Final Report

EPCOR

2020 Wastewater Treatment Cost of Service Study

January 2021

January 8, 2021

Mr. Darrell Manning
EPCOR Water Services, Inc.
9496 Rossdale Road
Edmonton, Alberta T5J 3B1

Subject: Comprehensive Wastewater Treatment Cost of Service Study Final Report

Dear Mr. Manning:

HDR Engineering, Inc. (HDR) was retained by EPCOR Water Services, Inc. (EPCOR) to provide technical assistance in the update of EPCOR's wastewater treatment cost of service analysis to support EPCOR's efforts in establishing cost-based rates for its wastewater treatment customers.

EPCOR was responsible for the development of the revenue requirement data which was provided to HDR for input into the cost of service analysis (model). The model and analysis were developed utilizing EPCOR's accounting, operating and management records. Based on the revenue requirement developed by EPCOR, HDR then developed a cost of service analysis to determine the equitable distribution of costs between the various wastewater treatment customer classes of service. HDR has relied on this information to develop our analyses, from which we draw our findings, conclusions and recommendations.

The analysis and model developed for EPCOR was prepared using generally accepted cost of service and rate making methodologies and principles. These generally accepted industry standard cost of service methodologies and principles are defined by the Water Environment Federation (WEF). The cost of service methodology used for EPCOR has been tailored to the specific and unique circumstances and facilities owned and operated by EPCOR. This report details the findings and conclusions of the analysis conducted herein. The development of the model and technical analysis is intended to provide cost-based, defensible, and equitable wastewater rates to EPCOR's wastewater treatment customers.

We appreciate the opportunity to provide technical assistance to EPCOR. We also appreciate the assistance provided by EPCOR management and staff in the development of this study.

Sincerely yours,
HDR Engineering, Inc.

Shawn Koorn
Associate Vice President

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1 Introduction and Overview

1.1 Introduction

HDR Engineering, Inc. (HDR) was retained by EPCOR, Inc. (EPCOR) to provide technical assistance in the development of a wastewater treatment cost of service analysis to support EPCOR's historical practice of establishing cost-based rates. This report outlines the approach, methodology, findings, and conclusions of the cost of service analysis developed for EPCOR's wastewater treatment services.

This report was developed utilizing EPCOR's accounting, operating and management records. HDR has relied on this information to develop the wastewater treatment cost of service analysis, from which we have drawn our findings, conclusions, and recommendations. At the same time, this study was developed utilizing "generally accepted" utility rate setting methodologies and principles. This report provides EPCOR with the basis for developing and implementing wastewater rates which are cost-based, equitable and defensible to its customers.

1.2 Study Goals and Objectives

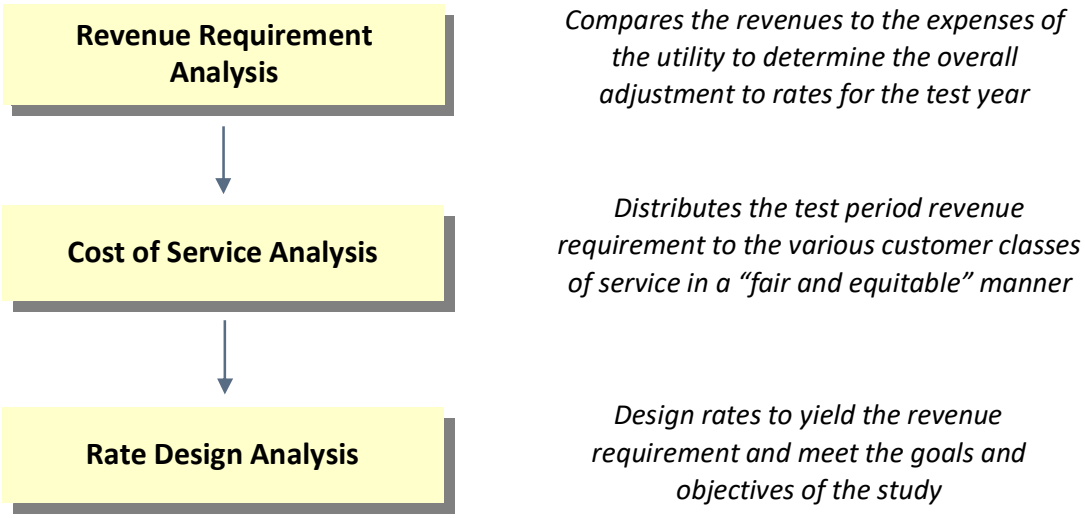
The development of this study was based on several key rate study goals and objectives. In general, these were as follows:

- Develop a wastewater treatment cost of service analysis that is consistent with the principles and methodologies established by the Water Environment Federation (WEF) Manual of Practice No. 27, Financing and Charges for Wastewater Systems.
- Develop a cost of service methodology to equitably distribute the cost of providing wastewater treatment to various customer classes of service.
- Review the current wastewater treatment rate structure and provide alternatives for discussion and review by EPCOR for their future consideration.
- Provide EPCOR with a cost of service model to use and evaluate the distribution of future wastewater treatment costs and rate impacts.

1.3 Overview of the Comprehensive Rate Study Process

Provided below in Figure 1 – 1 is an overview of the steps required to conduct a comprehensive rate study.

Figure 1 – 1
Overview of the Comprehensive Rate Study Process



The framework or methodology shown in Figure 1-1 provides an overview of the typical components of a comprehensive study. Each of these steps of the rate setting process and the technical analyses associated with them are based on the generally accepted wastewater rate-setting methodologies and principles described in the Water Environment Federation (WEF) Manual of Practice (MOP) #27. An important aspect of this study is incorporating and "tailoring" each of these analytical elements to reflect the specific and unique circumstances and characteristics of EPCOR's wastewater treatment system.

1.4 Report Organization

This report is organized as follows:

- Section 2 provides an overview of the wastewater treatment revenue requirement analysis which was developed by EPCOR and is used as a basic input into the cost of service analysis.
- Section 3 discusses and reviews the development of the wastewater treatment cost of service analysis.
- Section 4 provides an overview of rate setting goals and objectives and a summary of EPCOR's current treatment rates.

At the conclusion of this report, a technical appendix is attached which provides the detailed exhibits and technical analyses completed to support the wastewater treatment cost of service analysis.

1.5 Summary

This report provides a summary of the technical analyses undertaken to develop EPCOR's wastewater treatment cost of service analysis. HDR's study has been developed using generally accepted wastewater cost of service methodologies and principles. This report and our analyses are designed and intended to provide EPCOR with the information necessary to continue to develop cost-based and equitable rates applicable to its wastewater treatment utility.

2 Wastewater Treatment Revenue Requirement

2.1 Introduction

This section of the report discusses the revenue requirement for EPCOR's wastewater treatment utility. EPCOR management and staff developed the test period wastewater treatment costs and associated revenue requirement analysis. The results of the revenue requirement analysis provide a framework around which to evaluate the overall adequacy of EPCOR's current wastewater treatment rates. Provided below is a detailed discussion of the revenue requirements as independently developed by EPCOR management and staff. This wastewater treatment revenue requirement is then carried forward and utilized within the cost of service analysis developed for EPCOR by HDR.

2.2 Revenue Requirement Framework

By virtue of the differences between a public utility and a private utility, the revenue requirement is often based upon different elements or methodologies. Most private or regulated utilities utilize what is known as a "utility or accrual" basis of determining revenue requirements for setting rate levels. This convention calculates a utility's annual revenue requirement by aggregating a test period's operation and maintenance (O&M) expenses, taxes, depreciation expense and a fair return on investment.

In contrast to the "utility or accrual" method of developing revenue requirements for privately-owned public utilities, a different method of determining annual revenue requirements is often used for governmentally-owned public utilities. The convention used by most governmental or public utilities is called the "cash basis" methodology of setting revenue requirements. As the name implies, a public utility aggregates its cash expenditures to determine its total revenue requirements for a specified period of time.

Table 2 - 1 summarizes and compares the "cash" and "utility/accrual" basis methodologies.

Table 2 – 1
Cash versus Utility Basis Comparison

	Cash Basis		Utility Basis (Accrual)
+	O&M Expenses	+	O&M Expenses
+	Taxes/Transfer Payments	+	Taxes/Transfer Payments
+	Capital Improv. Funded From Rates (≥ Depreciation Expense)	+	Depreciation Expense
+	Debt Service (Principal + Interest)	+	Return on Investment
=	**Total Revenue Requirement**	=	**Total Revenue Requirement**

For this particular study, given that EPCOR is a regulated utility providing wastewater treatment services, the "utility/accrual basis" approach was utilized. This methodology is consistent with EPCOR's past rate setting methodologies and practices.

2.3 Development of the Wastewater Treatment Revenue Requirement

As noted above, the wastewater treatment revenue requirement used for this study was developed by EPCOR management and staff. This portion of the report will summarize and discuss the basic components and results of EPCOR's wastewater treatment revenue requirement analysis. The initial step in calculating the revenue requirement was to establish a time period around which the revenue requirement would be reviewed. For this particular study, the revenue requirement developed by EPCOR was based on budgeted 2019 expenditures and projected for 2020 through 2029.

The second step is to determine a method of accumulating costs. As discussed above, EPCOR used a utility/accrual basis methodology. Given this basic analytical framework, the wastewater treatment revenue requirement was developed for the review period.

2.4 Summary of EPCOR's Wastewater Treatment Revenue Requirement

HDR was provided with EPCOR's projected 2020 - 2029 wastewater treatment revenue requirement. Provided below in Table 2 -2 is a summary of the wastewater treatment revenue requirement developed by EPCOR. As noted previously, the costs included within this revenue requirement analysis provide the starting point for the costs to be equitably allocated within the wastewater treatment cost of service analysis. These costs will be equitably distributed to EPCOR's various customer classes of service.

Table 2 – 2
Summary of the Wastewater Treatment Revenue Requirement ($000)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Revenues										
Rate Revenues	$104,301	$110,825	$114,874	$117,442	$119,848	$127,875	$132,224	$134,959	$137,760	$140,628
Other Revenues	18,649	20,112	20,494	20,884	21,281	21,685	22,097	22,517	22,945	23,381
Total Revenues	**$122,950**	**$130,937**	**$135,368**	**$138,326**	**$141,129**	**$149,560**	**$154,321**	**$157,476**	**$160,705**	**$164,009**
Expenses										
O&M Expenses	$70,597	$73,907	$76,227	$77,706	$79,196	$81,161	$82,857	$84,449	$86,072	$87,728
Taxes	$616	$647	$659	$671	$684	$697	$710	$724	$738	$752
Depreciation	19,530	20,737	21,747	22,606	23,627	24,800	26,695	29,227	30,000	31,395
Financing Costs	11,951	13,464	14,359	15,197	15,561	15,598	16,243	17,007	17,194	18,809
Return on Investment	20,256	22,183	22,377	22,145	22,060	27,304	27,817	26,070	26,701	25,326
Total Expenses	**$122,950**	**$130,937**	**$135,368**	**$138,326**	**$141,129**	**$149,560**	**$154,321**	**$157,476**	**$160,705**	**$164,009**
Bal./(Deficiency) of Funds	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

As noted previously, the above wastewater treatment revenue requirement was developed by EPCOR and provided to HDR as the basis for the costs to be equitably distributed within the cost of service analysis.

2.5 Summary

This section of the report has provided a summary of the wastewater treatment revenue requirements as developed by EPCOR. The costs within the revenue requirement analysis were used by HDR as the starting point for the wastewater treatment cost of service analysis. The next section of the report will discuss the development of the EPCOR's wastewater treatment cost of service analysis.

3 Wastewater Treatment Cost of Service Analysis

3.1 Introduction

This section of the report details the wastewater treatment cost of service analysis developed by HDR Engineering, Inc. (HDR) for EPCOR's wastewater treatment utility. The cost of service utilizes and equitably distributes the revenue requirement as provided in Section 2. Provided below is a more detailed discussion of the key technical steps of the cost of service analysis undertaken and a summary of our findings, conclusions and recommendations.

3.2 Cost of Service Analysis

The objective of the cost of service analysis is to equitably distribute the revenue requirement to the various customer classes of service (e.g., residential, commercial, etc.). By following the generally accepted guidelines and principles of a cost of service analysis, it will inherently lead to wastewater treatment rates which are equitable, cost-based, and not viewed as arbitrary or capricious in nature.

As discussed in Section 2, the "utility basis" approach is the generally accepted methodology used by EPCOR to establish the level of costs to be equitably distributed within the cost of service analysis. There are two primary objectives in conducting a cost of service analysis:

1. Equitably distribute the revenue requirement among the customer classes of service
2. Derive average unit costs for subsequent reference/use in designing final rates

The objectives of the cost of service analysis are different from determining the revenue requirement. As noted in the previous section, a revenue requirement analysis determines the utility's overall financial needs, while the cost of service analysis provides a methodology to determine the fair and equitable manner in which to collect the revenue requirement.

The second rationale for conducting a cost of service analysis is to ensure a rate is designed such that it properly reflects the costs incurred by the utility. For example, a wastewater utility incurs costs related to wastewater flow, strength, and customer cost components. A wastewater utility typically must designed and built to sufficiently handle both the total flow and treat wastewater strengths. Therefore, those customers impacting the wastewater treatment system in these different ways should contribute their equitable share of the costs, based upon the respective burdens each place upon the system (e.g., high flow / low strength vs. low flow / high strength, etc.). Each of these types of costs may be collected in a slightly different manner as to allow for the development of wastewater treatment rates that collect costs in roughly (i.e., proportionally) the same manner as they are incurred.

3.3 Establishing Customer Classes of Service

The first step in a cost of service study is to determine the customer classes of service. For a cost of service analysis to equitably allocate costs, the utility must group customers in classes of

service that have similar usage patterns and facility requirements. EPCOR's current wastewater treatment rate schedules (classes of service) are as follows:

- Single Family
- Multi-Family
- Commercial
- Overstrength (High Strength Wastewater Customers)

During the development of the cost of service study, various alternative customer classes of service were discussed with EPCOR staff. As a starting point for that discussion, HDR noted that EPCOR has established a set of customer classes of service which appear to be very reasonable and, in HDR's opinion, follow current wastewater utility industry approaches. The establishment of customer classes of service allows for the development of cost-based rates and the ability to establish rate structures for each customer class of service that reflects the overall goals and objectives of EPCOR.

3.4 Key Assumptions of the Cost of Service

A number of key assumptions were used within EPCOR's wastewater treatment cost of service study. Listed below is a brief discussion of the major assumptions used.

- The test year used for the wastewater treatment cost of service analysis was the forecasted or projected 2021 revenue requirement.
- The revenue and expense data utilized by HDR within this study was provided by EPCOR.
- A "utility basis" approach or methodology was utilized for the cost of service analysis. This is a generally accepted methodology for accumulating costs and allocating them within a cost of service analysis. This generally accepted methodology is described in detail in the Water Environment Federation, Manual of Practice No. 27.
- The allocation and distribution of EPCOR's plant in service and revenue requirement was also developed based on generally accepted methodologies as described in the Water Environment Federation, Manual of Practice No. 27. The methodologies were tailored to be reflective of EPCOR's specific and unique treatment plant facilities and operations.
- The distribution factors for volume and strength, used within EPCOR's cost of service analysis to equitably assign costs to the various classes of service, were developed using EPCOR specific data which was provided by EPCOR.

3.5 General Cost of Service Procedures

In order to determine the cost to serve each customer class of service on the system, a cost of service analysis is conducted. A cost of service study utilizes a three-step approach to equitably and proportionally distribute the revenue requirement. These steps take the form of functionalization, allocation, and distribution. Provided below is a more detailed discussion of the wastewater treatment cost of service study, and the specific steps taken within EPCOR's analysis.

3.5.1 Functionalization of Costs

The first analytical step in the wastewater treatment cost of service process is called *functionalization*. Functionalization is the arrangement of expenses and asset (plant) data by major operating components and functions within the treatment plant. Within this study, the functionalization of the cost data was already largely accomplished through EPCOR's accounting and asset records.

3.5.2 Allocation of Costs

The second analytical task performed in a wastewater treatment cost of service study is the *allocation* of the costs. Allocation determines why the expenses were incurred or what type of need is being met. The utility's plant accounts (assets) and revenue requirement were reviewed and allocated.

- **Volume Related Costs:** Volume related costs are those costs which tend to vary with the total quantity or volumes of wastewater treated.
- **Strength-Related Costs:** Wastewater strength is a label which describes the physical, biological and chemical characteristics of the wastewater. Strength-related costs refer to specific wastewater characteristics and the process/cost associated with treating different contaminants and their concentration in the effluent. Higher strength discharges require additional treatment to meet discharge requirements. Strength levels or the parameters of wastewater can be measured in a variety of ways. For purposes of EPCOR's cost of service analysis, strength was characterized/measured around the following parameters: biochemical oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), total nitrogen (TKN), total phosphorous (TP), and oil and grease (OG). As already noted, increased or higher levels of these strength constituents generally equate to increased treatment costs for most wastewater treatment systems.
- **Customer-Related Costs:** Customer-related costs vary with the addition or deletion of a customer or a cost which varies as a function of the number of customers served. Customer related costs typically include the costs of billing, collecting, and accounting.
- **Revenue-Related Costs:** Some costs associated with the utility may vary with the amount of revenue received by the utility. An example of a revenue related cost would be a utility tax, or franchise fee, which is based on gross utility revenue.

Given the above types of costs, EPCOR's revenue requirement is allocated to the various cost components based upon the reason why the cost was incurred (e.g., to meet a volume-related need, etc.) as outlined in industry standard wastewater cost of service principles.

3.5.3 Development of Distribution Factors

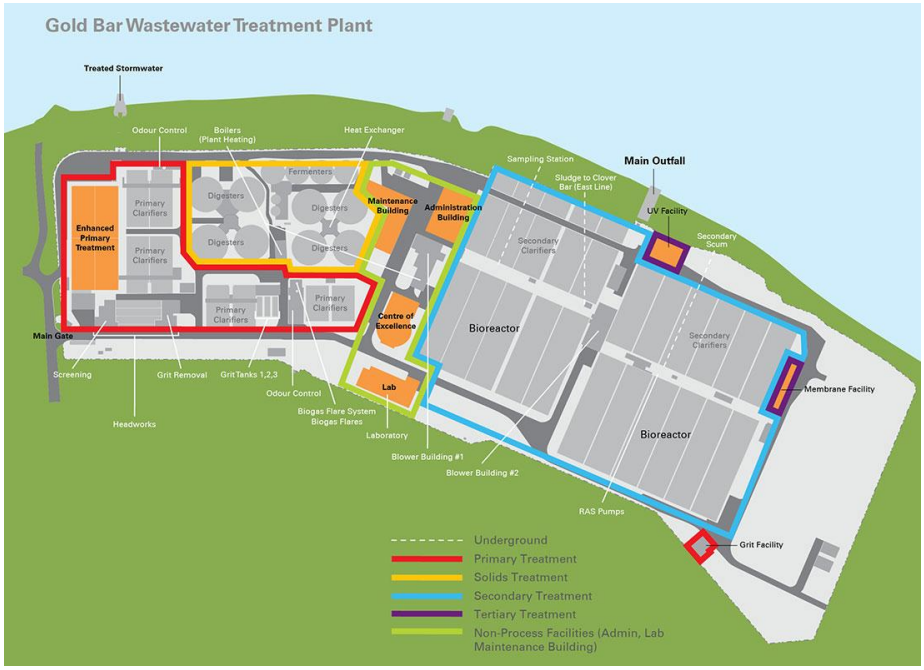
Once the allocation process is complete, and the customer groups have been defined, the various allocated costs are equitably distributed to each customer class of service, or rate schedule. EPCOR's wastewater treatment utility's allocated costs were distributed to the various customer groups using the following distribution factors.

