning construction standards, the duration the fire flow is required, and the number of customers to determine the equivalent fire service demand for each customer class. The equivalent fire service demand is then used to allocate the public fire protection revenue requirement between customer classes. Table 11.4.1-1 provides the equivalent fire service demand calculation and the percentage of the public fire protection revenue requirement allocated to each customer class over the 2022-2026 PBR term.

Table 11.4.1-1
Public Fire Protection
Equivalent Fire Service Demand Allocation

	Customer Class	A Peak Fire Flow Requirement (L/s)	B Duration (Minutes)	C Average Customer Count (2022-2026)	D Equivalent Fire Service Demand	E Allocation (%)
1	Residential	100	120	288,081	3,456,970	69.9%
2	Multi-Residential	300	180	3,811	205,816	4.2%
3	Commercial	300	240	17,846	1,284,936	26.0%
4	**Total**				**4,947,722**	**100.0%**

514. The equivalent fire service demand allocation results in an allocation of 69.9% to the residential customer class. As shown in Table 11.4.1-2, if the public fire protection revenue requirement were added to the current fixed service charge, without any further allocations or adjustments, it would result in EWSI collecting 80.8% of the public fire protection revenue requirement from residential customers. The use of the equivalent fire service demand calculation allows for a more equitable recovery of costs from customers that place larger demands on the fire system.

Table 11.4.1-2
Public Fire Protection
Equivalent Fire Demand vs Fixed Service Charge

	Customer Class	A Equivalent Fire Service Demand	B Current Water Monthly Fixed Service Charge
1	Residential	69.9%	80.8%
2	Multi-Residential	4.2%	4.9%
3	Commercial	26.0%	14.3%
4	**Total**	**100.0%**	**100.0%**

11.4.2 Public Fire Protection Rate Design

515. The AWWA M1 Manual provides three alternatives for fire protection rate design. These alternatives include:

- **Single fixed rate per customer class** – Under this alternative all customers within a class would pay the same monthly rate. Within the commercial class this would result in large customers (shopping malls, office tower, etc.) which place large demands on the fire system paying the same monthly rate as small customers.

- **A volumetric rate** – Under this alternative a customer's fire protection charge would be based on their monthly water consumption. There is no direct correlation between a customer's water consumption and the demand they place on the fire system. This alternative could result in high consumption customers subsidizing low consumption customers.
- **Rate per equivalent meter** – Under this alternative a customer's fire protection charge would be based on the size of the customer's water service/meter; this is the same methodology used to determine a customer's monthly fixed water service charge. A customer's water service size is determined based on building codes (number of fixtures in building, diameter and length of piping in building) typically a larger building, which places more demand on the fire system, will have a larger water service.

516. The use of equivalent meters provides the most equitable method to determine a customer's monthly fire protection rate. Table 11.4.2-1 provides the 2022 proposed monthly fire protection rates. For future years, these rates would be escalated annually using the PBR formula. The commercial class has a higher rate per equivalent meter, than the residential and multi-residential classes, driven by the higher demands this class placed on the fire system.

Table 11.4.2-1
2022 Monthly
Fire Protection Rate
($ per month)

	Fixed Monthly Charge per Meter	A Residential	B Multi-Residential	C Commercial
1	5/8" (15 mm)	2.59	2.54	5.87
2	3/4" (20 mm)	3.88	3.81	8.81
3	1" (25 mm)	6.47	6.36	14.68
3	1.5" (40 mm)	12.95	12.72	29.36
4	2" (50 mm)	20.72	20.34	46.97
5	3" (75 mm)	38.84	38.15	88.07
6	4" (100 mm)	64.74	63.58	146.78
7	6" (150 mm)	129.48	127.15	293.55
8	8" (200 mm)	207.16	203.44	469.68
9	10" (250 mm)	297.80	292.45	675.17
10	12" (300 mm)	437.11	429.26	991.03

12.0 PBR RATES

517. The following sections describe how PBR rates are developed and how these rates are applied to water services provided to EWSI's In-City customers.

12.1 PBR Rate Structure by Customer Class

518. EWSI's In-City customers are grouped into three customer classes: residential, mutli-residential, and commercial. The following sections describe how In-City customer classes are defined and how each class's water consumption characteristics and use of the waterworks system infrastructure influences its water rate structure.

12.1.1 Residential

519. The residential customer class consists of customers who receive domestic service, defined in the Bylaw as a service supplied to premises used primarily for domestic purposes, where no more than four separate dwelling units are metered by a single water meter and the service line to the premises is not greater than 50 millimeters in diameter.

520. Residential customers are charged a monthly service connection fee that varies with the size of the service, plus a variable charge for water consumption. Water consumption charges are based on an inclining rate structure with three consumption blocks (0 to 10 m^3, 10.1 to 35 m^3 and >35 m^3). The inclining rate structure promotes water conservation and further incents customers to be efficient with their water usage, either through technological change (e.g., water-efficient appliances) or behavioural change (e.g., more efficient lawn watering practices).

521. Between 2002, when PBR was first implemented and 2019, average monthly residential consumption decreased from 21.4 m^3 per customer per month to 13.8 m^3 per customer per month. An additional decrease of 1.3 m^3 is forecast by 2026. EWSI's research suggests that, even with this decrease, residential customers still have opportunities to further conserve their water usage. While encouraging water conservation creates revenue challenges for EWSI, not only does water conservation provide environmental benefits, over the long term, as customers conserve their water usage, the need for expensive plant expansions can be delayed or mitigated. For the 2022-2026 PBR the only change to the residential customer class rate structure is the addition of public fire protection to water rates.

12.1.2 Multi-Residential

522. The multi-residential customer class consists of customers who receive services supplied to premises used for domestic purposes and where more than four separate dwelling units are metered by a single water meter.

523. Multi-residential customers are charged a monthly service connection fee that varies with the size of the service, plus a variable charge for water consumption. Water consumption charges are based on a declining rate structure with three consumption blocks (0 to 100 m^3, 100.1 to 1,000.0 m^3 and >1,000 m^3).

524. EWSI has found that the cost to provide water to multi-residential customers is not the same as for residential and commercial customers. Multi-residential customers have less seasonal variability in water consumption and make lower peak demands on the waterworks system than residential customers. The COSS also shows that multi-residential customers have higher customer costs (i.e. costs associated with billing, metering and services) than commercial customers. Accordingly, EWSI has developed rates for the multi-residential customer class that follow a declining rate structure. For the 2022-2026 PBR the only change to the multi-residential customer class rate structure is the addition of public fire protection to water rates.

12.1.3 Commercial

525. The commercial customer class includes all water customers who are not residential or multi-residential water service customers or who do not receive hydrant or truck fill service water. The commercial customer class includes a large number of customers who use small quantities of water, such as small retail businesses and gas stations, and a small number of customers who use very large quantities of water, such as hospitals, educational institutions and beverage producers. As well, approximately one-eighth of commercial services are provided to seasonal customers, such as commercial lawn watering services. So although the commercial customer class shows a high level of seasonal variation in water consumption, this variability is predictable.

526. Commercial customers are charged a monthly service connection fee that varies with the size of the service, plus a variable charge for water consumption. Water consumption charges are based on a declining rate structure with five consumption blocks (0 to 25 m^3, 25.1 to 100 m^3, 100.1 to 1,000.0 m^3, 1,000.1 to 5,000 m^3 and >5,000 m^3).

527. EWSI has found that commercial customers with the highest consumption tend to have stable consumption throughout the year, providing for efficient use of the water system. Smaller customers also tend to have stable consumption, but since they are typically located in residential areas, they make greater average demands on distribution infrastructure than larger customers. Seasonal customers have their own unique characteristics. While their average monthly consumption is close to the average for the commercial customer class and their consumption is stable between April and October, seasonal customers make higher peak demands on the network than large customers. However, because of their larger size, seasonal customers make lower average demands on network infrastructure than small customers. These factors all support the use of a declining rate structure. For the 2022-2026 PBR the only change to the commercial customer class rate structure is the addition of public fire protection to water rates.

12.1.4 University of Alberta

528. Although the University of Alberta is classified as a commercial customer, the University is in a unique situation because it owns and operates its own underground water distribution system. The University of Alberta meets the eligibility requirements set out in Schedule 1, Part II of the Bylaw for a Distribution System Rider. The Distribution System Rider provides for a reduction to regular water rates, so that the effective water rates charged to the University are equivalent to the rates that would be charged if the University was in its own customer class. This reduction is calculated through the COSS and is defined in the Distribution System Rider Agreement between EWSI and the University dated July 1, 2017.

529. EWSI is not proposing any changes to the Distribution System Rider Agreement. Similar to the Distribution System Rider, the University of Alberta will receive a reduction to the commercial public fire protection rate.

12.2 2022-2026 Rates and Special Rate Adjustments

530. Under the PBR framework, water rate increases are limited to PBR inflation plus Special Rate Adjustments. For the 2022-2026 PBR term, EWSI is applying for Special Rate Adjustments to support: (i) re-basing of the revenue requirement (Re-basing); (ii) an increase to the monthly service connection fee; (iii) recovery of costs related to the 90 Day Deferral Program; and (iv) the collection of Public Fire Protection revenue requirement through rates.

12.2.1 Special Rate Adjustment for Re-basing

531. The Special Rate Adjustment for re-basing accounts for the difference between EWSI's revenue requirement forecast for the 2022-2026 PBR term and the revenue that would be realized by limiting annual rate increases to PBR inflation. The resulting revenue requirement shortfall and its major components are shown in Table 12.2.1-1 below:

Table 12.2.1-1
In-City Revenue Requirement Shortfall
2022-2026
($ millions)

		A **2022F-2026F**
1	In-City Revenue Collected at Prior Year's Rates	1,000.1
2	PBR Inflation Impact on In-City Revenue	62.6
3	In-City Revenue Collected at PBR Rates	1,062.8
4	Total In-City Revenue Requirement	1,115.6
5	Public Fire Protection Revenue Requirement	96.3
6	Less: Fire Protection Special Rate Adjustment (Table 12.2.4-1)	(67.3)
7	In-City Revenue Requirement, net of SRA	1,144.7
8	**In-City Revenue Requirement Shortfall to be recovered through Re-basing**	**(81.9)**
	In-City Revenue Requirement Shortfall attributable to:	
9	Cost savings achieved during the 2017-2021 PBR Term (Table 12.2.1-2)	21.7
10	Growth in In-City revenue requirements between 2022 and 2026 (Table 12.2.1-3)	(64.4)
11	Customer Growth over the 2022-2026 PBR Term (Table 12.2.1-4)	19.0
12	Declining Consumption over the 2022-2026 PBR Term (Table 12.2.1-4)	(58.2)
13	**In-City Revenue Requirement Shortfall to be recovered through Re-basing**	**(81.9)**

532. The total In-City revenue shortfall to be recovered through re-basing amounts to $81.9 million. This shortfall incorporates the impacts of cost savings achieved over the 2017-2021 PBR term, growth in the In-City revenue requirements over the 2022-2026 PBR term, continued impacts of long-term declines in consumption per customer, and a recovery of a portion of the Public Fire Protection revenue requirement through In-City rates. These impacts are further explained below.

a. Cost savings achieved during the 2017-2021 PBR Term

533. The portion of the revenue requirement shortfall attributable to the 2017-2021 PBR term is calculated as the difference between the 2022 In-City revenue requirement forecast and the 2021 decision amount escalated at PBR inflation. The difference between these two amounts is summarized in Table 12.2.1-2 below.

Table 12.2.1-2
Components of the Special Rate Adjustment for Re-basing
Arising over the 2017-2021 PBR Term
($ millions)

		A	B	C	D
		Revenue Requirement			2022-2026 Revenue Requirement Impact
		2022F	2021D[19] (Escalated)	Difference	
	2022F vs. 2021D – Operating				
1	Operating Expenses	94.8	101.6	(6.8)	
2	Revenue Offsets	(5.2)	(5.3)	0.1	
3	Franchise Fees	16.6	17.4	(0.8)	
4	Sub-total	106.1	113.6	(7.5)	(37.6)
	2022F vs. 2021D - Capital Related				
5	Depreciation and Amortization	38.4	34.2	4.2	
6	Cost of Debt	33.0	35.7	(2.7)	
7	Return on Equity	52.0	50.3	1.6	
8	Sub-total	123.4	120.2	3.2	15.9
9	**Total**	**229.5**	**233.9**	**(4.4)**	**(21.7)**

534. Table 12.2.1-2 shows that EWSI realized significant operating cost savings during the 2017-2021 PBR term (see Section 5.0). These cost savings reduce EWSI's 2022-2026 revenue requirements by $37.6 million. This reduction is partially offset by increases in depreciation expense and return on equity resulting from higher than forecast capital expenditures. The result of these factors is to reduce the 2022-2026 In-City revenue requirement by $21.7 million, which reduces the Special Rate adjustment for Re-basing by 0.8% annually.

b. Growth in the In-City revenue requirement between 2022 and 2026

535. Growth in the In-City revenue requirement between 2022 and 2026 is calculated as the difference between the forecast revenue requirements for 2026 and 2022. These differences and their impacts on the 2022-2026 revenue requirement are summarized in Table 12.2.1-3, below:

[19] 2021D has been adjusted to include the 2021D public fire protection revenue requirement and Non-Routine Adjustments approved over the 2017-2021 PBR term.

Table 12.2.1-3
Components of the Special Rate Adjustment for Re-basing
Resulting from Growth in the 2022-2026 In-City Revenue Requirement
($ millions)

	A	B	C	D	E
	Revenue Requirement				
	2026F	**2022F**	**Difference**	**CAGR**	**2022-2026 Revenue Requirement Impact**
1 Operating Expenses	102.0	94.8	7.2	1.85%	18.5
2 Revenue Offsets	(5.7)	(5.2)	(0.4)	2.06%	(1.1)
3 Franchise Fees	20.6	16.6	4.0	5.58%	10.4
4 Depreciation and Amortization	47.2	38.4	8.8	5.27%	24.1
5 Return on Debt	32.0	33.0	(1.0)	-0.79%	(1.9)
6 Return on Equity	56.6	52.0	4.6	2.16%	14.5
7 **Total**	**252.7**	**229.5**	**23.2**	**2.43%**	**64.4**

536. Growth over the 2022-2026 PBR term increases the In-City revenue requirement by $64. million over what it would have been had rate increases been capped at PBR inflation. Table 12.2.1-3 shows that the compound annual growth rates (CAGR) for the components of the revenue requirement vary significantly, with return on debt decreasing over the period, operating costs and revenue offsets increasing at or lower than PBR inflation, and depreciation, amortization, and return on equity increasing at higher rates. The CAGR for return on debt is decreasing over the 2022-2026 PBR term as some older higher cost debt is maturing over the PBR term and will be re-issued with lower cost debt. EWSI's average cost of debt is decreasing from 4.22% to 3.75% over the 2022-2026 PBR term (See Section 9.3). The CAGR for depreciation reflects higher depreciation rates on assets placed into service during the 2022-2026 PBR term (see Section 7.0), as well the CAGR for return on equity is a product of capital additions over the 2022-2026 PBR term.

537. The net effect of these changes is to increase the forecast revenue requirement by $64.4 million over the 2022-2026 PBR term which, absent the effect of cost savings detailed below, would have resulted in a 2.3% annual recurring Special Rate Adjustment over the 2022-2026 PBR term.

c. Consumption and Customer Growth

538. As in the 2017-2021 PBR Application, the long-term decline in consumption per customer continues to affect In-City Water revenue, with declines in consumption more than offsetting customer growth. Table 12.2.1-4 summarizes the impact that both increased customer counts and declining consumption have on the 2022-2026 rebasing adjustment.

