

**2017
PBR Progress
Report**



**2017 – 2021 Performance Based Regulation
Water and Wastewater Treatment Services**

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1 Executive Summary

This report provides an annual update to the City of Edmonton on the operational and financial results for the year ended December 31, 2017 for water services (“In-City Water”) and wastewater treatment services (“Wastewater”) provided within Edmonton by EPCOR Water Services Inc. (“EWSI”). These services are regulated by the City of Edmonton City Council in accordance with the Performance Based Regulation (“PBR”) Plan approved in the EPCOR Water Services and Wastewater Treatment Bylaw No. 17698 (the “Bylaw”).

1.1 Financial Performance

In-City Water and Wastewater’s net income and return on equity for 2017 are summarized on Tables 1.1-1 and 1.1-2 below¹:

Table 1.1-1
Net Income Return on Equity
(\$ millions)

		A	B
		2017	
In-City Water		PBR Forecast	Actual
1	Revenue	190.1	187.4
2	Operating expenses	(100.7)	(98.8)
3	Depreciation and amortization	(25.6)	(25.9)
4	Interest	(26.6)	(27.0)
5	Net Income	37.1	35.7
6	Mid-year equity portion of rate base	365.1	364.1
7	Return on Equity	10.175%	9.80%

In 2017, In-City Water realized a 9.80% rate of return on equity, slightly less than its forecast return of 10.175%, as revenues were impacted by lower than forecast consumption and lower than forecast inflation adjustments to rates.

¹ Consistent with the 2017-2021 PBR Application, all financial data in this report, including totals and sub-totals, are rounded to the nearest \$0.1 million. This practice ensures continuity of data between tables and between years. However, the sum of the rounded detailed data in certain tables may not be equal to the related rounded total or sub-total.

Table 1.1-2
Net Income and Return on Equity - Wastewater
(\$ millions)

		A	B
		2017	
Wastewater		PBR Forecast	Actual
1	Revenue	94.0	90.8
2	Operating expenses	(54.0)	(47.1)
3	Depreciation and amortization	(13.9)	(14.4)
4	Interest	(10.0)	(10.2)
5	Net Income	16.1	19.1
6	Mid-year equity portion of rate base	158.0	151.9
7	Return on Equity	10.175%	12.60%

Wastewater's revenues were also affected by lower than forecast inflation adjustments and lower than forecast consumption, but lower than forecast operating expenses and a lower than forecast mid-year equity portion of rate base resulted in a return on equity of 12.60%.

The factors affecting In-City Water and Wastewater's 2017 financial performance and financial results are explained in detail in sections 2.3 and 3.3, respectively.

1.2 Capital Expenditures

In-City Water and Wastewater's capital expenditures for 2017 and for the five year term of the PBR Plan (the "2017-2021 PBR term") are summarized in Table 1.2 below:

Table 1.2
Capital Expenditures
(\$ millions)

		A	B	C	D
		2017		2017-2021	
		PBR Forecast	Actual	PBR Forecast	Current Projection
1	In-City Water	108.1	98.1	475.8	563.5
2	Wastewater	54.5	46.8	235.4	238.7

In-City Water's capital expenditures were \$10.0 million less than forecast for 2017. Much of this difference relates to EWSI's decision to defer the planned \$16.0 million expansion of the Water Distribution and Transmission facility until the completion of an EPCOR-wide real estate review.

EWSI currently forecasts that In-City Water's total capital expenditures over the 2017-2021 PBR term will exceed the PBR forecast by \$87.8 million. The increase in capital expenditures, beyond what was in the PBR forecast, consists of: \$14.7 million for water main relocations to accommodate LRT expansion; \$29.9 million to meet customer and developer requirements for

growth, most of which results from changes to the Private Development Transmission Mains program (additional costs of \$13.5 million) and the Water Main Cost Sharing Program (additional costs of \$7.7 million); and \$10.7 million to address unanticipated needs for reliability and life cycle replacements. Besides these projects and programs, the increase in capital expenditures also includes a significant new project, the \$32.4 million E.L. Smith Solar Farm, designed to replace approximately 10% of conventional power with locally produced renewable power. This project is currently funded through rates and does not increase In-City Water's revenue requirements over the 2017-2021 PBR term.

Wastewater's lower (\$7.7 million) capital expenditures in 2017 are not attributable to any single project, but reflect changes to project timing and changes in project scope needed to address revised asset condition assessments identified during preliminary engineering, as well as external factors including a longer than anticipated rezoning timeframe for the Mid-Point Operations Centre, a key component of Wastewater's 2017-2021 capital program.

Wastewater's total capital expenditures over the 2017-2021 PBR term are projected to be slightly higher than the PBR forecast (\$3.3 million). Although the net change amounts to only 1.4% of Wastewater's capital program, this increase includes additional expenditures of \$22.3 million to upgrade and replace sludge lines, \$6.5 million to replace clarifier chains and \$7.5 million to rehabilitate the concrete within the Diversion Structure. The additional costs of these projects are offset by cost reductions resulting from changes in the scope of projects, such as the Square 1 Gas Room Expansion (\$9.0 million) and the Building and Site Rehab program (\$7.3 million) and the Structural Rehab Programs (\$5.5 million), which were identified during review of design options and value engineering. In addition, the Digester 4 Upgrade project has been deferred providing further reductions of \$10.9 million. The remainder of the change in Wastewater's capital program results from reprioritization of reliability and life cycle replacements.

Detailed analysis of actual to forecast differences in capital expenditures for 2017, as well as approved to forecast differences for the 2017-2021 PBR term are provided in section 2.4 for In-City Water and in section 3.4 for Wastewater.

1.3 Operational Performance

In-City Water's operational performance is measured by the results of five indices prescribed in Schedule 3 of Bylaw 17698 with each index consisting of one or more performance measures. Performance under each index is measured independently on a point basis with 100 base points available if the standards for all five performance measure indices are achieved. Bonus points are available for performance above standards and financial penalties are applied if EWSI does not meet the 100 base point standard.

In 2017, In-City Water exceeded the performance standards for all five performance measure indices. Section 2.5 provides detailed discussions of the performance measures making up each of the indices and highlights of Wastewater's operational performance.

Table 1.3-1
2017 Performance Measures
Water System Service Quality

		A	B
Performance Measure Index - In-City Water		Index Standard Points	Total Points Earned
1	Water Quality Index	25.0	25.0
2	Customer Service Index	20.0	21.1
3	System Reliability and Optimization Index	25.0	28.5
4	Environmental Index	15.0	16.5
5	Safety Index	15.0	16.5
6	Aggregate Points Earned	100.0	107.6

Wastewater's operational performance is measured on a similar basis to Water's, but with four indices tailored to Wastewater's operations. As with Water, performance under each index is measured independently on a point basis with 100 base points available if the standards for all five performance measure indices are achieved. Bonus points are available for performance above standards and financial penalties are applied if EWSI does not meet the 100 base point standard.

In 2017, Wastewater exceeded the performance standards for all four performance measure indices. Section 3.5 provides detailed discussions of the performance measures making up each of the indices and highlights of Wastewater's operational performance.

Table 1.3-2
2017 Performance Measures
Wastewater Treatment Services Quality

		A	B
Performance Measure Index - Wastewater		Index Standard Points	Total Points Earned
1	Water Quality and Environmental Index	55.0	60.5
2	Customer Service Index	15.0	16.5
3	System Reliability and Optimization Index	15.0	16.5
4	Safety Index	15.0	16.5
5	Aggregate Points Earned	100.0	110.0

1.4 Rates and Bill Comparisons

In 2017, EWSI's average residential customer's water bill, based on monthly consumption of 14.6 m³, was **\$36.40**, an increase of 1.6% from 2016. This increase consists of the 0.8% inflation

adjustment discussed in Section 2.3.1 and the special rate adjustments approved in Bylaw 17698 for Environmental Initiatives (0.4%), Accelerated Programs (0.6%) and Rebasing (-0.2%).

The average residential customer's wastewater bill in 2017, again based on monthly consumption of 14.6 m³, was **\$16.54**, an increase of 5.0% from 2016. This increase includes the 0.8% inflation adjustment and special rate adjustments for rebasing of 4.2% needed to support Wastewater's 2017-2021 capital programs.

EWSI undertakes annual bill comparison surveys with various cities and local communities to ensure that the City's water and wastewater treatment rates are reasonable and competitive. Section 2.6 shows that EWSI's residential water rates are lower than most of the cities and communities included in the comparison, with only Vancouver having lower water rates.

Wastewater bills are more difficult to compare because of variations in the nature and extent of wastewater treatment, the inclusion of certain services in property taxes, and geographic and climatic factors which influence the level of investment in and approach to flood mitigation. Section 3.6 shows that Edmonton's combined drainage and wastewater treatment rates are competitive with those of other cities and communities with similar geographic and climatic conditions. Commercial bill comparisons for both water and wastewater show similar results to residential water and wastewater bills.

1.5 Non-Routine Adjustments

Non-routine adjustments are defined in Bylaw 17698 as "items which are unusual, significant in size or nature, and beyond the scope of control of EWSI". Bylaw 17698 allows EWSI to request adjustments to In-City Water and Wastewater's rates for non-routine adjustments from the City. These requests are provided to either the City Manager or City Council, depending on the impact of the non-routine adjustment on In-City Water and Wastewater's revenue requirements.

Although EWSI did not identify any non-routine adjustments that met the criteria outlined in Bylaw 17698, Schedule 3, Section 5.0 during review of its 2017 operations, EWSI committed to flow the benefits of any reductions in corporate shared service cost allocations resulting from the transfer of Drainage Services assets to EPCOR to In-City Water and Wastewater customers through a negative non-routine adjustment. EWSI calculated that, over the 2017-2021 PBR term, these reductions would amount to \$11.4 million in savings for In-City Water customers and \$4.2 million in savings for Wastewater customers. These savings were included in EWSI's request to the City Manager for non-routine adjustments to 2018 water rates.

The City Manager approved EWSI's request on March 13, 2018. The resulting non-routine adjustments have been applied to fixed monthly service charges commencing April 1 2018. The savings to In-City Water customers amount to \$0.71 per 15mm (5/8") equivalent meter per month, providing savings of \$8.56 for the average residential customer for the period from April

1, 2018 to March 31, 2019, and total savings of \$35.28 over the 2017-2021 PBR term. For Wastewater customers, monthly savings amount to \$0.31 per customer connection per month, providing savings of \$3.72 per customer for the period from April 1, 2018 to March 31, 2019, and total savings of \$15.34 over the 2017-2021 PBR term.

2 In-City Water

2.1 Accomplishments and Challenges

In 2017, In-City Water realized a 9.80% return on equity, slightly less than the PBR target of 10.175%, with decreases in In-City revenues largely offset by decreases in operating expenses. Lower than forecast revenues are attributable to lower than forecast consumption in the commercial and multi-residential customer classes, which accounted for \$1.6 million of the \$3.6 million difference and a lower than forecast inflation adjustment to water rates, which accounted for the remaining \$2.0 million. The PBR inflation adjustment (see Table 2.3.1-2) consists of two components: (1) forecast inflation for 2017; and (2) the difference between forecast and actual inflation for 2016. Although forecast inflation for 2017 was 0.24% less than the PBR forecast, actual inflation for 2016 was 0.92% less than forecast, resulting in an inflation adjustment to 2017 rates of 0.84%, instead of the 2.02% PBR forecast adjustment.

Lower than forecast Corporate Shared Services costs accounted for \$2.1 million of the \$2.8 million difference between forecast and actual operating expenses. The remainder of the difference consists of lower power costs, reflecting both lower than forecast power consumption and lower than forecast wire charges, as well as lower than forecast staff costs and employee benefits resulting from reductions in fringe benefit rates and a one-time refund of long-term disability premiums. These lower than forecast costs were partially offset by higher than forecast chemical costs resulting from an early thaw which necessitated an early conversion from direct filtration to conventional water treatment, requiring much higher than forecast chemical use in the first half of the year.

In-City Water is undertaking an ambitious capital program over the 2017-2021 PBR term to replace existing assets, to lay the foundation for future growth, to meet environmental and health and safety goals, and to achieve improvements in performance and efficiency. EWSI's current projection is that capital expenditures over the 2017-2021 PBR term will exceed the PBR forecast by \$87.8 million. This increase includes the \$32.4 million E.L. Smith Solar Farm, designed to replace approximately 10% of conventional power with locally produced renewable power, \$29.9 million to meet customer and developer requirements for growth, \$14.7 million for water main relocations to accommodate LRT expansion, and \$10.7 million to address unanticipated needs for reliability and life cycle replacements. These changes and their impacts on In-City Water's capital program are discussed in detail in Section 2.4.

In-City Water's financial performance, capital expenditures programs, and operational performance are discussed in detail in sections 2.2 to 2.5, with comparisons of In-City Water's average bills for residential and commercial customers to water bills in other western Canadian cities and local communities provided in section 2.6.

2.2 Customers and Consumption

In-City Water provides services to three customer classes: Residential; Multi-Residential; and Commercial. These classes are unchanged from the previous PBR term and are described in greater detail in Appendix A. Customer counts, total annual consumption and monthly consumption per customer are shown in Table 2.2 below:

Table 2.2
Customers, Consumption and Consumption per Customer

Customers and Consumption		A	B
		2017	
		PBR Forecast	Actual
1	Annual Consumption (ML)		
2	Residential	45,057.0	45,477.9
3	Multi-Residential	18,370.0	17,828.8
4	Commercial	28,539.0	27,536.6
5	Total	91,966.1	90,843.2
6	Customers (Average Active Services per Month)		
7	Residential	256,306	259,335
8	Multi-Residential	3,746	3,752
9	Commercial	19,257	19,438
10	Total	279,310	282,524
11	Monthly Consumption per Customer* (m ³ per month)		
12	Residential	14.6	14.6
13	Multi-Residential	408.6	396.0
14	Commercial	123.5	118.1

*Monthly Consumption per Customer = (Annual Consumption x 1000) / (Customers x 12)

Although In-City Water's customer counts were 1.2% greater than forecast, total consumption was 1.2% less than forecast. The factors contributing to these results differ by customer class, as explained below:

- Residential.** Higher than forecast customer counts in 2017 reflect greater than expected resilience of residential markets. In 2016, when the PBR forecast was prepared, EWSI assumed that economic conditions would limit annual residential customer growth to 1.9% for the 2016 to 2021 period. Actual residential growth in 2016 remained strong at 2.8%, before declining to 2.1% in 2017. Since actual consumption per customer in 2016 was within 0.1 m³ of forecast, the increase in residential customers resulted in a 0.9% increase in total residential consumption volumes.
- Multi-Residential.** Although customer counts were within 0.1% of forecast, lower than forecast consumption per customer meant that total consumption was 2.9% less than forecast. The actual to forecast difference in consumption per customer in 2017, while appearing high in absolute terms, is well within the limits of historical variation in

consumption per customer, reflecting factors including weather conditions, vacancy rates, renovation of older buildings, and the number of units in new multi-residential buildings.