- **Volume Distribution Factor:** Volume-related costs are distributed on the basis of estimated class contributions to wastewater flows. Wastewater flows are not typically metered and given that, a reasonable methodology or surrogate must be used in order to estimate each customer class's contribution. As part of the data and information that EPCOR provided HDR, there was an estimate developed for each customer type which was used as the basis for the distribution of costs related to volume allocated costs. To verify the reasonableness of the estimated flows, the calculated total flows used in this distribution factor was compared to the recent historical flows at the treatment plant. The total volume in the distribution factor was approximately the same as the historical flows at the treatment plant. The calculation of the volume distribution factor is shown in Exhibit 3 of the technical appendix.
- **Customer Distribution Factor:** Customer costs, within the cost of service analysis, are distributed to the various customer classes of service based upon their respective number of customer accounts. Two types of customer distribution factors were developed – actual and weighted. The actual customer distribution factor assumes that there is no disproportionate cost associated with serving a customer (e.g., postage for bills is the same cost per customer, regardless of the size or usage of the customer). In contrast, a weighted customer distribution factor assumes that there is some disproportionality associated with serving different types of customers and attempts to estimate the level of difference in serving the customers. It is important to note that for this particular utility and this study, no per customer cost differences or weighting differences between customers was assumed. Exhibit 4 of the technical appendix provides the calculation of the customer allocation factors.
- **Strength-Distribution Factor:** Strength-related costs are allocated (i.e., assigned) between the wastewater parameters of BOD, COD, TKN, TP, TKN, OG, and TSS. Each of these specific types of strength-related costs are then equitably distributed to each class of service based upon flow contributions and the assumed strength level the class of service is contributing. For the residential, multi-family and commercial customers, their assumed wastewater strength-levels were set at domestic level strengths. In contrast to this, overstrength customers reflect those customers with higher strength wastewater discharged to EPCOR's wastewater treatment system and their strength levels are based on actual kilograms removed for each constituent from the actual testing done on overstrength customers. Exhibit 5 in the technical appendix provides the calculation of the strength-distribution factors.
- **Revenue-Related Distribution Factor:** The revenue related distribution factor was developed from the projected rate revenues for 2021 for each customer class of service. These revenue projects were developed as a part of the revenue requirement analysis (Exhibit 2). A summary of the revenue-related distribution factor is provided in Exhibit 6 of the technical appendix.

Given the development of the distribution factors, the final step in the wastewater treatment cost of service analysis was to distribute the allocated costs to the various customer classes of service.

3.6 Functionalization and Allocation of Plant in Service (Rate Base)

A necessary step of the cost of service is the functionalization and allocation of wastewater treatment plant in service (assets and infrastructure). In performing the functionalization of plant in service, HDR utilized EPCOR's historical plant account records. The purpose of the allocation step of the cost of service is to determine why the specific plant assets (treatment plant components) are in place, and what function they provide in the treatment process. In other words, which allocation component (Vol, BOD, COD, TKN, etc.) does the asset support or provide a benefit to.



The functionalization of EPCOR's wastewater treatment plant assets (plant in service) was largely accomplished from the existing asset records. Once the treatment assets were functionalized, the analysis shifted to allocation of the asset. The allocation process included reviewing each line item and determining which allocation cost components the assets were related to. During the course of the development of this portion of the analysis, there was significant discussion and analysis around the functionalization and allocation of the treatment plant and its components. HDR treatment process engineering staff initially worked through the assets based on knowledge of the treatment plant and general treatment plant functions. The allocation approach was then reviewed and discussed with EPCOR treatment plant and engineering staff to finalize the allocations of the treatment plant assets. The proposed allocations are based on HDR and EPCOR's understanding of the treatment facilities which are currently in place, their current operations, and generally accepted allocation methodologies for wastewater treatment. Table 3 - 1 provides the basis for the allocation of EPCOR's Gold Bar Wastewater Treatment Plant in service.

Table 3 – 1
Summary of the Wastewater Treatment Plant in Service ($000)

		Strength – Related						
	VOL	BOD	COD	TKN	TP	OG	TSS	Cust
Land	$0	$0	$0	$0	$0	$0	$0	$421
WWTP								
Admin	$0	$0	$0	$0	$0	$0	$0	$3,246
Air Scrub	0	0	0	0	0	5,766	5,766	0
Main Control Room	51	96	169	227	251	205	304	10
Aux Control Room	14	27	47	64	70	57	85	3
Blowers	0	1,124	450	2,474	450	0	0	0
Boilers	658	1,229	2,169	2,918	3,219	2,628	3,904	127
CBF (inc. Ostara)	739	1,381	2,436	3,277	3,615	2,951	4,384	143
Center of Excellence	5,701	0	0	0	0	0	0	0
Digesters	0	9,990	4,281	14,271	14,271	14,271	14,271	0
Distribution Station	1	2	3	4	4	3	5	0
Enhanced Prim. Treat.	0	0	2,829	1,297	0	4,244	3,419	0
Flare	0	123	53	176	176	176	176	0
Grit	0	0	22,792	7,597	0	7,597	37,986	0
Laboratory	469	1,689	1,689	1,689	1,689	469	1,689	0
Maintenance Building	146	273	482	648	715	583	867	28
Outfall	16	0	0	0	0	0	0	0
Penthouse	17	33	58	77	85	70	104	3
Primary Clarifier	0	0	20,051	9,190	0	30,076	24,228	0
Screens	970	0	0	0	0	0	2,263	0
Sampling	2	7	7	7	7	2	7	0
Scum	0	318	0	0	0	742	0	0
Bioreactor/Secondary Clarifier	0	13,258	5,682	28,411	37,881	0	9,470	0
Substation	53	98	173	233	257	210	312	10
UV	11,581	0	0	0	0	0	0	0
Waste Activated Sludge	0	1,149	492	2,461	3,282	0	820	0
EPT - Polymer System	0	0	849	389	0	1,273	1,026	0
Hydrogen Peroxide	125	0	0	0	0	0	0	0
Secondary Alum Room	91	0	0	0	257	0	257	0
Biogas	0	1,945	834	2,779	2,779	2,779	2,779	0
Blend Tanks	0	206	88	294	294	294	294	0
Fermenter	0	0	0	5,015	23,642	0	0	0
Sludge	0	5,609	2,404	8,012	8,012	8,012	8,012	0
CWIP	0	0	0	0	0	0	0	0
Total	**$20,634**	**$38,556**	**$68,038**	**$91,510**	**$100,957**	**$82,410**	**$122,428**	**$3,991**
General Plant	$2,472	$4,619	$8,151	$10,964	$12,095	$9,873	$14,668	$478
Total Net Plant in Service	**$23,106**	**$43,175**	**$76,190**	**$102,474**	**$113,053**	**$92,283**	**$137,096**	**$4,470**

Table 3 - 1 provides a summary of the basic functionalization and allocation of EPCOR's wastewater treatment plant assets. A detailed exhibit of the functionalization and allocation of plant investment can be found in the Technical Appendix, Exhibit 7c.

Provided in Table 3 – 2 is a summary of the percentage allocation to the various cost components of EPCOR's total wastewater treatment plant in service.

Table 3 – 2
Summary of the Wastewater Treatment Net Plant in Service Allocation ($000)

			Strength – Related						
	Total	VOL	BOD	COD	TKN	TP	OG	TSS	Cust
Total Allocation	100.0%	3.2%	7.0%	13.5%	17.0%	18.4%	15.8%	24.2%	0.9%

3.7 Functionalization and Allocation of Operating Expenses

Operating expenses are generally functionalized and allocated in a manner similar to the corresponding plant account (i.e., Tables 3-1 and 3-2). This approach to allocation of operating expenses was used for the allocation of expenses within EPCOR's wastewater treatment analysis. For the cost of service study, the 2021 revenue requirement for the wastewater treatment utility prepared by EPCOR was functionalized and allocated based on the allocation of treatment plant.

As noted previously, the revenue requirement was developed utilizing the utility/accrual basis methodology which was comprised of operation and maintenance expenses, annual depreciation expense, revenue tax, and a return on rate base (net plant in service). Similar to the allocation of plant in service, the analysis reviewed each line of the revenue requirement to determine the appropriate allocation of the revenue requirement component. In general, the majority of the revenue requirement was allocated as "net plant", or the overall percentages shown above in Table 3-2. However, there were also specific line items that were allocated to specific cost components. As examples, item such as franchise fees were allocated as revenue-related, chemicals were assigned to the strength related categories of phosphorus (TP) and suspended solids (TSS), and billing, meters, and customer service were allocated to the customer-related cost component.

One key objective of EPCOR's cost of service analysis is to review the costs associated with providing high strength treatment services, or service to "overstrength" customers. In reviewing the allocation of the revenue requirement, EPCOR has a separate line item that is related to managing and monitoring the overstrength customer program. This cost was directly assigned to the overstrength customer class of service so that the overstrength customers assume the cost responsibility for the administration and activities associated with the overstrength program. Provided in Table 3 – 3 is summary of the allocated revenue requirement for EPCOR's wastewater treatment utility.

Table 3 – 3
Summary of the 2021 Wastewater Treatment Expense Allocation ($000)

			Strength – Related								
	Total	VOL	BOD	COD	TKN	TP	OG	TSS	Cust	RR	DA
Total Alloc. - $	110,825	2,699	5,969	11,464	14,433	16,643	13,381	20,383	16,075	8,149	1,629
Total Alloc. - %	100.0%	2.4%	5.4%	10.3%	13.0%	15.0%	12.1%	18.4%	14.5%	7.4%	1.5%

As shown in Table 3-3, EPCOR's total revenue requirement has been allocated between the various cost components. A more detailed review of the allocation of EPCOR's wastewater treatment revenue requirement can be found in the Technical Appendix on Exhibit 8. These totals are then distributed between each customer class of service (rate schedule) based on their proportional share (i.e., contribution) of each allocation cost component. As a point of reference, the DA (direct assignment) is the allocation of the overstrength program costs to the overstrength customers.

3.8 Distribution of the Revenue Requirement

The next step in the cost of service process is the equitable *distribution* of the allocated costs to the customer classes of service. As noted in Section 3.5.3, a distribution factor was developed for each cost component. The distribution factor provides the basis for the proportional distribution of each cost component to each customer class of service. Provided below in Table 3-4 is a summary of the distributed revenue requirement to each customer class of service.

Table 3 – 4
Summary of the Distributed 2021 Revenue Requirement ($000)

	Total	Single Family	Multi-Family	Commercial	Over-Strength
Volume Related	**$2,699**	**$1,420**	**$554**	**$725**	**$0**
Strength Related					
Biochemical Oxygen Demand	$5,969	$2,567	$1,001	$1,310	$1,092
Total Suspended Solids	20,383	10,293	4,013	5,252	824
Chemical Oxygen Demand	11,464	5,716	2,229	2,917	602
Total Nitrogen	14,433	7,076	2,759	3,611	987
Oil & Grease	13,381	6,601	2,574	3,368	839
Total Phosphorous	16,643	8,486	3,309	4,330	519
Total Strength Related	**$82,273**	**$40,738**	**$15,885**	**$20,786**	**$4,864**
Customer Related					
Actual Customer	$0	$0	$0	$0	$0
Weighted Customer	16,075	14,922	209	944	0
Total Customer Related	**$16,075**	**$14,922**	**$209**	**$944**	**$0**
Revenue Related	**$8,149**	**$4,914**	**$1,430**	**$1,806**	**$0**
Direct Assignment	**$1,629**	**$0**	**$0**	**$0**	**$1,629**
Total Revenue Requirement	**$110,825**	**$61,994**	**$18,077**	**$24,261**	**$6,492**

As shown in Table 3-4, the distribution of the revenue requirement is developed for each allocation component. Another key component to note is that overstrength customers are only allocated strength-related costs and the direct assignment costs. This reflects the fact that the volume component is picked up through the treatment rate for the customer (e.g., commercial rate), and the overstrength component is for the additional impacts over and above typical (domestic) strength levels for each constituent as developed by EPCOR. A more detailed summary of the distribution of the revenue requirement is provided in Exhibit 9b of the technical appendix.

3.9 Summary of the Cost of Service Results

In summary form, EPCOR's wastewater treatment cost of service analysis began by functionalizing the plant asset records and revenue requirement. The functionalized plant and expense accounts were then allocated into their various cost components. The individual allocation totals were then distributed to the various customer groups based upon the appropriate and equitable (proportional) distribution factors. The distributed expenses for each customer group were then aggregated to determine each customer group's overall revenue responsibility. The total distributed costs are then compared to the current revenues received from each customer class of service to provide a measure of the current rates to each class' cost responsibility, if the cost of service results were implemented. A summary of the detailed cost responsibility developed for each class of service for 2021 is summarized below in Table 3 - 5.

Table 3 – 5
Summary of the EPCOR 2021 Cost of Service Results ($000)

	Present Revenue	Allocated Costs	$ Difference	% Difference
Single Family	$64,338	$61,994	$2,344	-3.6%
Multi-Family	18,716	18,077	639	-3.4%
Commercial	23,643	24,261	(617)	2.6%
Overstrength	4,127	6,492	(2,366)	57.3%
Total	**$110,825**	**$110,825**	**$0**	**0.0%**

The distribution of costs reflects the facilities and costs equitably distributed to each customer class, reflective of their respective benefit. The cost of service results indicated that some costs differences exist between the customer classes of service. A cost of service analysis is a dynamic analysis and the results change over time as costs change and as customer usage changes. Given that dynamic, HDR typically reviews a cost of service to determine whether a class of service is within a "reasonable range of their cost of service." The metric that HDR utilizes is a class of service is assumed to be within a "reasonable range of their cost of service" if the class is within ± 5% of the overall required adjustment. In other words, given EPCOR's 0.0% overall adjustment in this analysis, a class of service would be considered within a "reasonable range of their cost of service" if they are within the range of +5.0% to –5.0%.

The results above indicate that all but the overstrength customer class of service are "within a reasonable range of their cost of service." These results would seem to indicate that the Overstrength customers are not within a reasonable range of their cost of service. However, as noted previously, a key component of this study was the review of costs allocated to the overstrength customers to determine if overstrength rates are set at an appropriate level. Given these results, it would support the movement, or adjustment, of overstrength rates towards the cost of service results. In more closely reviewing the results, HDR would note that the amount of the short fall shown for this class of service ($2.36 million) is close to the direct assignment of overstrength costs (i.e., $1.66 million for regulatory services/strength testing). EPCOR would be advised to examine this more closely to better assure that these costs are the sole responsibility of the overstrength customers.

As noted above, this cost of service has been based upon a specific time period (2021), and costs and usage can change over time. As a result, HDR believes that cost of service is often best determined over an extended number of studies. It is recommended that EPCOR continues to review the wastewater treatment cost of service for the various customer classes before making interclass adjustments. The detailed summary of the water cost of service analysis can be found in the Wastewater Treatment Technical Appendix, Exhibits 9 and 10.

3.10 PBR Rate Setting and the Use of the Cost of Service Analysis

EPCOR uses a performance-based-ratemaking (PBR) approach for establishing its wastewater treatment rates. As the name implies, the PBR approach to ratemaking attempts to link rate

adjustments (price) to performance. In contrast, traditional ratemaking simply links price to cost, regardless of performance or efficiency. Under either ratemaking framework, including PBR, the starting point for establishing the final wastewater treatment rates is the cost of service analysis. The following notes this cost of service perspective:

> *"The starting point for utility rates generally is a cost of service study. The subsequent years' rates are determined by applying the PBR formula to adjust the previous rates for the effects of inflation and for productivity improvements."*[1]

As cited above, the starting point for establishing utility rates, including EPCOR's wastewater treatment rates, is the cost of service analysis (study). In particular, the cost of service analysis provides two important items of information which are used to establish the initial PBR rates. These items are as follows:

- ✓ Target revenue levels by customer class of service
- ✓ Average unit costs (cost-based rates)

The target revenue levels establish the level of revenue to be derived from each customer class of service. The average unit costs, as developed in the cost of service, provide the cost-basis for beginning to establish the fixed and variable wastewater treatment charges associated with each customer group. The average unit costs from the cost of service study are shown in Exhibits 11a and 11b of the Technical Appendix.

3.11 Summary

This section of the report has provided a summary of the wastewater treatment utility cost of service analysis completed for EPCOR. This analysis was prepared using generally accepted cost of service techniques, which have been tailored to reflect EPCOR's specific and unique wastewater treatment system and operations.

[1] Performance-Based Ratemaking: Theory and Practice, Dr. Michael R. Schmidt, Public Utilities Reports, Inc., Vienna, Virginia, 2000, p. 2.

4 Wastewater Treatment Rate Design

4.1 Introduction

The final step of a comprehensive wastewater treatment rate study is the design of rates to collect the desired levels of revenue, based on the results of the revenue requirement and cost of service analyses. This section of the report will discuss the key considerations and costs for the development of EPCOR's wastewater treatment rates.

4.2 Rate Design Goals and Objectives

In reviewing water rate designs, consideration is given to both the *level* of the rates and the *structure* of the rates. Level refers to the total revenue to be collected from a rate design; while structure refers to the way or manner (fixed vs. variable) the revenue is collected (i.e., how the customer is ultimately assessed for service). Provided below is an overview of the rate design process for EPCOR's wastewater treatment cost of service study.

4.2.1 Rate Design Criteria and Considerations

The key starting point for developing EPCOR's wastewater treatment rate design is to gain an understanding of EPCOR's specific rate design goals and objectives. Understanding EPCOR's rate design goals and objectives for their wastewater treatment rates can lead to exploring different rate structures, including the relationship between the monthly fixed charges and volumetric charges, along with how strength charges may be handled. Typical utility rate design goals and objectives include items such as rates being cost-based, easy to understand and administer, and that are set at a level that produce adequate revenues.

The rate manual, Principles of Public Utility Rates[2] by James C. Bonbright, is often cited as an important source or guide on the development of rates, particularly as it relates to determining rate design goals and objectives. In this rate manual, Bonbright created a list of key attributes (i.e. goals and objectives) that may be considered in the establishment of utility rates. Provided below is a paraphrased list of Bonbright's key rate design attributes.

Revenue-Related Attributes:

- Rates should be designed to **meet the total revenue requirement needs** under the "utility/accrual basis approach".[3]
- Rates should provide **revenue stability and predictability**; with a minimum of unexpected changes seriously adverse to the utility (e.g., annual swings in planned revenue should,

[2] James C. Bonbright; Albert L. Danielsen and David R. Kamerschen, Principles of Public Utility Rates, (Arlington, VA: Public Utilities Report, Inc., Second Edition, 1988), p. 383-384.

[3] The AWWA M-1 Manual, Principles of Water Rates, Fees and Charges, discusses two "generally-accepted" methodologies for establishing revenue requirements; the cash basis and utility/accrual basis. Most private utilities, including EPCOR utilize the "utility/accrual basis" methodology. Under this approach, a utility sums its O&M, taxes, depreciation expense and return on rate base (investment) to equal its revenue requirements.

for example, be no greater than +10% or −10%).

- From the customer's perspective, the rates should result in **customer bills that are stable and predictable**. The implementation of new rate structures should be consistent with past rate setting philosophy and minimize customer bill impacts during any change in rate structure.

Cost-Related Attributes:

- The rate structure should **promote efficient use** of services and discourage or penalize inefficient uses.
- The rate structure should **reflect all traditional internal costs** (direct and indirect) incurred, **and under appropriate situations and conditions** (e.g., severe drought) may also **include present and future costs and benefits** (i.e., marginal cost and/or value of commodity).
- **Fairness of the rates** in the allocation of total costs of service among the different ratepayers so as to **avoid arbitrariness, capriciousness and to attain equity**. The rates and the rate structure shall be based upon a fair allocation of total cost of service among the customer classes of service by use of a "generally accepted" cost of service methodology such as defined in the Water Environment Federation Manual of Practice #27.
- The rates should be, as practically possible, **non-discriminatory**, between customer groups, and within each customer group. The rate structures should avoid interclass subsidies whenever possible to ensure each class pays its full cost of service.
- The **responsiveness of the rate to respond to changes in demand and supply patterns**. The rate structure should be developed such that it either responds appropriately or alternatively, contains the flexibility to allow the utility to respond to the changing needs as a result of supply, demand, and/or environmental concerns (e.g., drought conditions).

Practical-Related Attributes:

- From the customer's perspective, the rate structure should be **simple to understand**, such that the customer can easily understand the bill. From the utility's perspective, the rate structure should be **easy to administer**. Finally, the rate structure should have acceptance by the majority of the customers that the rate structure and resulting bills are "fair and equitable."
- **Freedom from controversies** as to the application of the rate schedule to the customer and calculation of the customer's bill. It should be simple to explain and understand by the average customer to minimize any misinterpretation regarding the customer's bill and the overall goals that the rate structure has been developed to meet.

4.3 Current Wastewater Treatment Rates

In reviewing the above rate design goals and objectives it is important to understand that all of these goals and objectives cannot be achieved in a single rate design, and in some cases, certain goals and objectives may be in conflict with each other. For example, rates that are cost-based may be challenging from a customer affordability perspective. In that respect, EPCOR must

consider each of these goals and objectives and attempt to balance them in a way that meets the utility's overall rate design goals and objectives.

Table 4 - 1 summarizes the present wastewater treatment rate schedules for EPCOR's customers. EPCOR's rates generally reflect what is considered industry best-practices in that the rates are composed of a fixed service charge and a volumetric charge as well as overstrength charges for applicable customers.