Table 12.2.1-4
Components of the Special Rate Adjustment for Re-basing
Arising from Changes to Billing Determinates
($ millions)

		A **2017-2021 Decision**	B **2022-2026 Forecast**	C **Difference**	D **2022-2026 Rebasing Impact**
	Average Customer Counts				
1	Residential	266,232	288,081	21,848	
2	Multi-Residential	3,837	3,811	(26)	
3	Commercial	19,764	20,285	521	
4	Sub-Total	289,834	312,177	22,343	(19.0)
	Total Consumption (ML)				
5	Residential	226,216	223,566	(2,650)	
6	Multi-Residential	94,081	87,977	(6,104)	
7	Commercial	142,647	113,176	(29,471)	
8	Sub-Total	462,944	424,719	(38,225)	58.2
9	**Total**				**39.2**

539. The factors affecting both the forecast increase in 2022-2026 customer counts and the decrease in consumption per customer are explained in detail in Section 4. These factors increase the 2022-2026 revenue shortfall by $39.2 million, which increases the Special Rate Adjustment for Re-basing by 1.4% annually.

540. EWSI proposes to spread the re-basing adjustment evenly over the 2022-2026 PBR term, as an adjustment to fixed and variable water rates. This Special Rate Adjustment results in a 2.9% annual recurring increase to rates starting in 2022. (2.3% increase for 2022-2026 growth, 1.4% for consumption and customer growth, offset by a 0.8% reduction for 2017-2021 cost savings).

12.2.2 Special Rate Adjustment to Increase Monthly Service Connection Fee

541. EWSI's current water and wastewater monthly service connection fees are designed to recover customer related costs including billing, meter and service related costs. The segregation of these costs to the fixed component of a customer's bill is a common historic practice across the water industry as these costs are not impacted by changes in the levels of consumption. Over the 2017 to 2021 PBR term, approximately 15% of Water Services' revenue is generated from the monthly service connection fee. Table 12.2.2-1 summarizes the percentage of EWSI's revenue that is generated from the monthly service connection fee. The fixed variable split of revenue within Drainage Services is markedly different than either Water Services or Wastewater Treatment, owing to both the manner in which rates are determined as well as previous decisions made to increase the fixed component. As part of the City of Edmonton Drainage Services – 2013

Cost of Services Study prepared by Grant Thornton, the City of Edmonton updated the drainage rate structure to increase the fixed revenue component from 15% to 30%.

Table 12.2.2-1
Percentage of Fixed Revenue
(%)

		A	B	C	D	E
				Drainage Services		
	Customer Class	Water Services	Wastewater Treatment	Sanitary	Storm	Combined
1	Residential	18.6	25.4	41.7	100.0	60.1
2	Multi- Residential	4.6	1.2	11.1	100.0	25.3
3	Commercial	11.9	4.8	19.8	100.0	58.9
4	**Total**	**15.0**	**16.9**	**32.0**	**100.0**	**55.5**

542. As is common in the utility industry, a significant portion of EWSI's revenue requirement is fixed (85%), in the respect that the costs do not increase or decrease with the volume of water produced/treated in a year. As capital-intensive businesses with high level of fixed costs, most utilities cannot adequately adjust their costs to meet revenue variations, at least in the short term. To compensate for this many utilities have adjusted their rate structure to generate higher portions of revenue from the fixed service charge. Some Alberta electric utilities currently collect between 65% and 85% of their revenue through fixed service charges.

543. Table 12.2.2-2 provides a comparison of residential water bills for 10 communities in western Canada. Bills have been calculated using each municipality's 2020 water rates and 15 m^3 of consumption. All communities with the exception of Spruce Grove and Strathcona County have a higher fixed service charge percentage than EWSI's Water utility. On average, for communities with a higher fixed service charge than EWSI, the fixed service charges make up 35% of their bills versus 19% for EWSI.

Table 12.2.2-2
2020 Residential Water
Bill Comparison (15 m^3)
($)

	Municipality	A Fixed	B Variable	C Total Bill	D Fixed Percentage
1	Spruce Grove	-	52.55	52.55	0%
2	Strathcona County	5.36	40.35	45.71	12%
3	**Edmonton**	**7.66**	**32.92**	**40.58**	**19%**
4	Saskatoon	12.30	42.71	55.01	22%
5	Vancouver	8.50	19.69	28.19	30%
6	Sturgeon County	22.25	47.55	69.80	32%
7	St Albert	13.18	26.25	39.43	33%
8	Winnipeg	18.30	27.90	46.20	40%
9	Calgary	15.16	22.83	37.99	40%
10	Regina	25.50	30.60	56.10	45%

544. For the 2022-2026 PBR application EWSI is proposing to increase the monthly service connection fee, with a corresponding decrease to variable rates. This change will increase the fixed portion of the average residential water bill from 19% to 31%[20], which is comparable to other communities in western Canada. This change will also increase the percentage of fixed revenue EWSI collects from customers from 15% (Table 12.2.2-1 column A, row 4) to 25%. Increasing the monthly service connection fee will have benefits to both EWSI and In-City customers. This increase will help to address issues with revenue stability, seasonal fluctuation, and the long-term decline in consumption for EWSI. While customers will benefit from an increase in rate stability, as discussed in Section 12.2.1, the proposed rebasing adjustment includes a $57.8 million adjustment related to the decline in consumption, the increase to the monthly service connection fee will help to decrease consumption impacts in future PBR applications. The proposed increase to the monthly service connection fee will result in a bill increase of $0.89 for the average residential customer in 2022.

12.2.3 Special Rate Adjustment for 90 Day Deferral Program

545. On March 18, 2020, Alberta announced "Albertans who are experiencing financial hardship directly related to the COVID-19 pandemic can work with their utility company to defer electricity and natural gas bills until June 19, 2020 without any late fees or added interest payments." The option to defer payment applied to residential, farm and small commercial

[20] The 31% fixed portion is prior to the inclusion of public fire protection in In-City water rates (Section 12.2.4). With the inclusion of public fire protection, the fixed percentage increases to 35% for the average residential bill, which is still comparable to other communities in western Canada.

electricity consumers with sites that consume less than 250,000-kilowatt hours of electricity per year and to residential, farm and small commercial natural gas consumers with sites that consume less than 2,500 gigajoules per year. This program for electricity and gas customers is known as the "Utility Payment Deferral Program".

546. The Government of Alberta requested that Alberta municipalities develop similar utility payment deferral programs for municipal utility bills. On March 20, 2020, Edmonton City Council approved a 90-day deferral program for deferral of waste utility bills for customers in need. On March 24, 2020, Mayor Don Iveson, in accordance with a City Council Motion[21], sent a letter to EPCOR requesting that EPCOR implement a program to allow customers to defer water, wastewater treatment and drainage utility bill payments, without interest or penalty, for a 90-day period from March 18, 2020 to June 18, 2020.

547. On May 12, 2020, Alberta's Utility Payment Deferral Program Act (the Act), received royal assent in the Legislative Assembly of Alberta. The Act sets out the Electricity Utility Payment Deferral Program (Part 1); the Gas Utility Payment Deferral Program (Part 2) and the powers granted to the AUC to implement these programs (Part 3).

548. The Act allows regulated rate service providers to establish a deferral account to track and recover the costs for administering the deferral of customer payments, interest expenses and any incremental bad debts costs. The Act allows carrying charges to be applied to the deferral account balances to be calculated at the regulated rate service provider's weighted average cost of capital. Regulated rate service providers are to apply to the Commission for approval of a rate rider to recover the prudently incurred costs accrued to the deferral account during the period June 19, 2021 to June 18, 2022.

549. EPCOR's utility payment deferral program was structured to be in compliance with the Utility Payment Deferral Program Act for its electricity and gas customers. EEA, as EPCOR's retail service provider, delivered and managed a consistent and coordinated program across all of the EPCOR utilities. As such, the utility payment deferral programs for EWSI's Water Services, Wastewater Treatment Services, and Drainage Services were aligned, to the extent possible, with Alberta's requirements for electricity and gas programs described above. Table 12.2.3-1 summarizes the forecast incremental bad debt expense, administration, and carrying costs associated with the 90 Day Deferral Program. In the 2022-2026 PBR Application EWSI is proposing a Special Rate Adjustment in 2022 to recovery the $1.3 million of costs for the 90 Day

[21] http://sirepub.edmonton.ca/sirepub/mtgviewer.aspx?meetid=2703&doctype=MINUTES

Deferral Program. This Special Rate Adjustment will add $0.29 to the average residential bill in 2022, and will be removed from customer bills in 2023. EWSI also proposes to adjust its final rate to reflect the actual costs incurred for this program as part of its 2022 Rates Filing, which would be approved by the City Manager.

Table 12.2.3-1
Components of 90 Day Deferral Program
Special Rate Adjustment
($ millions)

	Item	A Expense
1	Incremental Bad Debt Expense	0.9
2	Late Payment Charges	0.2
3	Carrying Costs	0.2
4	**Total Revenue Requirement**	**1.3**

12.2.4 Special Rate Adjustment for Public Fire Protection

550. Edmonton City Council has directed EWSI to include recovery of the public fire protection revenue requirement through water rates over the 2022-2026 PBR term. EWSI proposes a Special Rate Adjustment effective April 1, 2022 to begin collection of the public fire protection revenue requirement though water rates. As shown in Table 12.2.4-1, the fire protection Special Rate Adjustment has been calculated at the 2021 Fire Hydrant Agreement amount plus franchise fees. The inclusion of public fire protection in water rates will result in EWSI paying additional franchise fees to the City.

Table 12.2.4-1
Fire Protection
Special Rate Adjustment
($ millions)

	Item	A Amount
1	2021 Fire Hydrant Agreement Rate	12.4
2	2021 Fire Hydrant Agreement Rate x 5 (2022-2026)	62.1
3	Add: Franchise Fees	5.1
4	**Fire Protection Special Rate Adjustment**	**67.3**

12.2.5 Summary of Bill Impacts

551. The net impact of PBR inflation, plus the three Special Rate Adjustments, on monthly bills for the typical customers, including a residential customer, a multi-residential customer and a

commercial customer with average water consumption for their customer classes, are summarized in Tables 12.2.5-1 to 12.2.5-3.

Table 12.2.5-1
Bill Impacts on an Average Residential Customer
2022-2026
($/month)

	Water: Residential	A 2022F	B 2023F	C 2024F	D 2025F	E 2026F	F Total/ Average
	Rate Increase over 2021 Decision:						
1	Normal Operations (i-x)	2.06%	2.06%	2.06%	2.06%	2.06%	
2	SRA – Re-basing	2.87%	2.70%	2.70%	2.70%	2.71%	
3	SRA – Fixed Charge Increase	2.37%					
4	SRA – 90 Day Deferral	0.79%	-0.70%				
5	SRA – Fire Protection	6.86%					
6	Total Annual Rate Increase	14.96%	4.06%	4.76%	4.76%	4.77%	
	Average Bill Impact:						
7	Monthly Consumption per Customer – m^3	13.4	13.2	12.9	12.7	12.5	
8	**Average Monthly Bill – $**	**43.37**	**44.59**	**46.14**	**47.73**	**49.41**	
9	Change in Bill – $	2.09	1.22	1.55	1.60	1.67	8.13
10	Change in Bill – %[22]	5.1%	2.8%	3.5%	3.5%	3.5%	3.7%

552. Table 12.2.5-1 shows that bill increases for residential customers are forecast to average 3.7% between 2022 and 2026. With 2.5% of the increase attributable to inflation and the re-basing adjustment and 1.2% of the increase attributable to the addition of public fire protection to In-City water rates. The 3.7% increase in the average bill amount is actually less than the forecast rate increases because of the forecast decline in residential consumption from 13.4 m^3 in 2022 to 12.5 m^3 in 2026.

[22] The Change in Bill - % Total (column F, row 9) is the **average** of the individual years (columns A- E, row 9).

Table 12.2.5-2
Bill Impacts on an Average Multi-Residential Customer
2022-2026
($/month)

	Water: Multi-Residential	A 2022F	B 2023F	C 2024F	D 2025F	E 2026F	F Total/ Average
	Rate Increase over 2021 Decision:						
1	Normal Operations (i-x)	2.06%	2.06%	2.06%	2.06%	2.06%	
2	SRA – Re-basing	2.87%	2.83%	2.83%	2.83%	2.83%	
3	SRA – Fixed Charge Increase	-7.46%					
4	SRA – 90 Day Deferral	0.19%	-0.19%				
5	SRA – Fire Protection	1.60%					
6	Total Annual Rate Increase	-0.74%	4.70%	4.89%	4.89%	4.89%	
	Average Bill Impact:						
7	Monthly Consumption per Customer – m^3	388.4	386.6	384.7	382.9	381.0	
8	**Average Monthly Bill – $**	**733.41**	**764.71**	**798.80**	**834.41**	**871.61**	
9	Change in Bill – $	(42.74)	31.30	34.08	35.61	37.20	95.46
10	Change in Bill – %[3]	-5.5%	4.3%	4.5%	4.5%	4.5%	2.4%

553. Table 12.2.5-2 shows that bill increases for multi-residential customers are forecast to average 2.4% between 2022 and 2026. Similar to residential customers, the average multi-residential bill change is less than the forecast rate increases because of the forecast decline in consumption from 388.4 m^3 in 2022 to 381.0 m^3 in 2026.

Table 12.2.5-3
Bill Impacts on a Commercial Customer
2022-2026
($/month)

	Water: Commercial	A 2022F	B 2023F	C 2024F	D 2025F	E 2026F	F Total/ Average
	Rate Increase over 2021 Decision:						
1	Normal Operations (i-x)	2.06%	2.06%	2.06%	2.06%	2.06%	
2	SRA – Re-basing	2.87%	2.65%	2.66%	2.66%	2.66%	
3	SRA – Fixed Charge Increase	-3.10%					
4	SRA – 90 Day Deferral	0.45%	-0.40%				
5	SRA – Fire Protection	8.95%					
6	Total Annual Rate Increase	11.23%	4.31%	4.72%	4.72%	4.72%	
	Average Bill Impact:						
7	Monthly Consumption per Customer – m^3	90.1	94.0	96.5	93.6	90.7	
8	**Average Monthly Bill – $**	**195.26**	**210.27**	**224.54**	**229.81**	**235.06**	
9	Change in Bill – $	27.44	15.02	14.26	5.27	5.25	67.24
10	Change in Bill – %[3]	16.3%	7.7%	6.8%	2.3%	2.3%	7.1%

554. Bills for commercial customers are forecast to increase more than those of residential and multi-residential customers primarily attributable to a forecast rebound in consumption per customer in 2022 and 2023 (Section 4.8).

13.0 PERFORMANCE MEASURES

13.1 Overview

555. EWSI has prepared the Water Bylaw in accordance with the *EPCOR Rates Procedure Bylaw No. 12294,* as amended, ("Rates Procedure Bylaw") Subsections 5(e) and 5(f), which state that "utility services are to be provided in a manner that reflects reasonable environmental management in comparison to industry benchmarks" and that "performance will be assessed by reference to industry benchmarks". The following defines these performance measures, the rationale for their selection and the performance level or standards at which Water is expected to perform. This section also describes Water's historic performance against the established standards since the inception of performance based regulation in 2002. The previous terms were: Term 1 from 2002 to 2006, Term 2 from 2007 to 2011, Term 3 from 2012-2016 and Term 4 from 2017-2021.