- **Commercial.** Consumption in the commercial customer class was 3.5% less than forecast, despite a 0.9% increase in customer counts. These results reflect the lack of homogeneity of commercial customers. This class includes a large number of customers, such as offices and retail stores, that consume very little water and a small number of customers, including businesses in the food and beverage processing industry, large shopping malls and hospitals, with very high levels of consumption. For example, in 2017, 290 (1.3%) of commercial customers accounted for 50% of commercial consumption. Therefore, increases in customer counts, which tend to be low water-consuming small businesses, will not necessarily result in a proportional increase in consumption for the commercial class. These conditions result in considerable year-over-year variation in consumption per customer.

EWSI notes that there were no comparable differences between actual and forecast consumption per customer in the Residential customer class. In response to higher than forecast declines in per customer consumption over the past two PBR terms, EWSI developed a new consumption forecasting model for the 2017-2021 PBR term incorporating time series analysis and weather normalization to better capture long-term trends in residential water consumption. While one year does not make a trend, the results of the residential forecasting model appear promising. Accordingly, EWSI is currently considering how to similarly enhance its forecast methodology for the Multi-Residential and Commercial customer classes.

2.3 Financial Performance

In-City Water's net income is derived from the provision of water services within Edmonton's boundaries. Besides these services, EWSI provides water services to surrounding communities under bulk water supply agreements with regional water service commissions ("Regional Customers"), and fire protection services to the City of Edmonton under a service agreement ("Fire protection").

EWSI's water system is fully integrated, with services jointly provided to In-City Water, Regional Customers and Fire Protection. Therefore, operating costs, depreciation, rate base and capital expenditures are presented and analyzed on a total system basis. In-City Water's share of these expenses, as well as its returns on rate base, are calculated in accordance with a cost of service model developed jointly by EWSI, the regional water service commissions and the City of Edmonton, and are shown as separate line items on each applicable table.

2.3.1 Revenue

In-City Water's rate revenues include fixed monthly services charges which vary by meter size and consumption charges applied to each cubic meter of water consumed. Besides rate

revenue, In-City Water revenues also include other revenue derived from temporary services, connection fees, water permits, late payment charges and other incidental services. Table 2.3.1-1 below provides a comparison of 2017 In-City Water revenues to the PBR forecast:

**Table 2.3.1-1
In-City Water Revenue
(\$ millions)**

		A	B
In-City Water Revenue		2017	
		PBR Forecast	Actual
1	Fixed Monthly Service Charges		
2	Residential	22.3	22.1
3	Multi-Residential	1.3	1.3
4	Commercial	3.9	4.0
5	Total Fixed Monthly Service Charge Revenue	27.5	27.3
6	Consumption Charges		
7	Residential	93.4	92.0
8	Multi-Residential	28.8	27.8
9	Commercial	35.5	34.5
10	Total Consumption Charge Revenue	157.8	154.3
11	In-City Water Rate Revenue	185.3	181.7
12	Other Revenue	5.0	5.7
13	Total In-City Water Revenue	190.2	187.4

The difference between 2017 actual and forecast rate revenue is attributable to two key factors. First, lower than forecast consumption, partially offset by higher than forecast customer counts, as explained in Section 2.2, accounted for \$1.6 million of the \$3.6 million difference between actual and forecast rate revenues. The remainder of the difference in revenue is attributable to the lower than forecast annual inflation adjustment to water rates. This adjustment, shown in Table 2.3.1-2, was 0.84%, compared to the PBR forecast rate of 2.02%. This difference is primarily attributable to the 0.92% difference between forecast and actual inflation for 2016, as the Alberta economy grew at a slower than expected rate in 2016.

**Table 2.3.1-2
2017 PBR Inflation Adjustment**

		A	B
PBR Inflation Adjustment to 2017 In-City Water and Wastewater Rates		2017	
		PBR Forecast	Actual
1	2017 Forecast Inflation		
2	CPI	2.20%	2.20%
3	Labour	2.40%	1.70%
4	Weighted Inflation (65% CPI, 35% Labour)	2.27%	2.03%
5	Less: Efficiency Factor	-0.25%	-0.25%
6	2017 Year Forecast Inflation	2.02%	1.78%
7	2016 Actual to Forecast Inflation Adjustment	-	-0.92%
8	PBR Inflation Adjustment (line 6 x line 7)	2.02%	0.84%

Besides rate revenues, In-City Water earned \$5.7 million in other revenue in 2017. The forecast to actual difference in 2017 results from a one-time charge of \$0.4 million to EPCOR Distribution and Transmission Inc. (“EDTI”) for meter reading services as part of the transfer of EPCOR’s meter reading function from EDTI to EWSI, and fees of \$0.3 million charged to private developers for water main flushing for new developments.

2.3.2 Operating Expenses by Function

Table 2.3.2 below provides a comparison of EWSI’s total water system operating expenses for 2017 to the PBR forecast.

Table 2.3.2
Operating Expenses by Function
(\$ millions)

		A	B
Function and Sub-function		2017	
		PBR Forecast	Actual
1	Power, Other Utilities and Chemicals		
2	Power	11.4	10.9
3	Natural Gas	0.6	0.6
4	Power and Other Utilities	12.0	11.6
5	Chemicals	7.2	8.4
6	Power, Other Utilities and Chemicals	19.2	20.0
7	Water Operations		
8	Water Treatment Plants	18.8	17.4
9	Water Distribution and Transmission	24.6	25.7
10	Operational Support Services	7.3	6.8
11	Quality Assurance and Environment	5.4	5.4
12	Capitalized Overhead Costs	(7.1)	(7.1)
13	Water Operations Expenses	49.0	48.3
14	Billing, Meters and Customer Service		
15	Billing and Collections	7.8	7.8
16	Meter Reading, Repairs and Maintenance	3.1	2.7
17	Customer Service	0.8	0.6
18	Billing, Meters and Customer Service Expenses	11.7	11.2
19	EWSI Shared Services		
20	EWSI Shared Services	9.8	10.0
21	Incentive and Other Compensation	3.1	2.8
22	EWSI Shared Services Expenses	12.9	12.8
23			
24	Corporate Shared Services	15.0	12.9
25			
26	Franchise Fees and Property Taxes		
27	Franchise Fees	14.5	14.3
28	Property Taxes	0.4	0.2
29	Franchise Fees and Property Taxes	15.0	14.6
30	Total Operating Expenses by Function	122.6	119.8
31	In-City Water Share - %	82.1%	82.4%
32	In-City Water Share - \$	100.7	98.8

Overall, total operating expenses for 2017 were \$2.8 million lower than the PBR forecast. Key factors contributing to this difference include:

- **Power and Other Utilities** (\$0.5 million less than forecast). Over 90% of EWSI power costs relate to the costs of pumping water from the North Saskatchewan River to its water treatment plants and from the plants through the distribution network to its customers. In 2017, the favourable variance in power costs is attributable to lower than forecast wire charges and lower than forecast power requirements.
- **Chemicals** (\$1.2 million greater than forecast). EWSI incurs a large portion of its chemical costs to mitigate turbidity, odour and colour during spring run-off. An unusual thaw in February 2017 resulted in EWSI experiencing two spring run-off events in 2017, requiring EWSI to stop direct filtration in February, rather than in March or April, and extending the use of chemicals (carbon, alum and caustic soda) in the water treatment process. After the second spring run-off event, EWSI maintained chemical usage at more normal levels and, in the fall, was able to reduce chemical usage through early conversion to direct filtration.
- **Water Treatment Plants** (\$1.4 million less than forecast). This function includes the operation, maintenance and repair of reservoirs and water treatment plants. Lower than forecast costs in 2017 are attributable to several factors, including: a higher than forecast proportion of internal labour on capital projects, which increased capital recoveries (\$0.5 million); reductions in fringe benefit costs, primarily associated with lower pension contribution rates, which provided additional savings in salary costs (\$0.3 million); and capitalization of filter media costs, which had previously been considered an operating expense (\$0.2 million). The remainder of the forecast to actual difference is made up of numerous small items, none of which exceed \$0.1 million.
- **Water Distribution and Transmission** (\$1.1 million greater than forecast). This function includes operations, repairs, maintenance and management of the distribution network. Although Water Distribution and Transmission also benefitted from the reduction in fringe benefit rates, the freeze thaw cycles in the spring of 2017 led to a high volume of emergency repairs, contributing to increased overtime costs of \$0.4 million and higher levels of contractor costs of \$0.7 million.
- **Operational Support Services** (\$0.4 million less than forecast). The variance in this function, which includes Project and Asset Management, Supply Chain Management, and Water Operations Management, reflects lower Staff Costs and Employee Benefit expenses, resulting from lower fringe benefit costs and delays in filling unanticipated staff vacancies in Project and Asset Management.
- **Meter Reading, Repairs and Maintenance** (\$0.4 million less than forecast). Staff Costs and Employee Benefit expenses, related to the decrease in fringe benefit rates, were \$0.3 million lower than forecast for this function. The remainder of the forecast to actual difference is made up of numerous small items, none of which exceed \$0.1 million.

- **Corporate Shared Services (\$2.1 million less than forecast).** This difference is attributable to several factors, including: reductions in corporate cost allocations of \$1.0 million resulting from the transfer of Drainage Services from the City of Edmonton to EPCOR Utilities Inc.; lower than forecast allocation factors; and decreases in corporate rent, higher staff vacancies and lower incentive costs. As noted in Section 1.5, the reductions to corporate shared services costs arising from the transfer of Drainage Services will be returned to In-City water customers through a non-routine adjustment to 2018 water rates.
- **Franchise Fees and Property Taxes (\$0.4 Million less than forecast).** EWSI pays a franchise fee to the City of Edmonton of 8% of its rate revenues. Therefore, lower than forecast result resulted in a \$0.2 million reduction in franchise fees. Lower than forecast property taxes relate to the deferral of the Distribution and Transmission facility which had been expected to increase Water Services' property taxes by \$0.2 million annually commencing in 2017.

Variances in other operating expense functions and sub-functions are not significant, either individually or in aggregate.

In 2017, In-City Water's share of operating expenses was \$98.8 million, compared to \$100.7 million in the PBR forecast. This result reflects both lower total operating expenses for Edmonton Water Services, as explained above, partially offset by In-City Water's 0.2% higher share of operating expenses determined through the cost of service model.

2.3.3 Operating Expenses by Cost Category

Table 2.3.3 below shows operating expenses by cost category for Water Operations, Billing Meters and Customer Service, and EWSI Shared Services, where cost categories differ from the sub-functions in Section 2.3.2.

Table 2.3.3
Operating Expenses by Cost Category
(\$ millions)

Cost Category		A	B
		2017	
		PBR Forecast	Actual
1	Water Operations		
2	Staff Costs and Employee Benefits	33.5	32.1
3	Contractors and Consultants	6.7	7.1
4	Vehicles	1.5	1.4
5	Materials and Supplies	3.0	3.3
6	Other	4.3	4.5
7	Water Operations Expenses	49.0	48.3
8	Billing, Meters and Customer Service		
9	CUS Charges	7.8	7.8
10	Staff Costs and Employee Benefits	6.6	6.3
11	Contractors and Consultants	0.5	0.4
12	Vehicles	0.3	0.3
13	Other	0.5	0.3
14	Meter Reading Services (Recoveries)	(4.1)	(3.9)
15	Billing, Meters and Customer Service Expenses	11.7	11.2
16	EWSI Shared Services		
17	EWSI Shared Services Allocation	9.8	9.6
18	Staff Costs and Employee Benefits	3.2	3.4
19	Contractors and Consultants	0.2	0.1
20	Other	(0.3)	(0.2)
21	EWSI Shared Services Expenses	12.9	12.8

The information presented in this table supports the explanations of differences between 2017 actual and forecast expenses provided in Section 2.3.2. Accordingly, no additional explanations are considered necessary.

2.3.4 Depreciation and Amortization

EWSI total system depreciation expense and amortization of contributed assets for 2017 are shown in Table 2.3.4 below:

Table 2.3.4
Depreciation and Amortization
(\$ millions)

		A	B
Depreciation and Amortization		2017	
		PBR Forecast	Actual
1	Provision for depreciation	42.2	43.1
4	Gains (losses) on disposal of property, plant and equipment	-	(0.1)
3	Depreciation expense	42.2	42.9
2	Amortization of contributions	(9.7)	(10.3)
5	Depreciation and Amortization	32.5	32.6
6	In-City Water Share - %	78.9%	79.1%
7	In-City Water Share - \$	25.6	25.9

Depreciation expense and amortization of contributions are both higher than forecast reflecting higher than forecast levels of developer-funded assets, explained in section 2.3.5 below. These impacts are offsetting, so actual depreciation expense, net of amortization, is within \$0.1 million of forecast.

In-City Water's share of 2017 depreciation expense is 0.2% higher than forecast. The proportion of depreciation and amortization expense allocated to In-City Water through the cost of service model varies in proportion to demands on the total water system. The 0.2% difference in 2017 is consistent with actual to forecast differences in the base and max day peaking factors used to allocate depreciation expense in functional cost categories to In-City customer classes versus that charged to the RWCG.

2.3.5 Rate Base

In 2017, EWSI's total water system rate base, shown in Table 2.3.5 below, was \$1.2 million less than forecast, with the higher than forecast gross rate base offset by higher than forecast contributions.