Table 4 - 1
Present Wastewater Treatment Rates

Rate Component	Present Rates
Flat Monthly Service Charge –	$4.83/month
Variable Monthly Charges –	***$ / m³***
Residential	$0.9842
Commercial	
0 – 10,000 m^3	$0.9842
10,000 – 100,000 m^3	0.7613
100,000 + m^3	0.3973
Overstrength Charges –	
(Exceeding Domestic Strength Levels)	***$ / kg***
BOD (>300 mg/L)	$0.6161
COD (>600 mg/L)	0.6161
Oil and Grease (>100 mg/L)	0.5386
Phosphorous (10 mg/L)	5.1263
TSS (>300 mg/L)	0.5591
TKN (>50 mg/L)	1.3085
BOD (>3000 mg/L)	$0.6161
COD (>6000 mg/L)	0.6161
Oil and Grease (>400 mg/L)	0.5386
Phosphorous (75 mg/L)	5.1263
TSS (>3000 mg/L)	0.5591
TKN (>200 mg/L)	1.3085

There are three rate components to EPCOR's current wastewater treatment rates; a flat monthly service charge, a variable (volumetric) charge and an overstrength charge. The flat monthly service charge applies to all customer classes of service. In contrast, the variable or volumetric charges are segregated between residential and commercial customers and the billing is based total water consumption. Finally, the overstrength charges are applicable to those customers with strength levels which exceed EPCOR's defined domestic level strengths. These specific customers are part of the overstrength program and their strength levels are monitored and tested for purposes of billing the overstrength charges. At the present time, the overstrength

charges reflect two levels of high strength waste. The first is for over domestic strength, but under the higher next step. These customers are charged the overstrength charge for the loadings. The second step adds the same charge, for all loadings over the higher strength loadings. This essentially doubles the overstrength charge for those over the higher strength level.

4.4 Future Wastewater Treatment Rate Structure Considerations

The results of the revenue requirement and cost of service analysis provide the basis for establishing cost-based rates. However, other policy considerations - other than strictly cost of service - may be considered when establishing final proposed wastewater treatment rates. Some examples of other considerations may include policy items such as revenue stability or sufficiency, economic development, ease of understanding and administration, ability to pay, etc.

It appears that EPCOR has taken policy considerations into account in the PBR process that has established the current wastewater treatment rates. As EPCOR continues forward with the development of the final proposed rates, a policy decision will need to be made whether to follow cost of service results; smoothly transition to a cost of service basis to attempt to minimize overall rate impacts to customers; or apply an “across the board” rate adjustment to all classes of service.

While the cost of service did show cost differences between classes of service for the wastewater treatment utility, a smooth transition to rates may take precedence over attempting to strictly follow the cost of service results. This recommendation of implementing a smooth transition towards cost of service results allows for better customer outreach, avoids rate shock, and allows the utility to track cost of service results over a number of years and adjust rates accordingly.

4.5 Summary

This section of the report has provided an overview of the rate design process. The results of the revenue requirement and cost of service analysis provide the basis and guidance for establishing and implementing cost-based wastewater treatment rates. A key objective of a cost of service study is to develop rates that are cost based while, at the same time, providing equity between customers.

5 Wastewater Treatment Technical Appendix

EPCOR
Wastewater Treatment COSA
Summary of the Revenue Requirement
Exhibit 1

	Budgeted	*Projected*									
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Revenues											
Rate Revenue	$96,723,177	$104,300,933	$110,824,643	$114,873,847	$117,442,306	$119,848,226	$127,875,041	$132,224,099	$134,959,372	$137,760,173	$140,628,260
Miscellaneous Revenues	17,270,978	18,649,308	20,112,305	20,494,438	20,883,833	21,280,626	21,684,957	22,096,972	22,516,814	22,944,634	23,380,582
Total Revenues	**$113,994,154**	**$122,950,241**	**$130,936,947**	**$135,368,285**	**$138,326,138**	**$141,128,852**	**$149,559,998**	**$154,321,071**	**$157,476,186**	**$160,704,807**	**$164,008,841**
Expenses											
Franchise Fees	$7,199,561	$7,856,176	$8,346,136	$8,750,362	$8,947,488	$9,131,451	$9,764,925	$10,104,013	$10,313,830	$10,528,719	$10,748,816
Total Power, Other Utilities & Chemicals	4,697,800	4,362,800	4,362,800	4,865,693	4,958,141	5,052,346	5,148,341	5,246,159	5,345,836	5,447,407	5,550,908
Total Wastewater Treatment Plant	33,934,196	36,051,995	38,268,376	39,245,475	39,991,139	40,750,971	41,525,239	42,314,219	43,118,189	43,937,435	44,772,246
Total Operational Support Services	4,947,273	5,477,757	5,542,731	5,648,043	5,755,356	5,864,707	5,976,137	6,089,683	6,205,387	6,323,290	6,443,432
Capital Overhead	0	0	0	0	0	0	0	0	0	0	0
Total Billing, Meters, & Customer Service	7,110,749	7,731,598	7,651,659	7,797,041	7,945,184	8,096,143	8,249,970	8,406,719	8,566,447	8,729,209	8,895,064
Total EWSI Shared Service	4,067,609	4,554,661	4,702,825	4,792,178	4,883,230	4,976,011	5,070,555	5,166,896	5,265,067	5,365,103	5,467,040
Corporate Shared Services	4,108,401	4,562,395	5,032,286	5,127,899	5,225,329	5,324,610	5,425,778	5,528,868	5,633,916	5,740,961	5,850,039
Total O&M Expenses	**$66,065,591**	**$70,597,382**	**$73,906,812**	**$76,226,691**	**$77,705,867**	**$79,196,240**	**$81,160,944**	**$82,856,557**	**$84,448,673**	**$86,072,123**	**$87,727,545**
Property Taxes	$649,363	$615,508	$646,653	$658,939	$671,459	$684,217	$697,217	$710,464	$723,963	$737,718	$751,735
Depreciation	17,950,263	19,530,017	20,736,688	21,747,371	22,605,951	23,627,205	24,799,670	26,694,641	29,226,772	29,999,914	31,394,923
Total Financing Costs	10,618,465	11,951,116	13,463,775	14,358,593	15,197,366	15,561,347	15,598,096	16,242,543	17,007,164	17,194,150	18,808,878
Return on Investment	18,710,473	20,256,218	22,183,020	22,376,691	22,145,496	22,059,844	27,304,072	27,816,867	26,069,615	26,700,902	25,325,762
Total Revenue Requirement	**$113,994,155**	**$122,950,242**	**$130,936,948**	**$135,368,286**	**$138,326,139**	**$141,128,852**	**$149,559,999**	**$154,321,072**	**$157,476,187**	**$160,704,807**	**$164,008,842**
Bal. / (Def.) of Funds	($0)	($0)	($0)	($0)	($0)	($0)	($0)	($0)	($0)	($0)	($0)
Balance a % of Rate Adj. Req'd	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

EPCOR
Wastewater Treatment COSA
Revenue Requirement
Exhibit 2

	Budgeted	*Projected*									
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	*Notes*
Revenues												
Rate Revenue												
Residential	$55,784,266	$60,190,845	$64,338,221	$66,958,009	$68,687,926	$70,326,745	$75,402,989	$78,263,819	$80,143,174	$82,071,836	$84,051,220	Schedule F-1
Multi-Res	16,299,259	17,540,298	18,716,369	19,458,048	19,938,598	20,389,438	21,824,844	22,631,937	23,143,677	23,666,989	24,202,133	Schedule F-1
Commercial	20,902,244	22,443,071	23,643,333	24,252,663	24,530,756	24,765,603	26,197,805	26,794,402	27,052,435	27,313,481	27,577,589	Schedule F-1
Overstrength Surcharges	3,737,408	4,126,720	4,126,720	4,205,127	4,285,025	4,366,440	4,449,403	4,533,941	4,620,086	4,707,868	4,797,317	Schedule I-2
Total Rate Revenues	**$96,723,177**	**$104,300,933**	**$110,824,643**	**$114,873,847**	**$117,442,306**	**$119,848,226**	**$127,875,041**	**$132,224,099**	**$134,959,372**	**$137,760,173**	**$140,628,260**	
Other Revenue												
Late Payment Charges	$255,999	$261,119	$266,341	$271,401	$276,558	$281,813	$287,167	$292,623	$298,183	$303,849	$309,622	Schedule I-2
Surplus Sales	5,219	5,220	5,220	5,319	5,420	5,523	5,628	5,735	5,844	5,955	6,068	Schedule I-2
ACRWC Swap	893,520	933,573	943,233	961,154	979,416	998,025	1,016,988	1,036,311	1,056,000	1,076,064	1,096,510	Schedule I-2
Suburban	485,677	512,844	542,274	552,577	563,076	573,775	584,676	595,785	607,105	618,640	630,394	Schedule I-2
Lab	400,000	400,002	400,002	407,602	415,346	423,238	431,280	439,474	447,824	456,333	465,003	Schedule I-2
Ostara	360,000	400,000	400,000	407,600	415,344	423,236	431,277	439,472	447,822	456,330	465,001	Schedule I-2
Biosolids												
ACRWC Recovery	$4,976,800	$4,100,000	$4,200,000	$4,279,800	$4,361,116	$4,443,977	$4,528,413	$4,614,453	$4,702,127	$4,791,468	$4,882,506	Schedule I-2
EPCOR Drainage Recovery	9,393,200	11,505,987	12,824,672	13,068,341	13,316,639	13,569,655	13,827,479	14,090,201	14,357,915	14,630,715	14,908,699	Schedule I-2
AESO DR Participation	70,000	100,000	100,000	101,900	103,836	105,809	107,819	109,868	111,955	114,083	116,250	Schedule I-2
Suburban - Strathcona	430,563	430,563	430,563	438,743	447,079	455,574	464,230	473,050	482,038	491,197	500,530	Schedule I-2
Total Other Revenues	**$17,270,978**	**$18,649,308**	**$20,112,305**	**$20,494,438**	**$20,883,833**	**$21,280,626**	**$21,684,957**	**$22,096,972**	**$22,516,814**	**$22,944,634**	**$23,380,582**	
Total Revenues	**$113,994,154**	**$122,950,241**	**$130,936,947**	**$135,368,285**	**$138,326,138**	**$141,128,852**	**$149,559,998**	**$154,321,071**	**$157,476,186**	**$160,704,807**	**$164,008,841**	
Franchise Fees	**$7,199,561**	**$7,856,176**	**$8,346,136**	**$8,750,362**	**$8,947,488**	**$9,131,451**	**$9,764,925**	**$10,104,013**	**$10,313,830**	**$10,528,719**	**$10,748,816**	Schedule I-2
Power, Other Utilities & Chemicals												
Power	$3,961,800	$3,737,800	$3,737,800	$4,228,818	$4,309,166	$4,391,040	$4,474,470	$4,559,485	$4,646,115	$4,734,391	$4,824,344	Schedule I-2
Water	423,000	400,000	400,000	407,600	415,344	423,236	431,277	439,472	447,822	456,330	465,001	Schedule I-2
Natural Gas	313,000	225,000	225,000	229,275	233,631	238,070	242,594	247,203	251,900	256,686	261,563	Schedule I-2
Total Power, Other Utilities & Chemicals	**$4,697,800**	**$4,362,800**	**$4,362,800**	**$4,865,693**	**$4,958,141**	**$5,052,346**	**$5,148,341**	**$5,246,159**	**$5,345,836**	**$5,447,407**	**$5,550,908**	
Wastewater Treatment Plant												
Plant Operations	$5,579,460	$5,600,143	$5,871,443	$5,983,000	$6,096,677	$6,212,514	$6,330,552	$6,450,832	$6,573,398	$6,698,292	$6,825,560	Schedule I-2
Ostara (Phosphorous)	1,053,715	1,099,170	1,117,792	1,139,030	1,160,671	1,182,724	1,205,196	1,228,094	1,251,428	1,275,205	1,299,434	Schedule I-2
Clover Bar (Biosolids)	14,750,062	15,905,715	17,344,764	17,674,315	18,010,127	18,352,319	18,701,013	19,056,332	19,418,403	19,787,352	20,163,312	Schedule I-2
Suncor - Recycled Water	0	0	0	0	0	0	0	0	0	0	0	Schedule I-2
General Maintenance	1,327,732	2,819,327	2,982,279	3,288,942	3,351,432	3,415,110	3,479,997	3,546,117	3,613,493	3,682,149	3,752,110	Schedule I-2
Process Maintenance	4,553,934	4,117,664	4,218,931	4,299,090	4,380,773	4,464,008	4,548,824	4,635,251	4,723,321	4,813,064	4,904,513	Schedule I-2
Facilities & Site Maintenance	3,061,019	2,894,287	2,965,489	3,021,833	3,079,248	3,137,754	3,197,371	3,258,121	3,320,025	3,383,106	3,447,385	Schedule I-2
Plant Controls and Automation	1,482,799	1,453,358	1,529,810	1,558,877	1,588,495	1,618,677	1,649,431	1,680,771	1,712,705	1,745,247	1,778,406	Schedule I-2
Plant Engineering	2,125,475	2,162,330	2,237,869	2,280,389	2,323,716	2,367,867	2,412,856	2,458,700	2,505,416	2,553,018	2,601,526	Schedule I-2
Abandonments	0	0	0	0	0	0	0	0	0	0	0	Schedule I-2
Total Wastewater Treatment Plant	**$33,934,196**	**$36,051,995**	**$38,268,376**	**$39,245,475**	**$39,991,139**	**$40,750,971**	**$41,525,239**	**$42,314,219**	**$43,118,189**	**$43,937,435**	**$44,772,246**	

EPCOR
Wastewater Treatment COSA
Revenue Requirement
Exhibit 2

	Budgeted	*Projected*										
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	*Notes*
Operational Support Services												
Quality Assurance and Environment	$3,453,190	$4,598,432	$4,694,072	$4,783,259	$4,874,141	$4,966,750	$5,061,118	$5,157,279	$5,255,268	$5,355,118	$5,456,865	Schedule I-2
Project Engineering	(541,112)	(789,430)	(898,868)	(915,946)	(933,349)	(951,083)	(969,153)	(987,567)	(1,006,331)	(1,025,451)	(1,044,935)	Schedule I-2
Gold Bar Administration	930,215	1,236,905	1,282,023	1,306,382	1,331,203	1,356,496	1,382,269	1,408,532	1,435,295	1,462,565	1,490,354	Schedule I-2
Centre of Excellence	500,089	0	0	0	0	0	0	0	0	0	0	Schedule I-2
Operations Communications	65,908	66,658	91,085	92,815	94,579	96,376	98,207	100,073	101,974	103,912	105,886	Schedule I-2
Legal Services	25,575	20,400	20,788	21,183	21,585	21,995	22,413	22,839	23,273	23,715	24,166	Schedule I-2
SCM Security	275,437	138,250	140,773	143,447	146,173	148,950	151,780	154,664	157,603	160,597	163,648	Schedule I-2
SCM Inventory Management	237,971	206,542	212,858	216,903	221,024	225,223	229,503	233,863	238,307	242,834	247,448	Schedule I-2
Total Operational Support Services	**$4,947,273**	**$5,477,757**	**$5,542,731**	**$5,648,043**	**$5,755,356**	**$5,864,707**	**$5,976,137**	**$6,089,683**	**$6,205,387**	**$6,323,290**	**$6,443,432**	
Capital Overhead	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	Schedule I-2
Billing, Meters, & Customer Service												
CUS Charges - Metering	$2,588,460	$2,523,773	$2,572,484	$2,621,361	$2,671,167	$2,721,919	$2,773,636	$2,826,335	$2,880,035	$2,934,756	$2,990,516	Schedule I-2
CUS Charges - Billing & Collections	3,248,399	3,587,822	3,411,173	3,475,986	3,542,029	3,609,328	3,677,905	3,747,785	3,818,993	3,891,554	3,965,494	Schedule I-2
Regulatory Services (Strength Testing)	1,273,891	1,620,002	1,668,002	1,699,694	1,731,988	1,764,896	1,798,429	1,832,599	1,867,418	1,902,899	1,939,054	Schedule I-2
Total Billing, Meters, & Customer Service	**$7,110,749**	**$7,731,598**	**$7,651,659**	**$7,797,041**	**$7,945,184**	**$8,096,143**	**$8,249,970**	**$8,406,719**	**$8,566,447**	**$8,729,209**	**$8,895,064**	
EWSI Shared Service												
Allocation from BU 8F	$2,870,680	$3,051,141	$3,153,952	$3,213,877	$3,274,941	$3,337,165	$3,400,571	$3,465,181	$3,531,020	$3,598,109	$3,666,473	Schedule I-2
Controller, Water Services	20,647	308,695	323,697	329,847	336,114	342,500	349,008	355,639	362,396	369,281	376,298	Schedule I-2
Controller & Fringe/SRP True-up	0	0	0	0	0	0	0	0	0	0	0	Schedule I-2
Health, Safety and Environment	165,829	172,883	178,639	182,033	185,491	189,016	192,607	196,267	199,996	203,796	207,668	Schedule I-2
Incentive	1,010,453	1,021,944	1,046,538	1,066,422	1,086,684	1,107,331	1,128,370	1,149,809	1,171,655	1,193,917	1,216,601	Schedule I-2
Total EWSI Shared Service	**$4,067,609**	**$4,554,661**	**$4,702,825**	**$4,792,178**	**$4,883,230**	**$4,976,011**	**$5,070,555**	**$5,166,896**	**$5,265,067**	**$5,365,103**	**$5,467,040**	
Corporate Shared Services	**$4,108,401**	**$4,562,395**	**$5,032,286**	**$5,127,899**	**$5,225,329**	**$5,324,610**	**$5,425,778**	**$5,528,868**	**$5,633,916**	**$5,740,961**	**$5,850,039**	Schedule I-2
Total O&M Expenses	**$66,065,591**	**$70,597,382**	**$73,906,812**	**$76,226,691**	**$77,705,867**	**$79,196,240**	**$81,160,944**	**$82,856,557**	**$84,448,673**	**$86,072,123**	**$87,727,545**	
Property Taxes	**$649,363**	**$615,508**	**$646,653**	**$658,939**	**$671,459**	**$684,217**	**$697,217**	**$710,464**	**$723,963**	**$737,718**	**$751,735**	Schedule I-2
Depreciation	$18,880,548	$20,460,302	$21,666,973	$22,677,656	$23,536,236	$24,557,490	$25,729,955	$27,624,926	$30,157,057	$30,930,199	$32,325,208	Schedule I-3
Less: Contributions Amortization	*($930,285)*	*($930,285)*	*($930,285)*	*($930,285)*	*($930,285)*	*($930,285)*	*($930,285)*	*($930,285)*	*($930,285)*	*($930,285)*	*($930,285)*	
Total Depreciation	**$17,950,263**	**$19,530,017**	**$20,736,688**	**$21,747,371**	**$22,605,951**	**$23,627,205**	**$24,799,670**	**$26,694,641**	**$29,226,772**	**$29,999,914**	**$31,394,923**	
Financing Costs												
Interest on LTD	$10,855,491	$11,690,853	$12,153,884	$12,326,160	$13,173,192	$13,359,819	$14,250,041	$14,766,897	$15,288,600	$15,885,995	$16,771,861	Schedule F-1
Interest on STD	1,355,747	1,947,931	2,359,004	2,155,238	2,026,736	2,007,284	1,980,503	2,075,769	2,011,956	1,918,632	1,938,540	Schedule F-1
AFUDC	(1,592,773)	(1,687,668)	(1,049,113)	(122,806)	(2,562)	194,243	(632,448)	(600,124)	(293,393)	(610,476)	98,477	Schedule F-1
Total Financing Costs	**$10,618,465**	**$11,951,116**	**$13,463,775**	**$14,358,593**	**$15,197,366**	**$15,561,347**	**$15,598,096**	**$16,242,543**	**$17,007,164**	**$17,194,150**	**$18,808,878**	
Return on Investment												
Retained Earnings	$8,710,473	$10,256,218	$7,183,020	$12,376,691	$2,145,496	$12,059,844	$17,304,072	$12,816,867	$11,069,615	$6,700,902	$5,325,762	Schedule F-1
Dividends / Equity Issue	10,000,000	10,000,000	15,000,000	10,000,000	20,000,000	10,000,000	10,000,000	15,000,000	15,000,000	20,000,000	20,000,000	Schedule F-1
Total Return on Investment	**$18,710,473**	**$20,256,218**	**$22,183,020**	**$22,376,691**	**$22,145,496**	**$22,059,844**	**$27,304,072**	**$27,816,867**	**$26,069,615**	**$26,700,902**	**$25,325,762**	
Total Revenue Requirement	**$113,994,155**	**$122,950,242**	**$130,936,948**	**$135,368,286**	**$138,326,139**	**$141,128,852**	**$149,559,999**	**$154,321,072**	**$157,476,187**	**$160,704,807**	**$164,008,842**	