13.1.1 Framework for Performance Measures

556. A framework for the categorization of performance measures was established to define the critical areas of operational performance that EWSI must meet. This framework was established at the inception of the Water PBR in 2002 and has been maintained since that time. It will continue to be used in the 2022-2026 PBR in order to ensure comparability to previous PBR terms as well as used in categorization of both the Wastewater Treatment and Drainage Services performance measure.

557. For the 2022-2026 PBR, operational performance of EWSI will be assessed under five categories:

- Water Quality;
- Customer Service;
- System Reliability and Optimization;
- Environment; and
- Safety.

558. Each of these categories contains individual performance measures that represent the more specific performance standards (or targets) expected. The performance standards are based on historic trending and targeted future performance and where available, aligned with industry benchmarks. With each PBR renewal, EWSI typically revises the PBR performance metrics through updating the standards of performance, where reasonable, and introducing new

metrics to better align with operational priorities and strategic goals. For the 2022-2026 PBR term, EWSI is proposing to limit the number of changes to the overall metrics program. Given the focus on moderating rate increases through reductions in capital programs and other means, maintaining a relatively consistent metrics program from the current term will enable stakeholders to be assured that service levels are being maintained despite the reductions. Where feasible, the standards of performance have been updated to the most recent 10 year average of past performance.

559. The selection of performance measures and their category weightings have been reviewed by customers as a component of the stakeholder engagement process completed by EWSI as part of PBR development activities. In particular, stakeholder have been asked to comment on the priority of the various performance categories to ensure their weightings are aligned with stakeholder expectations. This has resulted in these category weightings being updated from that used previously.

13.1.2 Assessment of Performance

560. Actual performance is assessed against the standard for each metric on an annual basis. An audit is conducted to provide assurance that all measurement and reporting of these metrics have been externally verified. (Note for the 2022-2026 period, EWSI is proposing that EPCOR internal audit department conducts these audits). If EWSI does not meet the standard, financial penalties are applied to a maximum of $2,400,000 per annum ($1,000,000 for Water, $400,000 for Wastewater and $1,000,000 for Drainage). If a penalty amount is assessed, that amount is returned to the customers in the form of a rate rebate. The proposed weighting and penalty amounts applicable to each performance category for water are detailed in Table 13.1.2-1. The weightings of the performance categories have been updated from those used in the 2017-2021 term based on the stakeholder engagement surveys.

Table 13.1.2-1
Water Performance Measures Indices and Penalties

	Performance Category	A 2017-2021 Weighting	B 2022-2026 Weighting	C 2022-2026 Maximum Penalty
1	Water Quality Index	25%	30%	$300,000
2	Customer Services Index	20%	15%	$150,000
3	System Reliability/Optimization Index	25%	25%	$250,000
4	Environmental Index	15%	15%	$150,000
5	Safety Index	15%	15%	$150,000
6	**Total**	**100%**	**100%**	**$1,000,000**

561. The weightings and financial penalties of the indices are different between Water, Wastewater Treatment and Drainage Services in order to reflect the different nature of the operations and stakeholder expectations. There is no financial reward to EWSI for exceeding performance standards. The purpose of the standards are to ensure that the level of service provided to customers does not degrade over the PBR period. EWSI is already performing at a high level and wants to present rates that are stable and predictable. The addition of a financial reward for performance that exceeds the standards is inconsistent with that goal.

13.1.3 EWSI's Performance Experience

562. Under provisions of the proposed Water Bylaw (defined within the sections entitled Water System Service Quality), EWSI reports on its actual performance results for each of the performance measures as part of its annual PBR Progress Report (presented to City of Edmonton Utility Committee) and the annual Water rate filing. The overall performance is determined on a point basis with 100 base points available if the standards for all five performance indices are achieved. Water, Wastewater and Drainage individually have a 100 point benchmark. For each utility, total points are determined by the summation of points available for each performance measure. Bonus points are also available for performance above standards and financial penalties are applied if EWSI does not meet the 100 base point standard (note: on an individual index basis, with some performance measures, such as main breaks, a lower-than-standard score represents performance above standards while for other measures a higher score indicates better performance).

563. As detailed in Table 13.1.3-1, EWSI Water System Service Quality audited results have met or exceeded performance standards since 2002 for water. Although 2002 indicates a score less

than 100 base points, no financial penalty was assessed as points earned were less than one full point below 100.

Table 13.1.3-1
Actual Water Total Performance Measure Results

		A	B	C	D	E	F	G
	PBR #1 (2002-2006)		**PBR #2 (2007-2011)**		**PBR #3 (2012-2016)**		**PBR #4 (2017-2021)**	
	Year	**Points**	**Year**	**Points**	**Year**	**Points**	**Year**	**%**
1	2002	99.4	2007	102.6	2012	106.4	2017	107.6
2	2003	100.1	2008	103.3	2013	106.8	2018	107.1
3	2004	102.4	2009	100.3	2014	107.2	2019	107.5
4	2005	101.6	2010	102.8	2015	106.0	2020	n/a
5	2006	102.1	2011	104.9	2016	108.4	2021	n/a
6	**PBR Average**	**101.1**	**PBR Average**	**102.8**	**PBR Average**	**107.0**	**PBR Average**	**107.4**
7	**10 Year Average**							**106.5**

13.1.4 Performance Benchmarks

564. In an effort to provide references to external benchmarks when establishing the standards for the proposed PBR performance measures, EWSI investigated the metrics used by other utilities as well as benchmarking studies conducted by various water and wastewater associations. This latter group included: the American Water Works Association (AWWA), the leading North American drinking water industry association, the Water Environment Federation, the leading wastewater industry association and the Office of Water Services (Ofwat), the primary water regulators in the United Kingdom. EWSI also reviewed the National Water & Wastewater Benchmarking Initiative.

565. Despite these efforts, it has proven challenging to find either other utilities that use an approach similar to EWSI's score card or specific, broad based industry benchmarks for the majority of the individual performance measurements proposed. While some utilities tend to use some of the individual measures similar to EWSI, benchmark comparisons with these utilities have proven to be not directly comparable due to factors such as plant and distribution system configuration, operating conditions, regulatory requirements, environmental factors, raw water and wastewater conditions and weather. Where available, comparable benchmarks are described in the subsequent sections describing the individual metrics. Where there are no external benchmarks, performance trends over a considerable period of time or the established

level of performance as reviewed by external stakeholders are the basis upon which the proposed standards are established.

13.2 Water System Performance Measures

566. Table 13.2-1 details the proposed 2022-2026 Water System Performance Measures, the accompanying expected standards that are to be achieved and applicable points. The base points available are earned by achieving performance that meets the standard. Their relative weighting has updated based on stakeholder input from the previous PBR term including the overall total target of 100 points. In the 2017-2021 period, the aggregation methodology was adjusted so that bonus points cannot be used to offset less than standard performance in the water quality index. That is, if the water quality index is below standard for any given year, that score cannot be compensated for by over-performance in other performance categories. EWSI is proposing to continue this approach given the overriding importance of maintaining water quality for all customers including those in Edmonton.

Table 13.2-1
Water Systems Service Quality Measures

	Index • Sub-indices	A Measure	B 2017-21 Standard	C 2022-26 Standard	D	E Points	F
					Avail.	Bonus	Total
1	**Water Quality Index**	% target achieved	99.7%	99.7%	**30.00**	**0**	**30.00**
2	**Customer Service Index**				**15.00**	**2.25**	**17.25**
3	• Post Service Audit Factor	% satisfied	74.9%	75.0%	3.75		
4	• Home Sniffing Factor	% satisfaction	94.4%	94.4%	3.75		
5	• Response Time Factor	Minutes to confirm	25	25	3.75		
6	• Planned Construction Impact Factor	% compliance	95.8%	95.8%	3.75		
7	**Reliability & Optimization Index**				**25.00**	**3.25**	**28.25**
8	• Main Break Factor	# of breaks	419	365	6.25		
9	• Water Main Repair Duration Factor	% fixed in 24 hrs.	93.7%	95.4%	6.25		
10	• Water Loss Factor	ILI Index	2.00	1.23	6.25		
11	• System Energy Efficiency Factor	Energy/ML/Account	309	281	6.25		
12	**Environmental Index**				**15.00**	**2.25**	**17.25**
13	• Water Conservation Factor	m^3 month/household	17.2	16.8	5.00		
14	• Environment Incident Factor	# of incidents	6	5	5.00		
15	• Solids Residual Mgt. Factor	Days in DF mode	120	120	5.00		
16	**Safety Index**				**15.00**	**2.25**	**17.25**
17	• Near Miss Reporting Factor	# of Reports	550	550	3.75		
18	• Worksite Inspections/ Observations	# completed	1,032	1,032	3.75		
19	• Lost Time Frequency Factor	Freq./Exposure	0.57	0.40	3.75		
20	• All Injury Frequency Factor	Freq./Exposure	1.54	1.00	3.75		
21	**Total Point To Be Earned**				**100.00**	**10.00**	**110.00**

13.2.1 Water Quality Index

567. The Water Quality index is of paramount importance as customers consume the treated water produced by EWSI. The standards for water quality are established by both the federal and provincial governments. Health Canada sets health-based, aesthetic and operational guideline limits for microbiological contaminants, trace metals, pesticides, organic solvents, inorganic salts, radioactive parameters, disinfection by-products and physical parameters in drinking water. Alberta Environment and Parks adopts these guidelines as regulation and sets stricter limits for certain parameters in EWSI's Approval to Operate. In addition, EWSI sets even stricter limits for critical parameters that are identified in the EWSI Quality Standards. These EWSI internal limits provide an early warning of any water quality problems that might be developing and can be acted on before violation limits are exceeded.

568. The Water Quality Index is calculated as the percentage of water quality test results that meet or exceed all regulatory requirements and the stricter EWSI internal limit objectives. Reported as a percentage of tests meeting all objectives, this index provides a measure of overall water quality in the city of Edmonton as it is delivered to the customer. The water quality tests included in this index are completed only on treated drinking water samples. This includes samples from plant finished water reservoirs, field reservoirs across the city, and distribution system samples including routine compliance monitoring samples (e.g., samples collected from employee homes, fire stations, business and public places), samples taken in response to customer complaints and samples collected following mainbreak repairs and other system repairs.

569. Table 13.2.1-1 details the parameters that are the most frequently tested. These parameters are the EWSI internal levels that are stricter than the regulatory limits. If EWSI sets a stricter internal limit, then the stricter limits take precedence over the Guidelines for Canadian Drinking Water Quality recommended by Health Canada (latest edition at: http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index-eng.php) or limits specified by Alberta Environment and Parks in the Edmonton Waterworks' Approval to Operate (638-03-00 or subsequent approvals). Those parameters specified in the Canadian Drinking Water Guidelines, or in the Alberta Environment Approval to operate that are not listed in Table 13.2.1-1 are detailed in Table 13.2.1-2. The Water Quality Index may also include parameters in addition to those defined in Table 13.2.1-2. If the Alberta Environment approval or the Canadian Drinking Water Guidelines are changed to introduce a stricter limit for any parameter, then that new limit takes precedence over the value indicated in Table 13.2.1-1.

Table 13.2.1-1
Water Quality Index Parameters and Limit

	Parameter (units)	A Location of measurement	B AEP Violation Limit	C EWSI Internal Limit
1	Turbidity (NTU)	Plant Reservoir Influent	No Limit	>0.3
		Plant Reservoir Effluent	No Limit	>1.0
		Distribution system during normal operations	No Limit	> 1.0
		Distribution system after maintenance activities (i.e., mainbreak repairs, other depressurizations)	No Limit	> 3.0
2	Chlorine, total residual (mg/L)	Plant reservoir influent	> 3.0	< 1.2 or > 2.5
		Plant reservoir effluent	< 1.0 or > 3.0	< 1.3 or > 2.4
		Field reservoirs	< 0.5 or > 3.0	< 1.0 or > 2.4
		Distribution system	< 0.5 or > 3.0	< 1.0 or > 2.4
3	Colour (TCU)	Plant reservoir effluent, field reservoirs and distribution system		> 10
4	pH	Plant reservoir effluent, field reservoirs and distribution system	< 6.5 or > 8.5	< 7.3 or > 8.3
5	Total Aluminum (mg/L) Conventional	Plant reservoir effluent, field reservoirs and distribution system during conventional WTP operation	No Limit	> 0.1
6	Total Aluminum (mg/L) Direct Filtration	Plant reservoir effluent , field reservoirs distribution system during direct filtration WTP operation [1]	No Limit	> 0.2
7	Iron (mg/L)	Plant reservoir effluent, field reservoir and distribution system	> 0.3	> 0.3
8	Odour	Plant reservoir effluent, field reservoir and distribution system	No Limit	Inoffensive
9	Pipe Lubricant (UV scan)	Plant reservoir effluent, field reservoir and distribution system	No Limit	Any positive pipe lubricant
10	Fluoride (mg/L) [2]	Plant reservoir effluent, field reservoir and distribution system	< 0.5 or > 0.9	< 0.6 or > 0.8
11	Coliforms, Total (presence/absence per 100 mL)	Plant reservoir influent & effluent, field reservoirs and distribution system	2> 0 per 100 mL (confirmed by resampling)	Any positive sample (i.e. > 0 /100mL
12	E. coli (presence /absence per 100mL)	Plant reservoir influent & effluent, field and distribution system	per 100 mL (confirmed by resampling)(i.e. > 0)	Any positive sample (i.e. > 0)
13	Trihalomethanes (ug/L)	Plant reservoir influent and effluent, field reservoirs and distribution system	> 100 based on 12-month location running annual average	> 50 based on single result
14	Bromodichloro-methane(ug/L)	Plant reservoir influent and effluent, field reservoirs and distribution system	No Limit	> 16
15	Haloacetic Acids (ug/L)	Plant reservoir influent & effluent, field reservoirs and distribution system	> 80 based on 12-month location running annual average	> 40 based on single result

	Parameter (units)	A Location of measurement	B AEP Violation Limit	C EWSI Internal Limit
16	N-nitroso dimethylamine (NDMA) (ng/L)	Plant reservoir influent & effluent, field reservoirs and distribution system	No limit	> 10
17	Giardia (cysts/1000 litres)	Plant reservoir influent & effluent	No limit	Detection of 1 or more cysts / 1000 L
18	Cryptosporidium (oocysts/1000 litres)	Plant reservoir influent & effluent	No limit	Detection of 1 or more oocysts / 1000 L

1 Direct filtration is a modified water treatment process which reduces chemical use and residuals to river.
2 Only when fluoridation in use.