Table 2.3.5
Mid-Year Rate Base
(\$ millions)

		A	B
Components of Mid-Year Rate Base		2017	
		PBR Forecast	Actual
1	Plant in Service		
2	Balance, beginning of year	2,148.1	2,192.3
3	Additions - EPCOR-funded	103.6	90.3
4	Additions - Developer-funded	6.0	22.7
5	Retirements and adjustments	-	(5.5)
6	Balance, end of year	2,257.4	2,299.8
7	Mid-Year Plant in service (= (line 1 + line 6)/2)	2,202.7	2,246.1
8	Accumulated Depreciation		
9	Balance, beginning of year	518.7	525.0
10	Depreciation expense	42.2	43.1
11	Retirements and adjustments	-	(5.4)
12	Balance, end of year	560.9	562.7
13	Mid-Year Accumulated Depreciation(= (line 8 + line 12)/2)	539.8	543.8
14	Other Rate Base Items		
15	Working Capital	20.5	20.2
16	Materials and Supplies	2.9	3.3
17	Gross Mid-Year Rate Base (= line 7 + line 13 + line 15 + line 16)	1,686.3	1,725.8
19	Contributions		
20	Balance, beginning of year	674.6	707.6
21	Contributions in aid of construction	6.0	22.7
23	Balance, end of year	680.6	730.2
24	Mid-Year Contributions (= (line 20 + line 23)/2)	677.6	718.9
25	Accumulated Amortization		
26	Balance, beginning of year	148.6	148.9
27	Amortization of contributions	9.7	10.3
28	Balance, end of year	158.3	159.2
29	Mid-Year Accumulated Amortization (= (line 26 + line 28)/2)	153.5	154.0
30	Mid-Year Contributions (= line 24 + line 29)	524.1	564.9
31	Net Mid-Year Rate Base (= line 17 + line 30)	1,162.1	1,160.9

The gross rate base reflects higher than forecast levels of developer-funded assets, both in 2016, which increased the opening balance of plant in service, as well as in 2017, offsetting lower than forecast EPCOR-funded capital additions, as discussed in Section 2.4.

Developers are responsible for construction of distribution infrastructure in new subdivisions. When these assets are placed into service, ownership of the assets is transferred to EWSI, where the assets, together with offsetting contributions in aid of construction, are added to the rate base. Therefore, in 2017, since higher than forecast developer-funded asset additions were fully offset by a corresponding increase in contributions, the net rate base remained within 0.1% of the PBR forecast.

2.3.6 Return on Rate Base

In-City Water's returns on rate base are based on its share of the total water system rate base, its deemed capital structure and its costs of debt and equity. Returns on rate base are summarized on Table 2.3.6-1 below:

Table 2.3.6-1
Return on In-City Water Share of Mid-Year Rate Base
(\$ millions)

		A	B
Return on Rate Base		2017	
		PBR Forecast	Actual
1	Net Mid-Year Rate Base	1,162.1	1,160.9
2	In-City Water Share - %	78.5%	78.4%
3	In-City Water Share - \$	912.6	910.3
4	Deemed Capital Structure		
5	Debt	60.00%	60.00%
6	Equity	40.00%	40.00%
7	Total	100.00%	100.00%
8	Cost Rates		
9	Debt	4.87%	4.95%
10	Equity	10.18%	9.80%
11	Weighted Average Cost of Capital (WACC)	6.99%	6.89%
12	Return on Rate Base		
13	Debt	26.6	27.0
14	Equity	37.1	35.7
15	Total Return on In-City Water Rate Base	63.8	62.7

In-City Water's share of the total system net mid-year rate base is 0.1% less than forecast, which is consistent with the change in In-City Water's demands on water system relative to that of Regional Customers. When combined with a total system rate base that was also very close to forecast, the In-City Water net mid-year rate base is within 0.1% of the amount forecast.

Returns on rate base are calculated separately for the debt-financed and equity-financed portions of In-City Water's net rate base. The rate of return on debt is equal to the embedded cost of debt for EWSI's total water system, as calculated in Table 2.3.6-2 below:

Table 2.3.6-2
Interest Expense and Cost of Debt
(\$ millions)

		A	B
Interest Expense and Cost of Debt		2017	
		PBR Forecast	Actual
1	Interest expense		
2	Interest on short-term debt	1.0	1.3
3	Interest on City of Edmonton debentures	0.9	0.9
4	Interest on intercompany debentures	31.5	31.2
5	Total interest expense	33.3	33.4
6	Mid-year debt and other long-term liabilities		
7	Mid-Year Short-term debt	36.3	27.9
8	Mid-Year Long-term debt	644.1	644.1
9	Mid-Year Other Long-term liabilities	4.0	2.1
10	Total mid-year debt and other long-term liabilities	684.4	674.1
11	Embedded Cost of Debt	4.87%	4.95%

The embedded cost of debt is slightly higher than forecast, reflecting a lower than forecast mid-year balance of short-term debt and, therefore, a higher proportion of higher cost long-term debt.

In-City's actual rate of return on equity, calculated as regulated net income in Section 1.1, is 0.3% less than approved ROE, reflecting EWSI's actions to control operating costs in response to the lower than forecast inflation component of 2017 rate increases.

2.3.7 Transactions with Affiliates

In-City Water derives a significant proportion of its revenue and expenses from transactions with affiliates, including the City of Edmonton, EPCOR Utilities Inc. and its subsidiaries, and other EWSI business units. Table 2.3.7 provides a summary of In-City Water's 2017 actual and forecast transactions with affiliates, together with references to the schedules in this report where these transactions are reported.

Table 2.3.7
Transactions with Affiliates
(\$ millions)

		A	B
Affiliate and Service		2017	
		PBR Forecast	Actual
1	Revenues from the provision of services to the City of Edmonton		
2	Public Fire Protection	10.8	11.1
3	Water sales (Table 2.3.1-1, lines 4 and 9)	3.2	3.3
4	Other (Table 2.3.1-1, line 12)	0.2	0.1
5	Total	14.2	14.4
6	Services provided by (recovered from):		
7	City of Edmonton		
8	Franchise Fees (Table 2.3.2, line 27)	14.5	14.3
9	Property Taxes (Table 2.3.2, line 28)	0.4	0.2
10	Interest on City of Edmonton Debentures (Table 2.3.6-2, line 3)	0.9	0.9
11	Mobile equipment services (Table 2.3.3, lines 4 and 12)	1.8	2.2
12	Other services (Table 2.3.3, lines 6, 13 and 20)	1.3	0.7
13	Meter Reading Recoveries (Table 2.3.3, line 14)	-	(1.4)
14	Total	19.0	17.0
15	EPCOR Utilities Inc.		
16	Corporate Shared Service Costs (Table 2.3.2, line 24)	15.0	12.9
17	Interest on Intercompany Debentures (Table 2.3.6-2, line 4)	31.5	31.2
18	Interest on Short-term debt (Table 2.3.6-2, line 2)	1.0	1.3
19	Total	47.4	45.4
20	EPCOR Distribution and Transmission Inc.		
21	Meter Reading Service Revenue (Table 2.3.1-1, line 12)	-	(0.4)
22	Other services (Table 2.3.3, line 13)	0.1	-
23	Total	0.1	(0.4)
24	EPCOR Technologies Inc.		
25	Hydrovac Charges and Space Rentals (Table 2.3.3, line 3)	0.9	1.2
26	EPCOR Energy Alberta LP		
27	Customer Billing and Collection Services (Table 2.3.3, line 9)	7.8	7.8
28	Other EWSI Business Units		
29	EWSI Shared Services Allocation (Table 2.3.3, line 19)	9.8	9.6
30	Water Sales to Wastewater (Table 2.3.1-1, lines 4 and 9)	(0.4)	(0.5)
31	Meter Reading Recoveries from Wastewater (Table 2.3.3, line 14)	(2.1)	(2.1)
32	Meter Reading Recoveries from Drainage Services (Table 2.3.3, line 14)	(2.1)	(0.4)
33	Customer Service Fees from Drainage Services (Table 2.3.3, line 13)	-	0.1
34	Total	5.4	6.7
35	Expenditures on capital projects arising from services provided by:		
36	City of Edmonton	3.0	1.5
37	EPCOR Technologies Inc.	3.8	4.7
38	EPCOR Utilities Inc.	-	0.7
39	EPCOR Drainage Services	-	0.8
40	EPCOR Distribution and Transmission Inc.	0.1	0.4
41	Total	6.9	8.2

2.4 Capital Programs – In City Water

In-City Water's approved capital program for the 2017-2021 PBR term amounts to \$475.8 million and includes over 200 projects in six major project categories. Over the course of the PBR term, changes to the capital program will be required in response to changes in regulatory or operational requirements, customer demands or other unforeseen circumstances. These changes are coordinated through EWSI's Project Management Office and are reviewed and approved by EWSI's Capital Project Steering Committee, EUI's Financial Review Council, or EPCOR's Board of Directors, depending on the significance of the change.

2.4.1 Capital Expenditures

Table 2.4.1 compares approved capital expenditures from the PBR forecast to actual capital expenditures for 2017 for each project with approved capital expenditures in excess of \$5.0 million over the 2017-2021 PBR term, as well as for each project category. Table 2.4.1 also provides a comparison of total 2017-2021 approved capital expenditures to EWSI's current capital forecast.

Although capital expenditures for In-City water were \$10.0 million less than the amounts approved for 2017, EWSI estimates that, over the 2017-2021 PBR term, the total cost of EWSI's capital program, including the cost of new projects, and the cost of changes in scope for existing projects, will exceed PBR approved amounts by \$87.8 million. These changes are explained in detail below Table 2.4.1.

**Table 2.4.1
Capital Expenditures
(\$ millions)**

		A	B	C	D	E	F
		2017			2017-2021		
		PBR Forecast	Actual	Increase (Decrease)	PBR Forecast	Current Projection	Increase (Decrease)
1	Regulatory						
2	Water Services Replace/Refurbish	1.9	1.9	(0.1)	10.2	10.1	-
3	Projects < \$5 Million	0.3	0.6	0.3	1.5	2.3	0.8
4	Subtotal	2.2	2.5	0.2	11.6	12.3	0.8
5	Growth/Customer Requirements						
6	Water Services Connections	4.0	5.0	1.0	23.6	24.8	1.2
7	PD Construction Coordination	2.7	2.7	-	15.4	14.1	(1.3)
8	Network PD Transmission Mains	3.5	6.8	3.3	14.4	27.9	13.5
9	New Meter Purchase/Installation	2.1	2.0	(0.1)	13.2	12.9	(0.2)
10	LRT Relocates	5.5	5.3	(0.3)	10.4	25.1	14.7
11	New Water Distribution Mains	1.7	1.6	(0.1)	8.8	10.1	1.3
12	Distribution System Modifications	1.4	1.3	(0.1)	6.0	5.1	(0.9)
13	Water Main Cost Sharing Program	0.8	0.8		3.0	10.8	7.7
14	Projects < \$5 Million	1.6	3.2	1.6	2.6	8.2	5.6
15	Subtotal	23.4	28.8	5.4	97.5	139.1	41.6
16	Health, Safety & Environment						
17	E.L. Smith - Deep Bed Filtration	-	-	-	22.3	22.6	0.3
18	Projects < \$5 Million	0.7	0.8	-	4.3	4.5	0.2
19	Subtotal	0.7	0.8	-	26.6	27.1	0.4
20	Reliability & Life Cycle Improvements						
21	Water Main Reactive Renewal	8.4	9.6	1.2	54.7	52.3	(2.3)
22	Meter Change Outs	2.6	2.9	0.3	25.6	17.3	(8.4)
23	Water Main Proactive Renewal	3.4	3.7	0.2	18.0	18.0	(0.0)
24	Transmission Mains Replace/Refurbish	2.4	2.8	0.3	13.3	13.7	0.4
25	Vehicle & Fleet Additions	3.7	3.7	-	11.8	11.9	0.1
26	E.L. Smith - Bypass (Ring) Main	-	-	-	7.0	7.3	0.3
27	Cell/Pumphouse Roof Replacement	2.7	1.5	(1.2)	6.3	2.9	(3.4)
28	SCADA System Upgrade Program	2.3	0.9	(1.4)	5.7	4.0	(1.7)
29	Network Valve Chamber Refurbishment	1.1	1.2	0.1	5.6	5.7	0.2
37	Electrical Upgrades - Reservoirs	1.1	0.4	(0.7)	5.3	4.3	(1.0)
38	Electrical Upgrades -- Rossdale	0.6	0.6	(0.6)	5.2	5.3	0.1
30	Obsolete Hydrants	0.8	1.3	0.4	4.4	7.4	3.0

		A	B	C	D	E	F	
		2017			2017-2021			
		PBR Forecast	Actual	Increase (Decrease)	PBR Forecast	Current Projection	Increase (Decrease)	
31	Obsolete Valves	0.8	1.5	0.7	4.1	7.6	3.5	9
32	Rossdale Filter Underdrains	1.1	2.2	1.0	4.7	8.1	3.4	10
33	Rossdale Clarifier C1-2 Upgrade	3.0	1.2	(1.7)	4.3	6.2	1.8	
34	ELS Mechanical Upgrades Program	1.2	1.1	(0.2)	4.9	6.2	1.3	
35	ELS Chemfeed Upgrades Program	0.8	1.2	0.4	4.0	5.2	1.2	
36	Rossdale Chemfeed Upgrades Program	0.9	1.9	1.0	4.0	5.5	1.5	
39	Projects < \$5 Million	16.5	14.3	(1.5)	73.4	86.7	13.3	11
40	Subtotal	53.6	52.0	(1.6)	262.4	275.6	13.2	
41	Performance Efficiency & Improvement							
42	Water Main Cathodic Protection	4.0	3.8	(0.2)	21.0	19.4	(1.7)	
43	Water D&T Facility Expansion	16.0	-	(16.0)	16.0	16.0	(0.0)	12
44	Projects < \$5 Million	1.4	1.0	(0.3)	7.1	6.4	(0.7)	
45	Subtotal	21.4	4.8	(16.6)	44.1	41.7	(2.4)	
46	Accelerated							
47	Accelerated Water Main Renewal	9.9	9.7	(0.2)	51.9	54.5	2.6	13
48	Accelerated Fire Protection	2.9	3.7	0.8	15.9	12.0	(3.9)	14
49	Subtotal	12.8	13.4	0.6	67.8	66.5	(1.3)	
50								
51	E.L Smith Solar Farm	-	1.5	1.5	-	32.5	32.5	15
52								
53	Capital Expenditures before contributions	114.1	103.7	(10.4)	510.1	594.9	84.8	
54								
55	Contributions							
56	Water Services Connections	(4.0)	(3.9)	0.1	(23.6)	(19.7)	3.9	16
57	New Water Distribution Mains	(1.7)	(1.4)	0.3	(8.8)	(9.4)	(0.6)	
58	Other contributions	(0.3)	(0.3)	0.0	(1.9)	(2.2)	(0.3)	
59	Subtotal	(6.0)	(5.6)	0.4	(34.3)	(31.3)	2.9	
60	Capital Expenditures	108.1	98.1	(10.0)	475.8	563.5	87.8	

Explanations for differences between PBR forecast capital expenditures for 2017 to 2021 and EWSI's current projection in excess of \$2.0 million or 20% on individual projects with total costs in excess of \$5.0 million, as well as for project categories in aggregate include:

1. **Network Private Development Transmission Mains** –\$13.5 million (93.9%) greater than forecast. This program includes the costs of developer-constructed transmission mains (450mm in diameter and larger), with developers determining both the timing of projects and the areas to be developed. Therefore, changes to the projected cost of this program result from changes to developers' plans,

EWSI's current projection of the costs of this program are based on transmission mains anticipated in upcoming development areas, and incorporate approved neighborhood structure plans, submitted drawings and discussions with the development community. Significant additions to this program include transmission main projects for Ellerslie Road, east of 127 St, scheduled for construction in 2019, and the Horse Hills industrial area scheduled for construction in 2020.