EPCOR
Wastewater Treatment COSA
Exhibit 3
Volume Distribution Factor

	Annual Flow (m^3) [1]	15.5% Inflow and Infiltration [2]	Total Annual Flow at Plant (m^3)	Avg. Daily Flow at Plant (ML / Day)	% of Total
Single Family	45,061,664	6,984,558	52,046,222	142.59	52.6%
Multi-Family	17,570,250	2,723,389	20,293,639	55.60	20.5%
Commercial	22,992,247	3,563,798	26,556,045	72.76	26.9%
Total	**85,624,161**	**13,271,745**	**98,895,906**	**270.95**	**100.0%**
		Actual Flows [3]	**98,884,000**	***270.92***	
					(VOL)

Notes

[1] - Based on 2019 projection
[2] - Estimated
[3] - Per EPCOR data, CY 2018

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Wastewater Treatment COSA
Exhibit 4
Customer Distribution Factors

	Actual Customer		*Cust. Serv. & Acntg*		
	Number of Account [1]	**% of Total**	**Weight Factor**	**Wt. Accounts**	**% of Total**
Single Family	269,705	92.8%	1.00	269,705	92.8%
Multi-Family	3,786	1.3%	1.00	3,786	1.3%
Commercial	17,058	5.9%	1.00	17,058	5.9%
Overstrength	0	0.0%	0.00	0	0.0%
Total	**290,549**	**100.0%**		**290,549**	**100.0%**
		(AC)			***(WCA)***

Notes

[1] - Based on 2019 projection

EPCOR
Wastewater Treatment COSA
Exhibit 5
Strength Distribution Factors

	Biochemical Oxygen Demand				Total Suspended Solids		
	Daily Flow (ML / Day)	Avg. Factor (mg/l)	Calculated Kilograms [1]	% of Total	Avg. Factor (mg/l)	Calculated Kilograms [1]	% of Total
Single Family	142.59	180	9,368,320	43.0%	330	17,175,253	50.5%
Multi-Family	55.60	180	3,652,855	16.8%	330	6,696,901	19.7%
Commercial	72.76	180	4,780,088	21.9%	330	8,763,495	25.8%
Overstrength			3,985,731	18.3%		1,375,641	4.0%
Tier 1			3,713,741	*17.0%*		1,297,402	*3.8%*
Tier 2			271,990	*1.2%*		78,239	*0.2%*
Total	**270.95**		**21,786,994**	**100.0%**		**34,011,290**	**100.0%**
	Total Kg's Removed [2] [3]		*20,377,287*	***(BOD)***	*Total Kg's Removed [2]*	*32,719,553*	***(TSS)***

	Chemical Oxygen Demand				Oil & Grease		
	Daily Flow (ML / Day)	Avg. Factor (mg/l)	Calculated Kilograms [1]	% of Total	Avg. Factor (mg/l)	Calculated Kilograms [1]	% of Total
Single Family	142.59	89	4,606,091	49.9%	45	2,342,080	49.3%
Multi-Family	55.60	89	1,795,987	19.4%	45	913,214	19.2%
Commercial	72.76	89	2,350,210	25.4%	45	1,195,022	25.2%
Overstrength			485,380	5.3%		297,695	6.3%
Tier 1			477,820	*5.2%*		278,924	*5.9%*
Tier 2			7,560	*0.1%*		18,771	*0.4%*
Total	**270.95**		**9,237,668**	**100.0%**		**4,748,011**	**100.0%**
	Total Kg's Removed [2] [3]		*8,733,123*	***(COD)***	*Total Kg's Removed [2]*		***(OG)***

	Total Nitrogen				Total Phosphorous		
	Daily Flow (ML / Day)	Avg. Factor (mg/l)	Calculated Kilograms [1]	% of Total	Avg. Factor (mg/l)	Calculated Kilograms [1]	% of Total
Single Family	142.59	36	1,873,664	49.0%	7.27	378,376	51.0%
Multi-Family	55.60	36	730,571	19.1%	7.27	147,535	19.9%
Commercial	72.76	36	956,018	25.0%	7.27	193,062	26.0%
Overstrength			261,334	6.8%		23,148	3.1%
Tier 1			223,629	*5.9%*		23,148	*3.1%*
Tier 2			37,705	*1.0%*		0	*0.0%*
	270.95		**3,821,587**	**100.0%**		**742,121**	**100.0%**
	Total Kg's Removed [2]		*3,559,898*	***(TKN)***	*Total Kg's Removed [2]*	*700,628*	***(TP)***

Notes

[1] - Calculated Kilograms = Daily Flow * Factor
[2] - Based on CY 2018 performance data
[3] - BOD / COD Kg removed split is 70% / 30%

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Wastewater Treatment COSA
Exhibit 6
Revenue Distribution Factor

	Projected 2021	% of Total
Single Family	$64,338,221	60.3%
Multi-Family	18,716,369	17.5%
Commercial	23,643,333	22.2%
Overstrength		0.0%
Tier 1	3,854,224	
Tier 2	272,496	
Total	**$106,697,923**	**100.0%**

(RR)

EPCOR
Wastewater Treatment COSA
Exhibit 7a
Plant in Service - Original Cost

	As of 12/31/18	Volume (VOL)	Strength Related: Biochemical Oxygen Demand (BOD)	Strength Related: Chemical Oxygen Demand (COD)	Strength Related: Total Nitrogen (TKN)	Strength Related: Total Phosphorous (TP)	Strength Related: Oil & Grease (OG)	Strength Related: Total Suspended Solids (TSS)	Actual Customer (AC)	Customer Serv & Actng. (WCA)	Revenue Related (RR)	Direct Assignment (DA)	Basis of Classification
Land	$420,842	$0	$0	$0	$0	$0	$0	$0	$0	$420,842	$0	$0	100.0% WCA
WWTP													
Admin	$3,245,752	$0	$0	$0	$0	$0	$0	$0	$0	$3,245,752	$0	$0	100.0% WCA
Air Scrub	11,532,557	0	0	0	0	0	5,766,279	5,766,279	0	0	0	0	50.0% TSS 50.0% OG
Main Control Room	1,313,227	51,269	95,800	169,054	227,375	250,849	204,764	304,197	0	9,918	0	0	*As all other treatment*
Aux Control Room	368,529	14,388	26,884	47,442	63,808	70,395	57,463	85,366	0	2,783	0	0	*As all other treatment*
Blowers	4,497,543	0	1,124,386	449,754	2,473,649	449,754	0	0	0	0	0	0	25.0% BOD 10.0% COD 55.0% TKN 10.0% TP
Boilers	16,851,663	657,899	1,229,334	2,169,350	2,917,740	3,218,956	2,627,582	3,903,539	0	127,265	0	0	*As all other treatment*
CBF (inc. Ostara)	18,924,085	738,807	1,380,518	2,436,137	3,276,564	3,614,824	2,950,722	4,383,597	0	142,916	0	0	*As all other treatment*
Center of Excellence	5,700,657	5,700,657	0	0	0	0	0	0	0	0	0	0	100.0% VOL
Digesters	71,356,464	0	9,989,905	4,281,388	14,271,293	14,271,293	14,271,293	14,271,293	0	0	0	0	BOD/COD, TKN, TP, OG, & TSS Equally
Distribution Station	22,376	874	1,632	2,881	3,874	4,274	3,489	5,183	0	169	0	0	*As all other treatment*
Enhanced Prim. Treat.	11,789,236	0	0	2,829,417	1,296,816	0	4,244,125	3,418,878	0	0	0	0	24.0% COD 29.0% TSS 11.0% TKN 36.0% OG
Flare	879,115	0	123,076	52,747	175,823	175,823	175,823	175,823	0	0	0	0	*As Biogas*
Grit	75,972,290	0	0	22,791,687	7,597,229	0	7,597,229	37,986,145	0	0	0	0	10.0% TKN 50.0% TSS 30.0% COD 10.0% OG
Laboratory	9,381,794	469,090	1,688,723	1,688,723	1,688,723	1,688,723	469,090	1,688,723	0	0	0	0	5.0% VOL 5.0% OG 18.0% BOD/COD/TKN/TSS/TP
Maintenance Building	3,742,193	146,097	272,994	481,740	647,933	714,823	583,498	866,846	0	28,261	0	0	*As all other treatment*
Outfall	16,168	16,168	0	0	0	0	0	0	0	0	0	0	100.0% VOL
Penthouse	446,830	17,445	32,596	57,521	77,365	85,352	69,672	103,504	0	3,374	0	0	*As all other treatment*
Primary Clarifier	83,545,085	0	0	20,050,820	9,189,959	0	30,076,231	24,228,075	0	0	0	0	24.0% COD 29.0% TSS 11.0% TKN 36.0% OG
Screens	3,232,363	969,709	0	0	0	0	0	2,262,654	0	0	0	0	30.0% VOL 70.0% TSS
Sampling	40,289	2,014	7,252	7,252	7,252	7,252	2,014	7,252	0	0	0	0	5.0% VOL 5.0% OG 18.0% BOD/COD/TKN/TSS/TP
Scum	1,059,928	0	317,978	0	0	0	741,950	0	0	0	0	0	30.0% BOD 70.0% OG
Bioreactor/Secondary Clarifier	94,702,662	0	13,258,373	5,682,160	28,410,799	37,881,065	0	9,470,266	0	0	0	0	20.0% COD 30.0% TKN 10.0% TSS 40.0% TP
Substation	1,346,727	52,577	98,244	173,367	233,176	257,248	209,987	311,957	0	10,171	0	0	*As all other treatment*
UV	11,581,041	11,581,041	0	0	0	0	0	0	0	0	0	0	100.0% VOL
Waste Activated Sludge	8,204,482	0	1,148,627	492,269	2,461,345	3,281,793	0	820,448	0	0	0	0	20.0% COD 30.0% TKN 10.0% TSS 40.0% TP
EPT - Polymer System	3,536,974	0	0	848,874	389,067	0	1,273,311	1,025,722	0	0	0	0	24.0% COD 29.0% TSS 11.0% TKN 36.0% OG
Hydrogen Peroxide	125,159	125,159	0	0	0	0	0	0	0	0	0	0	100.0% VOL
Secondary Alum Room	605,024	90,754	0	0	0	257,135	0	257,135	0	0	0	0	42.5% TSS 15.0% VOL 42.5% TP
Biogas	13,892,651	0	1,944,971	833,559	2,778,530	2,778,530	2,778,530	2,778,530	0	0	0	0	As Digesters
Blend Tanks	1,471,994	0	206,079	88,320	294,399	294,399	294,399	294,399	0	0	0	0	As Digesters
Fermenter	28,657,560	0	0	0	5,015,073	23,642,487	0	0	0	0	0	0	17.5% TKN 82.5% TP
Sludge	40,062,412	0	5,608,738	2,403,745	8,012,482	8,012,482	8,012,482	8,012,482	0	0	0	0	As Digesters
CWIP		0	0	0	0	0	0	0	0	0	0	0	*As all other treatment*
Plant Before General Plant	**$528,525,672**	**$20,633,947**	**$38,556,112**	**$68,038,205**	**$91,510,274**	**$100,957,459**	**$82,409,931**	**$122,428,295**	**$0**	**$3,991,450**	**$0**	**$0**	
% Plant Before General Plant	***100.0%***	***3.9%***	***7.3%***	***12.9%***	***17.3%***	***19.1%***	***15.6%***	***23.2%***	***0.0%***	***0.8%***	***0.0%***	***0.0%***	*Factor PBGP*

EPCOR
Wastewater Treatment COSA
Exhibit 7a
Plant in Service - Original Cost

	As of 12/31/18	Volume (VOL)	Strength Related: Biochemical Oxygen Demand (BOD)	Strength Related: Chemical Oxygen Demand (COD)	Strength Related: Total Nitrogen (TKN)	Strength Related: Total Phosphorous (TP)	Strength Related: Oil & Grease (OG)	Strength Related: Total Suspended Solids (TSS)	Actual Customer (AC)	Customer Serv & Actng. (WCA)	Revenue Related (RR)	Direct Assignment (DA)	Basis of Classification
General Plant													
Furnature	$504,685	$19,703	$36,817	$64,969	$87,382	$96,403	$78,693	$116,906	$0	$3,811	$0	$0	*As Factor PBGP*
Software	5,065,203	197,748	369,508	652,054	877,002	967,541	789,788	1,173,309	0	38,253	0	0	*As Factor PBGP*
Hardware	13,717,394	535,535	1,000,688	1,765,869	2,375,064	2,620,257	2,138,873	3,177,513	0	103,594	0	0	*As Factor PBGP*
Tools	2,079,471	81,184	151,698	267,695	360,045	397,215	324,240	481,691	0	15,704	0	0	*As Factor PBGP*
Vehicles	1,280,019	49,973	93,378	164,779	221,626	244,506	199,586	296,505	0	9,667	0	0	*As Factor PBGP*
Guardhouse	48,792	1,905	3,559	6,281	8,448	9,320	7,608	11,302	0	368	0	0	*As Factor PBGP*
Fencing	736,696	28,761	53,742	94,836	127,553	140,722	114,869	170,649	0	5,564	0	0	*As Factor PBGP*
Security	2,829,112	110,450	206,385	364,197	489,840	540,409	441,127	655,339	0	21,366	0	0	*As Factor PBGP*
Paving, Roads, Parking, etc.	1,731,131	67,584	126,287	222,852	299,732	330,676	269,925	401,001	0	13,074	0	0	*As Factor PBGP*
Utilities	29,100,816	1,136,113	2,122,914	3,746,208	5,038,589	5,558,754	4,537,521	6,740,947	0	219,771	0	0	*As Factor PBGP*
Generator	3,334,854	130,195	243,279	429,303	577,405	637,014	519,984	772,489	0	25,185	0	0	*As Factor PBGP*
Glycol	2,892,953	112,943	211,042	372,416	500,893	552,604	451,081	670,127	0	21,848	0	0	*As Factor PBGP*
Total General Plant	**$63,321,126**	**$2,472,093**	**$4,619,296**	**$8,151,460**	**$10,963,580**	**$12,095,420**	**$9,873,295**	**$14,667,779**	**$0**	**$478,204**	**$0**	**$0**	
Total Plant in Service	**$591,846,798**	**$23,106,040**	**$43,175,408**	**$76,189,665**	**$102,473,854**	**$113,052,878**	**$92,283,226**	**$137,096,073**	**$0**	**$4,469,654**	**$0**	**$0**	

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Exhibit 8.1
Allocation of the Revenue Requirement

	Test Year 2021	Volume *(VOL)*	*Strength Related* Biochemical Oxygen Demand *(BOD)*	Chemical Oxygen Demand *(COD)*	Total Nitrogen *(TKN)*	Total Phosphorous *(TP)*	Oil & Grease *(OG)*	Total Suspended Solids *(TSS)*	Actual Customer *(AC)*	Customer Serv & Actng. *(WCA)*	Revenue *(RR)*	Direct *(DA)*	*Basis of Classification*
Franchise Fees	**$8,346,136**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$8,346,136**	**$0**	100% RR
Power, Other Utilities & Chemicals													
Power	$3,737,800	$119,102	$263,416	$505,918	$636,942	$686,335	$590,548	$903,464	$0	$32,075	$0	$0	As Net Plant
Water	400,000	12,746	28,189	54,141	68,162	73,448	63,197	96,684	0	3,432	0	0	As Net Plant
Natural Gas	225,000	7,169	15,857	30,454	38,341	41,315	35,549	54,385	0	1,931	0	0	As Net Plant
Chemicals	0	0	0	0	0	0	0	0	0	0	0	0	As Net Plant
Salaries-OT CompTime Cashout	0	0	0	0	0	0	0	0	0	0	0	0	As Net Plant
Furlough Savings	0	0	0	0	0	0	0	0	0	0	0	0	As Net Plant
Labor Concessions	0	0	0	0	0	0	0	0	0	0	0	0	As Net Plant
Year-End Accrual -Sal & Bene	0	0	0	0	0	0	0	0	0	0	0	0	As Net Plant
Vacation Cashout (Annual)	0	0	0	0	0	0	0	0	0	0	0	0	As Net Plant
Total Power, Other Utilities & Chemicals	**$4,362,800**	**$139,017**	**$307,462**	**$590,513**	**$743,445**	**$801,098**	**$689,294**	**$1,054,533**	**$0**	**$37,438**	**$0**	**$0**	
Wastewater Treatment Plant													
Plant Operations	$5,871,443	$187,089	$413,782	$794,710	$1,000,526	$1,078,115	$927,650	$1,419,187	$0	$50,384	$0	$0	As Net Plant
Ostara (Phosphorous)	1,117,792	0	0	0	0	1,117,792	0	0	0	0	0	0	100% TP
Clover Bar (Biosolids)	17,344,764	0	0	0	0	0	0	17,344,764	0	0	0	0	100% TSS
Suncor - Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	As Net Plant
General Maintenance	2,982,279	95,028	210,172	403,657	508,197	547,606	471,181	720,847	0	25,591	0	0	As Net Plant
Process Maintenance	4,218,931	134,433	297,323	571,040	718,929	774,680	666,564	1,019,758	0	36,203	0	0	As Net Plant
Facilities & Site Maintenance	2,965,489	94,493	208,989	401,384	505,336	544,523	468,528	716,788	0	25,447	0	0	As Net Plant
Plant Controls and Automation	1,529,810	48,746	107,811	207,063	260,688	280,904	241,700	369,771	0	13,128	0	0	As Net Plant
Plant Engineering	2,237,869	71,308	157,711	302,900	381,345	410,918	353,569	540,915	0	19,203	0	0	As Net Plant
Abandonments	0	0	0	0	0	0	0	0	0	0	0	0	As Net Plant
Total Wastewater Treatment Plant	**$38,268,376**	**$631,097**	**$1,395,789**	**$2,680,753**	**$3,375,022**	**$4,754,537**	**$3,129,192**	**$22,132,030**	**$0**	**$169,956**	**$0**	**$0**	
Operational Support Services													
Quality Assurance and Environment	$4,694,072	$149,573	$330,808	$635,351	$799,896	$861,926	$741,633	$1,134,604	$0	$40,280	$0	$0	As Net Plant
Project Engineering	(898,868)	(28,642)	(63,346)	(121,663)	(153,172)	(165,050)	(142,015)	(217,265)	0	(7,713)	0	0	As Net Plant
Gold Bar Administration	1,282,023	40,851	90,349	173,524	218,464	235,405	202,551	309,878	0	11,001	0	0	As Net Plant
Centre of Excellence	0	0	0	0	0	0	0	0	0	0	0	0	As Net Plant
Operations Communications	91,085	2,902	6,419	12,328	15,521	16,725	14,391	22,016	0	782	0	0	As Net Plant
Legal Services	20,788	662	1,465	2,814	3,542	3,817	3,284	5,025	0	178	0	0	As Net Plant
SCM Security	140,773	4,486	9,921	19,054	23,988	25,849	22,241	34,026	0	1,208	0	0	As Net Plant
SCM Inventory Management	212,858	6,783	15,001	28,811	36,272	39,085	33,630	51,450	0	1,827	0	0	As Net Plant
Total Operational Support Services	**$5,542,731**	**$176,615**	**$390,617**	**$750,218**	**$944,512**	**$1,017,757**	**$875,716**	**$1,339,734**	**$0**	**$47,563**	**$0**	**$0**	

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Exhibit 8.1
Allocation of the Revenue Requirement