Table 13.2.1-2
Canadian Drinking Water Guidelines, or Alberta Environment Approval Parameters

A		B	
1	Antimony	41	Lead
2	Arsenic	42	Lead-210
3	Atrazine	43	Malathion
4	Azinphos-methyl	44	Manganese
5	Barium	45	Mercury
6	Bendiocarb	46	Methychlorophenoxyacetic (2-, 4-) acid (MCPA)
7	Benzene	47	Metolachlor
8	Benzo(a)pyrene	48	Metribuzin
9	Boron	49	Methyl Tertiary-Butyl Ether (MTBE)
10	Bromate	50	Monochlorobenze
11	Bromoxynil	51	Nitrate(as N)
12	Cadmium	52	Nitrilotriacetic acid
13	Carbaryl	53	Nitrite(as N)
14	Carbofuran	54	Paraquat
15	Carbon Tetrachloride	55	Pentachlorophenol
16	Cesium-137	56	Perfluorooctane Sulfonate (PFOS)
17	Chlorate	57	Perfluorooactanoic Acid (PFOA
18	Chloride	58	Phorate
19	Chlorite	59	Picloram
20	Chlorpyrifos	60	Radium-226
21	Chromium	61	Selenium
22	Copper	62	Simazine
23	Cyanide	63	Sodium
24	Cyanobacterial toxins	64	Strontium
25	Diazinon	65	Strontium-90
26	Dicamba	66	Sulphate
27	Dichlorobenzene 1,2-	67	Sulphide
28	Dichlorobenzene 1,4-	68	Terbufos
29	Dichloroethane 1,2-	69	Tetrachloroethylene
30	Dichloroethylene 1,1-	70	Tetrachlorophenol,2,3,4,6-
31	Dichloromethane	71	Toluene
32	Dichlorophenol 2,4-	72	Total Dissolved Solids(Calc)
33	Diclofop-methyl	73	Trichloroethylene
34	Dichlorophenoxyacetic acid 2,4 (2,4-D)	74	Trichlorophenol,2,4,6-
35	Dimethoate	75	Trifluralin
36	Diquat	76	Tritium
37	Diuron	77	Uranium
38	Ethylbenzene	78	Vinyl Chloride
39	Glyphosate	79	Xylenes, total
40	Iodine-131	80	Zinc

570. Testing is conducted by EWSI's Quality Assurance Laboratory or a suitably accredited commercial laboratory. For calculation of the Water Quality Index over 50,000 water quality tests per year on more than 100 physical, chemical, and microbiological parameters. The quality of the water testing data produced by EWSI laboratory adheres to the international management system standard ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories". The laboratory has been accredited to ISO/ IEC 17025 since 2001 by

the Canadian Association for Laboratory Accreditation. The Water Lab underwent full assessment in 2019 as part of the bi-annual audit and achieved ISO17025 certification.

571. When violations and variances arise, they are typically caused by localized water quality issues in the water distribution system, are due to poor sampling technique, or are due to internal customer issues such as plumbing problems within a customer's building. Multiple complaints for the same parameter (e.g. turbidity, colour, odour) on the same day that result from one incident such as a problem with flushing over a major area, or transmission main flows, will be counted as a single incident on the Water Quality Index. If two or more parameters are affected, then the number of incidents would equate to the number of affected parameters. If a water quality violation is reported to Alberta Environment and Parks, but is later found, after investigation, to be attributable to a customer's system, then that sample result will be removed from the index.

572. The scope of the Water Quality Index does not include:

- Any samples of raw water (river), upstream watershed, partially treated plant water, waste streams, bulk chemical tests, quality assurance/control tests, special project samples, water main construction project samples (before commissioning), environmental releases, or any research testing.
- Any drinking water quality tests not carried out by EWSI's accredited Quality Assurance Water Laboratory. For example, field testing conducted by distribution system operators, water treatment plant (WTP) operators or measurements by on-line analyzers are not within the scope of the Water Quality Index.
- Violations and variances in a distribution system sample that are shown to be the result of internal customer building plumbing problems and are not related to the quality of water in the distribution system.
- Any extra testing done to investigate, isolate and resolve water quality problems that have been identified by previous testing.
- Any wastewater testing.
- Any test results from EPCOR sites and operations outside the city of Edmonton.

573. Construction of a new laboratory facility at the Rossdale Water Treatment Plant site was completed in 2015 and facilitates a high level of water testing capabilities for many years to come. EWSI also maintains close contact with Alberta Environment and Parks and Health Canada on developing Canadian Drinking Water Guidelines and with local regional Health Authorities on health issues related to drinking water.

574. Table 13.2.1-3 details the historical results of EWSI Quality Index performance. The results show excellent performance in meeting regulated standards and the stricter EWSI internal limits.

Table 13.2.1-3
Annual Water Quality Index Results

	A		B	C	D	E	F	G
	PBR #1 (2002-2006)		**PBR #2 (2007-2011)**		**PBR #3 (2012-2016)**		**PBR #4 (2017-2021)**	
	Year	**%**	**Year**	**%**	**Year**	**%**	**Year**	**%**
1	2002	99.6%	2007	99.8%	2012	99.8%	2017	99.8%
2	2003	99.6%	2008	99.8%	2013	99.8%	2018	99.8%
3	2004	99.7%	2009	99.7%	2014	99.8%	2019	99.8%
4	2005	99.8%	2010	99.7%	2015	99.8%	2020	n/a
5	2006	99.7%	2011	99.7%	2016	99.7%	2021	n/a
6	Average	99.7%	Average	99.7%	Average	99.8%	Average	99.8%
7	Standard	99.6%	Standard	99.6%	Standard	99.6%	Standard	99.7%
8	**10 Year Average**							**99.8%**

575. The ISO 24512:2007 Guidelines for the Management of Drinking Water Utilities and for the Assessment of Drinking Water Services recommends "meeting or exceed regulatory requirements" as possible service assessment performance indicator and for protection of public health. The EWSI quality index is consistent with this performance indicator.

576. EWSI has had this water quality measure in place since 1996 and over that time, a significantly higher level of water quality has been maintained. EWSI increased the standard for the 2017-21 PBR from 99.6% to 99.7%. Over the last five years, the actual value of the index has remained constant at approximately 99.7 to 99.8% demonstrating the value of the Water Quality Index has reached a stable level. EWSI has not identified cost-effective initiatives to increase the index score further. EPCOR is, therefore, proposing to maintain the standard at 99.7% for 2022-2026 PBR to ensure that drinking water quality is maintained. On this basis, the proposed standard is not set at the 10 year average.

13.2.2 Customer Service Index

577. The customer service index is a composite measure of the customers' perception of satisfaction with EWSI service, the aesthetic quality of water and speed of response to customer issues. These measures are important because they represent the direct contact that customers have with EWSI. This index is comprised of four equally weighed factors:

- Post Audit Service Factor;
- Home Sniffing Factor;
- Response Time Factor; and
- Planned Construction Factor.

578. EWSI has previously surveyed Calgary, Vancouver, and Winnipeg and found that they do not use a comprehensive customer service measure. However, benchmark information was available on some of the individual measures.

13.2.2.1 Post Service Audit Factor

579. EWSI assesses customer satisfaction through the Post Service Audit Factor (PSA). This measure is determined from those customers who have called the EWSI emergency line. After the customer call has been completed, an independent research firm audits the performance of both the EWSI emergency phone staff and field crews. These transactional surveys determine the level of customer satisfaction based on:

- Overall satisfaction with the most recent call to the emergency line; and
- Overall satisfaction with the field crew response to the call.

580. Historically, the research firm accumulates the results of these surveys to form an overall assessment of customers' perception of the performance of EWSI emergency response. The PSA result is the percentage of surveyed customers who rate EWSI as "very satisfied" or "completely satisfied" using a 1 to 7 rating scale. These top two ratings are equivalent to receiving a 6 or 7 score out of a total of 7. These results are detailed in Table 13.2.2.1-1.

Table 13.2.2.1-1
Annual Post Service Audit Measure Results

	A	A	B	C	D	E	F	G
	PBR #1 (2002-2006)		**PBR #2 (2007-2011)**		**PBR #3 (2012-2016)**		**PBR #4 (2017-2021)**	
	Year	**%**	**Year**	**%**	**Year**	**%**	**Year**	**%**
1	2002	70.6%	2007	71.3%	2012	72.3%	2017	72.5%
2	2003	71.0%	2008	74.5%	2013	77.8%	2018	71.3%
3	2004	77.6%	2009	74.7%	2014	73.6%	2019	74.5%
4	2005	76.7%	2010	78.1%	2015	77.4%	2020	n/a
5	2006	75.7%	2011	73.9%	2016	77.8%	2021	n/a
6	Average	74.3%	Average	74.5%	Average	75.8%	Average	72.8%
7	Standard	71.6%	Standard	72.6%	Standard	74.0%	Standard	74.9%
8	**10 Year Average**							**74.9%**

581. Since 2017, EWSI has been challenged in meeting the required 74.9% PSA target. To improve customer satisfaction, EWSI worked with other EPCOR entities, including Distribution & Transmission Inc. (EDTI) and Drainage Services, who handle similar emergency calls. All three utilities implemented a shared phone number to make it easier for customers in addition to common call handling processes to ensure customers receive a similar customer experience regardless of utility. EWSI also implemented process changes and increased quality assurance of phone calls and field visits to improve the customer experience. In 2019, PSA improved to 74.5, but remained 0.4% short of the 74.9% target.

582. While working with the other EPCOR entities on a consistent customer experience, EWSI reviewed other customer satisfaction benchmarks set out across EPCOR. EPCOR's electricity business units, EDTI and EPCOR Energy Alberta L.P. (EEA), measure customer satisfaction as directed by their regulator the Alberta Utilities Commission. Similar to EWSI, both EDTI and EEA have transactional surveys completed by an independent research firm. The AUC outlines customer satisfaction standards for regulated rate providers, default suppliers, and electricity/gas distributors across Alberta. The AUC requires that 75% of surveyed customers are satisfied (respond positively to the survey) as defined by the following survey questions:

a. Insert name of owner] makes it easy for customers to reach them.
b. [Insert name of owner]'s employees are helpful.
c. [Insert name of owner]'s employees are knowledgeable.
d. [Insert name of owner]'s employees are courteous.
e. [Insert name of owner]'s employees provide satisfactory service.

583. On November 13, 2020, the AUC proposed to reduce regulatory burden and improve operational efficiency by allowing flexibility for utilities in establishing the specific questions that comprise the surveys. This was indicated in the AUC's comments:

> Annual performance reports: restructured to remove prescriptive reporting requirements to allow regulated service providers the discretion to report how their customer care and billing operations and processes are structured to align with their customers' expectations of service quality.[23]

584. For the 2022-26 PBR Term, EWSI is proposing to align its customer satisfaction survey with EDTI and EEA in order to develop direct comparability of results and support a consistent customer experience. Given the AUC proposal to provide flexibility in establishing the survey questions, the survey questions and survey technology may change of the 5 year PBR term. On an annual basis, EWSI, ETDI and EEA will determine if changes are required to the survey questions or methodology. In the event that changes are proposed, EWSI will advise Utility Committee in order to ensure that alignment with the underlying expectations of the measure are maintained. In all instances, the proposed changes would continue to align with the AUC transactional requirements as outlined below:

a. Survey Methodology:
    i. type of survey (e.g., transaction, random);
    ii. method of surveying (e.g., telephone, email, web);
    iii. issues canvassed;
    iv. nature of response (e.g., ranking on a scale, yes/no, open-ended);
    v. frequency of survey;
    vi. number of customers surveyed; and
    vii. response rate.
b. Measures customer satisfaction success internally to achieve a minimum 75 per cent target.
c. Identifies and evaluates the top three areas for improvement received from customer surveys.

585. Aligning EWSI with EDTI and EEA will help inform how to better serve customers as there will be a direct comparison to the other EPCOR business units who answer emergency calls and

[23] AUC Bulletin 2020-36.

dispatch field crews. As this is a modified measure from what has previously used, EWSI is proposing to set the 2022-2026 performance standard at the 75% minimum level established by the AUC.

13.2.2.2 Home Sniffing Factor

586. In the spring of each year, large quantities of organic matter flow into the river as a result of snow melt. A residual effect of the organic matter is increases in both taste and odour in the water. While neither the taste nor odour associated with this phenomenon is harmful to health, they do influence and affect the aesthetic quality of the finished drinking water and can be a source of consumer concern.

587. EWSI goes to considerable measures to minimize the taste and odour through the treatment process. However, the raw water quality in the spring (and fall months) is historically quite poor and can change significantly very quickly. Depending upon the temperature, the rate of snowmelt and precipitation at the time, EWSI is often challenged to provide aesthetically pleasing water for the first few weeks of spring run-off.

588. In order to continually adjust to the changing river conditions, EWSI uses a laboratory test called flavour profile analysis to determine the odour of the treated water. This analysis is then used to make adjustments to the treatment process during the spring run-off. To verify the effectiveness of treatment and monitoring for removal of odour from the customers' perspective, EWSI conducts a customer home sniffing study each year. This study aims to have a random panel of 200 to 300 customers from across the city of Edmonton and from different age groups. The customers will be asked to smell both the hot and cold water at their tap each day during the study and to rate the intensity of odour on an odour intensity scale. This scale is detailed in Table 13.2.2.2-1.

Table 13.2.2.2-1
Odour Intensity Scale

		A
	Intensity	**Description**
1	0.00	No odour detected
2	0.25	Trace odour (difficult to identify)
3	0.50	Very slight odour (identifiable, not objectionable)
4	1.00	Slight, but definite odour (slightly objectionable)
5	1.50	Slight to moderate odour (somewhat objectionable)
6	2.00	Moderate, very noticeable odour (objectionable)
7	2.50	Very strong odour (strongly objectionable)
8	3.00	Severe odour (so objectionable that water is undrinkable)

589. A customer is considered satisfied with a sample of water on a given day when the odour intensity they record is 0.5 or less. The study typically begins in late winter, prior to spring run-off, and is conducted through spring run-off until the odours in the raw water have dissipated – this will usually occur within 2 to 3 months, but can vary depending on weather conditions in that year.

590. Since 2010, EWSI has used an independent research firm to select the random panel of customers and to conduct the home sniffing study (prior to 2010, the study was conducted internally by EWSI). The research firm provides the results to EWSI for analysis and for determination of an overall % satisfaction score for the entire period. The results of the Home Sniffing survey are detailed in Table 13.2.2.2-2.

Table 13.2.2.2-2
Annual Home Sniffing Survey Results

		A	B	C	D	E	F	G
	PBR #1 (2002-2006)		**PBR #2 (2007-2011)**		**PBR #3 (2012-2016)**		**PBR #4 (2017-2021)**	
	Year	**%**	**Year**	**%**	**Year**	**%**	**Year**	**%**
1	2002	96.3%	2007	91.5%	2012	97.0%	2017	94.5%
2	2003	96.3%	2008	92.6%	2013	94.8%	2018	92.8%
3	2004	96.3%	2009	90.5%	2014	95.7%	2019	95.5%
4	2005	96.5%	2010	96.5%	2015	93.9%	2020	n/a
5	2006	94.8%	2011	96.7%	2016	96.2%	2021	n/a
6	Average	96.0%	Average	95.4%	Average	95.5%	Average	94.3%
7	Standard	92.5%	Standard	93.4%	Standard	93.8%	Standard	94.4%
8	**10 Year Average**							**95.4%**

591. In establishing the performance standard, it is noted that there appears to be no industry benchmarks that are comparable to the EWSI approach. The ISO 24512:2007 Guidelines for the

Management of Drinking Water Utilities and for the Assessment of Drinking Water Services recommends that utilities "maintain acceptable aesthetics (taste, odour and colour)" as performance service assessment criteria for the goal of protecting public health. The EWSI home sniffing factor is consistent with this performance assessment criterion. In addition, the consumer response to those occasions when there are taste and odour concerns clearly indicate that the inclusion of this performance measure is appropriate.