2. **LRT Relocates** – \$14.7 million (141.2%) greater than forecast. This category includes the costs of moving infrastructure to accommodate LRT expansion. The costs approved in the PBR application were based on EWSI's understanding of track alignment and project timing at the time the PBR application was prepared. Subsequent changes to both the Southeast and West lines have resulted in significantly increases to projected costs. As these changes were beyond EWSI's control, EWSI believes that they meet the criteria for a non-routine adjustment. Once the associated costs are more fully known, EWSI will review the applicability of a non-routine adjustment with City Administration.
3. **Water Main Cost Sharing Program** - \$7.7 million (255.5%) greater than forecast. This program is driven by developer activity. The increase in the cost of this program results from higher than forecast increases in developer activity.
4. **Growth and Customer Requirements less than \$5.0 million** – \$5.6 million (217.8%) greater than forecast. The projected increase in this category results from a new booster station project needed to address development in a high elevation area (\$1.4 million); additional costs to acquire water mains from a regional water commission following city expansion (\$2.4 million) and changes to projected costs for other growth projects amounting to \$1.8 million.
5. **Water Main Reactive Renewal** - \$2.3 million (4.3%) less than forecast. In this program, water mains are replaced if they meet criteria around main break frequency, materials, age and other pertinent factors. The forecast decrease in project costs results from a lower than forecast number of water mains qualifying for replacement.
6. **Meter Change-Outs** - \$8.4 million (32.9%) less than forecast. The decrease in the projected cost of this program results from an increase in the expected lives of water meters, resulting

from improvements to manufacturing processes for the batteries used in the meters. Accordingly, the forecast costs of this program have been reduced, since fewer meters are expected to require replacement.

7. **Cell/Pumphouse Roof Replacement** - \$3.4 million (53.8%) less than forecast. This decrease reflects lower costing from contractors, as well as consolidation of this project with the Reservoir Structural Upgrades Program to enhance project management and project coordination, and to achieve delivery efficiencies.
8. **Obsolete Hydrants** - \$3.0 million (67.5%) greater than forecast. EWSI has adjusted its hydrant replacement schedule due to higher than expected rates of deterioration, so that backlogs are reduced and fire protection service levels maintained.
9. **Obsolete Valves** - \$3.5 million (84.4%) greater than approved. As with Obsolete Hydrants, higher than expected rates of deterioration have led to increased backlog, requiring adjustments to valve replacement schedules. Although the projected cost of this program has increased substantially, improving overall valve operability in the system reduces isolation time, lessens the potential for property damage and mitigates customer impacts during emergency main break response.
10. **Rossdale Filter Underdrain Upgrades** - \$3.4 million (71.9%) greater than forecast. Both the scope and cost of this project have increased following close inspection of the filter underdrain system that identified that each filter would require unforeseen upgrades to air scour systems.
11. **Reliability and Life Cycle Improvements less than \$5.0 million** – \$13.3 million (18.1%) greater than forecast. Unexpected asset failures and updated asset condition assessments have resulted in increases to both the scope and cost of work needed to complete rehabilitation projects and life cycle replacements.
12. **Water D&T Facility Expansion.** Although the projected cost of this project has not changed, this \$16.0 million project has been deferred from 2017 to 2019 pending completion of EPCOR's corporate wide real estate review, which was initiated following the transfer of Drainage Services to EPCOR.
13. **Accelerated Water Main Renewal Program** - \$2.6 million (5.0%) greater than forecast. EWSI has identified an increased number of sub-projects that meet the criteria for accelerated renewal, especially to accommodate water main replacement in conjunction with the City of Edmonton's Alley Paving program. The increase in costs for this program will be entirely offset by lower than approved expenditures on Accelerated Fire Protection.
14. **Accelerated Fire Protection Program** - \$3.9 million (24.5%) less than forecast. Although 2017 expenditures were higher than approved, EWSI expects that expenditures over the

remainder of the 2017-2021 PBR term will be less than approved amounts, due to a smaller number of potential sub-projects meeting the Accelerated Fire Protection Program criteria.

15. **E.L. Smith Solar Farm** - \$32.5 million (new project). The special rate adjustment for environmental initiatives includes a proposal to replace 10% of EWSI's conventional power with locally produced renewable energy at an annual cost of \$1.9 million. After assessing a number of alternatives, rather than purchasing local green power, EWSI has initiated a new project to construct a solar farm on land adjacent to the E.L. Smith Water Treatment Plant reserved for future treatment plant expansion.
16. **Water Services Connections Contributions** - \$3.9 million (16.3%) less than forecast. EWSI has revised its contributions forecast to align more closely with actual cost recoveries from prior years. Contributions for individual service installations are based on set service application rates and are intended to cover the full construction cost of an individual service installation. However, EWSI has found that after accounting for all program costs, including variations in construction costs, program administration, and service removals, contributions only account for 72.5% of the costs of individual service installations. Accordingly, current projections have been revised to reflect EWSI's actual experience.

2.4.2 Construction Work in Progress

In-City Water's rate base consists of plant in service. If a capital project is not completed (i.e. not placed into service) in the year, the capital expenditures on that project remain in Construction Work in Progress and are excluded from the rate base. In 2017, as shown on Table 2.4.2, the balance in Construction Work in Progress was \$6.6 million greater than forecast, of which \$3.5 million was attributable to higher than forecast carry-over projects from 2016, with the remainder attributable to carry-over projects for 2017.

Table 2.4.2
Construction Work in Progress
(\$ millions)

		A	B
		2017	
Construction Work in Progress		PBR Forecast	Actual
1	Balance, beginning of year	0.3	3.8
2	Capital Expenditures	108.1	98.1
4	Capital Additions	(103.3)	(90.3)
7	Balance, end of year	5.0	11.6

The PBR plan allows EWSI to capitalize the costs of financing certain projects remaining in Construction Work in Progress, using an allowance for funds utilized during construction ("AFUDC"). In 2017, AFUDC included in capital expenditures on eligible projects amounted to \$0.3 million, compared to the PBR forecast amount of \$0.1 million.

2.5 Operational Performance

Water System Service Quality is measured by the results of five indices prescribed in Bylaw 17698. Performance under each index is measured independently on a point basis with 100 base points available if the standards for all five performance measure indices are achieved. Bonus points are available for performance above standards and financial penalties are applied if EWSI does not meet the 100 base point standard. The performance measurement process for the 2017-2021 PBR term is similar to that of previous PBR term, with enhancements made to:

- Align metrics with the City of Edmonton's The Way We Green/Grow strategies, including the introduction of energy efficiency, water conservation, solids residual management, and other environmentally-focused metrics;
- Revise scoring, so that below-standard performance for Water Quality and Wastewater Quality cannot be offset with bonus points earned on other measures;
- Eliminate metrics within EPCOR's control (e.g. safety meetings); and
- Update targets to 10 year historic average (with a few exceptions).

2.5.1 Water Quality Index

The Water Quality index is calculated as the percentage of water quality test results that meet EPCOR's internal water standards. Water quality standards are established by both the federal and provincial governments and are incorporated into EWSI's Approval to Operate from Alberta Environment and Parks. In some cases, EWSI sets even stricter limits for critical parameters that are identified in EWSI Quality Standards, to provide early warnings of potential water quality problems; so that corrective actions can be taken before external standards are not met.

Table 2.5.1
Water Quality Index

Index Component	PBR Performance Measure	Standard	Actual Score	Index
Water Quality Index	The percentage of the total number of water quality tests taken in the period that do not yield suspect results	99.7%	99.8%	1.001
Average Index				1.001
Index Standard Points				25.0
Total Actual Points				25.0
Maximum Available Points Including Bonus Points				25.5
Total Points Earned				25.0

2017 Highlights

- EWSI met all Guidelines for the Canadian Drinking Water Quality health-based limits and AEP Approval water quality testing requirements. Additionally, EPCOR's internal targets were not met in only 94 of 59,915 tests conducted on treated water.
- EWSI's efforts in improving the water quality in areas with cast iron piping and low flow due to low water use resulted in an improvement in failed distribution system tests for low chlorine and/or high turbidity from 154 in 2016 to 84 in 2017.

2017 Areas for Improvement

- EWSI's Process Development Team will continue to work on identifying cold weather treatment factors related to the removal of *Cryptosporidium* and *Giardia* during direct filtration operation. This project will be completed in early 2018.
- Turbidity and Chlorine in the distribution system have been identified for future water quality opportunities. There continue to be localized areas in the distribution system that experience high turbidity or low chlorine at times, and result in water quality complaints. These are typically in older areas with cast iron piping and dead end flow. These will be addressed in the short term by actively investigating complaints and flushing where required, and in the longer term by identifying priority areas for water main renewals or lining.

2.5.2 Customer Service Index

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.

Table 2.5.2
Customer Service Index

Index Component	PBR Performance Measure	Standard	Actual Score	Index
Post Service Audit Factor	The percentage of the customers responding as "completely" or "very satisfied" in the level of service received from the EWSI Emergency group.	74.9%	72.5%	0.968
Home Sniffing Factor	The percentage result of customer satisfaction for the home sniffing survey.	94.4%	94.5%	1.001
Response Time Factor	The average number of minutes needed to confirm a water main break from the time a call is received at EWSI's dispatch office.	25	18.3	1.268
Planned Construction Impact Factor	The percentage of the total planned construction events where EWSI complies with required construction notification procedures.	95.8%	93.3%	0.974
Average Index				1.053
Index Standard Points				20.0
Total Actual Points				21.1
Maximum Available Points Including Bonus Points				23.0
Total Points Earned				21.1

2017 Highlights/

- **Home Sniffing Factor.** EWSI has increased water quality monitoring and laboratory-scale treatment testing to help optimize powdered activated carbon dose and remove odour causing compounds during the spring runoff period. EWSI has also initiated a research program for 2018 with University of Waterloo to characterize the organic content of the river water. This program is intended to increase EWSI's understanding of the complex chemistry that results in odour in the treated water during spring run-off and lead to better operational strategies at the water treatment plants.

2017 Areas for Improvement

- **Post Service Audit Factor.** This factor is very dependent on timely and effective responses to customers. For 2018, the Water Call Centre has developed internal tracking systems to provide more timely analysis of Call Centre data and to identify upcoming issues earlier and has implemented customer service training programs to improve customer experience

- **Planned Construction Impact Factor.** EWSI has provided training to all project teams to ensure appropriate notification timelines are followed for work in 2018. Additional improvements include implementation of proactive construction communication plans and enhancements to field systems to improve real-time tracking of construction dates and project completion progress.

2.5.3 System Reliability and Optimization Index

The System Reliability Index is a measure of the confidence that customers can place in the reliability of the waterworks system.

Table 2.5.3
System Reliability and Optimization Index

Index Component	PBR Performance Measure	Standard	Actual Score	Index
Water Main Break Factor	The number of water main breaks that occurred in the reporting period.	419	256	1.389
Water Main Break Repair Duration Factor	The percentage of water main breaks repaired and confirmed by EWSI within 24 hours from the time that the flow of water is shut off, excluding main breaks on arterial or collector roads	93.7%	95.7%	1.022
Water Loss Factor	The Infrastructure Leakage Index, a performance indicator quantifying how well a water distribution system is managed for the control of "real" water losses (i.e. leakage).	2.0	1.06	1.470
System Energy Efficiency Factor	The energy used at all water facilities in kWh divided by the average annual water production per residential customer account (ML/kWh/customer).	309	263	1.175
Average index				1.264
Index Standard Points				25.0
Total Actual Points				31.6
Maximum Available Points Including Bonus Points				28.5
Total Points Earned				28.5

2017 Highlights

- **Water Loss Factor (ILI).** EWSI's ILI of 1.06 significantly exceeded the PBR standard and is near the theoretical lowest level of leakage expected given the water supply system characteristics. An AWWA Water Audit Validation exercise is being considered to provide additional understanding of the system and identification of potential opportunities for further system improvement.

2.5.4 Environment Index

The environmental index measures the success of programs and policies designed to mitigate and report adverse environmental impacts.

Table 2.5.4
Environmental Index

Index Component	PBR Performance Measure	Standard	Actual Score	Index
Water Conservation Factor	The actual 10 year rolling average monthly Edmonton residential consumption per household	17.2	16.1	1.068
Environment Incident Factor	The number of reportable and preventable environmental incidents	6	3	2.000
Solids Residual Management Factor	The average number of days that the Rosedale and E.L. Smith water treatment plants are operating in direct filtration mode.	120	129	1.077
Average index				1.382
Index Standard Points				15.0
Total Actual Points				20.7
Maximum Available Points Including Bonus Points				16.5
Total Points Earned				16.5

2017 Highlights

- Environment Incidents.** Procedures to identify chlorinated waste streams have been improved and have resulted in fewer releases to the river and the drainage system. In addition, operations are now applying additional controls for dechlorination of smaller waste streams which has resulted in fewer incidents. The Water Distribution and Transmission system achieved registration of their Environmental Management System to the international standard ISO14001. Now the entire Edmonton Water System is registered to ISO14001. This will help lead to further improvements environmental performance.
- Solids Residual Management Factor.** Despite the operational challenges of an early spring run-off in February, high colour in the fall, and customer demand, the water treatment plants were still able to achieve 129 days in direct filtration operation. Increased use of direct filtration reduced total solids discharged to the North Saskatchewan River by 25% during the months of January to February and November to December 2017, compared to baseline conventional operation. This result was a significant improvement over 2016 when the reduction was limited to 11.5% during these months.