			Strength Related										
	Test Year 2021	**Volume** *(VOL)*	**Biochemical Oxygen Demand** *(BOD)*	**Chemical Oxygen Demand** *(COD)*	**Total Nitrogen** *(TKN)*	**Total Phosphorous** *(TP)*	**Oil & Grease** *(OG)*	**Total Suspended Solids** *(TSS)*	**Actual Customer** *(AC)*	**Customer Serv & Actng.** *(WCA)*	**Revenue** *(RR)*	**Direct** *(DA)*	*Basis of Classification*
Capital Overhead	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	As Net Plant
Billing, Meters, & Customer Service													
CUS Charges - Metering	$2,572,484	$0	$0	$0	$0	$0	$0	$0	$0	$2,572,484	$0	$0	100% WCA
CUS Charges - Billing & Collections	3,411,173	0	0	0	0	0	0	0	0	3,411,173	0	0	100% WCA
Regulatory Services (Strength Testing)	1,668,002	0	0	0	0	0	0	0	0	0	0	1,668,002	100% DA
Total Billing, Meters, & Customer Service	**$7,651,659**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$5,983,657**	**$0**	**$1,668,002**	
EWSI Shared Service													
Allocation from BU 8F	$3,153,952	$0	$0	$0	$0	$0	$0	$0	$0	$3,153,952	$0	$0	100% WCA
Controller, Water Services	323,697	0	0	0	0	0	0	0	0	323,697	0	0	100% WCA
Controller & Fringe/SRP True-up	0	0	0	0	0	0	0	0	0	0	0	0	100% WCA
Health, Safety and Environment	178,639	0	0	0	0	0	0	0	0	178,639	0	0	100% WCA
Incentive	1,046,538	0	0	0	0	0	0	0	0	1,046,538	0	0	100% WCA
Total EWSI Shared Service	**$4,702,825**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$4,702,825**	**$0**	**$0**	
Corporate Shared Services	**$5,032,286**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$5,032,286**	**$0**	**$0**	100% WCA
Total O&M Expenses	**$73,906,812**	**$946,729**	**$2,093,868**	**$4,021,484**	**$5,062,979**	**$6,573,392**	**$4,694,202**	**$24,526,297**	**$0**	**$15,973,725**	**$8,346,136**	**$1,668,002**	
Property Taxes	**$646,653**	**$20,605**	**$45,572**	**$87,526**	**$110,193**	**$118,738**	**$102,167**	**$156,303**	**$0**	**$5,549**	**$0**	**$0**	As Net Plant
Depreciation	$21,666,973	$690,401	$1,526,951	$2,932,663	$3,692,173	$3,978,491	$3,423,242	$5,237,125	$0	$185,927	$0	$0	As Net Plant
Less: Contributions Amortization	($930,285)	(29,643)	(65,561)	(125,916)	(158,526)	(170,819)	(146,979)	(224,859)	0	(7,983)	0	0	As Net Plant
Total Depreciation	**$20,736,688**	**$660,758**	**$1,461,390**	**$2,806,748**	**$3,533,647**	**$3,807,672**	**$3,276,263**	**$5,012,266**	**$0**	**$177,944**	**$0**	**$0**	
Financing Costs													
Interest on LTD	$12,153,884	$387,274	$856,529	$1,645,050	$2,071,089	$2,231,697	$1,920,235	$2,937,716	$0	$104,294	$0	$0	As Net Plant
Interest on STD	2,359,004	75,168	166,248	319,295	401,987	433,160	372,707	570,195	0	20,243	0	0	As Net Plant
AFUDC	(1,049,113)	(33,429)	(73,935)	(141,999)	(178,775)	(192,638)	(165,753)	(253,581)	0	(9,003)	0	0	As Net Plant
Total Financing Costs	**$13,463,775**	**$429,012**	**$948,842**	**$1,822,346**	**$2,294,302**	**$2,472,219**	**$2,127,190**	**$3,254,330**	**$0**	**$115,534**	**$0**	**$0**	

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Wastewater Treatment COSA
Exhibit 8.1
Allocation of the Revenue Requirement

			Strength Related										
	Test Year **2021**	**Volume** *(VOL)*	**Biochemical Oxygen Demand** *(BOD)*	**Chemical Oxygen Demand** *(COD)*	**Total Nitrogen** *(TKN)*	**Total Phosphorous** *(TP)*	**Oil & Grease** *(OG)*	**Total Suspended Solids** *(TSS)*	**Actual Customer** *(AC)*	**Customer Serv & Actng.** *(WCA)*	**Revenue** *(RR)*	**Direct** *(DA)*	*Basis of Classification*
Return on Investment													
Retained Earnings	$7,183,020	$228,881	$506,214	$972,235	$1,224,027	$1,318,947	$1,134,871	$1,736,208	$0	$61,638	$0	$0	As Net Plant
Dividends / Equity Issue	15,000,000	477,963	1,057,105	2,030,277	2,556,083	2,754,301	2,369,903	3,625,651	0	128,717	0	0	As Net Plant
Total Return on Investment	**$22,183,020**	**$706,844**	**$1,563,319**	**$3,002,511**	**$3,780,110**	**$4,073,247**	**$3,504,774**	**$5,361,859**	**$0**	**$190,355**	**$0**	**$0**	
Total Revenue Requirement	**$130,936,948**	**$2,763,948**	**$6,112,990**	**$11,740,615**	**$14,781,232**	**$17,045,268**	**$13,704,595**	**$38,311,054**	**$0**	**$16,463,108**	**$8,346,136**	**$1,668,002**	
Less: Non-Operating Revenue													
Late Payment Charges	$266,341	$5,622	$12,435	$23,882	$30,067	$34,672	$27,877	$77,929	$0	$33,488	$16,977	$3,393	As Revenue Requirement
Surplus Sales	5,220	110	244	468	589	680	546	1,527	0	656	333	66	As Revenue Requirement
ACRWC Swap	943,233	19,911	44,036	84,576	106,480	122,789	98,724	275,982	0	118,596	60,123	12,016	As Revenue Requirement
Suburban	542,274	11,447	25,317	48,624	61,216	70,593	56,757	158,665	0	68,182	34,565	6,908	As Revenue Requirement
Lab	400,002	8,444	18,675	35,867	45,155	52,072	41,866	117,037	0	50,293	25,497	5,096	As Revenue Requirement
Ostara	400,000	8,444	18,675	35,866	45,155	52,072	41,866	117,037	0	50,293	25,497	5,096	As Revenue Requirement
Biosolids													
ACRWC Recovery	$4,200,000	0	0	0	0	0	0	4,200,000	0	0	0	0	100% TSS
EPCOR Drainage Recovery	12,824,672	0	0	0	0	0	0	12,824,672	0	0	0	0	100% TSS
AESO DR Participation	100,000	2,111	4,669	8,967	11,289	13,018	10,467	29,259	0	12,573	6,374	1,274	As Revenue Requirement
Suburban - Strathcona	430,563	9,089	20,101	38,607	48,605	56,050	45,065	125,979	0	54,136	27,445	5,485	As Revenue Requirement
Total Other Revenues	**$20,112,305**	**$65,177**	**$144,151**	**$276,856**	**$348,557**	**$401,946**	**$323,169**	**$17,928,087**	**$0**	**$388,218**	**$196,811**	**$39,333**	
Net Revenue Requirement	**$110,824,643**	**$2,698,772**	**$5,968,839**	**$11,463,759**	**$14,432,674**	**$16,643,323**	**$13,381,427**	**$20,382,967**	**$0**	**$16,074,890**	**$8,149,325**	**$1,628,669**	

EPCOR
Wastewater Treatment COSA
Exhibit 8.2
Direct Assignment of the Revenue Requirement

	Total	Single Family	Multi-Family	Commercial	Overstrength Tier 1	Overstrength Tier 2	Notes
Franchise Fees	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	
Power, Other Utilities & Chemicals							
Power	$0	$0	$0	$0	$0	$0	
Water	0	0	0	0	0	0	
Natural Gas	0	0	0	0	0	0	
Chemicals	0	0	0	0	0	0	
Salaries-OT CompTime Cashout	0	0	0	0	0	0	
Furlough Savings	0	0	0	0	0	0	
Labor Concessions	0	0	0	0	0	0	
Year-End Accrual -Sal & Bene	0	0	0	0	0	0	
Vacation Cashout (Annual)	0	0	0	0	0	0	
Total Power, Other Utilities & Chemicals	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	
Wastewater Treatment Plant							
Plant Operations	$0	$0	$0	$0	$0	$0	
Ostara (Phosphorous)	0	0	0	0	0	0	
Clover Bar (Biosolids)	0	0	0	0	0	0	
Suncor - Recycled Water	0	0	0	0	0	0	
General Maintenance	0	0	0	0	0	0	
Process Maintenance	0	0	0	0	0	0	
Facilities & Site Maintenance	0	0	0	0	0	0	
Plant Controls and Automation	0	0	0	0	0	0	
Plant Engineering	0	0	0	0	0	0	
Abandonments	0	0	0	0	0	0	
Total Wastewater Treatment Plant	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	
Operational Support Services							
Quality Assurance and Environment	$0	$0	$0	$0	$0	$0	
Project Engineering	0	0	0	0	0	0	
Gold Bar Administration	0	0	0	0	0	0	
Centre of Excellence	0	0	0	0	0	0	
Operations Communications	0	0	0	0	0	0	
Legal Services	0	0	0	0	0	0	
SCM Security	0	0	0	0	0	0	
SCM Inventory Management	0	0	0	0	0	0	
Total Operational Support Services	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	
Capital Overhead	$0	$0	$0	$0	$0	$0	

EPCOR
Wastewater Treatment COSA
Exhibit 8.2
Direct Assignment of the Revenue Requirement

	Total	Single Family	Multi-Family	Commercial	Overstrength Tier 1	Overstrength Tier 2	Notes
Billing, Meters, & Customer Service							
CUS Charges - Metering	$0	$0	$0	$0	$0	$0	
CUS Charges - Billing & Collections	0	0	0	0	0	0	
Regulatory Services (Strength Testing)	1,668,002	0	0	0	834,001	834,001	
Total Billing, Meters, & Customer Service	**$1,668,002**	**$0**	**$0**	**$0**	**$834,001**	**$834,001**	
EWSI Shared Service							
Allocation from BU 8F	$0	$0	$0	$0	$0	$0	
Controller, Water Services	0	0	0	0	0	0	
Controller & Fringe/SRP True-up	0	0	0	0	0	0	
Health, Safety and Environment	0	0	0	0	0	0	
Incentive	0	0	0	0	0	0	
Total EWSI Shared Service	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	
Corporate Shared Services	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	
Total O&M Expenses	**$1,668,002**	**$0**	**$0**	**$0**	**$834,001**	**$834,001**	
Property Taxes	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	
Depreciation	$0	$0	$0	$0	$0	$0	
Less: Contributions Amortization	0	0	0	0	0	0	
Total Depreciation	$0	$0	$0	$0	$0	$0	
Financing Costs							
Interest on LTD	0	0	0	0	0	0	
Interest on STD	0	0	0	0	0	0	
AFUDC	0	0	0	0	0	0	
Total Financing Costs	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	
Return on Investment							
Retained Earnings	$0	$0	$0	$0	$0	$0	
Dividends / Equity Issue	0	0	0	0	0	0	
Total Return on Investment	**$0**	**0**	**0**	**0**	**0**	**0**	
Total Revenue Requirement	**$1,668,002**	**$0**	**$0**	**$0**	**$834,001**	**$834,001**	
Less: Non-Operating Revenue							
Late Payment Charges	$3,393	$0	$0	$0	$1,696	$1,696	
Surplus Sales	66	0	0	0	33	33	
ACRWC Swap	12,016	0	0	0	6,008	6,008	
Suburban	6,908	0	0	0	3,454	3,454	
Lab	5,096	0	0	0	2,548	2,548	
Ostara	5,096	0	0	0	2,548	2,548	
Biosolids	0	0	0	0	0	0	
ACRWC Recovery	0	0	0	0	0	0	
EPCOR Drainage Recovery	0	0	0	0	0	0	
AESO DR Participation	1,274	0	0	0	637	637	
Suburban - Strathcona	5,485	0	0	0	2,742	2,742	
Total Other Revenues	**$39,333**	**$0**	**$0**	**$0**	**$19,667**	**$19,667**	
Net Revenue Requirement	**$1,628,669**	**$0**	**$0**	**$0**	**$814,334**	**$814,334**	

EPCOR
Wastewater Treatment COSA
Exhibit 9a
Distribution of Total Revenues Requirement

					Overstrength		
		Single Family	Multi-Family	Commercial	*Tier 1*	*Tier 2*	*Basis of Allocation*
Volume Related	**$2,698,772**	**$1,420,290**	**$553,793**	**$724,688**	**$0**	**$0**	*(VOL)*
Strength Related							
Biochemical Oxygen Demand	$5,968,839	$2,566,577	$1,000,749	$1,309,569	$1,017,429	$74,515	*(BOD)*
Total Suspended Solids	20,382,967	10,293,129	4,013,453	5,251,963	777,533	46,889	*(TSS)*
Chemical Oxygen Demand	11,463,759	5,716,065	2,228,784	2,916,563	592,965	9,382	*(COD)*
Total Nitrogen	14,432,674	7,076,114	2,759,088	3,610,514	844,561	142,397	*(TKN)*
Oil & Grease	13,381,427	6,600,737	2,573,731	3,367,958	786,098	52,903	*(OG)*
Total Phosphorous	16,643,323	8,485,722	3,308,716	4,329,752	519,133	0	*(TP)*
	$82,272,988	**$40,738,345**	**$15,884,520**	**$20,786,318**	**$4,537,719**	**$326,086**	
	$84,971,760	**$42,158,635**	**$16,438,314**	**$21,511,006**	**$4,537,719**	**$326,086**	

EPCOR
Wastewater Treatment COSA
Exhibit 9b
Distribution of Total Revenue Requirement

		Single Family	Multi-Family	Commercial	Overstrength	*Basis of Allocation*
Volume Related	**$2,698,772**	**$1,420,290**	**$553,793**	**$724,688**	**$0**	*(VOL)*
Strength Related						
Biochemical Oxygen Demand	$5,968,839	$2,566,577	$1,000,749	$1,309,569	$1,091,944	*(BOD)*
Total Suspended Solids	20,382,967	10,293,129	4,013,453	5,251,963	824,422	*(TSS)*
Chemical Oxygen Demand	11,463,759	5,716,065	2,228,784	2,916,563	602,347	*(COD)*
Total Nitrogen	14,432,674	7,076,114	2,759,088	3,610,514	986,959	*(TKN)*
Oil & Grease	13,381,427	6,600,737	2,573,731	3,367,958	839,001	*(OG)*
Total Phosphorous	16,643,323	8,485,722	3,308,716	4,329,752	519,133	*(TP)*
Total Strength Related	**$82,272,988**	**$40,738,345**	**$15,884,520**	**$20,786,318**	**$4,863,805**	
Customer Related						
Actual Customer	$0	$0	$0	$0	$0	*(AC)*
Weighted Customer	16,074,890	14,921,672	209,487	943,731	0	*(WCA)*
Total Customer Related	**$16,074,890**	**$14,921,672**	**$209,487**	**$943,731**	**$0**	
Revenue Related	**$8,149,325**	**$4,913,995**	**$1,429,510**	**$1,805,820**	**$0**	*(RR)*
Direct Assignment	**$1,628,669**	**$0**	**$0**	**$0**	**$1,628,669**	*(DA)*
Total Revenue Requirements	**$110,824,643**	**$61,994,301**	**$18,077,311**	**$24,260,557**	**$6,492,474**	

EPCOR
Wastewater Treatment COSA
Exhibit 10
Cost of Service Analysis Summary

	Test Year 2021	Single Family	Multi-Family	Commercial	Overstrength
Revenues at Present Rates	**$110,824,643**	$64,338,221	$18,716,369	$23,643,333	$4,126,720
Allocated Revenue Requirement	**$110,824,643**	$61,994,301	$18,077,311	$24,260,557	$6,492,474
Balance / (Deficiency) of Funds	**($0)**	**$2,343,920**	**$639,058**	**($617,224)**	**($2,365,754)**
Required % Change in Rates	**0.0%**	**-3.6%**	**-3.4%**	**2.6%**	**57.3%**

EPCOR
Wastewater Treatment COSA
Exhibit 11a
Unit Costs Summary

	System Average	Single Family	Multi-Family	Commercial	Overstrength Tier 1	Overstrength Tier 2
Variable						
Volume Costs - $ / m^3	$0.0315	$0.0315	$0.0315	$0.0315		
BOD Costs - $ / m^3	0.0697	0.0570	0.0570	0.0570		
TSS Costs - $ / m^3	0.2381	0.2284	0.2284	0.2284		
COD Costs - $ / m^3	0.1339	0.1268	0.1268	0.1268		
TKN Costs - $ / m^3	0.1686	0.1570	0.1570	0.1570		
OG Costs - $ / m^3	0.1563	0.1465	0.1465	0.1465		
TP Costs - $ / m^3	0.1944	0.1883	0.1883	0.1883		
RR+DA Costs - $ / m^3	0.0095	0.0091	0.0068	0.0065		
Total	**$1.0019**	**$0.9447**	**$0.9424**	**$0.9421**		
Fixed						
Customer - $ / Acct. / Mo	$4.61	$4.61	$4.61	$4.61		
Total	**$4.61**	**$4.61**	**$4.61**	**$4.61**		
Basic Data						
Billed Volumes	85,624,161	45,061,664	17,570,250	22,992,247	0	0
Number of Accounts	290,549	269,705	3,786	17,058	0	
Number of Wt Units	290,549	269,705	3,786	17,058	0	
Kilograms						
BOD	21,786,994	9,368,320	3,652,855	4,780,088	3,713,741	271,990
TSS	34,011,290	17,175,253	6,696,901	8,763,495	1,297,402	78,239
COD	9,237,668	4,606,091	1,795,987	2,350,210	477,820	7,560
TKN	3,821,587	1,873,664	730,571	956,018	223,629	37,705
OG	4,748,011	2,342,080	913,214	1,195,022	278,924	18,771
TP	742,121	378,376	147,535	193,062	23,148	0

EPCOR
Wastewater Treatment COSA
Exhibit 11b
Unit Costs Summary - Kilograms

					Overstrength	
		Single Family	**Multi-Family**	**Commercial**	*Tier 1*	*Tier 2*
Surcharge per Kilogram						
BOD Costs - $ / Kg	$0.27	$0.27	$0.27	$0.27	$0.37	$0.37
TSS Costs - $ / Kg	0.60	0.60	0.60	0.60	0.80	0.80
COD Costs - $ / Kg	1.24	1.24	1.24	1.24	1.66	1.66
TKN Costs - $ / Kg	3.78	3.78	3.78	3.78	5.04	5.04
OG Costs - $ / Kg	2.82	2.82	2.82	2.82	3.76	3.76
TP Costs - $ / Kg	22.43	22.43	22.43	22.43	29.94	0.00
Limits (mg/l)						
BOD		N/A	N/A	N/A	> 300	> 3,000
TSS		N/A	N/A	N/A	> 300	> 3,000
COD		N/A	N/A	N/A	> 600	> 6,000
TKN		N/A	N/A	N/A	> 50	> 200
OG		N/A	N/A	N/A	> 100	> 400
TP		N/A	N/A	N/A	> 10	> 75

Final Report


EPCOR

2020 Sanitary and Stormwater Drainage Cost of Service Study

January 2021

January 18, 2021

Mr. Darrell Manning
EPCOR Water Services, Inc.
9496 Rossdale Road
Edmonton, Alberta T5J 3B1

Subject: Comprehensive Sanitary and Stormwater Drainage Cost of Service Study
Final Report

Dear Mr. Manning:

HDR Engineering, Inc. (HDR) was retained by EPCOR Water Services, Inc. (EPCOR) to provide technical assistance in the update of EPCOR's sanitary and stormwater drainage cost of service analyses to support EPCOR's efforts in establishing cost-based rates for its customers. This study is a companion effort to HDR's wastewater treatment cost of service analysis. In this case, EPCOR's drainage utility provides two key services: wastewater collection and stormwater management.

For the sanitary and stormwater drainage study, EPCOR was responsible for the development of the development of the revenue requirement analysis and HDR was responsible for the development of the cost of service analysis. The objective of the cost of service analysis is to equitably distribute EPCOR's sanitary and stormwater drainage costs to the various customer classes of service. This is accomplished by using industry accepted cost of service principles and methodologies and tailoring them to the specific and unique characteristics and operations of EPCOR's drainage system.

In developing these analyses, HDR has relied upon EPCOR's accounting, operating and management records. From our analyses, HDR has provided our findings, conclusions, and recommendations. This report details our approach and methodology for the sanitary and stormwater drainage utilities. The model and technical analyses are intended to provide cost-based, defensible, and equitable sanitary and stormwater drainage rates.

We appreciate the opportunity to provide technical assistance to EPCOR. We also appreciate the assistance provided by EPCOR management and staff in the development of this study.

Sincerely yours,
HDR Engineering, Inc.

Shawn Koorn
Associate Vice President

Table of Contents

1 Introduction and Overview

1.1 Introduction

EPCOR Water Services, Inc. (EPCOR) provides drainage utility services. More specifically, drainage utility services are related to the collection of wastewater (sanitary drainage) and the management of stormwater runoff (stormwater drainage). These services are provided under the drainage utility. While they appear to be two separate and distinct utility services, which they are, they do share certain facilities and resources. Given that, this cost of service study will examine each service, sanitary drainage, and stormwater drainage, on a separate cost/rate basis.