592. EWSI has increased the standard for the home sniffing factor in each PBR since 2002-2006. For the 2017-2021 PBR, the performance standard proposed was the average ten-year historical performance by EWSI as reflected in Table 13.2.2.2-2. The resulting 94.4% performance standard was above the previous standard of 93.8% set in the 2012 to 2016 PBR (which was above the 2002 and 2007 PBRs respectively). However, performance on this parameter has levelled-off in the last 10-years and is subject to year-to-year variation in meteorological conditions. As a result, EWSI has met the most recent 10-year average of 95.4% in only standard 6 out of the last 10 years. Although further improvements in the home sniffing are theoretically possible, it will required increased addition of the expensive treatment chemical Powder Activated Carbon, and much will still depends on meteorological conditions in a given year. Therefore, EWSI is proposing to maintain the target at the relatively high performance level of 94.4%.

13.2.2.3 Response Time Factor

593. The Response Time Factor is the average number of minutes taken by EWSI to confirm a water main break once a call is received by the dispatch office. As such, it is a direct measure of EWSI's responsiveness to customer concerns. Table 13.2.2.3-1 details the historical performance for this measure.

Table 13.2.2.3-1
Response Time Factor Results

		A	B	C	D	E	F	G
	PBR #1 (2002-2006)		**PBR #2 (2007-2011)**		**PBR #3 (2012-2016)**		**PBR #4 (2017-2021)**	
	Year	**Minutes**	**Year**	**Minutes**	**Year**	**Minutes**	**Year**	**%**
1	2002	20	2007	21	2012	16	2017	18
2	2003	19	2008	25	2013	16	2018	21
3	2004	19	2009	25	2014	21	2019	20
4	2005	22	2010	20	2015	21	2020	n/a
5	2006	20	2011	18	2016	17	2021	n/a
6	Average	20	Average	22	Average	18	Average	20
7	Standard	22	Standard	22	Standard	25	Standard	25
8	**10 Year Average**							**19**

594. In assessing the variability of this measure, consideration should be given to some of the external factors that have impacted the results. Effective January, 2008, all EWSI employees were prohibited from using any telecommunications devices while driving on EWSI business. As a result of this commitment to safety, Emergency Response personnel are required to pull off the roadway to a safe location before responding to a phone call. This safety requirement represented a significant change from previous behaviour and has been estimated to add an average of 2 to 3 minutes to the response time result. In addition, Emergency Response personnel are not expected to break posted speed limits to make up for lost time. The results are also impacted by population growth and the associated geographic expansion of the city of Edmonton. Consequently, Emergency Response personnel are required to respond to a variety of service calls (in addition to main breaks), over a greater geographic distance, while navigating increased traffic volumes. Lastly, response times are also highly correlated with the number of main breaks, which as noted are primarily determined by changes in temperature. Repeat breaks have also impacted the results, as a repeat break typically occurs while crews are already on site, resulting in a very low response time.

595. The impact of the planned move to the Aurum facility has also been reviewed in order to determine if there is a potential of delayed responses due to the additional travel times. Under normal circumstances, crews are mobile within the city of Edmonton when notified of a main break, imply no change in response times. The only impact in response times would be when crews are physically located at the Aurum facility and have to respond from that location. As this situation only occurs during shift change and on weekend nights, the impact on response times is seen as very limited.

596. For the 2022-2026 PBR, EWSI is proposing to maintain the standard for response time at a standard of 25 minutes. Despite the 10 year average being below this level, EWSI has noted an increasing trend in the average response time in recent years. This is attributable to the geographic expansion of the city of Edmonton and increased traffic. Response personnel have also noted increasing difficulty in safely reaching the site within the required time.

13.2.2.4 Planned Construction Impact Factor

597. When EWSI performs planned upgrades or rehabilitation on the water system, certain inconveniences, such as temporary water interruptions and local traffic disruptions may be experienced by customers. EWSI attempts to minimize these interruptions by performing advance planning and customer notifications. In order to assess whether this objective is met, a Planned Service Interruption Factor was used in the 2002-2006 and 2007-2012 PBRs to determine the percentage of time that customers were provided at least 48 hours advance notice of large scale planned construction projects requiring temporary water hoses.

598. As the Planned Interruption Factor measure focused only on the interruption to customers' water service and did not address the interruption to customers' local roads and property, in the 2012-2016 PBR, EWSI modified the metric to a Planned Construction Impact Factor assessment to better address customer concerns. To measure EWSI's effectiveness at minimizing inconvenience to customers during planned construction projects, EWSI measured its performance based on the following criteria:

- Providing a minimum of five days advance notice of large-scale planned construction projects to customers who are directly impacted by the construction and require temporary water hose hook-ups. Large scale projects are defined as those where the entire length of a water main and associated appurtenances are being renewed, resulting in the shut-down of water service to multiple properties. These projects may also include disruptions to parking, traffic patterns, and limited access to service lanes. Typically, these projects are engineered and planned well before the work proceeds. Duration of these projects is generally measured in weeks.
- Ensuring the full scope of construction under EWSI control is completed within the timeframe noted on the construction letter.

599. The results of these measures are detailed in Table 13.2.2.4-1.

Table 13.2.2.4-1
Planned Service Interruption/Planned Service Impact Factor Results

	A		B	C	D	E	F	G
	PBR #1 (2002-2006)		**PBR #2 (2007-2011)**		**PBR #3 (2012-2016)**		**PBR #4 (2017-2021)**	
	Interruption Factor		**Interruption Factor**		**Construction Factor**		**Construction Factor**	
	Year	**%**	**Year**	**%**	**Year**	**%**	**Year**	**%**
1	2002	89.0%	2007	98.0%	2012	95.6%	2017	93.3%
2	2003	94.0%	2008	96.0%	2013	95.6%	2018	96.2%
3	2004	99.0%	2009	98.0%	2014	96.4%	2019	97.1%
4	2005	96.0%	2010	100.0%	2015	95.4%	2020	n/a
5	2006	94.0%	2011	98.0%	2016	97.0%	2021	n/a
6	Average	94.0%	Average	98.0%	Average	96.0%	Average	95.5%
7	Standard	95.0%	Standard	95.0%	Standard	95.0%	Standard	95.8%
8	**8 Year Average (Construction Factor Only)**							**95.8%**

600. In establishing benchmarks for this measure, it was noted that Calgary and Regina have notification procedures in place but they do not measure their actual performance against procedures. There are also similar measures used in the United Kingdom, where customers can apply for rebates from the water utility if it does not provide advance notification or fails to restore the water supply within a specified time. Unfortunately, the U.K. only measures the absolute number of rebates so the results are not directly comparable.

601. For the 2022-2026 PBR period, EWSI is proposing to establish the standard for the Planned Construction Impact Factor at the 8 year average of 95.8%. This standard remains the same as the previous term, which was based on the 4 year average of prior performance.

13.2.3 System Reliability and Optimization Index

602. The system reliability index is a measure of the confidence that customers can place in the reliability of the waterworks system. This index is comprised of four equally weighed factors:

- Water Main Break Factor (Number of main breaks);
- Water Main Duration Repair Duration Factor;
- Water Loss Factor; and
- Per Account System Energy Factor.

13.2.3.1 Water Main Break Factor

603. The water main break factor is the number of water main breaks that have occurred in the waterworks system in a year. It is a measure of system reliability as it is effectively the frequency of unplanned interruptions in the system.

604. EWSI has initiated a wide range of activities over many years to reduce the number of water main breaks including performing preventative maintenance, increasing investment in water main replacement, and focusing the investments on those water mains that are most prone to break. The impact of these measures are seen in the year over year decrease in the number of main breaks as detailed in Table 13.2.3.1-1. It must be noted that the number of water main breaks experienced in any given year is highly dependent upon changes in temperature and soil conditions, and in particular the soil moisture content. As a result, variability in the actual number of main breaks is expected and does not convey a reduction in preventative maintenance or other measures designed to reduce the number of main breaks.

Table 13.2.3.1-1
Water Main Break Factor Results

		A	B	C	D	E	F	G
	PBR #1 (2002-2006)		**PBR #2 (2007-2011)**		**PBR #3 (2012-2016)**		**PBR #4 (2017-2021)**	
	Year	**#**	**Year**	**#**	**Year**	**#**	**Year**	**%**
1	2002	711	2007	475	2012	370	2017	256
2	2003	597	2008	583	2013	278	2018	345
3	2004	436	2009	669	2014	389	2019	298
4	2005	305	2010	334	2015	277	2020	n/a
5	2006	430	2011	385	2016	242	2021	n/a
6	Average	496	Average	489	Average	311	Average	300
7	Standard	640	Standard	630	Standard	574	Standard	419
8	**10 Year Average**							**317**

605. When comparing to other jurisdictions, temperature, age of infrastructure, type of infrastructure, and soil conditions all play a role in the number of water main breaks experienced. As these factors are different in each of the jurisdictions reviewed, it is not possible to provide a comparison that is based upon the same criteria. Therefore, the historical data of EWSI's performance in this area is likely the most comparable benchmark for this measure.

606. Since the first PBR term, the main break performance standard has decreased over successive terms by an average of 12.5%. EWSI proposes to establish the 2022-2026 standard

based on the continuation of this trend. That is, the 2022-2026 standard is proposed at 365 main breaks per year or 12.5% below the 2017-2021 standard of 417. The 10 year historical average for number of water main breaks is seen as at a level that may not be sustainable over an extended period given changes in weather patterns and the potential impact of reduced capital spending in the 2022-2026 PBR term necessary to moderate rate increases. This latter factor would likely only be apparent in the final years of the PBR term.

13.2.3.2 Water Main Break Repair Duration Factor

607. The repair duration measures the speed at which EWSI repairs water main breaks when they do occur. This is determined by measuring the percentage of time that water main breaks are repaired within 24 hours from the time the flow of water is shut off (i.e., the time of customer interruption).

608. Table 13.2.3.2-1 details the historic performance for the Water Main Break Repair Duration Factor. Generally, performance has exceeded the standard established for the PBR term, although the variability on a year over year basis is noted. As can be expected, there are a considerable number of factors, such as traffic, time of year, size and complexity of the break. Most of these factors are beyond EWSI's control but can impact the time required to complete the repair. These factors are seen as accounting for this variability.

609. The City of Edmonton Transportation Operations has also indicated that water main break repair work on arterial and collector roadways may be suspended during rush hours to remove impediments to traffic. As a result, the duration factor measure excludes water main repairs on arterial and collector roadways in cases where a work suspension has been requested by the City, since the time required to complete these repairs may increase. However, EWSI does still strive to complete the water main break repairs as quickly and safely as possible.

Table 13.2.3.2-1
Water Main Break Repair Duration Results
(Breaks Repaired with 24 Hours)

		A	B	C	D	E	F	G
	PBR #1 (2002-2006)		**PBR #2 (2007-2011)**		**PBR #3 (2012-2016)**		**PBR #4 (2017-2021)**	
	Year	**%**	**Year**	**%**	**Year**	**%**	**Year**	**%**
1	2002	94.2%	2007	92.9%	2012	94.6%	2017	95.7%
2	2003	93.8%	2008	89.1%	2013	94.9%	2018	96.0%
3	2004	93.0%	2009	90.7%	2014	91.2%	2019	95.2%
4	2005	98.0%	2010	96.8%	2015	97.4%	2020	n/a
5	2006	95.3%	2011	94.1%	2016	98.3%	2021	n/a
6	Average	94.9%	Average	92.7%	Average	95.3%	Average	95.6%
7	Standard	93.0%	Standard	93.6%	Standard	93.7%	Standard	93.7%
8	**10 Year Average**							**95.4%**

610. With limited industry benchmarks available, EWSI proposes to establish the standard for the 2022-2026 PBR based on the 10-year historical average of performance. This increases the standard to 95.4% from the previous standard of 93.7% set in 2012, which was also based on a 10-year historical average.

13.2.3.3 Water Loss Factor

611. Determination of a water loss factor effectively measures how well a distribution system is managed for the control of real losses (leakage), with lower measures indicating better management as less water is lost.

612. Prior to the 2012-2016 PBR, the water loss factor was assessed on the AWWA's then recommended approach which determined the metered ratio of water volumes produced vs. water volumes billed as a performance measure. This format is simply a measure of water losses (lost revenue) based on actual meter readings, rather than a measure of the system's performance. Beginning with the 2012-2016 PBR, EWSI moved to the Infrastructure Leakage Index (ILI) approach.

613. In its 2003 Committee Report, the AWWA's Water Loss Control Committee advocated the use of the IWA/AWWA format for conducting water audits. One indicator used in the International Water Association format is the ILI which, when compared to the original AWWA method, was deemed to be a much better indicator of how well a system is being operated and maintained. The ILI is a highly effective performance indicator for benchmarking the performance of utilities in operational management of real losses.

614. The ILI is a performance indicator quantifying how well a distribution system is managed (maintained, repaired, and rehabilitated) for the control of real (leakage) losses at the current operating pressure. Mathematically, it is the ratio of current annual real losses (CARL) to unavoidable annual real losses (UARL), or ILI = CARL/UARL. A low ILI value indicates that a water utility has managed its leakage down toward the level of UARL, or the theoretical technical low limit of leakage achievable in a water system. CARL is the volume of water lost from reported leaks, unreported leaks, background losses and operator error (storage tank overflows) during the water audit reporting period.

615. UARL in water utilities cannot be totally eliminated. UARL represents the lowest loss technically achievable in a water utility based on its key characteristics. UARL calculation is based on leakage data gathered from well maintained and well managed systems. Equations for calculating UARL for individual systems were developed and tested by the IWA Water Loss Task Force and were published in 2000. The equations take into account measured frequencies, flow rates and durations of background losses, reported and unreported leaks, as well as the pressure-leakage relationship (assumed to be linear for most large systems).

616. The Alberta Provincial Government has also recommended the use of the ILI method of reporting water losses as part of its Water for Life strategy.

617. A PBR standard of 3.0 was established for 2012-2016 and then reduced to 2.0 for the 2017-2021 term. Both standards are derived from the Water Research Foundation's guidelines for setting a target ILI based on financial, operational and water resource considerations. The Water Research Foundation recommended that an ILI target should be based on the specific financial, operational and water resource considerations of a community. These considerations for choosing an ILI target are presented in Table 13.2.3.3-1. Based on Edmonton's characteristics a target range of >3.0 to 5.0 was thought to best match the recommended ILI guidelines.

Table 13.2.3.3-1
ILI Target Financial, Operational and Water Resource Considerations

	Target ILI Range	A Financial Considerations	B Operational Considerations	C Water Resource Considerations
1	1.0 – 3.0	Water resources are costly to develop or purchase; ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability.	Operating with system leakage above this level would require expansion of existing infrastructure and/or additional water resources to meet the demand.	Available resources are greatly limited and are very difficult and /or environmentally unsound to develop.
2	> 3.0 – 5.0	Water resources can be developed or purchased at reasonable expense; periodic water rate increases can be feasibility imposed and are tolerated by the customer population.	Existing water supply infrastructure capability is sufficient to meet long-term demand as long as reasonable leakage management controls are in place.	Water resources are believed to be sufficient to meet long-term needs, but demand management interventions (leak management, water conservation) are included in the long term planning.
3	> 5.0 – 8.0	Cost to purchase or obtain / treat water is low, as are rates charged to the customers.	Superior reliability, capacity and integrity of the water supply infrastructure make it relatively immune to supply shortages.	Water resources are plentiful, reliable, and easily extracted.
4	> 8.0	Although operational and financial considerations may allow a long term ILI greater than 8.0, such a level of leakage is not an effective utilization of water as a resource. Setting a target level greater than 8.0 other than as an incremental goal to a smaller long term target is discouraged.		