2017 Areas for Improvement

- Solids Residual Management Factor,** EWSI continues to trial different types of polymer and to investigate different strategies for dosing during transition from conventional treatment

to direct filtration at its water treatment plants in an effort to extend the number of days in direct filtration and reduce solids discharged to the North Saskatchewan River.

2.5.5 Safety Index

The safety index is a measure of the success of programs and the application of policies that maximizes the safety of employees and the public.

**Table 2.5.5
Safety Index**

Index Component	PBR Performance Measure	Standard	Actual Score	Index
Near Miss Reporting Factor	The number of near miss reports entered in the ESS system.	550	1,119	2.035
Work Site Inspections and Observations Factor	Number of Work Site Inspections and observations completed per year.	1,032	2,036	1.973
Lost Time Frequency Factor	The actual lost time frequency rate.	0.57	0.38	1.500
All Injury Frequency Factor	The actual all injury frequency rate	1.54	1.33	1.158
Average index				1.666
Index Standard Points				15.0
Total Actual Points				25.0
Maximum Available Points Including Bonus Points				16.5
Total Points Earned				16.5

2017 Highlights

- **Near Miss Reporting Factor.** Near Miss reporting effectively assisted employees with identification and mitigation of hazards that had potential to become incidents. Continued focus on near miss reporting in 2018 is expected to further assist employees in identifying and mitigating hazards that have the potential to become incidents.
- **Work Site Inspections and Observations.** These leading indicators assisted employees in identifying changes needed to improve existing processes and procedures.

2017 Areas for Improvement

- **All Injury Frequency Factor.** Although EWSI achieved better than standard results for this factor, EWSI will be introducing a new program in 2018 to prevent musculoskeletal injuries. This program will encourage employees to engage in specific pre and periodic stretching exercises throughout their work day.

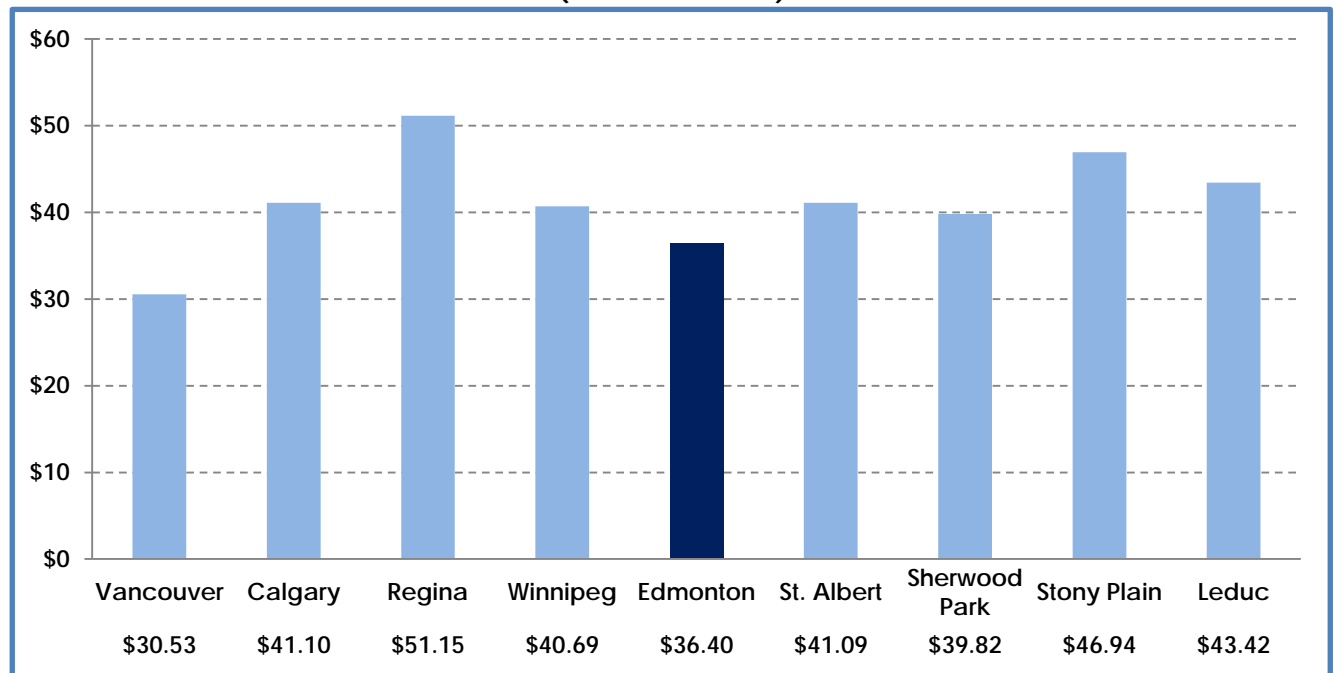
2.6 Rates and Bill Comparisons

Water bill comparisons for 2017 are based on the published water rates for Calgary, Vancouver, Winnipeg and Regina, as well as four local communities. These bill comparisons represent the total cost to the customer and include fixed charges, consumption charges and any other applicable surcharges.

2.6.1 Residential Water Bills

Figure 2.6.1 provides a comparison of residential household water bills for residential household consumption of 14.6 m³ per month, the average residential customer consumption per month in Edmonton in 2017. Comparison of residential water bills shows that Edmonton’s water bills are lower than all of the cities and local communities surveyed, except for Vancouver. This result is not unexpected; Vancouver has an excellent raw water source and, therefore, has lower needs for water treatment than Edmonton.

Figure 2.6.1
2017 Monthly Residential Water Bill Comparison
(14.6 m³/month)



2.6.2 Commercial Water Bills

Table 2.6.2 provides a comparison of the water bills for commercial customer of various sizes. This table shows that water bills for EWSI’s commercial customers are lower than all of the other surrounding communities and other major cities in western Canada, except for higher volume customers in Vancouver.

Table 2.6.2
Commercial Monthly Water Bill Comparison
(\$ per month)

		A	B	C	D
Monthly Bill - \$ per month		Small	Medium	Large	Extra Large
1	Monthly Consumption - m³	10	250	1,000	5,000
2	Vancouver	25.79	272.86	1,135	5,406
3	Calgary	41.92	381.67	1,279	6,570
4	Regina	42.50	503.30	2,141	10,087
5	Winnipeg	32.50	461.80	1,846	9,059
6	Edmonton	24.44	358.55	1,409	5,918
7	St. Albert	33.64	422.44	1,637	8,117
8	Sherwood Park	28.96	595.36	2,365	11,805
9	Stony Plain	37.22	544.18	2,128	10,578
10	Leduc	30.84	547.20	2,284	10,826

3 Wastewater

3.1 Accomplishments and Challenges

Wastewater realized a 12.60% return on equity, compared to the 10.175% return on equity forecast for the 2017-2021 PBR Plan. Wastewater's return on equity reflects both higher net income, largely attributable to lower than forecast operating expenses, which more than offset lower than forecast revenues, as well as a lower than forecast equity portion of the rate base. Wastewater also benefitted from reductions in corporate shared services cost allocations following the transfer of Drainage Services from the City of Edmonton to EPCOR, reductions in fringe benefit rates, a one-time refund of long-term disability premiums, and increases in capital transfers and capitalized overhead associated with a higher than forecast proportion of internal labour on capital projects. Since most of the reductions in operating expenses are non-recurring, EWSI expects that returns over the remainder of the 2017-2021 PBR term will align more closely with the PBR forecast.

Wastewater's capital program for the 2017-2021 PBR term focuses on projects and programs needed to address reliability and rehabilitation issues at the Gold Bar Wastewater Treatment Plant. Wastewater's 2017-2021 capital program is currently forecast to be \$238.7 million, an increase of \$3.3 million (1.4%) from the PBR forecast. Although the net change amounts is relatively small, the current projection includes additional expenditures of \$22.3 million to upgrade and replace sludge lines, \$6.5 million to replace clarifier chains, and \$7.5 million to rehabilitate the concrete within the Diversion Structure. Review of design options and value engineering enabled Wastewater to identify cost reductions to offset most of the additional costs. These cost reductions included changes to the scope of projects, such as the Square 1 Gas Room Expansion (\$9.0 million), the Building and Site Rehab program (\$7.3 million) and the Structural Rehab Program (\$5.5 million), as well as deferral of the Digester 4 Upgrade project, providing further reductions of \$10.9 million over the 2017-2021 PBR term. The remainder of the change in Wastewater's capital program results from reprioritization of reliability and life cycle replacements.

Wastewater's financial performance, capital expenditures programs, and operational performance are discussed in detail in sections 3.2 to 3.5, with comparisons of Wastewater's average bills for residential and commercial customers to water bills in other western Canadian cities and local communities provided in section 3.6.

3.2 Consumption and Customers

Wastewater's customer counts, consumption and consumption per customer are similar to those of In-City Water. Differences in customer counts, which are almost entirely within the commercial customer class, are attributable to "water-only" customers who are not tied into

the City's drainage system, such as businesses in industrial parks that are served by septic systems, as well as seasonal water customers, such as commercial lawn watering services and golf courses. Table 3.2 below provides a comparison of 2017 forecast to actual customer counts and consumption per customer.

Table 3.2
Consumption, Customer Counts and Consumption per Customer

		A	B
Customers and Consumption		2017	
		PBR Forecast	Actual
1	Annual Consumption - ML		
2	Residential	45,035.7	45,368.7
3	Multi-Residential	18,378.1	17,794.9
4	Commercial	24,775.0	23,798.3
5	Total	88,188.8	86,961.9
6	Customers (Average Active Services per Month)		
7	Residential	256,191	259,237
8	Multi-Residential	3,746	3,752
9	Commercial	16,537	16,629
10	Total	276,474	279,617
11	Monthly Consumption per Customer* (m ³ per month)		
12	Residential	14.6	14.6
13	Multi-Residential	408.8	395.2
14	Commercial	124.8	119.3

*Monthly Consumption per Customer = (Annual Consumption x 1000) / (Customers x 12)

Actual to forecast differences in Wastewater's customer counts and consumption are attributable to the same factors discussed in Section 2.2.

3.3 Financial Performance

3.3.1 Revenue

Wastewater's rate revenues include fixed monthly services charges applied on a per connection basis, and consumption charges applied to each cubic metre of consumption. Besides rate revenues, Wastewater also has a relatively small amount of other revenue. Table 3.3.1 below provides a comparison of Wastewater's 2017 actual and forecast revenue.

Table 3.3.1
Wastewater Revenue
(\$ millions)

Wastewater Revenue		A	B
		2017	
		PBR Forecast	Actual
1	Fixed Monthly Service Charges		
2	Residential	13.4	13.3
3	Multi-Residential	0.2	0.2
4	Commercial	0.9	0.9
5	Total Fixed Monthly Service Charge Revenue	14.4	14.3
6	Consumption Charges		
7	Residential	37.4	37.1
8	Multi-Residential	15.3	14.6
9	Commercial	19.5	18.6
10	Total Consumption Charge Revenue	72.2	70.3
11	Wastewater Rate Revenue	86.6	84.6
12	Other Revenue	6.2	6.2
13	Total Wastewater Revenue	92.8	90.8

In 2017, Wastewater's rate revenues were \$2.0 million less than forecast. This difference is attributable to the factors discussed in Section 2.3.1, including lower than forecast per customer consumption (\$1.2 million) and lower than forecast inflation (\$0.8 million). About one-half of Wastewater's other revenues, which were equal to the PBR forecast, are derived from overstrength surcharges to commercial customers with high concentrations of certain constituent components of wastewater. The remainder of Wastewater's other revenues are incidental revenues derived from sales of by-products, treatment of effluent from the Alberta Capital Regional Wastewater Commission, late payment fees and miscellaneous charges.

3.3.2 Operating Expenses by Function

Wastewater's operating expenses are presented and analyzed on both functional and cost category bases. Actual and forecast operating expenses by function are shown in Table 3.3.2 below:

Table 3.3.2
Operating Costs by Operational Function
(\$ millions)

		A	B
Function and Sub-function		2017	
		PBR Forecast	Actual
1	Power, Other Utilities and Chemicals		
2	Power and Other Utilities	5.2	4.7
3	Chemicals	1.6	1.0
4	Power, Other Utilities and Chemicals	6.8	5.8
6	Wastewater Treatment		
7	Wastewater Treatment Plant	18.4	17.2
8	Operations Support Services	7.9	6.5
9	Capitalized Overhead	(2.3)	(3.1)
10	Wastewater Treatment Expenses	24.0	20.6
12	Billing, Meters and Customer Service		
13	Billing and collections	3.2	3.3
14	Meter reading	2.3	2.1
15	Regulatory Services	1.0	1.0
16	Billing, Meters and Customer Service Expenses	6.5	6.4
18	EWSI Shared Services		
19	EWSI Shared Services	3.3	3.2
20	Incentive and Other Compensation	1.1	(0.1)
21	EWSI Shared Services Expenses	4.4	3.2
22			
23	Corporate Shared Services	4.8	4.0
24			
25	Franchise Fees and Property Taxes		
26	Franchise Fees	6.8	6.6
27	Property Taxes	0.6	0.6
28	Franchise Fees and Property Taxes	7.4	7.2
29	Total Operating Expenses by Function	54.0	47.1

Overall, Wastewater's operating expenses were \$6.9 million less than forecast. Key factors contributing to this difference include:

- **Power** (\$0.5 million less than forecast). Lower than forecast power costs are almost entirely attributable to lower power prices obtained in Wastewater's new power contract. The benefits of lower than forecast power prices are expected to continue for the remainder of the 2017-2021 PBR term.