HDR Engineering, Inc. (HDR) was retained by EPCOR to provide technical assistance in the development of a sanitary and stormwater drainage cost of service analysis to support EPCOR's historical practice of establishing cost-based rates. This report outlines the approach, methodology, findings, and conclusions of the sanitary and stormwater cost of service analyses.

This report was developed utilizing EPCOR's accounting, operating and management records. HDR has relied on this information to develop our analyses, from which we draw our findings, conclusions, and recommendations. The sanitary and stormwater cost of service analyses were developed utilizing "generally accepted" utility rate setting and cost of service principles and methodologies. This report provides EPCOR with the basis for developing and implementing sanitary and stormwater drainage rates which are cost-based and defensible to its customers.

1.2 Study Goals and Objectives

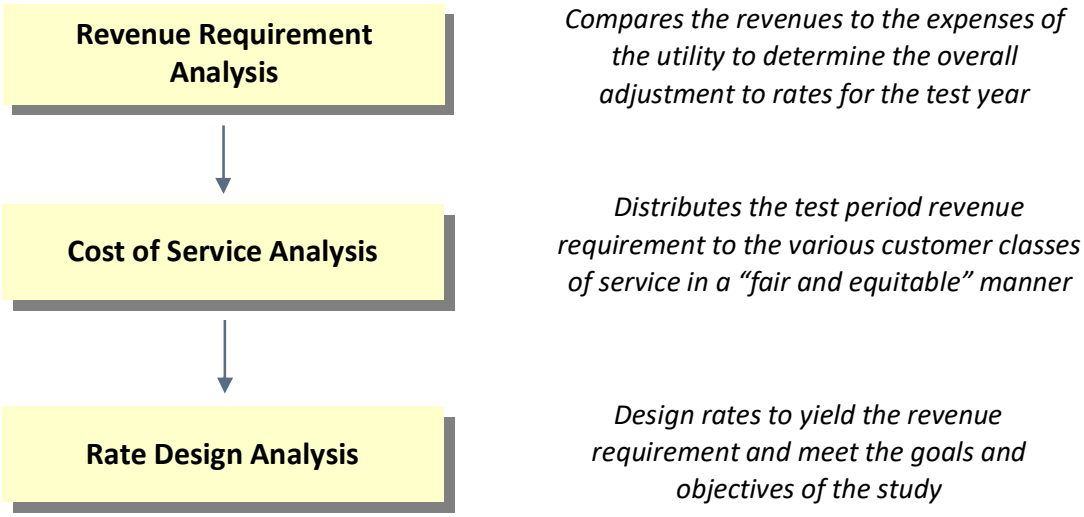
The development of this study was based on several key rate study goals and objectives. In general, these were as follows:

- Develop a sanitary drainage (wastewater collection) cost of service analysis that is consistent with the principles and methodologies established by the Water Environment Federation (WEF) Manual of Practice No. 27, Financing and Charges for Wastewater Systems.
- Develop a stormwater drainage cost of service analysis that is consistent with industry best-practices and cost of service principles and methodologies for stormwater utilities.
- Develop sanitary and stormwater cost of service methodologies to equitably distribute the cost of providing these services to the various customer classes served.
- Review the current sanitary and stormwater drainage rate structures and provide alternatives for discussion and review by EPCOR for their future consideration.
- Provide EPCOR with a sanitary and stormwater cost of service model to use and evaluate the distribution of future sanitary and stormwater drainage costs and rate impacts.

1.3 Overview of the Comprehensive Rate Study Process

Provided in Figure 1 – 1 is an overview of the steps required to conduct a comprehensive rate study.

Figure 1 – 1
Overview of the Comprehensive Rate Study Process



These "generally accepted" methodologies are based on rate-setting principles and practices described in the Water Environment Federation (WEF) Manual of Practice (MOP) #27. The framework or methodology shown in Figure 1 - 1 provides an overview of the typical components of a comprehensive rate study, regardless of the utility being analyzed. An important aspect of this study is incorporating and "tailoring" those analytical elements to reflect the specific circumstances of EPCOR's sanitary and stormwater drainage system.

1.4 Report Organization

This report is designed to discuss and document the technical analyses undertaken within this study. To that end, this report is organized as follows:

- Section 2 provides an overview, discussion, and summary of the sanitary and stormwater drainage revenue requirement analyses, which was developed by EPCOR.
- Section 3 reviews the development of the sanitary drainage cost of service analysis.
- Section 4 reviews and discusses the development of the stormwater cost of service analysis.
- Section 5 provides a discussion of the current sanitary and stormwater drainage rates.
- Technical Appendix A - detailed technical exhibits of the analyses completed to support the sanitary drainage cost of service analysis.

- Technical Appendix B - detailed technical exhibits of the analyses completed to support the stormwater drainage cost of service analysis.

1.5 Summary

This report provides a summary of the technical analyses undertaken to develop the sanitary and stormwater drainage cost of service analysis based on generally accepted methodologies which will provide EPCOR with the information necessary to continue to develop cost-based and equitable rates applicable to its sanitary and stormwater utility.

2 Drainage Utility Revenue Requirement

2.1 Introduction

This section of the report discusses the development of the revenue requirement for EPCOR's sanitary and stormwater drainage utility. A revenue requirement analysis provides a technical framework around which to evaluate the overall adequacy of EPCOR's current drainage rates, both sanitary and stormwater.

It is important to note that EPCOR's drainage utility is operated and accounted for on a combined utility basis. For purposes of the comprehensive rate study, and the cost of service analyses in particular, the revenue requirement will be segregated between sanitary drainage and stormwater drainage. EPCOR management and staff were responsible for the development of the revenues and expenses (i.e., costs) included in the drainage revenue requirement analysis. In addition, EPCOR was largely responsible for the final segregation of drainage costs between the sanitary and stormwater utility functions/services.

Provided below is a detailed discussion of the drainage utility revenue requirement analysis. This section of the report will also discuss the assignment/allocation of the drainage utility revenue requirement between the sanitary drainage and stormwater drainage functions/services. The segregated revenue requirement analyses for the sanitary and stormwater drainage ultimately becomes the initial input into the sanitary and stormwater drainage cost of service analyses developed for EPCOR by HDR.

2.2 Revenue Requirement Framework

By virtue of the differences between a public utility and a private utility, the revenue requirement is often based upon different elements or methodologies. Most private or regulated utilities utilize what is known as a "utility or accrual" basis of determining revenue requirement for setting rate levels. This convention calculates a utility's annual revenue requirement by aggregating a test period's operation and maintenance (O&M) expenses, taxes, annual depreciation expense and a fair return on investment.

In contrast to the "utility or accrual" method of developing the revenue requirement for privately-owned public utilities, a different method of determining the revenue requirement is often used for governmentally-owned public utilities. The convention used by most governmental or public utilities is called the "cash basis" methodology of setting revenue requirement. As the name implies, a public utility aggregates its cash expenditures to determine its total revenue requirement for a specified period of time.

Table 2 - 1 summarizes and compares the "cash" and "utility/accrual" basis methodologies.

Table 2 – 1
Cash versus Utility Basis Comparison

	Cash Basis		Utility Basis (Accrual)
+	O&M Expenses	+	O&M Expenses
+	Taxes/Transfer Payments	+	Taxes/Transfer Payments
+	Capital Improv. Funded From Rates (≥ Depreciation Expense)	+	Depreciation Expense
+	Debt Service (Principal + Interest)	+	Return on Investment
=	**Total Revenue Requirement**	=	**Total Revenue Requirement**

For this particular study, given that EPCOR is a regulated utility, the "utility/accrual basis" approach was utilized. This methodology is consistent with EPCOR's past rate setting methodologies and practices.

2.3 Development of the Drainage Revenue Requirement

The first step of the comprehensive rate study process is the development of the revenue requirement analysis. The drainage utility revenue requirement used for this study was developed by EPCOR management and staff. This section of the report will discuss and summarize EPCOR's drainage utility revenue requirement analysis.

The initial step in calculating the drainage utility revenue requirement was to establish a test period or time frame around which the revenue requirement would be reviewed. For this particular analysis, the drainage utility revenue requirement analysis has been developed based on EPCOR's budgeted 2019 expenditures and projected out from 2020 through 2029.

The drainage utility expenses are budgeted and accounted for between the following major cost groups:

- Franchise Fees
- Drainage Operations
- Planning
- Billing and Meter Reading
- Project Support Costs
- Drainage Services Administration
- Corporate Allocations
- Efficiencies
- O&M Expenses - NRAs

For each major cost group there are numerous subaccounts. The revenue requirement developed herein for the drainage utility utilized the subaccounts and projected costs for the ten-year projected test period. Provided below in Table 2-2 is a summary of the drainage utility revenue requirement analysis for 2020 through 2029.

Table 2 – 2
Summary of the Drainage Utility Revenue Requirement ($000)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Revenues										
Rate Revenues	$200,073	$209,954	$233,067	$253,439	$275,613	$299,774	$312,102	$320,320	$329,056	$337913
Other Revenues	(1,635)	735	7,391	10,298	16,348	22,123	30,542	40,828	52,725	63,316
Total Revenues	**$198,438**	**$210,689**	**$240,458**	**$263,737**	**$291,961**	**$321,898**	**$342,644**	**$361,148**	**$381,781**	**$401,228**
Expenses										
O&M Expenses	$112,903	$120,230	$115,155	$116,882	$120,926	$123,376	$126.106	$129,103	$131,742	$134,433
Property Tax	772	811	827	842	858	875	891	908	925	943
Depreciation Exp.[1]	37,859	38,755	42,408	45,142	50,615	54,846	56,769	61,926	66,486	71,525
Financing Costs	18,387	22,048	31,609	35,276	38,291	45,613	55,145	60,538	64,932	70,546
Return on Investment	28,517	28,846	50,460	65,594	81,271	97,188	103,417	108,673	117,695	123,781
Total Expenses	**$198,438**	**$210,689**	**$240,458**	**$263,737**	**$291,961**	**$321,898**	**$342,644**	**$361,148**	**$381,781**	**$401,228**
Bal./(Deficiency) of Funds	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

[1] – Annual depreciation expense is net of contributions.

Given the drainage utility total revenue requirement, the next step of the revenue requirement analysis was to segregate, or assign, the drainage costs between the sanitary drainage and stormwater drainage services. To accomplish this, the budget/projected expenses provided by EPCOR were split between sanitary drainage and stormwater drainage based on a number of different factors. For example, the factors used were based on assets, customers, revenues, and percentage split between each utility (e.g., 50%/50% split). Provided below in Table 2-3 is a summary of the segregated costs between sanitary and stormwater drainage for test year 2021.

Table 2 – 3
Summary of the TY 2021 Drainage Utility Revenue Requirement
Segregated Between Sanitary Drainage and Stormwater Drainage ($000)

Account	Composite Cost Split [1] Sanitary	Stormwater	Total Drainage	Total Sanitary	Total Stormwater
Oper. & Maint. Exp. –					
Franchise Fee	100%	0%	$10,695	$10,695	$0
Drainage Operations	55%	45%	43,070	23,485	19,585
Planning	48%	52%	12,444	6,021	6,423
Billing/Meter Reading	97%	3%	7,366	7,122	243,354
Project Support Costs	50%	50%	4,673	2,336	2,336
Drainage Svces Admin.	63%	37%	13,778	8,727	5,051
Corporate Allocation	63%	37%	19,609	12,420	7,189
Efficiencies	65%	35%	0	0	0
O&M Expense – NRA's	52%	48%	8,595	4,471	4,123
Total O&M Exp.			**$120,230**	**$75,278**	**$44,952**
Property Taxes	50%	50%	811	406	406
Depreciation (Net)	39%	61%	38,755	15,287	23,468
Financing Costs	65%	35%	22,048	14,383	7,665
Return on Investment	65%	35%	28,846	18,818	10,028
Total Revenue Require.			**$210,689**	**$124,170**	**$86,519**

[1] – Percentages shown are the composite of all allocations within each cost group.

The percentage allocations and results shown above are for test year 2021. While Table 2-3 has summarized the percentage allocations as a composite percentage for the major cost groups, different allocation percentages (i.e., methods) were often used to assign different costs within a major cost group. For that reason, the composite split may vary slightly over time as the same percentage allocation factors were used for all years, but the costs and relationships between costs can vary over time.

2.4 Summary of the Drainage Revenue Requirement

The approach shown in Table 2-3 was used for each year of the drainage utility revenue requirement (Table 2-2). Summarized below in Table 2-4 is a summary of the sanitary drainage revenue requirement for test years 2020 – 2029. Table 2-5 on the following page is the stormwater drainage revenue requirement for test years 2020 – 2029.

Table 2 – 4
Summary of the Sanitary Drainage Revenue Requirement ($000)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Revenues -										
Rate Revenues	$129,448	$134,390	$147,314	$159,588	$172,900	$187,350	$194,374	$198,763	$203,543	$208,314
Other Revenues	(5,794)	(4,402)	(4,139)	(3,886)	(1,546)	(405)	4,305	9,250	11,006	12,542
Total Revenues	**$123,654**	**$129,988**	**$143,175**	**$155,703**	**$171,353**	**$186,945**	**$198,680**	**$208,013**	**$214,549**	**$220,857**
Expenses -										
O&M Expenses	$70,773	$75,278	$71,733	$72,635	$75,838	$77,432	$79,606	$81,396	$83,129	$84,896
Property Tax	386	406	413	421	429	437	446	454	463	471
Depreciation	14,933	15,287	16,728	17,806	19,965	21,634	22,392	24,426	26,225	28,213
Financing Costs	11,995	14,383	20,620	23,012	24,979	29,756	35,974	39,492	42,358	46,021
Return on Investment	18,603	18,818	32,917	42,791	53,017	63,401	67,464	70,893	76,779	80,749
Total Expenses	**$116,690**	**$124,170**	**$142,411**	**$156,665**	**$174,228**	**$192,659**	**$205,881**	**$216,661**	**$228,954**	**$240,350**
Bal./(Defic.) of Funds	$6,964	$5,817	$764	($963)	($2,875)	($5,714)	($7,201)	($8,649)	($14,405)	($19,943)

Table 2 – 5
Summary of the Stormwater Drainage Revenue Requirement ($000)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Revenues –										
Rate Revenues	$70,625	$75,564	$85,753	$93,850	$102,714	$112,424	$117,728	$121,557	$125,513	$129,599
Other Revenues	4,159	5,138	11,530	14,184	17,894	22,529	26,237	31,578	41,720	50,773
Total Revenues	**$74,784**	**$80,702**	**$97,283**	**$108,034**	**$120,608**	**$134,953**	**$143,965**	**$153,135**	**$167,232**	**$180,372**
Expenses –										
O&M Expenses	$42,130	$44,952	$43,422	$44,247	$45,088	$45,945	$46,818	$47,707	$48,613	$49,537
Property Tax	386	406	413	421	429	437	446	454	463	471
Depreciation	22,926	23,468	25,680	27,336	30,650	33,212	34,377	37,500	40,261	43,313
Financing Costs	6,392	7,665	10,989	12,264	13,312	15,857	19,171	21,046	22,573	24,525
Return on Investment	9,914	10,028	17,542	22,804	28,254	33,787	35,953	37,780	40,917	43,032
Total Expenses	**$81,748**	**$86,519**	**$98,047**	**$107,072**	**$117,733**	**$129,239**	**$136,763**	**$144,487**	**$152,827**	**$160,879**
Bal./(Defic.) of Funds	($6,964)	($5,817)	($764)	$963	$2,875	$5,714	$7,201	$8,649	$14,405	$19,493

As noted previously, both the sanitary and stormwater drainage revenue requirement analyses summarized above were developed by EPCOR and provided to HDR. This revenue and cost information provides the basis for the cost of service analysis.

2.5 Summary

This section of the report has provided a summary of the sanitary and stormwater drainage revenue requirement as developed by EPCOR. The revenue requirement results for test year 2021 were used by HDR as the starting point for the sanitary and stormwater drainage cost of service analyses. The next section of the report will discuss the development of the sanitary drainage cost of service analysis.

3 Sanitary Drainage Cost of Service Analysis

3.1 Introduction

This section of the report details the development of the sanitary drainage cost of service analysis. Sanitary drainage is related to the collection of wastewater for treatment at EPCOR's wastewater treatment facilities. The sanitary drainage cost of service analysis equitably distributes the sanitary drainage revenue requirement previously summarized in Table 2-4. Provided below is a more detailed discussion of the key technical steps of the sanitary drainage cost of service analysis conducted by HDR, along with our findings, conclusions, and recommendations.

3.2 Overview and Purpose of the Cost of Service Analysis

The objective of a cost of service analysis is to equitably distribute the utility's revenue requirement to the various customer classes of service. Following generally accepted cost of service guidelines, principles and methodologies will inherently lead to sanitary drainage rates which are equitable, cost-based, and not viewed as arbitrary or capricious in nature.

There are two primary objectives in conducting a cost of service analysis:

1. Equitably distribute the revenue requirement among the customer classes of service
2. Derive average unit costs for subsequent reference/use in designing final rates

The objectives of a cost of service analysis are different than determining a revenue requirement. As noted in the previous section, a revenue requirement analysis determines the utility's overall financial needs, while the cost of service analysis provides a methodology to determine the fair and equitable manner in which to apportion or collect the revenue requirement across the various customer groups (e.g., residential, commercial).

The second rationale for conducting a cost of service analysis is to design a rate such that it properly reflects the costs incurred by the utility. For example, a sanitary drainage (or collection) system primarily incurs costs related to the total flow of wastewater. Given that, those customers impacting the system and total flows should be assigned an equitable (i.e., proportional) share of the costs based upon their proportional contribution to total wastewater flow. Wastewater flow is one type of cost incurred on a wastewater system. Each type of cost may be collected in a slightly different manner as to allow for the development of rates that collect costs in roughly the same manner as they are incurred.

3.3 Establishing Sanitary Drainage Customer Classes of Service

The first step in a cost of service study is to determine the customer classes of service which costs will be equitably distributed to. To establish the classes of service, the utility must segregate customers into groups of customers (i.e., classes of service) that have similar usage patterns and facility requirements. For EPCOR's sanitary drainage cost of service analysis, the following customer classes of service were utilized.

- Residential
- Multi-Residential
- Commercial
- University of Alberta (UofA)

During the development of the sanitary drainage cost of service, a review of the classes of service for this analysis was conducted. After discussions with EPCOR staff, it was concluded that the current sanitary drainage customer classes of service appear to be very reasonable and follow current industry practices. The establishment of customer classes of service allows for the development of cost-based rates and the ability to establish sanitary drainage rate structures, by customer class of service, reflective of their cost of service.

3.4 General Cost of Service Procedures

A cost of service analysis utilizes a three-step approach to review costs and these analytical steps take the form of *functionalization*, *allocation*, and *distribution*. Provided below is a more detailed discussion of the sanitary drainage cost of service analysis, and the specific steps taken within the analysis.

3.4.1 Functionalization of Sanitary Drainage Costs

The first analytical step of the sanitary drainage cost of service analysis is called *functionalization*. Functionalization is the arrangement of asset (plant/infrastructure) data and expenses (costs) by major operating functions within the utility (e.g., collection, pumping, etc.). Within this study, the functionalization of the sanitary drainage cost data was accomplished through EPCOR's sanitary drainage system of accounts. EPCOR's plant accounts are segregated between the major categories of sanitary, stormwater, and common. The sanitary plant assets were included within the sanitary cost of service analysis. The common (shared) plant assets were proportionally assigned between the sanitary and stormwater drainage utilities based upon the relative plant assets of each utility.

3.4.2 Allocation of Sanitary Drainage Costs

The second analytical task performed in the sanitary drainage cost of service analysis is the *allocation* of the costs. The allocation of sanitary drainage costs is a process which reviews each cost and determines why the expense was incurred or what type of need (e.g., volume/flow-, customer-related) is being met. The sanitary drainage utility's plant accounts and revenue requirement were reviewed and allocated using generally accepted cost of service principles and methodologies. Provided below is an overview of the various types of allocated costs used in the sanitary drainage cost of service analysis.

- **Volume-Related Costs:** Volume-related costs are those costs which tend to vary with the total quantity of wastewater collected and conveyed.
- **Capacity/Demand-Related Costs:** Capacity/demand costs are costs which are related to the capacity requirements of the system. This allocation method is used to reflect that the sanitary collection system is a function of both the number of customers on the system (i.e., a network of pipes, pumps), but also a function of the maximum flows that customers place on the system.