618. The historic results for this measure are detailed in Table 13.2.3.3-2.

Table 13.2.3.3-2
ILI Water Loss Factor Results

		A	B	C
	PBR #3 (2012-2016)		**PBR #4 (2017-2021)**	
	Year	**ILI Measure**	**Year**	**ILI Measure**
1	2012	1.46	2017	1.06
2	2013	1.29	2018	0.90
3	2014	1.27	2019	1.19
4	2015	1.46	2020	n/a
5	2016	1.18	2021	n/a
6	Average	1.33	Average	1.05
7	Standard	3.00	Standard	2.00
8	**8 Year Average**			**1.23**

619. For the 2022-2026 PBR term, EWSI proposes to set the standard of the average for the past 8 years or 1.23. It is also noted that the ILI reported in a given year is actually the result for the previous year due to data collection timelines.

13.2.3.4 System Energy Efficiency Factor

620. Treating and delivering water to customers in Edmonton consumes a large amount of energy. While the water treatment process tends to be energy intensive, the most significant amount of energy is used in the delivery processes, including pumping water from the treatment plants to the consumers. EWSI has historically implemented a number of energy efficiency initiatives which focus on improving pumping efficiency at the water treatment plants, the field reservoirs, and the booster stations. In order to align with City of Edmonton goals, EWSI introduced an energy system performance measure in the 2017-2021 PBR. This was part of an overall approach of being more aware of the impact on the environment.

621. Historically, EWSI tracks three energy indices. The Plants Energy Index tracks the efficiency of energy used in the water treatment plants. This index is the energy required in kWh to treat one million litres of water from the river and deliver the drinking water into the water distribution system. The second index, the System Energy Index tracks the aggregate energy efficiency performance of all EWSI facilities in Edmonton. This index is the energy use of all facilities in kWh divided by the total water production volume in millions of litres. The third index, the Per Account Energy index tracks the energy consumed in kWh per million litres of water

delivered to residential accounts. The number of accounts is used, rather than population, as the information is available monthly whereas accurate population data is only available with periodic censuses. Only residential accounts are included in the index as residential developments better reflect the continuous growth in the system, as opposed to industrial and commercial accounts that are more variable. The Per Account index was introduced as a PBR measure in the 2017-2021 term as it most clearly demonstrates the impact of energy efficiency initiatives while compensating for general population growth. The historic results of the Per Account Energy Index are detailed in Table 13.2.3.4-1.

Table 13.2.3.4-1
Per Account Energy Efficiency Factor
(KWh/ML/Account)

		A	B	C	D	E	F	G
							PBR #4 (2017-2021)	
	Year	**Index**	**Year**	**Index**	**Year**	**Index**	**Year**	**%**
1	2002	353	2007	337	2012	307	2017	263
2	2003	346	2008	330	2013	293	2018	257
3	2004	337	2009	311	2014	282	2019	250
4	2005	327	2010	311	2015	271	2020	n/a
5	2006	333	2011	311	2016	265	2021	n/a
6	Average	339	Average	320	Average	284	Average	257
7							Standard	309
8	**10 Year Average**							**281**

622. The steady decrease in the per account energy index reflects the decrease in the amount of water consumed per account as a result of conservation and water use efficiency measures as well as energy efficiency initiatives in more recent years. As the city of Edmonton continues to grow, however, more energy is required on a per unit volume basis to pump water to the growth areas which are typically at higher elevation at the edge of the city (note: this is not the case for infill growth). This is a major energy management challenge for EWSI and is the reason why the plant and system energy indices have increased gradually over time until about 2013. In 2013, however, plant and system efficiency indices decreased for the first time and this decrease directly reflects the impact of recent energy efficiency initiatives. When population is considered, the index has fallen consistently for the last 15 year. The decrease has been greater since the E. L. Smith water treatment plant upgrade was completed in 2008, as it allowed more production to shift from the Rossdale water treatment plant to that facility which allowed for the pumping philosophy to be modified to better take advantage of elevations in the city of Edmonton.

623. For the 2022-2026 PBR, EWSI proposed that the Per Account Energy Efficiency standard be established at 281, the 10 year average of the historic results.

13.2.4 Environment Index

624. EWSI recognizes that the environment is common to all stakeholders and requires thoughtful stewardship and accountability by all users to sustain its quality and preserve it for future generations. EPCOR conducts its electricity and water business in a responsible and open manner that is environmentally, socially, and economically sustainable. EWSI demonstrates its environmental commitment through many programs and activities in which it is involved. EWSI is a founding member of the North Saskatchewan Watershed Alliance (NSWA) Society. The purpose of the NSWA is to increase knowledge of the watershed, spread awareness of water quality issues, encourage sustainable practices, and share information. EWSI also takes part in activities ranging from implementing new technologies and programs for water conservation to sponsoring programs and events that educate the public about environmental issues.

625. For the 2022-2026 PBR, EWSI is proposing that the Environmental Index be comprised of the following three equally weighted factors:

- Water Conservation Factor;
- Environment Incident Factor; and
- Solids Residual Management Factor.

13.2.4.1 Water Conservation Factor

626. The Water Conservation Factor assesses the average monthly water consumption in cubic meters (m^3) per Edmonton residential household. Similar to other North American utilities, EWSI has experienced decreasing water consumption on both a per capita and per residential basis over many years. This can be attributed to a number of factors, including the installation of water efficient appliances and fixtures (primarily toilets and washing machines) that require no behavioural changes to reduce water consumption, smaller lot sizes in new developments and generally greater awareness of the need to conserve a limited resource. EWSI has also contributed to the decline seen in Edmonton through various water conservation programs.

627. In the 2012-2016 PBR, EWSI also introduced an inclining block rate structure for residential customers that made higher levels of consumption more expensive. The intent of this change was to move towards greater conservation by providing a dis-incentive for wasteful water

use. This structure is being maintained in the 2022-2026 term in order to continue to incent conservation. Table 13.2.4.1-1 details the Water Conservation Factor Results.

Table 13.2.4.1-1
Water Conservation Factor Results
(Average m^3 consumption per residential household)

		A	B	C	D	E	F	G
	PBR #1 (2002-2006)		**PBR #2 (2007-2011)**		**PBR #3 (2012-2016)**		**PBR #4 (2017-2021)**	
	Year	**Average**	**Year**	**Average**	**Year**	**Average**	**Year**	**%**
1	2002*	20.5	2007*	19.8	2012*	18.2	2017	16.1
2	2003*	20.3	2008*	19.6	2013*	17.8	2018	15.8
3	2004*	20.2	2009*	19.4	2014*	17.5	2019	15.3
4	2005*	20.0	2010*	19.1	2015*	17.3	2020	n/a
5	2006*	19.9	2011*	18.7	2016*	16.9	2021	n/a
6	Average	20.2	Average	19.3	Average	17.5	Average	15.7
7	Standard	20.0	Standard	20.0	Standard	19.0	Standard	17.2
8	**10 Year Average**							**17.3**

* Billed Account basis which is 0.5 higher than active account basis

628. While water consumption across North America is declining, the actual degree of decline experienced in any particular region is highly dependent upon that region's specific attributes. This includes general economic conditions, rate of renovations (and associated incentives), population age and residential household composition, weather and a multitude of other factors. Therefore, there is no representative benchmark which EWSI can provide a comparison to the trend seen in Edmonton.

629. From its inception to the end of the 2012-2016 PBR term, the water conservation factor was based on the number of billed customers, as that was the only customer count available when the metric was introduced. The billed customers count does not properly adjust for the limited number of occasions where some customers receive two bills in a monthly period, and none the next month as a result of their billing cycle, month end timing, etc. This has resulted in a water conservation factor 0.5 m^3 higher than would have been achieved if the metric was based on active accounts. Active account records effectively eliminates the issues of the billed customer counts. Commencing in 2017, the water conservation factor was determined solely on an active account basis.

630. For the 2022-2026 PBR, EWSI is proposing to establish the Water Conversation Factor standard at the 10 year historic at 16.8. This number is determined after adjusting for the billed versus active account difference (billed is 0.5 m^3 higher than active account basis) for the years

the metric was determined on a billed basis. The resulting standard of 16.9 m^3 recognizes the decreasing trend seen in consumption over the past years.

13.2.4.2 Environmental Incident Factor

631. EWSI is committed to improvement in environmental performance and to reducing the number of incidents that are reportable to the provincial or federal regulator and that were considered preventable. The Environmental Incident Factor tracks those incidents that are deemed to have been both preventable and reportable.

632. Reportable Incidents are determined as per the Guidance Document for Reportable Environment and Public Health Incidents for EPCOR Water Canada Facilities – April 6, 2015. This includes:

- Contraventions of a facility regulatory approval/permit/Code of Practice.
- Any contravention of any Federal or Provincial Act, Regulation or Municipal Bylaw or statute.
- A spill or release (including untreated or partially treated wastewater) of material to the environment that is not fully contained.
- A release of chlorinated water (potable or superchlorinated) directly into a watercourse.
- Water main breaks that cause natural area site erosion, sediment transport or habitat destruction.

633. Preventable Incidents are those incidents that involve a failure to meet performance limits, or failure to follow procedures or take reasonable measures to prevent an incident. Examples are incidents involving:

- administrative contravention (missed or failed tests, failure to report on time or meet an administrative requirement);
- failure to follow procedure;
- inadequate or no procedure;
- equipment failure (where EWSI maintains the equipment);
- lack of training/awareness; and
- lack of appropriate change management.

634. Non-Preventable incidents are those incidents where the root cause is not within EWSI's control. Examples include:

- incidents caused by extreme weather events;
- incidents cause by 3rd parties (members of the public, organizations not contracted by EWSI); and
- incidents where root cause is related to a 3rd party's infrastructure (i.e., loss of power at an industrial site).

635. A **preventable reportable** incident is one that is both reportable and preventable according to the above criteria. It is a government reportable incident that could have been prevented if reasonable diligence was exercised by EWSI. If it can be demonstrated that EWSI took all reasonable measures to prevent the incident from occurring, the incident will not be considered preventable. Mitigating circumstances and external factors (i.e., unpredictable equipment failure, unusual weather conditions, the actions of external parties that are not controllable by EWSI) will be considered in determining if the incident was preventable.

636. Given the nature and complexity of EWSI's operations, some level of reportable incidents that are determined to be preventable do occur and will likely continue to occur. EWSI is committed to reducing the frequency of these incidents in the long term. The historical results for preventable recordable environmental incidents are detailed in Table 13.2.4.2-1.

Table 13.2.4.2-1
Environmental Incident Factor Results

		A	B	C
	PBR #3 (2012-2016)		**PBR #4 (2017-2021)**	
	Year	**#**	**Year**	**%**
1	2012	5	2017	3
2	2013	4	2018	4
3	2014	5	2019	3
4	2015	10	2020	n/a
5	2016	4	2021	n/a
6	Average	6	Average	3
7	Standard	7	Standard	6
8	**8 Year Average**			**5**

637. In establishing a standard for environmental incidents, it has been determined that the number of incidents at any particular utility is highly dependent upon that utility's operational parameters and procedures, maintenance criteria and a wide variety of other factors that are not comparable to EWSI operations. Therefore, an external benchmark for this metric has not been determined. It is noted, however, that "Non-conformance, Corrective and Preventative Action"

is an element of an ISO 14001:2004 environmental management system and the inclusion on this metrics remains part of a comprehensive environmental program.

638. For the 2022-2026 PBR, EWSI is proposing to set the performance standard for Environmental Incident Report at 5 incidents per year, which is the 8 year average of historical performance. This represents an increase in performance over the previous standard and is aligned with current regulatory reporting requirements.

13.2.4.3 Solids Residuals Management Factor

639. The treatment of river water to produce clean, safe drinking water generates waste or residual streams. Some of these streams, such as the blowdown from clarifiers and filter backwash and waste water, contain a significant amount of solid material that is a mixture of the suspended solids removed from the river water along with the alum and polymer that are used in the treatment process to aid in removing those solids. These waste streams have historically been released back to the river.

640. For the past several years, EWSI has been addressing these waste streams through developing more environmentally sensitive alternatives that seek to balance the reduction of the environmental impact on the river against cost and the primary objective of meeting drinking water treatment standards and protecting public health. In 2020, a Sustainable Return-On-Investment (SROI) study was completed with multiple stakeholders, including AEP, the City of Edmonton and the NSWA. The SROI study examined options for construction of facilities at the water treatment plant that would treat the residuals on site and divert to dewatered residuals to landfill for disposal. Based on a triple bottom line assessment, EPCOR has concluded that the costs (financial, environmental and social) of on-site treatment strategies far outweigh the environmental benefits. Further, financial resources would be better invested in other strategies for reducing solids loading to the river such as implementation of green infrastructure and low impact development to reduced stormwater discharges.

641. Since 2009, the EWSI Rossdale and E. L. Smith water treatment plants have converted to the direct filtration mode of operation during the winter months to reduce the amount of residuals released to the river. The switch from conventional mode to direct filtration mode involves reducing alum dosing during treatment by up to 80%. This change results in a corresponding reduction, of up to 50% of the total mass of solids residuals produced during treatment that have to be discharged to the river.

642. While direct filtration operation has been successful in terms of maintaining excellent treated water quality and substantially reducing residuals discharged to the river, there have been some operational challenges. After 11 seasons of direct filtration operation, EWSI has learned that the key variable in determining operational success is the colour in the raw water. During the first two seasons (2009-2010, 2010-2011) the colour was relatively low and stable. However, in recent years, the colour has been higher and more variable. This has resulted in the performance measure not being met in a number of years. EWSI has determined that direct filtration can be operated successfully under the higher and more variable raw water colour conditions with appropriate alum dosing and by using all of the clarifiers at the plants for treatment. With approval from AEP, EWSI has been able to extend the direct filtration mode of operation into the fall (September to October), when the water quality in the river can be amenable to direct filtration treatment.

643. In addition to direct filtration, EWSI has been further reducing residuals production by optimizing and reducing alum and powder activated carbon treatment in conventional mode operation during other parts of the year.

644. Table 13.2.4.3-1 summarizes the actual solids discharged to the river from the two water treatment plants by application of both the direct filtration and the chemical optimization processes over the last eight years (2012-2019).

Table 13.2.4.3-1
Total Residuals Reduction Optimization Programs Results
Total Suspended Solids Discharged to the NSR - tonnes

		A	B	C	D	E
			Operating Mode			
			Direct Filtration (Jan.-Feb., Nov.-Dec.)	**Extended DF** (Mar., Sept.-Oct.)	**Chemical Optimization** (Apr.-Aug.)	**Total** (Jan.-Dec.)
1	**2012**	Baseline	1,070	898	16,600	18,600
2		Actual	489	394	15,430	16,423
3		**Total**	**55%**	**44%**	**7%**	**12%**
4	**2013**	Baseline	1,060	935	18,950	20,940
5		Actual	523	586	17,840	18,940
6		**Total**	**51%**	**37%**	**6%**	**10%**
7	**2014**	Baseline	1170	936	10,190	12,290
8		Actual	581	654	9,190	10,420
9		**Total**	**50%**	**30%**	**10%**	**15%**
10	**2015**	Baseline	825	N/A*	3,680	4,505
11		Actual	468	N/A*	3,774	4,242
12		**Total**	**43%**	**N/A***	**-2.5%**	**6%**
13	**2016**	Baseline	381	N/A*	10596	10977
14		Actual	224	N/A*	10500	10724
15		**Total**	**41%**	N/A*	**0.9%**	**2.3%**
16	**2017**	Baseline	1030	150	11337	12517
17		Actual	773	107	10857	11737
18		**Total**	**25%**	**29%**	**4.2%**	**6.2%**
19	**2018**	Baseline	1128	193	8794	10115
20		Actual	941	112	8399	9453
21		**Total**	**17%**	**42%**	**4.5%**	**6.6%**
22	**2019**	Baseline	1395	98	15150	16644
23		Actual	1180	56	14666	15902
24		**Total**	**15%**	**43%**	**3.2%**	**4.5%**

* The plants could not be operated in DF mode in March due to an early Spring Runoff, nor in September-October due to persistent high colour and pH for that time of year.