- **Chemicals** (\$0.5 million less than forecast). Lower than forecast chemical costs are attributable to two factors. First, the initialization; development and optimization of the Ostara nutrient removal process, resulted in lower chemical usage throughout most of 2017. Second, Wastewater achieved significant reductions in alum usage from process and dosing optimization.
- **Wastewater Treatment Plant** (\$1.2 million less than forecast). Lower than forecast costs reflect a higher than forecast proportion of internal labour on capital projects (\$0.7 million), resulting from adjustments to the capital program (see section 2.4), where projects with a high component of contractor costs were replaced by capital maintenance and repair projects completed by Wastewater personnel. Staff costs and employee benefit costs were also affected by savings from lower than forecast fringe benefit rates (\$0.3 million), primarily associated with pension contributions, and lower than forecast overtime costs (\$0.1 million) resulting from decreases in breakdown call outs.
- **Operations Support Services** (\$1.4 million less than forecast). As with Wastewater Treatment Plants, lower than forecast costs reflect a higher than forecast proportion of internal labour on capital projects (\$0.4 million) and lower than forecast fringe benefit rates (\$0.1 million). The favourable variance is also attributable to delays in filling vacancies in Wastewater's engineering areas, which further reduced Staff Costs and Employee Benefits expenses (\$0.2 million). The remainder of the actual to forecast difference is made up of numerous small items, none of which exceed \$0.1 million.
- **Capitalized Overhead** (\$0.8 million greater than forecast). This function includes a portion of the salaries and benefits for managers and administrators in areas where staff work on both operational and capital projects. Higher than forecast capitalized overheads is consistent with the higher than forecast levels of internal labour on capital projects noted in both the Wastewater Treatment Plant and Operations Support Services functions.
- **EWSI Shared Services** (\$1.3 million less than forecast). This function includes Wastewater's share of the costs of centrally-provided services, including: Information Services; Finance; Health, Safety and Environment; Technical Training; Regulatory Services; EWSI Executive Administration. To maintain employee confidentiality, this function also includes costs, such as incentives, termination payments and long-term disability.

Lower than forecast costs in this category result from two adjustments to long-term disability, including a \$0.6 million one-time premium refund, and a \$0.4 million annual true-up, related to the low number of staff receiving long-term disability support. Besides these adjustments, the allocation of EWSI Shared Services costs to Wastewater was \$0.3 million less than forecast due to the transfer of Drainage Services to EPCOR.

- **Corporate Shared Services** (\$0.8 million less than forecast). This difference reflects both the reduction in corporate cost allocations resulting from the transfer of Drainage Services from

the City of Edmonton to EPCOR Utilities Inc., as well as cost savings in corporate functions. As with In-City Water, the cost reductions arising from the transfer of Drainage Services will be returned to Wastewater customers through a non-routine adjustment to 2018 water rates.

- **Franchise Fees and Property Taxes** (\$0.2 million less than forecast). As with water, lower than forecast franchise fees reflect lower than forecast revenues.

3.3.3 Operating Expenses by Cost Category

Table 3.3.3 shows operating expenses by cost category for Wastewater Treatment Plant Operations, Billing Meters and Customer Service, and EWSI Shared Services, where cost categories differ from the sub-functions in Section 3.3.2.

Table 3.3.3
Operating Costs by Cost Category
(\$ millions)

Cost Category		A	B
		2017	
		PBR Forecast	Actual
1	Wastewater Treatment		
2	Staff Costs and Employee Benefits	17.2	14.2
3	Contractors and Consultants	3.9	3.9
4	Materials and Supplies	2.0	2.4
5	Other	1.0	0.1
6	Wastewater Treatment Expenses	24.0	20.6
7	Billing, Meters and Customer Service		
8	CUS Charges	3.2	3.3
9	Contractors and Consultants	3.3	3.1
10	Billings, Meters and Customer Services Expenses	6.5	6.4
11	EWSI Shared Services		
12	EWSI Shared Services Allocation	3.1	2.8
13	Staff Costs and Employee Benefits	1.2	0.3
14	Other	0.1	0.1
15	EWSI Shared Services Expenses	4.4	3.2

The information presented in this table supports the explanations of differences between 2017 actual and forecast expenses provided in Section 3.3.3. Accordingly, no additional explanations are considered necessary.

3.3.4 Depreciation Expense

Wastewater's depreciation expense and amortization of contributed assets for 2017 are shown in Tables 3.3.4 below:

Table 3.3.4
Depreciation and Amortization
(\$ millions)

		A	B
		2017	
Depreciation and Amortization		PBR Forecast	Actual
1	Gross depreciation expense	14.9	15.3
2	Amortization of contributions	(0.9)	(0.9)
3	Depreciation, net	13.9	14.4

Wastewater's 2017 depreciation expense was \$0.5 million greater than forecast, even though plant in service (see Table 3.3.5 below) was less than forecast. This result is attributable to two factors:

- Depreciation on asset overhauls completed in 2017 (\$0.2 million). In 2017, Wastewater completed approximately 30 asset overhauls at an average cost of \$0.2 million per overhaul. Since asset overhauls only add to the useful life of an existing asset, capital additions related to asset overhauls have higher effective depreciation rates than capital additions related to new assets. In the PBR forecast, depreciation expense was calculated as if all asset additions were new assets, rather than overhauls of existing assets; and
- Additional depreciation on Grit Tanks 4 & 5 (\$0.2 million). In the PBR forecast, depreciation expense on this project was calculated as a single asset with a 44 year useful life. When this project was completed in 2016, the actual costs of the project were broken down into asset components, some of which had much shorter useful lives, reducing the average life of Grit Tanks 4 & 5 and, therefore, increasing annual depreciation expense.

3.3.5 Rate Base

Wastewater's 2017 mid-year rate base, shown in Table 3.3.5 below, was \$15.5 million less than forecast, reflecting lower opening balances of plant in service and accumulated depreciation, as well as lower than forecast capital additions. Differences in opening balances result from lower than forecast capital expenditures in 2016, as well as a higher balance of carry-in projects in construction work in progress (see Table 3.4.2, line 1). Lower than forecast capital additions reflect lower than forecast capital expenditures and delays in completing projects, and the adjustments to the capital program discussed in Section 3.4.1.

Table 3.3.5
Mid-Year Rate Base
(\$ millions)

		A	B
		2017	
Components of Mid-Year Rate Base, net of Contributions		PBR Forecast	Actual
1	Plant in Service		
2	Balance, beginning of year	526.1	512.8
3	Capital additions	61.0	44.4
5	Retirements and adjustments	-	(9.4)
6	Balance, end of year	587.1	547.8
7	Mid-Year Plant in service	556.6	530.3
8	Accumulated Depreciation		
9	Balance, beginning of year	(136.3)	(130.2)
10	Depreciation expense	(14.9)	(15.3)
11	Retirements and adjustments	-	9.4
12	Balance, end of year	(151.2)	(136.2)
13	Mid-Year Accumulated Depreciation	(143.7)	(133.2)
14	Other Rate Base Items		
15	Working Capital	5.2	5.5
16	Materials and Supplies	1.9	1.9
17	Gross Mid-Year Rate Base	420.0	404.5
19	Contributions		
20	Balance, beginning of year	(41.0)	(41.0)
21	Contributions in aid of construction	-	-
23	Balance, end of year	(41.0)	(41.0)
24	Mid-Year Contributions	(41.0)	(41.0)
25	Accumulated Amortization		
26	Balance, beginning of year	15.6	15.6
27	Amortization of contributions	0.9	0.9
29	Balance, end of year	16.5	16.5
30	Mid-Year Accumulated Amortization	16.1	16.1
31	Mid-Year Contributions	(24.9)	(24.9)
32	Mid-Year Rate Base	395.1	379.6

Unlike In-City Water, where contributions relate primarily to developer-funded assets, contributions included in Wastewater's rate base offset the cost of non-utility assets included in Wastewater's plant in service. This treatment ensures that the capital costs associated with these assets are not borne by utility rate payers. The cost of operating these assets, as well as any related revenues are also excluded from Wastewater's financial results.

3.3.6 Return on Rate Base

Wastewater's returns on rate base are its deemed capital structure and its costs of debt and equity. Returns on rate base are summarized on Table 3.3.6-1 below. As with In-City Water, returns on rate base are calculated separately for the debt-financed and equity-financed portions of Wastewater's rate base.

**Table 3.3.6-1
Return on Rate Base
(\$ millions)**

		A	B
		2017	
Return on Rate Base		PBR Forecast	Actual
1	Mid-year Rate Base	395.1	379.6
2	Capital Structure		
3	Debt (%)	60.00%	60.00%
4	Equity (%)	40.00%	40.00%
5	Total	100.00%	100.00%
6	Cost of Capital		
7	Cost of Debt	4.23%	4.46%
8	Cost of Equity	10.175%	12.60%
9	Weighted Average Cost of Capital	6.61%	7.71%
10	Return on Mid-Year Rate Base		
11	Return on Rate Base Financed by Debt	10.0	10.2
12	Return on Rate Base Financed by Equity	16.1	19.1
13	Return on Mid-year Rate Base	26.1	29.3

The rate of return on debt is equal to the embedded cost of debt, as calculated in Table 3.3.6-2 below. Wastewater's embedded cost of debt is 0.23% higher than forecast, reflecting a lower than forecast mid-year balance of short-term debt, related to lower than forecast operating expenses and lower than forecast capital expenditures. The result of this decrease is that, even with a \$10.0 million reduction in long-term debt issuances, Wastewater had greater reliance on higher cost long-term debt, resulting in higher embedded cost of debt.

**Table 3.3.6-2
Interest Expense and Cost of Debt
(\$ millions)**

		A	B
		2017	
Interest Expense and Cost of Debt		PBR Forecast	Actual
1	Interest Expense		
2	Interest on short-term debt	1.0	1.1
3	Interest on City of Edmonton debentures	3.4	3.4
4	Interest on intercompany debentures	6.0	5.8
5	Total Interest expense	10.4	10.3
6	Mid-year debt and other long-term liabilities		
7	Mid-Year Short-term debt	35.0	26.0
8	Mid-Year Long-term debt	209.3	204.3
9	Mid-Year Other Long-term liabilities	0.5	0.5
10	Total Mid-year debt and other long-term liabilities	244.8	230.9
11	Embedded cost of Debt	4.23%	4.46%

In 2017, Wastewater's actual return on equity was \$3.0 million greater than forecast. Higher than forecast net income, combined with a lower than forecast rate base, enabled Wastewater to earn a 12.60% return on equity in 2017, significantly greater than its forecast

return on 10.175%. Wastewater's returns on equity are expected to decrease over the remainder of the 2017-2021 PBR term as Wastewater accelerates work on its capital program.

3.3.7 Transactions with Affiliates

Wastewater derives a significant proportion of its revenue and expenses from transactions with affiliates, including the City of Edmonton, EPCOR Utilities Inc. and its subsidiaries, and other EPCOR Water Services Inc. business units. Table 3.3.7 provides a summary of Water Services 2017 actual and forecast transactions with affiliates, together with references to the schedules in this report where these transactions are presented.

Table 3.3.7
Transactions with Affiliates
(\$ millions)

Affiliate and Service		A	B
		2017	
		PBR Forecast	Actual
1	Revenues from the provision of services to the City of Edmonton		
2	Wastewater Treatment Services (Table 3.3.1, lines 4 and 9)	1.0	1.1
3	Other Services (Table 3.3.1, line 12)	0.2	0.3
4	Total	1.2	1.3
5	Services provided by (recovered from):		
6	City of Edmonton		
7	Franchise Fees (Table 3.3.2, line 26)	6.8	6.6
8	Property Taxes (Table 3.3.2, line 27)	0.6	0.6
9	Interest on Long Term Debt (Table 3.3.6-2, line 3)	3.4	3.4
10	Regulatory Services (Table 3.3.2, line 15)	1.0	0.7
11	Other Services (Table 3.3.3, lines 5)	0.2	0.2
12	Total	11.9	11.4
13	EPCOR Utilities Inc.		
14	Corporate Shared Service Costs (Table 3.3.2, line 23)	4.8	4.0
15	Interest on Intercompany Loans (Table 3.3.6-2, line 4)	6.0	5.8
16	Interest on Short-term debt (Table 3.3.6-2, line 2)	1.0	1.1
17	Total	11.8	10.9
18	EPCOR Distribution and Transmission Inc.		
19	Maintenance and other services (Table 3.3.3, line 3)	0.1	0.2
20	EPCOR Technologies Inc.		
21	Hydrovac Charges (Table 3.3.3, line 3)	-	0.1
22	EPCOR Energy Alberta LP		
23	Billing and Collection Services (Table 3.3.3, line 9)	2.9	2.9
24	Other EWSI Business Units		
25	EWSI Shared Services Allocation (Table 3.3.3, line 13)	3.1	2.8
26	Meter reading services from In-City Water (Table 3.3.2, line 14)	2.3	2.1
27	Water purchases from In-City Water (Table 3.3.2, line 2)	0.4	0.4
28	Regulatory services from Drainage Services (Table 3.3.2, line 15)	2.9	0.4
29	Project engineering recoveries from Drainage Services (Table 3.3.2, line 8)		(0.8)
30	Laboratory services recoveries from Drainage Services (Table 3.3.2, line 8)		(0.1)
31	Total	8.6	4.7

3.4 Capital Expenditures - Wastewater

Wastewater's approved capital program for the 2017-2021 PBR term amounts to \$235.4 million and includes over 50 projects in six major project categories. As part of the 2017-2021 PBR application, EWSI provided the City Utility Committee with comprehensive business cases for all capital projects greater than \$5.0 million. The Gold Bar Wastewater Treatment Plant's aging infrastructure poses challenges to capital planning, since it is often difficult to accurately assess asset condition and the scope of rehabilitation needed before commencing work on a project. Therefore, over the course of the PBR term, changes to the program may be required in response to address unforeseen needs for repairs or rehabilitation. Changes may also be required to changes in regulatory or operational requirements, customer demands or other external factors. These changes are coordinated through EWSI's Project Management Office and are reviewed and approved by EWSI's Capital Project Steering Committee, EUI's Financial Review Council, or EPCOR's Board of Directors, depending on the significance of the change.

3.4.1 Capital Expenditures

Overall, Wastewater's 2017 actual capital expenditures were \$7.7 million less than the PBR-forecast. This shortfall is primarily a result of lower than planned costs to complete the Hydrovac Sanitary Grit Recovery Facility and delays in the Operations Centre at Mid-Point Entrance project.

EWSI's current projection is that, over the 2017-2021 PBR term, the total cost of Wastewater's capital program, including the cost of new projects, as well as the cost of changes in scope for existing projects, will exceed the PBR forecast by \$3.3 million. Although EWSI's current projected costs are not significantly different from the PBR forecast, the Gold Bar Wastewater Treatment Plant's aging infrastructure poses challenges to capital planning, since, in many cases, it is difficult to accurately assess asset condition and the scope of rehabilitation work needed to ensure the high level of performance and reliability needed to safely and effectively treat wastewater.