- **Customer-Related Costs:** Customer-related costs are those costs which vary with the addition or deletion of a customer or a cost which is a function of the number of customers served. Customer-related costs typically include the costs of accounting, billing, and collecting, and accounting. Customer costs can also be segregated between *actual* and *weighted*. An actual customer cost does not vary on a per customer basis, regardless of the size or usage of the customer (e.g., postage on a bill). In contrast, certain customer-related costs may vary by customer, on a per customer cost basis. For example, the cost of metering can vary given a customer with a larger sized meter. This study has utilized the concept of actual versus weighted customer costs.
- **Revenue-Related Costs:** Revenue-related costs are those costs which vary with the amount of revenue received by the utility. An example of a revenue-related cost would be a utility tax which is based (i.e., assessed) on gross utility revenue.

The basis, or methodology, for the allocation of EPCOR's sanitary drainage plant assets and costs is based on generally accepted wastewater cost of service principles and methodologies. These wastewater cost of service principles and methodologies are discussed and outlined in the Water Environment Federation, Manual of Practice #27, Financing and Charges for Wastewater Systems. The principles and methodologies discussed and outlined in this wastewater rate setting manual were adapted and tailored to be reflective of EPCOR's specific and unique facilities, customers, costs, and operations.

3.4.3 Development of the Sanitary Drainage Distribution Factors

Once the allocation of sanitary drainage assets and costs is complete, and the customer groups have been defined, the various allocated costs are proportionally and equitably distributed to each customer group using distribution factors. EPCOR's sanitary drainage allocated assets and costs were distributed to the various customer classes of service using the following sanitary drainage distribution factors.

- **Volume Distribution Factor:** Volume-related costs are generally distributed on the basis of estimated contributions to wastewater flows. Wastewater flows are not typically metered and must be estimated using a reasonable surrogate for a customer class's contribution. In wastewater cost of service analyses, metered water consumption, adjusted for outdoor irrigation usage, is often used as a reasonable surrogate for wastewater volume contributions. As part of the data and information provided by EPCOR to HDR, estimates of volume contributions of each class of service was provided. These volumetric estimates by sanitary drainage customer class of service were used as the basis for the volume distribution factor. The development and calculation of the volume distribution factor is shown in Exhibit 3 of the Sanitary Drainage Technical Appendix.
- **Capacity/Demand Distribution Factor:** Capacity/demand-related costs, and the distribution factor developed for them, considers both the number of customers served by the system, but also the capacity use or maximum volumes a customer can place upon the system. This distribution factor is based on an equivalent meter analysis which takes into consideration the number of meters by customer class of service (i.e., number of customers), but also the size of each individual meter and the capacity flow from that meter. This capacity/demand concept was used to equitably allocate and distribute a

portion of the sanitary drainage systems collection lines. The development and calculation of the capacity/demand distribution factor is shown in Exhibit 4 of the Sanitary Drainage Technical Appendix.

- **Customer Distribution Factors:** Customer costs within the sanitary drainage cost of service analysis are distributed to the various customer classes of service based upon their respective number of customer accounts. For EPCOR's sanitary drainage cost of service analysis, two basic types of customer distribution factors were developed – actual and weighted. The actual customer distribution factor reflects that there is no disproportionate cost associated with serving a customer and distributes costs on the basis of the number of customers/accounts. In contrast, a weighted customer distribution factor typically assumes that there is some disproportionality associated with serving different types of customers and attempts to estimate the level of difference in serving the customers. For EPCOR's weighted distribution factor for customer service and accounting, no disproportionate cost difference was assumed. Exhibit 5 of the Sanitary Drainage Technical Appendix provides the development and calculation of the actual and weighted customer distribution factors.
- **Revenue Related Distribution Factor:** The revenue related allocation factor was developed from the projected rate revenues for 2021 for each customer class of service, as developed in Exhibit 2. A summary of the revenue distribution factor is provided in Exhibit 6 of the Sanitary Drainage Technical Appendix.

The development of the distribution factors is based on generally accepted principles and methodologies. Given the development of the distribution factors, the final step in the cost of service analysis is to distribute the allocated costs to the various customer classes of service and summarize the results.

Given the general overview above of the procedures used in EPCOR's sanitary drainage cost of service analysis, the focus shifts to a more specific discussion of the key assumptions and details used in this analysis.

3.5 Functionalization and Allocation of Net Plant in Service

A necessary step of the cost of service is the functionalization and allocation of the sanitary drainage net plant in service. Net plant in service is defined as the original cost (OC) of plant in service, less the accumulated depreciation. The net plant in service balances were provided by EPCOR and were reflective of December 31, 2018.

In performing the *functionalization* of net plant in service, HDR utilized EPCOR's historical plant records. The drainage utility's total assets were then split into three categories: sanitary, stormwater, and common. The shared or common plant assets are related to sections of EPCOR's system where there are legacy "combined" sanitary and stormwater drainage system components. For the shared or common assets, a determination was made on how to equitably divide or split the costs. In general, the costs of common plant assets were split based on the percentage of the sanitary and stormwater drainage assets as a percent of the total assets less the common assets. HDR reviewed with EPCOR staff the assignment of the common plant assets

to confirm the appropriateness of their assignment between sanitary and stormwater drainage net plant assets.

Provided below in Table 3 – 1 is a summary of the allocation of the common net plant in service to the sanitary and stormwater drainage plant in service.

Table 3 – 1
Summary of the Assignment of Net Plant in Service [1]
Between Sanitary and Stormwater Drainage ($000)

Plant Components	Total	Sanitary	Stormwater
Common Plant			
Collection	$24,181	$11,254	$12,926
General Plant	55,068	34,074	20,995
Storage	2,237	167	2,160
Subtotal Common Plant	$81,576	$45,495	$36,080
Sanitary Plant	1,512,446	1,512,446	0
Stormwater Plant	2,117,018	0	2,117,018
Total Net Plant in Service	**$3,711,039**	**$1,557,941**	**$2,153,098**

[1] – Net plant as of December 31, 2018

Given the assignment of the common plant in service and the functionalization of net plant in service, HDR then *allocated* each plant asset category (i.e., collection, pumping, and storage) to the various cost allocation components previously described.

The allocation process included reviewing each plant line item and determining which cost components the assets were related to. The proposed allocations are based upon HDR's understanding of EPCOR's current sanitary drainage facilities, their current operations, and generally accepted allocation methodologies for sanitary/wastewater utilities. HDR's proposed allocations of net plant in service to the various cost components were reviewed with EPCOR's staff to confirm that the allocated plant components reasonably reflect the facilities and operations of EPCOR's sanitary drainage plant. Table 3 - 2 provides a summary of the allocated net plant in service for the sanitary drainage utility.

Table 3 – 2
Summary of the Allocation of Sanitary Drainage Plant in Service ($000)

	Total Net Plant	Volume	Capacity/ Demand	Actual Customer	Weighted Customer	Revenue Related	Dir. Assign
Collection	$1,390,309	$1,112,247	$278,062	$0	$0	$0	$0
Collection - Common	11,254	9,003	2,251	0	0	0	0
Pumping Stations	68,281	68,281	0	0	0	0	0
Storage	39,250	31,400	7,850	0	0	0	0
Storage - Common	167	134	33	0	0	0	0
Biosolids	10,387	0	10,387	0	0	0	0
Total before General	**$1,519,648**	**$1,221,065**	**$298,583**	**$0**	**$0**	**$0**	**$0**
General Plant	$38,293	$30,769	$7,524	$0	$0	$0	$0
Grand Total	**$1,557,941**	**$1,251,834**	**$306,107**	**$0**	**$0**	**$0**	**$0**

Tables 3 - 2 provides a summary of the basic functionalization and allocation of EPCOR's sanitary drainage net plant in service. A detailed exhibit of the functionalization and allocation of plant investment can be found in the Sanitary Drainage Technical Appendix A, Exhibit 7.

3.6 Functionalization and Allocation of the Revenue Requirement

Operating expenses are generally functionalized and allocated in a manner similar to the corresponding plant account. This approach to allocation of operating expenses was used for this analysis. For the cost of service study, the 2021 revenue requirement for the sanitary drainage utility prepared by EPCOR was functionalized, allocated, and distributed. As noted previously, the revenue requirement was developed utilizing the utility/accrual basis methodology which was comprised of operation and maintenance expenses, depreciation, revenue tax, and a return on rate base. Provided in Table 3 – 3 is summary of the allocated revenue requirement for EPCOR's sanitary drainage.

Table 3 – 3
Summary of the Allocation of the Sanitary Drainage
2021 Revenue Requirement ($000)

	Total Rev. Req.	Volume	Capacity/ Demand	Actual Customer	Weighted Customer	Revenue Related	Dir. Assign
Total O&M	$75,278	$ 49,535	$7,925	$7,122	$0	$10,695	$0
Property Taxes	406	0	0	0	0	406	0
Depreciation (Net)	15,287	10,059	1,609	1,446	0	2,172	0
Financing Costs	14,383	9,464	1,514	1,361	0	2,043	0
Return on Investment	18,818	12,382	1,981	1,780	0	2,673	0
Total Rev. Require.	**$124,170**	**$81,440**	**$13,030**	**$11,7100**	**$0**	**$17,990**	**$0**
Less: Non-Op Rev.	($4,402)	($2,887)	($461)	($415)	$0	($638)	$0
Net Rev. Require.	**$128,573**	**$84,327**	**$13,492**	**$12,125**	**$0**	**$18,628**	**$0**

A more detailed exhibit of the functionalization and allocation of the 2021 sanitary drainage revenue requirements can be found on Exhibit 8 of the Sanitary Drainage Technical Appendix.

3.7 Sanitary Drainage Key Cost of Service Assumptions

A number of key assumptions were used within the EPCOR sanitary drainage cost of service study. Listed below is a brief summary of the key assumptions used.

- The test year used for the sanitary drainage cost of service analyses was the test period 2021 forecasted revenue requirement.
- The revenue and expense data utilized by HDR within this study was provided by EPCOR.
- A "utility basis" approach was utilized for the revenue requirement and cost of service analysis. This is a generally accepted cost of service methodology.
- The allocation and distribution of plant in service and the revenue requirement was based on EPCOR specific data and information. Where key assumptions or estimates were required, HDR relied on EPCOR's staff understanding of the system and customers and HDR's direct industry experience in similar cost of service studies.
- The distribution factors developed as a part of the sanitary drainage cost of service analysis used EPCOR specific customer data. In particular, the data and information used to develop the volume distribution factor was provided by EPCOR.

3.8 Summary of the Sanitary Drainage Cost of Service Analysis

In summary form, the sanitary drainage cost of service analysis began by functionalizing the sanitary drainage net plant asset records and revenue requirements. The functionalized net plant and expense accounts were then allocated into their various cost components. The individual allocation totals were then distributed to the various customer classes of service based upon the use of proportional and equitable distribution factors. The distributed revenue requirement (i.e., expenses) for each customer class of service were then aggregated to determine each customer group's overall revenue responsibility. A summary of the detailed cost responsibility developed for each sanitary drainage class of service for 2021 is shown below in Table 3 - 4.

Table 3 – 4
Summary of the Sanitary Drainage Cost of Service Analysis ($000)

	Present Revenue	Allocated Costs	$ Difference	% Difference
Residential	$84,028	$78,703	$5,325	–6.3%
Multi-Residential	21,164	21,313	(150)	0.7%
Commercial	27,990	27,233	757	–2.7%
University of Alberta	1,209	1,323 [1]	(114)	9.5%
Total	**$134,573**	**$128,573**	**$5,817**	**–4.3%**

[1] – Allocated cost shown includes a "Large Wholesale with Collection System" discount of 44% to UofA.

The distribution of costs reflects the facilities and costs equitably distributed to each customer class, reflective of their respective benefit. The cost of service results indicated that some cost differences exist between the customer classes of service. A cost of service analysis is a dynamic

analysis, and the results can change over time as changes in costs and customer usage occurs. Given that dynamic, HDR typically reviews the summary of a cost of service analysis to determine whether a class of service is within a "reasonable range of their cost of service." The metric that HDR utilizes is a class of service is assumed to be within a "reasonable range of their cost of service" if the class is within ± 5% of the overall required adjustment. In other words, given EPCOR's –4.3% overall adjustment in this analysis, a class of service would be considered within a "reasonable range of their cost of service" if they are within the range of +1.3% to –9.3%.

The results above indicate that the majority of classes of service are within a reasonable range of covering their respective costs. The University is somewhat outside of the presumed range of reasonableness assumed by HDR. It is important to note that the above results are based upon a specific time period (i.e., one year) and a specific time period's costs and usage characteristics. As a result, "cost of service" for a class of service is often best determined over an extended number of studies. It is recommended that EPCOR continues to review and update the sanitary drainage cost of service before making interclass adjustments.

The detailed summary of the sanitary drainage cost of service analysis can be found in the Sanitary Drainage Technical Appendix A, Exhibits 9 and 10.

3.9 Sanitary Drainage Average Unit Costs

Average unit costs are essentially cost-based rates. In this case, the distributed sanitary drainage costs are converted from dollars to per unit costs. The per unit costs take the form of a fixed and variable (volumetric) average cost. Provided in Table 3-5 is a summary of the calculated average unit cost for the sanitary drainage utility.

Table 3 – 5
Summary of the Sanitary Drainage Average Unit Costs

	System Average	Residential	Multi-Residential	Commercial	Univ. of Alberta [1]
Variable Costs – Volume-Related $/m³	**$0.85**	**$0.86**	**$0.86**	**$0.86**	**$0.48**
Fixed Costs – $/Eq. Mtr./Mth					
Actual Customer	$3.02	$3.45	$0.73	$1.31	$0.02
Weighted Customer	0.00	0.00	0.00	0.00	0.00
Capacity/Demand	3.36	3.36	3.36	3.36	3.36
RR/Dir. Assign.	4.63	3.58	13.53	7.16	65.56
Total Fixed Costs	**$11.01**	**$10.39**	**$17.62**	**$11.83**	**$68.94**

[1] – Calculated average unit costs has included the discount for UofA.

The calculated average unit costs for the sanitary drainage utility have placed the distributed "variable" costs in the context of $/m³ and the "fixed" costs in a $/equivalent meter/month. It is important to understand that these average unit costs are the starting point for proposed sanitary drainage rate designs. Final rate designs, as discussed in Section 5 can consider other

rate design attributes other than strictly cost of service. In addition, the average unit costs are also impacted by those costs which are considered "fixed" versus "variable." For example, in this calculation of the average unit costs, the capacity/demand-related costs have entirely been included in the fixed (meter charge) costs. There certainly could be a perspective that these specific costs could be semi-fixed/semi-variable which, in that case, would shift some costs to the variable average unit cost and increase that component, while decreasing the fixed average unit cost.

EPCOR uses a performance-based-ratemaking (PBR) in the development of many of their utility rates. In short, PBR attempts to link rate adjustments (price) to performance. In contrast, traditional ratemaking simply links price to cost. Regardless of the ratemaking method utilized, including PBR, the starting point for establishing the rates is the cost of service analysis. The following notes this cost of service perspective:

> *"The starting point for utility rates generally is a cost of service study. The subsequent years' rates are determined by applying the PBR formula to adjust the previous rates for the effects of inflation and for productivity improvements."*[1]

As noted above, the starting point for establishing the sanitary drainage rates is the cost of service analysis. In particular, the sanitary drainage cost of service analysis provides two important items of information which may be used to establish the sanitary drainage rates. These items are as follows:

- Target revenue levels by customer class of service
- Average Unit Costs

The target revenue levels or allocated costs from the cost of service analysis (Table 3-4) establish the level of revenue to be derived from each customer class of service. In comparison, the average unit costs (Table 3-5), as developed in the cost of service analysis, provide the cost basis for the fixed and variable charges associated with each customer class of service. The detailed exhibit of the development of the sanitary drainage average unit costs can be found in the sanitary drainage technical appendix A, Exhibit 11.

3.10 Summary

This section of the report has reviewed the sanitary drainage cost of service analysis. This analysis was developed using EPCOR specific asset and expense records and information. The overall cost of service methodology for the sanitary drainage utility was based upon generally accepted cost of service principles and methodologies, tailored to reflect EPCOR's specific and unique system.

[1] Performance-Based Ratemaking: Theory and Practice, Dr. Michael R. Schmidt, Public Utilities Reports, Inc., Vienna, Virginia, 2000, p. 2.

4 Stormwater Drainage Cost of Service Analysis

4.1 Introduction

This section of the report details the development of the stormwater drainage cost of service analysis. Stormwater drainage is related to the management of stormwater runoff. The stormwater drainage cost of service analysis developed herein equitably distributes the stormwater drainage revenue requirement summarized in Table 2-5. Provided below is a more detailed discussion of the key technical steps of the stormwater drainage cost of service analysis, conducted by HDR, along with our findings, conclusions, and recommendations.

4.2 Overview and Purpose of the Cost of Service Analysis

The objective of a cost of service analysis is to equitably distribute a utility's revenue requirement to the various customer classes of service. Following generally accepted cost of service guidelines, principles and methodologies will inherently lead to stormwater drainage rates which are equitable, cost-based, and not viewed as arbitrary or capricious in nature.

There are two primary objectives in conducting a cost of service analysis:

1. Equitably distribute the revenue requirement among the customer classes of service
2. Derive average unit costs for subsequent reference/use in designing final rates

The objectives of a cost of service analysis are different than determining a revenue requirement. As noted previously, a revenue requirement analysis determines the utility's overall financial needs, while the cost of service analysis provides a methodology to determine the fair and equitable manner in which to apportion or collect the revenue requirement across the various customer groups (e.g., residential, commercial, etc.).

The second rationale for conducting a cost of service analysis is so that the proposed stormwater drainage rate is designed such that it properly reflects the costs incurred by the utility. For example, stormwater runoff and costs are a function of a parcel's impervious area and intensity of development/runoff coefficient. Given that, those customers with larger areas and higher intensity development should have rates reflective of those parcel characteristics and relative stormwater runoff contributions.

4.3 Establishing Stormwater Drainage Customer Classes of Service

The first step in a cost of service study is to determine the customer classes of service which costs will be equitably distributed to. To establish the classes of service, the utility must segregate customers into groups of customers (i.e., classes of service) that have similar stormwater characteristics, parcels and/or facility requirements. For EPCOR's stormwater drainage cost of service analysis, the following customer classes of service were utilized.

- Residential
- Multi-Residential
- Commercial

During the development of the stormwater drainage cost of service, a review of the classes of service for this analysis was conducted. After discussions with EPCOR staff, it was concluded that these stormwater drainage customer classes of service appear to be very reasonable and are reflective of current industry practices. The establishment of customer classes of service allows for the development of cost-based rates and, if desired, the ability to establish stormwater drainage rate structures, by customer class of service, reflective of their cost of service.

4.4 General Cost of Service Procedures

A cost of service analysis utilizes a three-step approach to review costs and these analytical steps take the form of *functionalization*, *allocation*, and *distribution*. Provided below is a more detailed discussion of the stormwater drainage cost of service analysis, and the specific steps taken within the analysis.

4.4.1 Functionalization of Stormwater Drainage Costs

The first analytical step of the stormwater drainage cost of service analysis is called *functionalization*. Functionalization is the arrangement of asset (plant) data and expenses (costs) by major operating functions within the utility (e.g., collection, pumping, storage, etc.). Within this study, the functionalization of the stormwater cost data was accomplished through EPCOR's existing stormwater drainage system of accounts. EPCOR's plant accounts are segregated between the major categories of sanitary, stormwater and common. In this case, the stormwater plant assets were included within the stormwater cost of service analysis. The common (shared) plant assets were proportionally assigned between the sanitary and stormwater drainage utilities based upon the relative plant assets of each utility.

4.4.2 Allocation of Stormwater Drainage Costs

The second analytical task performed in the stormwater drainage cost of service analysis is the *allocation* of the costs. The allocation of stormwater drainage costs is a process which reviews each cost and determines why the expense was incurred or what type of need (e.g., volume/flow, customer-related, etc.) is being met. The stormwater drainage utility's plant accounts and revenue requirement were reviewed and allocated using generally accepted cost of service principles and methodologies. Provided below is an overview of the various types of allocated costs used in the stormwater drainage cost of service analysis.

- **Equivalent Stormwater Unit (ESU)-Related Costs:** An equivalent stormwater unit (ESU) is an equivalency measure of run-off contributions (i.e., volume) and typically this approach, or similar approaches, are used for billing stormwater customers. An ESU considers a parcel's area, development intensity, and runoff coefficient.
- **Customer-Related Costs:** Customer-related costs are those costs which vary with the addition or deletion of a customer or a cost which is a function of the number of customers served. Customer-related costs typically include the costs of accounting,

billing, and collecting, and accounting. Similar to the sanitary drainage cost of service analysis, a weighted customer cost reflects a disproportionate customer-related cost.