645. It is noted that in any given year, the actual solids loading to the river depends on the raw water conditions for that year and the total impact of the reductions residuals programs will, therefore, vary from year to year. To determine the benefit of the solids reduction strategy against this background variation, EWSI compares the actual solids discharged from the two treatment plants to the amount that would have been discharged using the 2005-2019

conventional treatment strategy. For example, in 2019 the actual amount of solids residual produced and discharged was 1180 tonnes during the winter (Jan-Feb, Nov-Dec) direct filtration period. If the plant had been operated in conventional mode with the same raw water conditions, 1,395 tonnes of residual solid would have been produced and discharged. Direct filtration operation, therefore, achieved a 15% reduction in solids reduced and discharged during this period. During the extended direct filtration operation period of late winter (March) and fall (Sept-Oct), 56 tonnes were discharged compared to 98 tonnes that would have been discharged by conventional operation (a 43% decrease during this period).

646. Since commencing direct filtration in 2012, over the past eight years EWSI has achieved an 8.25% reduction in solids discharged to the river. The reductions in the winter and fall seasons, when the flow and background solids loading in the river is lower, and the relative environmental impact larger, have been far more significant. During the winter season, under ice cover (Nov – Feb), reductions in loading average 35% but show considerable variation with a range of 15% to 55% achieved. The extended direct filtration season is impacted to a greater extent by poor raw water quality conditions and late summer water demand. As previously mentioned, the plants could not operate in the extended direct filtration season in 2015 or 2016. In 2017-2021 PBR term, EWSI introduced a performance metric that measures the number of total days in direct filtration mode and is proposing to continue this metric in the 2022-2026 term. By using # of days, rather than a solids reduction in tonnes or %, the influence of raw water quality is lessened, though certainly not removed. The commitment to AEP is to convert to direct filtration during the winter months (November through February), which is 120 days. Given the high variability in the historic results, EWSI is proposing to continue to use the 120 days as the standard for the 2022-2026 PBR term. This would be based on the total days in direct filtration as well as days in extended direct filtration. Each water plant has two process trains and any one of these four trains may or may not be in operation due to planned outages and may be converted to direct filtration at different times. To reconcile this for the index, the average # of days in direct filtration between the two trains at each plant will be used. If a plant or process train is not operational, it will not be counted in the index.

647. The historic number of days each plant has operated in the direct filtration mode is detailed in Table 13.2.4.3-2.

Table 13.2.4.3-2
Historic Average Number of Days in Operating Mode by Plant

		A	B	C	D	E	F	G
		Operating Mode						
		Direct Filtration (Jan.-Feb, Nov.-Dec.)		**Extended DF** (Sept.-Oct.)		**Total** (Jan.-Dec.)		
		Rossdale	**E.L. Smith**	**Rossdale**	**E.L. Smith**	**Rossdale**	**E.L. Smith**	**Average**
1	2010	120	118	5	0	125	118	**122**
2	2011	120	83	14	0	134	83	**109**
3	2012	120	120	55	49	175	169	**172**
4	2013	120	120	56	38	176	158	**167**
5	2014	120	120	55	31	175	151	**163**
6	2015	120	111	1	0	121	111	**116**
7	2016	71	62	0	3	71	65	**68**
8	2017	120	93	33	12	153	105	**129**
9	2018	57	58	43	33	100	91	**96**
10	2019	68	56	17	18	85	73	**79**
11	**Average**	104	94	28	18	132	112	122

648. As noted in the table, there is considerable variation in the total average days. While the proposed standard would have been easily met in some years, in a number of years, the 120 day standard would not have been met. This is attributable to river conditions. Despite the challenges inherent in the metric, its addition supports EWSI's commitment to reduce its impact on the river.

13.2.5 Safety Index

649. EPCOR and EWSI are committed to a safe, healthy workplace and demonstrate this through care and concern for people. Both believe that safety, quality, and productivity are mutually dependent and when diligently managed will provide challenging and satisfying work experiences in a safe and healthy environment. In order to fulfill this commitment EPCOR has established Health, Safety and Environment Policy that applies to all staff. The Policy is as follows:

Health, Safety and Environment (HSE) Policy

650. Getting home safely and protecting the environment are responsibilities we all share. There is nothing more important than the health and safety of our employees, contractors and the general public.

651. Everyone is expected to understand, promote and support the implementation of this policy. We must deliver on our commitments.

652. We Believe

- All injuries are preventable.
- Everyone has the right to work in a safe workplace.
- All employees and contractors are accountable for working safely and in an environmentally responsible manner.
- Health, safety and environmental aspects must be considered when establishing processes.
- Employee involvement, training and communication are essential to achieve health and safety excellence.

653. Our Commitments

- Sustain an effective HSE management system and promote a positive culture to prevent all injuries and work related illnesses.
- Reduce pollution and minimize harm to the environment.
- Meet or exceed all applicable legal requirements, industry standards and societal expectations.
- Set objectives and targets to continually improve HSE management and performance.
- Provide timely and effective training, resources and equipment.
- Identify hazards, evaluate risks and ensure controls are in place.
- Learn from our incidents and apply corrective actions to prevent reoccurrence.
- Involve employees to improve health and safety performance.
- Measure and share our HSE performance.

EWSI Safety Initiatives

654. In keeping with the EPCOR HSE policy, EWSI believes all incidents are preventable and that safety is a responsibility shared by everyone. In order to achieve a workplace free of occupational injury and illness, all EWSI employees and contractors have an obligation to take responsibility, intervene in unsafe or non-compliant situations, seek to identify and address safety hazards and environmental aspects before they can cause harm, and learn from the incidents that occur. EWSI's overarching goal is to focus on safety awareness and training for all employees and contractors and to achieve a zero injury workplace.

655. Some of the initiatives intended to support and achieve this goal include the following:

- continuous monitoring and analysis of safety incidents;
- root cause analysis teams for serious incidents;

- near miss reporting;
- department specific health and safety plans;
- health and safety summits and seminars;
- safety surveys with accompanying action plans;
- safety recognition programs; and
- safety culture programs.

656. For the 2022-2024 PBR term, EWSI is proposing to have common safety measures across the Water, Wastewater and Drainage business units in order to drive consistency in approach and comparability of results. EWSI is proposing that the Safety Index continues to be comprised of the following four equally weighted factors:

- Near Miss Reporting;
- Worksite Inspections/Observations;
- Lost Time Frequency (LTIF) Rate; and
- All Injury Frequency (AIF) Rate.

657. The proposed safety measures includes both leading and lagging indicators as a combination provides the broadest assessment of safety programs. Lagging indicators (LTIF and AIF) measure incidents in the form of past accident statistics and assess the overall effectiveness of safety programs. The major drawback to these indicators is that they are a poor gauge for assessing prevention programs. Leading indicators (near miss reporting and worksite inspections/observations) are measures intended to prevent future incidents. Leading indicators are focused on future safety performance and continuous improvement. These measures are proactive in nature and report what employees are doing on a regular basis to prevent injuries. Industry safety statistics indicate that increasing performance on leading indicators should have an inverse relationship to lagging indicators. That is, higher levels of injury prevention should lead to a corresponding decrease in actual incidents

13.2.5.1 Near Miss Reporting Factor

658. A **near miss** is an unplanned event, unsafe condition or unsafe action that did not result in contact, injury, illness, or damage – but had the potential to do so. The contact, injury, fatality or damage was only prevented by a fortunate break in the chain of events surrounding the event. An “Unsafe Condition” is any condition in the work place that is likely to cause injury or property damage. An “Unsafe Act” is any performance of a task or other activity that is conducted in a manner that may threaten the health and/or safety of workers.

659. The rationale for including Near Miss Reporting is that most safety activities are reactive rather than proactive. Unfortunately, many organizations wait for losses to occur before taking steps to correct the underlying problem and prevent a recurrence. Near miss events often precede actual loss producing incidents but are largely ignored because no contact, injury, damage or loss occurred. By formally identifying near misses, organizations have been able to develop mitigations and employee awareness programs that have reduced the overall safety incident rates. Near-misses are also an indicator of culture. As employees learn to look for unsafe acts/conditions and act on them, they become more aware of unsafe conditions and eventually safety becomes a way of life, on and off the job.

660. EWSI has developed a formal near miss reporting program including an automated reporting process available to all staff. Near miss reporting was first introduced in the 2017-2021 PBR term but, at that time, there was not a historic track record on which to base the standard. As a result, the annual target was based on an average of each employee reporting 1.25 near misses annually or 550 near misses reported per year. The actual performance, as outlined in Table 13.2.5.1-1 is above the level.

Table 13.2.5.1-1
Near Miss Reporting

		A
	PBR #4 (2017-2021)	
	Year	**#**
1	2017	1,119
2	2018	855
3	2019	894
4	2020	n/a
5	2021	n/a
7	Standard	550
8	**3 Year Average**	**956**

661. For the 2022-2026 PBR, EWSI is proposing to establish the near miss reporting target at 550, the same standard as per the previous PBR term While historic results are above this level, EWSI has found that the quality of the near miss reporting is more important than the number. In this respect, quality refers to the identification of issues and concerns that are actionable and lead to tangible change. Higher level targets can lead to items that are reported to meet a target rather than achieve the expected outcomes. EWSI is focused on ensuring that all near miss are aligned with the intended objectives of the metric.

13.2.5.2 Worksite Inspections and Observations Factor

662. Worksite inspections and observations are intended to prevent occupational injury, illness, environmental incident or property damage. Effective worksite inspections assist in maintaining safe working conditions and the removal of any potential hazards that arise in the workplace. EWSI's worksite inspection programme ensures that comprehensive inspections are conducted throughout the work environment including buildings, structures, grounds, excavations, tools, equipment, machinery, work methods and practices both in the field and office environments.

663. Worksite inspections and observations are conducted by specific individuals or as a group. Group participants may include: area worker, area supervisor, specialists (e.g., HSE Advisors, fire system technician, engineer, hygienist, work methods specialist, etc.), and whenever feasible, include a health and safety representative. Inspections are physically observed actions on worksites, while observations are behaviour based observations, i.e., how the work is done.

664. The following can be taken into consideration when planning to perform a workplace inspection:

- recent incidents;
- recent procedural changes;
- insurance, fire or other agency reports;
- recent workplace inspection reports (trends);
- items of concern brought up at an HSE meeting; and
- recent changes (new equipment or personal protective equipment).

665. All work site inspections are completed and then submitted to the appropriate foreman. Each foreman then submits them to the Advisor, Health and Safety in order to ensure that observations and learnings from one site can be transferred to others areas. All work site report deficiencies are reviewed at the monthly safety meeting. The observations are entered directly into the "Workplace Observation Online Tool" by the observer. Any corrective action is then documented, assigned and followed through to completion by the respective area.

666. The actual results of the Worksite Inspection and Observations metrics are detailed in Table 13.2.5.2-1.

Table 13.2.5.2-1
Worksite Inspection and Observations

		A	B	C	D	E	F	G
	PBR #1 (2002-2006)		**PBR #2 (2007-2011)**		**PBR #3 (2012-2016)**		**PBR #4 (2017-2021)**	
	Year	**#**	**Year**	**#**	**Year**	**#**	**Year**	**%**
1	2002	606	2007	1,129	2012	1,127	2017	2,036
2	2003	626	2008	847	2013	998	2018	2,720
3	2004	2,042	2009	860	2014	1,297	2019	3,217
4	2005	1,600	2010	896	2015	1,347	2020	n/a
5	2006	889	2011	895	2016	1,121	2021	n/a
6	Average	1,153	Average	925	Average	1,178	Average	2,658
7	Standard	500	Standard	800	Standard	800	Standard	1,032
8	**10 Year Average**							**1,565**

667. For the 2022-2026 PBR, EWSI is proposing to establish the Worksite Inspection and Observations standard at 1,032 or the same standard as the previous PBR term. As with near miss reporting, EWSI has found that the quality of the inspections/observations is more important than the number. In this respect, quality refers to the identification of issues and concerns that are actionable and lead to tangible change. Higher level targets can lead to items that are reported to meet a target rather than achieve the expected outcomes. EWSI is focused on ensuring that all observations and inspections reported are aligned with the intended objectives of the metric.

13.2.5.3 Lost Time Frequency Factor and Injury Frequency Rate Factor

668. Both of these measures have a standardized reporting protocol that is defined within the Canadian Electrical Association's (CEA) 1-2 Standard for Recording and Measuring Occupational Injury/Illness Experience and Transportation Incidents. Use of this protocol, while ensuring consistent reporting, also enables EWSI to compare itself against the other business units within EPCOR, and peer utilities. It is noted that the results are not always specifically comparable given the differences between water/wastewater business and electricity focused businesses. The CEA has noted that their standards are consistent with recognized external standards including:

- U.S. Occupational Safety and Health Administration (OSHA) 29 CFR Part 1904, Occupational Injury and Illness Recording and Reporting Requirements: Final Rule; and
- CSA Z795, Coding of Work Injury or Disease Information.

669. In order to clearly define lost time, EWSI has adopted the guidelines developed by the CEA criteria where incidents are separated into four categories:

- Near Miss – an undesired event that could have resulted in a work-related injury, damage, loss of production, etc. The accident did not occur.
- First Aid – simple care of an injury that was taken care of onsite without the help of a medical professional. In the case where the employee went to see a physician, treatment was something that did not require professional training.
- Medical Aid – medical treatment of an injury that could not be performed by a first-aid trained employee. Examples include stitches, casting of broken bones, ordering prescriptions. The employee is able to return to work for their next shift.
- Lost Time – employee cannot return to work due to a disability injury.

670. Each measure is also determined based on Exposure Hours which are defined as the total number of hours employees are exposed to the work site.

671. These indicators vary from year to year depending on the number and nature or occurrences/incidents. EPCOR aims to reduce these indicators by promoting safe behaviours in order to minimize the risk of occurrence of severe incidents. The specific details of each of these measures are further defined in the respective sections below.

672. The Lost Time Frequency factor is a measure of the effectiveness of EWSI's safety programs as related to disability injuries and illnesses. It measures the frequency or number of lost time injuries per hours of exposure. The historic results for the Lost Time Frequency Rate are detailed in Table 13.2.5.3-1.