Table 3.4.1 compares approved capital expenditures from the PBR forecast to actual capital expenditures for 2017 for each project with approved capital expenditures in excess of \$5.0 million over the 2017-2021 PBR term, as well as for each project category. Table 3.4.1 also provides a comparison of total 2017-2021 approved capital expenditures to EWSI's current capital forecast.

Table 3.4.1
Capital Expenditures
(\$ millions)

		A	B	C	D	E	F	
		PBR Forecast	Actual	Increase (Decrease)	Forecast	Current Projection	Increase (Decrease)	
1	Reliability and Life Cycle Improvements							
2	Site Ventilation Rehabilitation	3.0	4.5	1.4	31.5	29.6	(1.9)	
3	Ops Centre at Mid-Point Entrance	4.0	0.5	(3.5)	19.4	16.0	(3.4)	1
4	Structural Rehab Secondaries 1-8	3.3	4.3	1.0	17.6	18.4	0.9	
5	Mechanical Rehab Program	3.5	5.1	1.6	15.6	15.4	(0.2)	
6	Square 1 Gas Room Expansion	-	-	-	15.6	6.6	(9.0)	2
7	Utility Hot Water System Rehab	1.3	0.3	(1.0)	13.9	13.8	(0.1)	
8	Buildings and Site Rehab	1.1	1.0	(0.1)	12.8	5.4	(7.3)	3
9	Digester 4 Upgrades	-	1.0	1.0	12.0	1.1	(10.9)	4
10	Digester 3 Upgrades	6.9	5.1	(1.8)	11.3	10.9	(0.4)	
11	Structural Rehab Program	1.5	0.7	(0.8)	7.7	2.2	(5.5)	5
12	Electrical Rehab Program	2.8	1.1	(1.7)	7.2	5.0	(2.1)	6
13	Headworks & Primary Upgrades	0.6	0.1	(0.5)	6.7	3.8	(2.9)	7
14	Replace 2.5 km of Sludge lines	-	0.2	0.2	-	14.7	14.7	8
15	Sludge Line Upgrades	1.1	3.0	1.9	3.4	11.0	7.6	9
16	Clarifier Chain Replacement	1.2	1.3	0.1	4.1	10.6	6.5	10
17	Diversion Structure Structural Rehab	-	-	-	-	7.5	7.5	11
18	Projects < \$5 million	10.2	8.9	(1.3)	25.0	34.7	9.8	12
19	Subtotal	40.5	36.9	(3.6)	203.4	206.8	3.4	
20								
21	Hydrovac Sanitary Grit Facility	8.4	6.7	(1.8)	8.4	7.2	(1.2)	
22								
23	Performance Efficiency & Improvement							
24	Projects < \$5 million	3.3	2.3	(1.0)	17.6	16.0	(1.6)	
25								
26	Growth/Customer Requirements							
27	Projects < \$5 million	1.5	-	(1.5)	1.5	1.5	-	
28								
29	Health, Safety and Environment							
30	Projects < \$5 million	0.8	1.0	0.2	4.5	7.2	2.7	13
31	Capital Expenditures, net	54.5	46.8	(7.7)	235.4	238.7	3.3	

Explanations for differences between PBR forecast capital expenditures for 2017 to 2021 and EWSI's current projection in excess of \$2.0 million or 20% on individual projects with total costs in excess of \$5.0 million, as well as for project categories in aggregate include:

1. **Operations Centre at Mid-Point Entrance** - \$3.4 million (57.8%) less than forecast. This project has been delayed due to additional design reviews and scope adjustments as well as significantly higher public consultation efforts than originally expected...
2. **Square 1 Gas Room Expansion** - \$9.0 million (57.8%) less than forecast. Review of design options and value engineering resulted in reductions to the scope of this project and significant reductions in projected costs.
3. **Buildings and Site Rehab** - \$7.4 million (57.5%) less than forecast. The variance reflects reductions in the scope of this program. An updated asset condition assessment determined that some of the sub-projects included in this program were of lower priority than originally believed and, therefore, could be safely deferred, allowing resources to be focused on unanticipated, higher-priority projects.
4. **Digester 4 Upgrades** - \$10.9 million less than forecast. Upgrades to Digester 4 have been delayed as a result of necessary design reviews and the successful rehabilitation of Digester 3, which has provided sufficient capacity to delay upgrades to Digester 4.
5. **Structural Rehab Program** - \$5.5 million (71.8%) less than forecast. Similar to Building and Site Rehab, the decrease in the projected costs of this program reflect reprioritization of identified projects against new unanticipated projects allowing resources to be focused on unanticipated, higher-priority projects.
6. **Electrical Rehab Program** - \$2.2 million (29.8%) greater than forecast. The main reason for the overage is due to higher cost than planned for the Standby Generator project and an unidentified MCC (motor control centre) in the Blower building requiring immediate replacement.
7. **Headworks & Primary Upgrades** - \$2.9 million (43.1%) less than forecast. The variance is due to timing change to allow additional time for review of various options before a final design was selected. This led to a projected reduction of \$3 million in the total cost of the project.
8. **Replace 2.5 km of Sludge lines** - \$ 14.7 million (new). This project provides for replacement of 2.5 km of sludge pipeline. This section of the sludge pipelines was found to be in such poor condition that repairs and/or rehabilitation was not financially viable.
9. **Sludge Line Upgrades** - \$7.6 million (227.3%) greater than forecast. This project included the costs of cleaning and inspecting the sludge lines, with only minimal costs forecast for

repairs. Inspections have since shown that the sludge lines are in poor condition and require significant expenditures to ensure that they can continue to operate with minimal risk of leakage.

10. **Clarifier Chain Replacement** - \$6.5 million (160.5%) greater than forecast. Wastewater has experienced premature failure of stainless steel clarifier chains due to unexpected localized corrosion. These chains are being replaced with plastic and loop chains which have a better record of performance at Gold Bar.
11. **Diversion Structure Structural Rehab** \$7.5 million (new). This new project is required to rehabilitate the concrete within the Diversion Structure. Inspection of the concrete structure was recently completed and the condition of the concrete found to be very poor with structural failure possible within two to five years.
12. **Reliability and Life Cycle Improvement Projects < \$5 million** - \$9.7 million (39.2%) greater than forecast. The large variance is attributable to greater than anticipated rehabilitation and replacement requirements, particularly for Channel work and Odour Control Projects.
13. **Health, Safety and Environment Projects < \$5 million** - \$2.7 million (59.6%) greater than forecast. The variance is attributable to two unplanned safety-related projects, including projects to modify biogas systems and install safety and equipment davits to further minimize risks of injury.

3.4.2 Construction Work in Progress

Wastewater's rate base consists of plant in service. If a capital project is not completed (i.e. not placed into service) in the year, the capital expenditures on that project remain in Construction Work in Progress and are excluded from the rate base. The 2017 year-end balance of Wastewater's Construction Work in Progress is \$12.3 million greater than forecast, of which \$3.4 million is attributable to higher than forecast carry-over project from 2016, with the remainder attributable to projects which were not completed in 2017 and, therefore, remained in Construction Work in Progress.

Table 3.4.2
Construction Work in Progress
(\$ millions)

		A	B
		2017	
Construction Work in Progress		PBR Forecast	Actual
1	Balance, beginning of year	19.2	22.6
2	Capital Expenditures	54.5	46.8
4	Capital Additions	(61.0)	(44.4)
7	Balance, end of year	12.7	25.0

The PBR plan allows EWSI to capitalize the costs of financing certain projects remaining in Construction Work in Progress, using an allowance for funds utilized during construction (“AFUDC”). In 2017, AFUDC included in capital expenditures on eligible projects amounted to \$1.7 million, compared to the PBR forecast amount of \$1.3 million.

3.5 Operational Performance

Wastewater System Service Quality is measured by the results of four indices prescribed in Bylaw 17698. Performance under each index is measured independently on a point basis with 100 base points available if the standards for all five performance measure indices are achieved. Bonus points are available for performance above standards and financial penalties are applied if EWSI does not meet the 100 base point standard.

The performance measurement process for the 2017-2021 PBR term is similar to that of previous PBR term, with enhancements made to combine the Water Quality and Environment categories into a single index to recognize that the environment and the quality of water (or effluent) returned to the river are directly linked. As well, the System Reliability index has been expanded to include Operational Optimization metrics to more clearly align this category with the City of Edmonton’s *The Way Ahead* strategies by adding metrics for energy utilization to track decreasing energy demands through conservation and efficiency programs.

In 2017, Wastewater had strong operational performance, exceeding standards for each performance measure in each of its four indices and earning maximum bonus points.

3.5.1 Water Quality and Environmental Index

The Water Quality and Environmental index is a composite measure intended to assess EWSI’s impact on the environment through the quality of the wastewater effluent returned back to the North Saskatchewan River and the effectiveness of environmental management programs.

Table 3.5.1
Water Quality and Environmental Index

Index Component	PBR Performance Measure	Standard	Actual Score	Index
Water Quality Factor	The value of the Wastewater Effluent Limit Performance, which measure the percentage of the discharge limit for five parameters in the Gold Bar wastewater treatment plant's final effluent.	28.0%	22.0%	1.270
Environmental Incident Factor	The actual number of environmental incidents that are both reportable and preventable	10	3	3.333
Average Index				2.302
Index Standard Points				55.0
Total Actual Points				126.6
Maximum Available Points Including Bonus Points				60.5
Total Points Earned				60.5

2017 Highlights

- **Wastewater Effluent Limit Performance Index.** This index was negatively impacted by significant snow melt and rain early in the year during the months of February to April. However, sustained focus on BNR operations allowed the plant to recover and improve its performance through the remainder of the year.
- **Environment Incident Management.** Root cause investigations of three events (release from a transfer line, a secondary bypass and sampling timing) provided information that resulted in improved operating procedures.

2017 Areas for Improvement

- **Wastewater Effluent Limit Performance Index.** Studies to assess ammonia side stream treatment at Clover Bar with the objective of reducing ammonia loading to the plant and in turn improving over-all treatment effective are already underway.

3.5.2 Customer Service Index

Wastewater's customer service index for the 2017-2021 PBR term includes three equally weighted odour metrics. These metrics recognize that Wastewater's customer interactions typically relate to odour concerns from customers located close to the Gold Bar Wastewater Treatment Plant.

Table 3.5.2
Customer Service Index

Index Component	PBR Performance Measure	Standard	Actual Score	Index
H ₂ S - 1 Hour Exceedance Factor	The average of the number of exceedances of the 1 hour limit registered at the Gold Bar and Beverly air quality monitoring stations.	6	1	6.000
H ₂ S - 24 Hour Exceedance Factor	The average of the number of exceedances of the 24 hour limit registered at the Gold Bar and Beverly air quality monitoring stations.	2	0	1.000
Scrubber Uptime Factor	The percentage of time that the scrubbers are on line.	90%	97.4%	1.082
Average Index				2.694
Index Standard Points				15.0
Total Actual Points				40.4
Maximum Available Points Including Bonus Points				16.5
Total Points Earned				16.5

2017 Highlights

- **H₂S - 1 and 24 Hour Exceedance Factor.** Success in meeting the targets set for these two measures was accomplished through close attention to contributing operating factors such as housekeeping (keeping doors closed to contain foul air so that it could be directed to the scrubbers) and regular sampling which ensured optimal chemical application to the foul air scrubbers.
- **Scrubber Uptime Factor.** Scrubber uptime was maximized by scheduling multiple capital upgrades and maintenance simultaneously and by performing corrective maintenance on a priority basis to minimize downtime.

2017 Areas for Improvement

- Capital projects intended to address operational issues have been initiated to address the following issues:
 - Improving foul air collection from process areas through air balancing;
 - Improving scrubber reliability by providing redundant chemical injection pumps; and
 - Improving EPT source capture of foul air to maximize scrubbing operations.

3.5.3 System Reliability and Optimization Index

The system reliability and optimization index is a measure of the performance of the Gold Bar Wastewater Treatment Plant and the degree to which the wastewater treatment system is optimized to minimize its impact on the environment.

**Table 3.5.3
System Reliability and Optimization Index**

Index Component	PBR Performance Measure	Standard	Actual Score	Index
Enhanced Primary Treatment Factor	The percentage of time that the enhanced primary treatment facility ran during wet weather events where the influent flow rate exceeded the EPT event threshold.	80.0%	100.0%	1.250
Biogas Utilization Factor	The percentage of biogas utilized, calculated as the volume of biogas produced less the volume flared divided by the volume produced.	60.0%	84.2%	1.403
Energy Efficiency Factor	The energy used in all wastewater facilities in kWh divided by the volume of wastewater effluent that either receives ultraviolet (UV) treatment or is membrane plant effluent.	514	497	1.034
Average Index				1.229
Index Standard Points				15.0
Total Actual Points				18.4
Maximum Available Points Including Bonus Points				16.5
Total Points Earned				16.5

2017 Highlights

- **Enhanced Primary Treatment (EPT).** EPT clarifiers are now operated year round and maintenance is only performed on two of the four clarifiers at any given time. This ensures maximum availability of the clarifiers during wet weather events.
- **Biogas Utilization Factor.** Wastewater achieved a significant increase in the use of biogas for heating needs relative to natural gas usage.
- **Energy Efficiency Factor.** Wastewater achieved reductions in energy consumption in two processes that consume a significant portion of energy at the site (blowers sending foul air to the scrubbers and UV disinfection operations).

2017 Areas for Improvement

- **Enhanced Primary Treatment (EPT).** In 2018, covers will be installed to cover the EPT clarifiers to more effectively direct that foul air to the scrubbers. The objective will be to further minimize both odour and H2S issues originating in the building.
- **Biogas Utilization Factor.** Operations will continue to maximize biogas utilization to run boilers used for system heating demand.
- **Energy Efficiency Factor.** Operations will optimize the UV disinfection dose set point which is expected to reduce energy consumption.

3.5.4 Safety Index

EPCOR and EWSI are committed to a safe, healthy lifestyle and demonstrate this through care and concern for people. The safety index is a measure of the success of programs and the application of policies that maximizes the safety of employees and the public

**Table 3.5.4
Safety Index**

Index Component	PBR Performance Measure	Standard	Actual Score	Index
Near Miss Reporting Factor	The number of near miss reports entered in the ESS system.	220	327	1.486
Work Site Inspection Factor	Number of Work Site Inspections and observations completed per year.	919	1,088	1.184
Lost Time Frequency Factor	The actual lost time frequency rate.	0.75	0.00	1.000
All Injury Frequency Factor	The actual all injury frequency rate	1.50	1.92	0.781
Average Index				1.113
Index Standard Points				15.0
Total Actual Points				16.7
Maximum Available Points Including Bonus Points				16.5
Total Points Earned				16.5

2017 Highlights

- **Near Miss Reporting Factor.** Near Miss reporting effectively assisted employees with identification and mitigation of hazards that had potential to become incidents. Continued focus on near miss reporting in 2018 is expected to further assist employees in identifying and mitigating hazards that have the potential to become incidents.
- **Work Site Inspections and Observations.** These leading indicators assisted employees in identifying changes needed to improve existing processes and procedures.

2017 Areas for Improvement

- **All Injury Frequency Factor.** EWSI will be introducing a new program in 2018 to prevent musculoskeletal injuries. This program will encourage employees to engage in specific pre and periodic stretching exercises throughout their work day.

3.6 Rates and Bill Comparisons

Wastewater bill comparisons for 2017 are based on the published drainage and wastewater treatment rates for Calgary, Vancouver Winnipeg and Regina, as well as four local

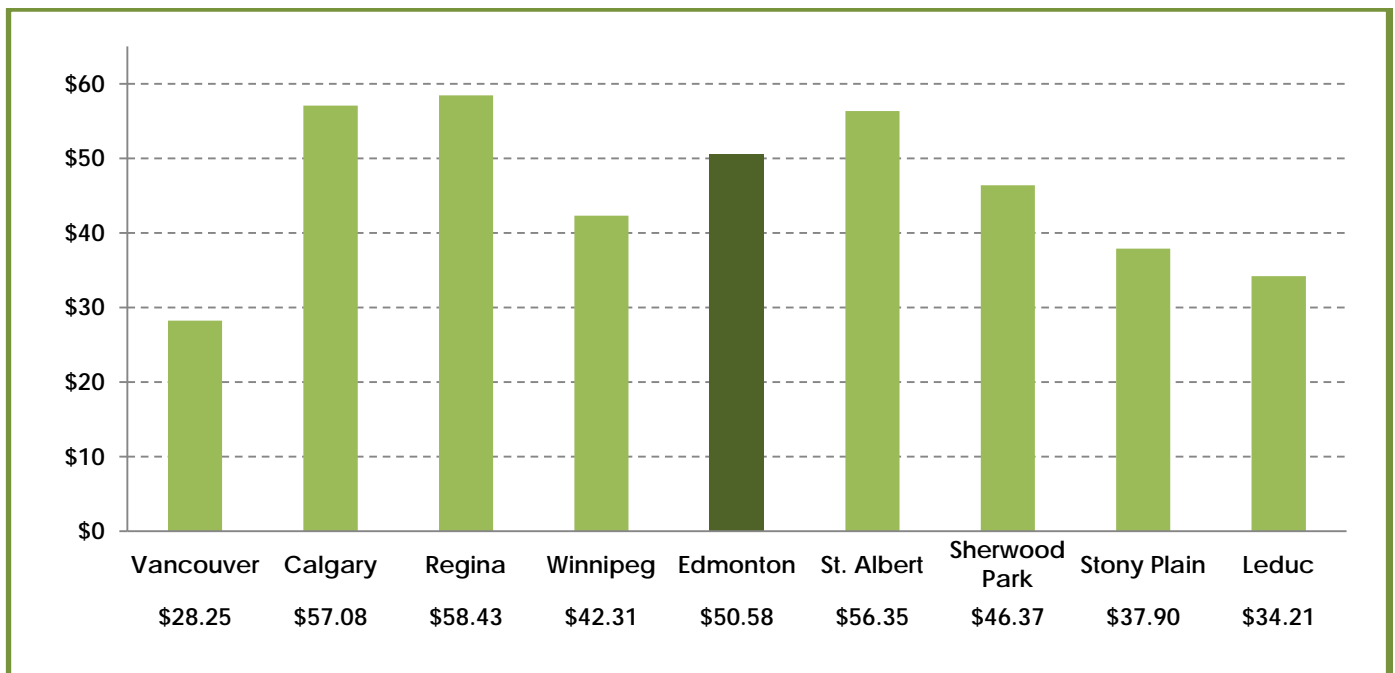
communities. These bill comparisons represent the total cost to the customer and include fixed charges, consumption charges and any other applicable surcharges.

Unlike most cities, where wastewater treatment services and drainage services are combined, Wastewater is only responsible for wastewater treatment; the operations and maintenance of sanitary, storm and combined sewer systems are provided through EPCOR Drainage Services. Accordingly, wastewater bill comparisons are based on blended EWSI wastewater treatment and City drainage rates.

3.6.1 Residential Wastewater Bills

Figure 3.6.1 provides a comparison of residential household wastewater bills for residential household consumption of 14.6 m³ per month, the average residential customer consumption per month in Edmonton in 2017.

Figure 3.6.1
2017 Monthly Residential Drainage and Wastewater Comparison
(14.6 m³/month)



Unlike water services which are relatively consistent among cities and communities, the nature and extent of wastewater treatment and drainage services vary significantly because of differences in the extent of wastewater treatment between different cities and municipalities, the inclusion of certain services in property taxes, and geographic and climatic factors which affect the level of investment in and approach to flood mitigation and storm water services.

Edmonton's \$50.58 average monthly bill from Figure 3.6.1 includes Wastewater charges of \$16.54 and Drainage Services charges of \$34.03. While the total bill is higher than Vancouver and Winnipeg, it is lower than Calgary and Regina, the two cities where drainage and wastewater treatments are most comparable to Edmonton.

3.6.2 Commercial Wastewater Bills

Table 3.6.2 provides a comparison of the wastewater bills for commercial customers of various sizes. This table shows that combined wastewater and drainage bills for commercial customers are competitive with surrounding communities and with major cities in western Canada, although Edmonton's relative ranking varies with the size of the customers with larger customers receiving relatively high monthly bills. These results reflect differences in rate structures between cities and municipalities, as well as differences in the extent of wastewater treatment and drainage services provided.

Table 3.6.2
Commercial Monthly Wastewater Bill Comparison
(\$ per month)

		A	B	C	D
Monthly Bill - \$ per month		Small	Medium	Large	Extra Large
1	Monthly Consumption - m³	10	250	1,000	5,000
2	Vancouver	24	234	978	4,624
3	Calgary	52	371	1,369	6,688
4	Regina	51	461	1,913	9,087
5	Winnipeg	26	638	2,550	12,750
6	Edmonton	42	487	1,964	10,311
7	St. Albert	75	483	1,758	8,558
8	Sherwood Park	39	432	1,659	8,204
9	Stony Plain	31	414	1,611	7,994
10	Leduc	27	380	1,483	7,363

Appendix A: PBR Plan 2017-2021

A.1 PBR Framework

EWSI's In-City Water and Wastewater rates for the 2017-2021 PBR term are regulated in accordance with the PBR Plan approved in Bylaw 17698. This plan encompasses rates, performance measures, and return on equity. The relationships between these components, discussed below, ensure that capital and operating cost decisions provide a balance between operational performance, rates, and return on equity, while safeguarding system reliability and service quality, providing fair, stable, predictable rates to rate payers, and providing a basis for the future development of the water and wastewater treatments system.

- **PBR Rates.** Annual changes to In-City Water and Wastewater rates are limited to inflation, less an efficiency factor, plus special rate adjustments and, in rare cases, non-routine adjustments. The determination of PBR rates is described in Schedule 3, Sections 1, 2 and 5 of the bylaw. The use of a formulaic approach for calculating and setting utility rates acts as a “price cap” providing ratepayers with stable and predictable rates. The efficiency factor, set at 0.25% for the 2017-2021 PBR term, requires EWSI to increase productivity and achieve efficiencies in excess of inflation if it is to meet its targeted return on equity.
- **Performance Measures.** EWSI's PBR framework includes performance measures for water and wastewater treatment system service quality as described in Schedule 3, Sections 3 and 4 of the bylaw. EWSI faces financial penalties if it does not meet or exceed performance measure standards, providing assurance to customers that water and wastewater treatment system service quality will not be sacrificed to keep rates low or increase returns to EWSI. EWSI's performance measures are audited annually by an independent accounting firm.
- **Return on Equity.** The PBR plan incorporates a forecast rate of return on equity commensurate with consumption, cost and other risks that allows EWSI to finance its operational and capital programs, to provide its customers with high levels of service quality and reliability, and to provide “just and reasonable” returns to its shareholder. Achieving this return is dependent on EWSI achieving operating cost efficiencies, meeting or exceeding performance standards, and developing the utility infrastructure needed to provide service to its customers. For the 2017-2021 PBR term, returns on equity are based on a deemed capital structure of 60% debt and 40% equity and a 10.175% rate of return on equity, a decrease of 0.7% from the 10.875% rate of return on equity approved for the 2012-2016 PBR term.

A.2 Risks and Incentives

The PBR framework provides incentives for EWSI to improve operational performance while achieving cost savings through process improvements and other means. Under this framework, EWSI also assumes the risks associated with water consumption, operating costs, financing costs and capital costs, ensuring that customers are provided with stable and predictable rate increases. These risks and EWSI's strategies to mitigate them include:

- **Water Consumption Risk.** Under PBR, EWSI bears all of the risks associated with weather-related fluctuations in water consumption and water quality, as well as the longer-term risks associated with declining consumption per customer. While EWSI expects the impacts of short-term weather-related volatility to even out over the five year PBR term, longer term declines are of greater concern. In the 2012-2016 PBR term, per customer consumption was significantly lower than forecast, resulting in substantial revenue shortfalls. Accordingly, EWSI revised its consumption forecast methodology for its 2017–2021 PBR forecast to better capture long term trends in water consumption.
- **Operating Cost Risk.** EWSI actively works to minimize fluctuations in input prices through long-term power contracts, chemical optimization processes, and continuous efforts to implement cost reduction strategies in all areas of its operations.
- **Interest Risk.** Fluctuations in short-term interest rates, long-term debt issue costs and in the level of capitalized interest have significant impacts on EWSI's net income and return on equity. EWSI mitigates interest risk through timing of long-term debt issuances and optimizing working capital.
- **Capital Cost Risk.** In-City Water and Wastewater's operations are capital intensive. Over the 2012-2016 period, EWSI found that a much higher than forecast level of capital replacements was required at the Gold Bar Wastewater Treatment Plant to maintain plant reliability. EWSI seeks to minimize these risks through comprehensive capital project and asset management programs, ensuring that new projects or changes to existing projects are justified and that there is an appropriate level of management, senior management and executive oversight over capital spending.

A.3 In-City Water

A.3.1 In-City Water Customer Classes

In-City Water rates consist of fixed monthly service charges that vary with meter size and variable charges applied to each cubic metre of water consumed. Consumption charges differ for each of In-City Water's customer classes. These classes and their rate structures include:

- **Residential Customer Class.** Residential customers are charged based on an inclining rate structure with three consumption blocks. The inclining rate structure is intended to promote water conservation and provide incentives for residential customers to use water efficiently.
- **Multi-Residential Customer Class.** Multi-residential customers are charged based on a declining rate structure with three consumption blocks. EWSI has found that the cost of providing water to individual multi-residential customers declines as the size of the multi-residential building increases. As well, there is a wide range of consumption volumes for multi-residential customers. Accordingly, a declining rate structure best reflects the cost characteristics of this customer class.
- **Commercial Customer Class.** Similar to multi-residential customers, commercial customers are charged based on a declining rate structure, but with five consumption blocks to recognize the wide range of average consumption volumes within this customer class.

A.3.3 In-City Water Special Rate Adjustments

The 2017-2021 PBR Plan includes three special rate adjustments for In-City Water:

- **Special Rate Adjustment for Rebasing.** The In-City Water revenue requirement was rebased at the beginning of the 2017-2021 PBR term. The resulting rebasing adjustment to rates includes the on-going benefits to rate-payers of efficiency gains realized in the 2012-2016 PBR term, the impacts of higher than forecast capital expenditures during the 2012-2016 PBR term; and increases in the capital expenditure programs for the 2017-2021 PBR term (discussed in section 3.4). Also included in the rebasing adjustments is the impact of EWSI's cost of service study which has resulted in redistribution of revenue requirements from the Residential and Multi-Residential customer classes to the Commercial customer class.
- **Special Rate Adjustment for Accelerated Programs.** These special rate adjustments support the acceleration of the replacement of water mains as part of the City of Edmonton's neighbourhood renewal program and the upgrade of water mains to increase fire protection capacity in neighbourhoods experiencing increased densities as a result of infill development.
- **Special Rate Adjustments for Environmental Programs.** EWSI is undertaking two significant environmental initiatives during the 2017-2021 PBR term. The first initiative is an extensive River Monitoring Project to regularly monitor, evaluate and report on a number of water quality variables from several sampling sites in the river for 2018-2021. This program is forecast to have annual costs of \$1.0 million starting in 2018. The second initiative, which aligns with the City's "*The Way We Green*" strategy, is a Green Power Initiative to replace approximately 10% of EWSI's total power volumes with energy from locally produced renewable sources starting in 2018. This initiative is forecast to cost \$1.9 million annually commencing in 2018.

A.4 Wastewater

A.4.1 Wastewater Customer Classes

Wastewater treatment rates consist of fixed monthly service charges that are applied equally to each customer and variable charges applied to each cubic meter of water consumed. Wastewater has two customer classes:

- **Residential Customer Class.** Unlike In-City Water, there are no separate rates for multi-residential customers. Instead, customers who would be multi-residential water customers are subject to the same rates as residential wastewater customers. The common rate structure for residential and multi-residential customers recognizes that the costs of wastewater treatment are very similar for residential and multi-residential customers. Accordingly, charges to Residential customers are based on a flat rate structure with a single consumption block.
- **Commercial Customer Class.** Consumption charges for commercial customers are based on a declining rate structure with three consumption blocks to recognize that there are economies of scale in wastewater treatment for larger commercial customers. In addition, commercial customers are charged overstrength fees for prescribed materials that exceed the concentrations shown in Section 4 of Schedule 1 to Bylaw 17698.

A.4.2 Wastewater Special Rate Adjustments

The 2017-2021 PBR Plan includes a single special rate adjustment for rebasing. Similar to In-City Water, Wastewater's revenue requirement was rebased at the beginning of the 2017-2021 PBR term to reflect efficiency gains realized in the 2012-2016 PBR term, as well as the substantial increases in capital spending needed to deal with the challenges of the aging infrastructure at the Gold Bar Wastewater Treatment Plant.