Table 13.2.5.3-1
Lost Time Frequency Rate

		A	B	C	D	E	F	G
	PBR #1 (2002-2006)		**PBR #2 (2007-2011)**		**PBR #3 (2012-2016)**		**PBR #4 (2017-2021)**	
	Year	**#**	**Year**	**#**	**Year**	**#**	**Year**	**%**
1	2002	no data	2007	0.62	2012	0.96	2017	0.38
2	2003	no data	2008	0	2013	0.46	2018	0.38
3	2004	0.63	2009	0.54	2014	0.67	2019	0.00
4	2005	0.66	2010	0.51	2015	0.00	2020	n/a
5	2006	1.48	2011	0.48	2016	0.20	2021	n/a
6	Average		Average	0.43	Average	0.46	Average	0.25
7	Standard	0.51	Standard	0.59	Standard	0.59	Standard	0.57
8	**10 Year Average**							**0.40**

673. For the 2022 to 2026 PBR term, EWSI is proposing to establish the Lost Time Frequency standard at 0.40 which is the 10 year average of historic results. This level of performance equates to 2 lost time injuries 200,000 exposure hours per calendar year (based on the average exposure of the past few years).

674. The Injury Frequency Rate is a measure of the frequency of disabling injuries and medical aid injuries per unit of exposure. The measure is based on the total number of fatalities (EWSI has never had a workplace fatality) and Lost Time injuries plus the number of medical treatment injuries per total hours of exposure. The historic results for the Injury Frequency Rate are detailed in Table 13.2.5.3-2.

Table 13.2.5.3-2
Injury Frequency Rate Results

		A	B	C	D	E	F	G
	PBR #1 (2002-2006)		**PBR #2 (2007-2011)**		**PBR #3 (2012-2016)**		**PBR #4 (2017-2021)**	
	Year	**#**	**Year**	**#**	**Year**	**#**	**Year**	**%**
1	2002	n/a	2007	3.40	2012	1.68	2017	1.33
2	2003	n/a	2008	0.30	2013	0.46	2018	1.72
3	2004	1.90	2009	2.40	2014	1.57	2019	0.97
4	2005	2.64	2010	1.40	2015	1.56	2020	n/a
5	2006	2.67	2011	0.00	2016	0.65	2021	n/a
6	Average	2.40	Average	1.50	Average	1.18	Average	1.34
7	Standard	2.38	Standard	2.40	Standard	2.40	Standard	1.54
8	**10 Year Average**							**1.13**

675. For the 2022 to 2026 PBR term, EWSI is proposing to establish the Injury Frequency Rate standard at 1.00 which is below the ten year average of historic results. This level represents EPCOR's corporate commitment to health and safety for all employees as a top performing employer. This level of performance equates to less than 5 events per 200,000 exposure hours per calendar year (based on the average exposure of the past few years).

14.0 SERVICE CHARGES AND TERMS AND CONDITIONS OF WATER SERVICE

14.1 Service Charges

676. Service Charges are set out in Part III, Schedule 1 of the Bylaw. In the Bylaw, there are currently 20 different Service Charges. Through this Application, EWSI seeks approval to update the charges related to a number of the existing services in addition to adding two new Service Charges.

677. EWSI provides a number of services to rate payers where the cost of providing those services are not included in rates. Rate charges are intended to recoup costs related to the provision of services that are uniformly required by all customers. For services that are directly attributable to a single customer, Service Charges related to the provision of that service are charged to that customer in order to prevent subsidization by other customers. As such, EWSI proposes to recover the costs of providing the service from the customer using the service. This approach aligns with EWSI's cost of service methodology and practices used to calculate rates and assigns cost responsibility to the customer as end user.

678. EWSI determines Service Charges based on the average cost of providing those services with no additional markups. As part of the PBR application process, each Service Charge is reviewed and the costs related to providing the service are updated. Where costs have not increased markedly, EWSI maintains the Service Charge from the prior PBR term. Other services see an update to existing charges to better reflect EWSI's costs of providing the service. Historically, EWSI has not adjusted Service Charges annually for inflation. EWSI is proposing to introduce an annual update of Service Charges for inflation commencing in the 2022-2026 PBR term in order to ensure costs remain appropriately allocated. This inflation adjustment will be determined on the same basis as for rates.

679. The total Service Charge listing as well as proposed changes for the 2022-2026 PBR term are set out below in Table 14.1-1

Table 14.1-1
Service Charge Including Proposed Changes

	Service Charge		A Existing Service Charge Bylaw 15816, Schedule 1, Part III	B Proposed Charge	
1	Account Application Charge		$25.00		$25.00
2	Meter Installation or Removal Charges	Up to 25 mm	$200.00	Up to 25 mm	$200.00
3		40 to 75 mm meter	$300.00	40 to 50 mm meter	$300.00
4		Over 75 mm meter	Actual Cost	Over 50 mm meter	Actual Cost
5		Seasonal meters	Actual Cost	Seasonal meters	Actual Cost
6	Meter Test Charges	Up to 25 mm	$160.00	Up to 25 mm	$200.00
7		40 to 75 mm meter	$225.00	40 to 50 mm meter	$275.00
8		Over 75 mm meter	Actual Cost	Over 50 mm meter	Actual Cost
9	Off-Cycle Meter Read Charge		$12.52		$12.52
10	Non-Standard Meter Read Charge		$15.20 per month		$49.03 per month
11	Non-Standard Meter Installation Charge		$200.00		$200.00
12	Damage Repair Charge		Actual Cost		Actual Cost plus $100.00
13	Tampering Charge		Cost to repair plus $250.00		Cost to repair plus $250.00
14	Thawing of Frozen Services Charge	First Visit	No Charge	First Visit	No Charge
15		Second Visit	$300 per hour	Second Visit	$300 per hour
16	Missed Appointment Charge		$35 per missed appointment		$60 per missed appointment
17	EWSI Missed Appointment Credit		$35 credit		$35 credit
18	No Access Charge		$35 per month		$40 per month
19	Customer Locate Fee		N/A*		$20.00
20	Hydrant Permit Charge		$85.00 per permit		$90.00 per permit
21			Consumption Charge $50.00/month		Consumption Charge $50.00/month
22	Construction Service Charge		$0.44 / $1000 of construction cost		$0.44 / $1000 of construction cost
23	Service Connection Fee		N/A*		Cost of service
24	Water Service Turn-on/Turn-off Charge	During Regular Hours	$110.00	During Regular Hours	$130.00
25		Outside Regular Hours	$160.00	Outside Regular Hours	$160.00
26		Required within 48 hours	$240.00	Required within 48 hours	$240.00
27	Water Service Turn-on/Turn-off Charge Non Payment	During Regular Hours	$60.00	During Regular Hours	$80.00
28		Outside Regular Hours	$80.00	Outside Regular Hours	$100.00
29		Required within 48 hours	$120.00	Required within 48 hours	$120.00

	Service Charge	A Existing Service Charge Bylaw 15816, Schedule 1, Part III		B Proposed Charge	
30	Fire Protection Services	50 mm	$2.28 per month	50 mm	$1.42 per month
31		100 mm	$11.87 per month	100 mm	$8.80 per month
32		150 mm	$25.72 per month	150 mm	$25.57 per month
33		200 mm	$47.00 per month	200 mm	$54.50 per month
34		250 mm	$74.21 per month	250 mm	$98.01 per month
35		300 mm	$117.41 per month	300 mm	$158.32 per month
36	Truck Fill Service	Account Application Fee	$35.00	Account Application Fee	$35.00
37		Consumption Charge	$4.00 per m^3	Consumption Charge:	$4.00 per m^3

*Fees not charged for these services prior to April 1, 2022.

680. Two additional Service Charges are proposed for the 2022-2026 term. The first Service Charge, referred to as a "Customer Locate Fee," is a $20.00 charge to all customers that fail to notify EWSI when they have taken possession of a site. When this occurs, EWSI is required to conduct a land title searches for the site to identify the customer to ensure that billing can commence. This charge is intended to recover the cost of obtaining a land title and the internal administrative cost associated with conducting the search. The second proposed service charge is the "Service Connection Fee" which is the fee charged to a customer for the cost of service of a new water service installation. This fee was previously charged to customers but was not listed in the Service Charges. The Service Connection Fee is calculated in accordance with the Water Services Guidelines.

14.2 Terms and Conditions of Service

681. The existing Terms and Conditions of Service (Terms & Conditions) are set out in Schedule 2 to the Bylaw. EWSI has proposed a number of changes to the Terms & Conditions that govern its relationship with its Customers. Each of the amendments to the Terms & Conditions are set out in the blacklined version of the Bylaw, included in Part II of the Rates Report. The majority of the proposed changes add clarity, improve consistency and readability. Details regarding all of the proposed amendments (except changes of a minor nature) along with a rationale for each change is set out in Appendix A. Details regarding the more substantial proposed changes are set out below.

682. EWSI proposes to include the following amended definitions in Section 1.1 of the Terms & Conditions:

> **"Non-Standard Meter"** means a water meter that does not have the capability of remotely communicating via radio frequency signals with EWSI's advanced metering network;
>
> **"Standard Meter"** means an advanced water meter that has the capability of remotely communicating via radio frequency signals with EWSI's advanced metering network;

683. The purpose of these amendments is to allow EWSI to reflect the implementation of the AMI Deployment Project, if approved.

684. EWSI proposes to amend Section 2.2(c) of the Terms and Conditions to add additional guidelines developed by EWSI to the Water Services Guidelines. These additional guidelines set out procedures and requirements necessary to ensure the safe operation and protection of the Waterworks System. Specifically, the Hydrant Servicing Guidelines are required in order to set out the servicing standards for fire hydrant services provided by EWSI for public fire protection. The Water and Sewer Connections Guidelines set out the standards and requirements related to new sewer service connections and have been developed to provide assistance to building owners, developers, consultants and other contractors. The Water Utility Handbook sets out the requirements for notifying, locating and working in close proximity to the existing Waterworks System in order to protect EWSI's Facilities. EWSI proposes to add the following underlined language to the Terms and Conditions:

> **Article 2.2 Water Services Guidelines**
>
> (c) The following are deemed to be Water Services Guidelines and are effective and binding upon every Customer, and may be amended or rescinded from time to time by EWSI:
>
> (i) the EWSI document entitled "EWSI Service Standards";
>
> (ii) the document entitled "Design and Construction Standards for the City of Edmonton; Volume 4 – Water" ("Design and Construction Standards");
>
> (iii) the EWSI document entitled "Cross Connection Control Policy";

(iv) the EWSI document entitled "Guidelines for Working Around Water Infrastructure";

(v) the EWSI document entitled "Hydrant Servicing Guidelines";

(vi) the EWSI document entitled "Water and Sewer Connections Guidelines"; and

(vii) the EWSI document entitled "Water Utility Handbook".

685. In limited instances, a Customer may obtain possession of a premises to which Water Services are being supplied but the Customer fails to open an Account. Article 2 of the Terms & Conditions includes a provision that requires a Customer to open an Account prior to receiving any Water Services from EWSI to pay for all Water Services provided by EWSI. Because metering of consumption is an integral part of fair and equitable billing, it is important that EWSI accurately monitors water consumed by its Customers. In an effort to encourage more strict compliance with this existing provision, EWSI proposes to include the following underlined language:

Article 3.1 Requirement for Account and Obligation to Pay

(a) Prior to receiving any Water Services from EWSI, a Customer is obligated to open an Account. Customers shall pay in full for all Water Services provided by EWSI. If a Customer fails to open an Account when they have possession of the premises to which Water Services are being supplied, EWSI may bill the Customer for the Water Services received, from their legal possession or occupancy date, whichever occurs first, and EWSI shall determine the retroactive billing by reasonably estimating the Customer's consumption.

EWSI will send a Customer a bill for Water Services provided to the Customer during the previous month, or an amount of time reasonably close to a month, calculated in accordance with Schedule 1. A Customer's obligation to pay the amount set out in the bill shall continue regardless of whether the Customer receives the bill. A late payment charge of 2.5% per month, not compounded, is applied to all charges on a Customer's Account, if a Customer does not pay a bill in full by the payment due date specified on the bill. If considered to be interest payable for credit advanced, then the late payment charge is equivalent to a maximum yearly rate of 45.6%. A dishonoured cheque charge is applied for each cheque returned for insufficient funds.

686. A tenant or lessee must be in arrears for more than 60 days before EWSI can commence collection from the Owner of the site. To minimize the loss of revenue where a tenant or lessee has not paid their Account, EWSI proposes a change to allow EWSI to commence collection from the Owner of the site upon 30 days' written notice to the Owner instead of the current 90 days' written notice. The proposed change will allow EWSI to commence collection 90 days after the site is in arrears instead of the current 150 days:

Article 3.1 Requirement for Account and Obligation to Pay

(d) EWSI may, without approval or consent of an Owner, upon not less than 30 days written notice to the Owner, open a new Account in the name of the Owner in respect of leased premises if:

(i) the tenant or lessee is more than 60 days in arrears of payment for Water Services; and

(ii) it is physically impossible or impracticable to Turn Off Water Services to the tenant or lessee without adversely affecting Water Services to one or more other Customers that occupy the same premises and/or that receive Water Services through a common Service Connection.

In such a case, the Owner shall be required to pay for Water Services from the date on which the new account is opened by EWSI in the Owner's name. The Owner shall not be required to pay EWSI for the tenant or lessee's arrears for Water Services at that location, unless a provision in an agreement otherwise specifies.

687. EWSI may issue EWSI-owned equipment to Customers with a permit to use water from a fire hydrant for use in connection with the hydrants. In order to facilitate the return of this equipment to EWSI and to offset the costs if the equipment is not returned, EWSI proposes to include the following underlined language:

3.5 Security Deposits

. . .

(b)(vii) the Customer has a permit to use water from a fire hydrant and is issued EWSI-owned equipment for use in connection with the hydrants.

. . .

(d) Unless extraordinary circumstances apply, the maximum security deposit EWSI will require from a Customer for Water Services not involving a new Service Connection is an amount equal to three times the amount EWSI estimates will be the average monthly billing to the Customer for Water Services. Notwithstanding this Section 3.5(d), if a Customer is required to post a security deposit pursuant to Section 3.5(b)(vii) above, then such amount shall be in addition to any other security deposit required under Section 3.5.

688. EWSI proposes to include the following underlined language in Section 8.1(a) to outline the circumstances in which EWSI is permitted to charge the Non-Standard Metering Reading Fee to Customers who do not respond to EWSI's communication efforts for the installation of the Standard Meter for the AMI Deployment Project:

Article 8.1: Installation of Meters:

(a) Provision and Ownership

…

Any Customer that is subject to the exceptions listed in (i) and (ii) above shall be required to pay the Non-Standard Meter Reading Fee as set out in Schedule 1. In addition, a Customer shall be required to pay the Non-Standard Meter Reading Fee as set out in Schedule 1 upon a Customer's deemed refusal of the installation of a Standard Meter. A Customer is deemed to have refused the installation of a Standard Meter if the Customer does not respond to EWSI's reasonable communication efforts, as determined by EWSI, for the installation of the Standard Meter.

689. Section 8.1(b) of the Terms and Conditions provides that the Customer shall ensure that the Meter location on or in the Customer's premises provides protection from freezing and physical damage. EPCOR requires the Customer to pay for all Water Services received in connection with a burst Meter which results from inadequate Customer protection. To provide clarity on the Customer's responsibility for these Water Services, EWSI proposes to include the following underlined language:

Article 8.1 Installation of Meters

(b) Responsibility of Customer

Each Customer shall ensure that a location on or in the Customer's premises for Meter installation is provided, complete with an EWSI approved meter setting, as prescribed by Design and Construction Standards, and that safe and easy access to the Meter is provided for the purpose of reading or servicing the Meter, in accordance with all applicable requirements of the Water Services Guidelines as amended from time to time. The Meter location shall provide protection from freezing and physical damage. The Customer shall be liable for all Water Services received in connection with a burst Customer Meter resulting from inadequate protection.