- **Revenue-Related Costs:** Revenue-related costs are those costs which vary with the amount of revenue received by the utility. An example of a revenue-related cost would be a utility tax which is based (i.e., assessed) on gross utility revenue.

The basis, or methodology for the allocation of EPCOR's stormwater drainage plant assets and costs is based upon generally accepted cost of service principles and methodologies. These generally accepted cost of service principles and methodologies were adapted and tailored to be reflective of EPCOR's specific and unique facilities, customers, costs, and operations.

4.4.3 Development of the Stormwater Drainage Distribution Factors

Once the allocation of stormwater drainage assets and costs is complete, and the customer groups have been defined, the allocated costs are proportionally and equitably distributed to each customer group using distribution factors. EPCOR's stormwater drainage allocated assets and costs were distributed to the various customer classes of service using the following stormwater drainage distribution factors.

- **Equivalent Stormwater Unit (ESU) Distribution Factor:** Equivalent stormwater units are an equivalency measure for estimating surface water runoff from a parcel. EPCOR's existing stormwater rates develop billing units reflective of a parcel's area, stated in m^2, along with a development intensity factor and a runoff coefficient which is based upon the zoning of the premises. The intensity factor is assumed to be 1.0, except for properties where the parcel owners have demonstrated that they contribute less stormwater per m^2 (e.g., retention/detention) during rainfall than similarly zoned parcels. This distribution factor was based upon EPCOR's current billing units which take these factors into account and are reflective of the relative runoff contributions. Exhibit 3 of the stormwater drainage technical appendix provides the calculation of the ESU distribution factor.
- **Customer Distribution Factor:** Customer costs within the cost of service analysis are distributed to the various customer classes of service based upon their respective number of customer accounts. Two types of customer distribution factors were developed – actual and weighted. The actual customer distribution factor assumes that there is no disproportionate cost associated with serving a customer (e.g., postage for bills is the same regardless of the size or usage of the customer). In contrast, a weighted customer distribution factor assumes that there is some disproportionality associated with serving different types of customers and attempts to estimate the level of difference in serving the customers. It is important to note that this Study assumes no weighting for differences between customers. Exhibit 4 of the stormwater drainage technical appendix provides the calculation of the customer allocation factor.
- **Revenue Related Distribution Factor:** The revenue related allocation factor was developed from the projected rate revenues for 2021 for each customer class of service, as developed in Exhibit 2. A summary of the revenue allocation factor is provided in Exhibit 5 of the Stormwater Drainage Technical Appendix.

The development of the distribution factors is based on generally accepted principles and methodologies. Given the development of the distribution factors, the final step in the cost of service analysis is to distribute the allocated costs to the various customer classes of service and summarize the results.

Given the general overview above of the procedures used in EPCOR's stormwater drainage cost of service analysis, the focus shifts to a more specific discussion of the key assumptions and details used in this analysis.

4.5 Functionalization and Allocation of Net Plant in Service

A necessary step of the cost of service is the functionalization and allocation of the stormwater drainage net plant in service. Net plant in service is defined as the original cost (OC) of plant in service, less the accumulated depreciation. The net plant in service balances were provided by EPCOR and were reflective of December 31, 2018.

Section 3.5 provided a detailed discussion of the process used to assign net plant in service for sanitary and stormwater drainage. Provided below in Table 4 – 1 is a summary of the allocation of the common net plant in service to the sanitary and stormwater drainage plant in service.

Table 4 – 1
Summary of the Assignment of Net Plant in Service [1]
Between Sanitary and Stormwater Drainage ($000)

Plant Components	Total	Sanitary	Stormwater
Common Plant			
Collection	$24,181	$11,254	$12,926
General Plant	55,068	34,074	20,995
Storage	2,237	167	2,160
Subtotal Common Plant	$81,576	$45,495	$36,080
Sanitary Plant	1,512,446	1,512,446	0
Stormwater Plant	2,117,018	0	2,117,018
Total Net Plant in Service	**$3,711,039**	**$1,557,941**	**$2,153,098**

[1] – Net plant as of December 31, 2018

Given the assignment of the common plant in service and the functionalization of net plant in service, HDR then *allocated* each stormwater plant asset category (i.e., collection, pumping, and storage) to the various cost allocation components previously described.

The allocation process included reviewing each plant line item and determining which cost components the assets were related to. The proposed allocations are based on HDR's understanding of EPCOR's current stormwater drainage facilities, their current operations, and "generally accepted" allocation methodologies for stormwater utilities. HDR's proposed allocations of net plant in service to the various cost components were reviewed with EPCOR's staff to confirm that the allocated stormwater plant components reasonably reflect the facilities

and operations of EPCOR's stormwater drainage plant. Table 4 - 2 provides a summary of the allocated net plant in service for the stormwater drainage utility.

Table 4 – 2
Summary of the Allocation of Stormwater Drainage Plant in Service ($000)

	Total Net Plant	Eqv. Storm Unit	Actual Customer	Weighted Customer	Revenue Related	Dir. Assign
Collection	$1,596,871	$1,596,871	$0	$0	$0	$0
Collection - Common	12,926	12,926	0	0	0	0
Pumping Stations	9,774	9,774	0	0	0	0
Storage	507,773	507,773	0	0	0	0
Storage - Common	2,160	2,160	0	0	0	0
Biosolids	0	0	0	0	0	0
Total before General	**$2,129,504**	**$2,129,504**	**$0**	**$0**	**$0**	**$0**
General Plant	$23,594	$23,594	$0	$0	$0	$0
Grand Total	**$2,153,098**	**$2,153,098**	**$0**	**$0**	**$0**	**$0**

Tables 4 - 2 provides a summary of the basic functionalization and allocation of EPCOR's stormwater drainage net plant in service. A detailed exhibit of the functionalization and allocation of plant investment can be found in the Stormwater Drainage Technical Appendix, Exhibit 6.

4.6 Functionalization and Allocation of the Revenue Requirement

Operating expenses are generally functionalized and allocated in a manner similar to the corresponding plant account. This approach to allocation of operating expenses was used for this analysis. For the cost of service study, the 2021 revenue requirement for the stormwater drainage utility prepared by EPCOR was functionalized, allocated, and distributed. As noted previously, the revenue requirement was developed utilizing the utility/accrual basis methodology which was comprised of operation and maintenance expenses, depreciation, revenue tax, and a return on rate base. Shown below in Table 4 – 3 is summary of the allocated revenue requirement for EPCOR's stormwater drainage utility.

Table 4 – 3
Summary of the Allocation of the Stormwater Drainage
2021 Revenue Requirement ($000)

	Total Rev. Req.	Eqv. Storm Unit	Actual Customer	Weighted Customer	Revenue Related	Dir. Assign
Total O&M	$44,952	$44,952	$0	$0	$0	$0
Property Taxes	406	406	0	0	0	0
Depreciation (Net)	23,468	23,468	0	0	0	0
Financing Costs	7,665	7,665	0	0	0	0
Return on Investment	10,028	10,028	0	0	0	0
Total Rev. Require.	**$86,519**	**$86,519**	**$0**	**$0**	**$0**	**$0**
Less: Non-Op Rev.	$5,138	$5,138	$0	$0	$0	$0
Net Rev. Require.	**$81,381**	**$81,381**	**$0**	**$0**	**$0**	**$0**

A more detailed review of the allocation of EPCOR's stormwater drainage revenue requirement can be found in the Technical Appendix B in Exhibit 7.

4.7 Stormwater Drainage Key Cost of Service Assumptions

A number of key assumptions were used within the EPCOR stormwater drainage cost of service analysis. Listed below is a brief summary of the key assumptions used.

- The test year used for the stormwater drainage cost of service analyses was the test period 2021 forecasted revenue requirement.
- The revenue and expense data utilized by HDR within this study was provided by EPCOR.
- A "utility basis" approach was utilized for the revenue requirement and cost of service analysis. This is a generally accepted cost of service methodology.
- The allocation and distribution of plant in service and the revenue requirement was based upon EPCOR specific data and information. Where key assumptions or estimates were required, HDR relied upon our direct industry experience in similar cost of service studies and EPCOR staff's understanding of the stormwater drainage system and facilities.
- The equivalent stormwater unit distribution factor developed as a part of the stormwater drainage cost of service analysis used EPCOR specific customer data and billing information. These ESUs by customer class of service were provided by EPCOR to HDR.

4.8 Summary of the Stormwater Drainage Cost of Service Analysis

In summary form, the stormwater drainage cost of service analysis began by functionalizing the stormwater drainage net plant asset records and revenue requirements. The functionalized net plant and expense accounts were then allocated into their various cost components. The individual allocation totals were then distributed to the various customer classes of service based upon the use of proportional and equitable distribution factors. The distributed revenue requirement (i.e., expenses) for each customer class of service were then aggregated to determine each customer group's overall revenue responsibility. A summary of the detailed cost

responsibility developed for each stormwater drainage class of service for 2021 is shown below in Table 4 - 4.

Table 4 – 4
Summary of the Stormwater Drainage Cost of Service Analysis ($000)

	Present Revenue	Allocated Costs	$ Difference	% Difference
Residential	$40,403	$42,795	($2,392)	5.9%
Multi-Residential	3,792	4,169	(377)	9.9%
Commercial	31,369	34,417	(3,048)	9.7%
Total	**$75,564**	**$81,381**	**($5,817)**	**7.7%**

The distribution of costs reflects the facilities and costs equitably distributed to each customer class, reflective of their respective benefit. The cost of service results indicated that small costs differences exist between the customer classes of service. A cost of service analysis is a dynamic analysis, and the results may change over time as costs and development impacts change. Given that dynamic, HDR typically reviews the summary of a cost of service analysis to determine whether a class of service is within a "reasonable range of their cost of service." The metric that HDR utilizes is a class of service is assumed to be within a "reasonable range of their cost of service" if the class is within ± 5% of the overall required adjustment. In other words, given EPCOR's 7.7% overall adjustment in this analysis, a class of service would be considered within a "reasonable range of their cost of service" if they are within the range of 2.7% to 12.7%.

The results above indicate that all classes of service are within a reasonable range of covering their respective costs. As noted above, a cost of service analysis is a dynamic analysis and as such, the "cost of service" for a class of service is often best determined over an extended number of studies. It is recommended that EPCOR continue to review and update the stormwater drainage cost of service. This will provide a sound basis for any future interclass adjustments that may be proposed by EPCOR.

The detailed summary of the stormwater drainage cost of service analysis can be found in the Wastewater Treatment Technical Appendix B, Exhibits 8 and 9.

4.9 Stormwater Drainage Average Unit Costs

Average unit costs are essentially cost-based rates. In this case, the distributed stormwater drainage costs are converted from dollars to per unit costs, stated as $/square metre ($m^2$). Provided below in Table 4-5 is a summary of the calculated average unit cost for the sanitary drainage utility.

Table 4 – 5
Summary of the Stormwater Drainage Average Unit Costs

	System Average	Residential	Multi-Residential	Commercial
Unit Costs – $/square metre				
Equiv. Storm Unit (ESU)	$0.0519	$0.0519	$0.0519	$0.0519
Actual Customer	0.0000	0.0000	0.0000	0.0000
Weighted Customer	0.0000	0.0000	0.0000	0.0000
RR/Dir. Assign.	0.0000	0.0000	0.0000	0.0000
Total $/square metre ($m^2$)	**$0.0519**	**$0.0519**	**$0.0519**	**$0.0519**

The calculated average unit costs for the stormwater drainage utility are very straight-forward. The total stormwater drainage costs were allocated to the equivalent stormwater unit (ESU) cost component. Thus, all costs are placed in the context of a $/ESU.

Similar to EPCOR's other utility rates, performance-based-ratemaking (PBR) is a component of the development of stormwater drainage utility rates. Like the sanitary drainage cost of service analysis, the stormwater drainage cost of service analysis provides two important items of information which may be used to establish the stormwater drainage rates. These items are as follows:

- Target revenue levels by customer class of service
- Average Unit Costs

The target revenue levels or allocated costs from the cost of service analysis (Table 4-4) establish the level of revenue to be derived from each customer class of service. In comparison, the average unit costs, as developed in the cost of service analysis, provide the cost basis for any fixed and variable charges associated with each customer class of service. At the present time, and as a point of reference, EPCOR does not have stormwater rates by class of service, and the utility assesses a flat rate per m^2. The average unit costs from the stormwater drainage cost of service analysis are shown in Exhibit 10 of the Stormwater Drainage Technical Appendix.

4.10 Summary

This section of the report has reviewed the stormwater drainage cost of service analysis. This analysis was developed using EPCOR specific asset and expense records and information. The overall cost of service methodology for the stormwater drainage utility was based upon generally accepted cost of service principles and methodologies, tailored to reflect EPCOR's specific and unique stormwater system.

5 Drainage Rate Design

5.1 Introduction

The final step of a comprehensive sanitary and stormwater drainage rate study is the review of rates for both utilities which meet the overall rate design goals and objectives of EPCOR and collect the appropriate (i.e., cost-based) levels of revenue, based on the results of the revenue requirement and cost of service analyses.

5.2 Rate Design Goals and Objectives

In reviewing all utility rate designs, consideration is given to the ***level*** of the rates and the ***structure*** of the rates. *Level* refers to the total revenue to be collected from a rate design; while *structure* refers to how (fixed vs. variable) the revenue is collected, or how the customer is ultimately charged. Provided below is an overview of the rate design considerations for EPCOR's sanitary and stormwater drainage utilities.

5.2.1 Rate Design Criteria and Considerations

The key to developing a successful rate design is to gain an understanding of the utility's goals and objectives and how different rate structures and the relationship between the monthly fixed charges and consumption/volumetric charges can help achieve those goals and objectives. Typical rate design goals and objectives include items such as rates being cost-based, easy to understand and administer and that are set at a level that produce sufficient revenues.

Principles of Public Utility Rates[2] by James C. Bonbright's is often cited as an important source or guide on the development of rates. Bonbright developed a list of key attributes (i.e., goals and objectives) that may be considered in the establishment of utility rates. Provided below is a paraphrased list of Bonbright's attributes.

Revenue-Related Attributes:

- Rates should be designed to **meet the total revenue requirement needs** under the "utility/accrual basis approach".[3]
- Rates should provide **revenue stability and predictability**; with a minimum of unexpected changes seriously adverse to the utility (e.g., annual swings in planned revenue should, for example, be no greater than +10% or −10%).
- From the customer's perspective, the rates should result in **customer bills that are stable and predictable**. The implementation of new rate structures should be consistent with

[2] James C. Bonbright; Albert L. Danielsen and David R. Kamerschen, Principles of Public Utility Rates, (Arlington, VA: Public Utilities Report, Inc., Second Edition, 1988), p. 383-384.

[3] The Water Environment Federation, Manual of Practice #27, Financing and Charges for Wastewater Systems, discusses two "generally-accepted" methodologies for establishing revenue requirements; the cash basis and utility/accrual basis. Most private utilities, including EPCOR utilize the "utility/accrual basis" methodology. Under this approach, a utility sums its O&M, taxes, depreciation expense and return on rate base (investment) to equal its revenue requirements.

past rate setting philosophy and minimize customer bill impacts during any change in rate structure.

Cost-Related Attributes:

- The rate structure should **promote efficient use** of services and discourage or penalize inefficient uses.
- The rate structure should **reflect all traditional internal costs** (direct and indirect) incurred, **and under appropriate situations and conditions** (e.g., rapid growth) may also **include present and future costs and benefits** (i.e., marginal cost and/or value of commodity).
- **Fairness of the rates** in the allocation of total costs of service among the different ratepayers so as to **avoid arbitrariness, capriciousness and to attain equity**. The rates and the rate structure shall be based upon a fair allocation of total cost of service among the customer classes of service by use of a "generally accepted" cost of service methodology such as defined in the Water Environment Federation Manual of Practice #27.
- The rates should be, as practically possible, **non-discriminatory**, between customer groups, and within each customer group. The rate structures should avoid interclass subsidies whenever possible to ensure each class pays its full cost of service.
- The **responsiveness of the rate to respond to changes in demand and supply patterns**. The rate structure should be developed such that it either responds appropriately or alternatively, contains the flexibility to allow the utility to respond to the changing needs as a result of supply, demand, and/or environmental concerns.

Practical-Related Attributes:

- From the customer's perspective, the rate structure should be **simple to understand**, such that the customer can easily understand the bill. From the utility's perspective, the rate structure should be **easy to administer**. Finally, the rate structure should have acceptance by the majority of the customers that the rate structure and resulting bills are "fair and equitable."
- **Freedom from controversies** as to the application of the rate schedule to the customer and calculation of the customer's bill. It should be simple to explain and understand by the average customer to minimize any misinterpretation regarding the customer's bill and the overall goals that the rate structure has been developed to meet.

While the above rate design goals and objectives (i.e., attributes) are intended for all rate designs, certain goals and objectives may be more relevant than others, particularly when comparing the differences between an electric, water, wastewater, or stormwater utility. For that reason alone, EPCOR should review the different rate design goals and objectives and determine those with the highest relevance and priority for the particular utility rates being reviewed.

5.3 Review of the Current Drainage Rates

As noted above, it is important to understand that all of the rate design goals and objectives cannot be achieved in a single rate design, and in some cases, certain goals and objectives may

be in conflict with each other. For example, rates which promote conservation may so complex that they do not achieve the objective of ease of customer understanding and administration. In that respect, EPCOR must consider each of these goals and objectives and attempt to balance them in a way that meets the utility's overall rate goals and objectives. The rate design goals and objectives for the sanitary drainage rates may be different than the goals and objectives for the stormwater utility.

For EPCOR, these rate design goals and objectives can be used as a starting point in considering proposed changes to the sanitary and stormwater drainage rate designs.

5.3.1 Current Sanitary Drainage Rates

The current sanitary drainage rates are designed to collect the costs associated with wastewater collection services. The current sanitary drainage rate design is composed of a flat monthly service charge and a variable charge. Provided below in Table 5 - 1 is a summary of the current sanitary drainage rate design.

Table 5 - 1
Overview of the EPCOR's Present Sanitary Drainage Rates[1]

Rate Component	Present Rates
Flat Monthly Service Charge (Per Meter Size)	
16mm	$10.52
20mm	18.93
25mm	29.45
40mm	56.79
50mm	77.83
75mm	160.93
100mm	299.77
150mm	566.92
200mm	904.55
250mm	2,244.55
300mm	2,244.55
400mm	2,455.57
500mm	2,644.77
Variable Monthly Charge - $/m^3	
All Customers	$1.11740
Large Wholesale w/ collection system	0.62572

[1] – Rates shown are effective January 1, 2021.

EPCOR's present sanitary drainage rate schedules use the same schedule for fixed charges for all customer classes of service. The flat monthly service charge is based on meter size. In contrast to the fixed monthly service charge, the variable or volumetric charge for sanitary drainage is a uniform volumetric structure which is the same for all residential, multi-residential and commercial customers. The variable rate is stated in $/cubic metre ($/m^3). There is a separate variable rate for the University of Alberta (UofA). The UofA is a large wholesale customer with

it's own sanitary collection system. Given that, the UofA has their own variable rate. UofA is provided with a lower rate since they own and operate their own on-campus collection system. For billing of variable charges, the volume billing is determined based upon the following:

i. Water consumption for the premises;
ii. Sewer discharge for a premises on which a sewer meter has been installed; or
iii. Water consumption for the premises as discounted by the application of a utility credit as approved in accordance with EPCOR's bylaws (e.g., wholesale w/ collection system).

The current rate design approach used by EPCOR for their sanitary drainage utility rates is contemporary in approach and design. Most wastewater utilities have sewer rates (i.e., treatment and collection) which contain a fixed and variable component. The variable component is typically based upon metered water consumption, similar to EPCOR's approach, but in some cases, the volume billed may be "capped" at a specified volume to try and segregate water consumption between indoor and outdoor uses. In areas with significant outdoor water use, the approach of using average winter water use (AWWU) to cap sewer volumes is common.

5.3.2 Current Stormwater Drainage Rates

Provided below in Table 5-2 is EPCOR's current stormwater drainage rate.

Table 5 - 2
Overview of EPCOR's Present Stormwater Drainage Rate [1]

Rate Component	Rate
All Parcels (Customers)	$0.046159/square metre

[1] – Rates shown are effective January 1, 2021.

As can be seen, EPCOR's current stormwater rate appears to be very simple and straight-forward. While that may appear to be the case, in actuality, the basis for the billing of the stormwater rate is more complex. Specifically, EPCOR's stormwater fee is a monthly charge that is calculated using the following formula:

A x **I** x **R** x **Rate**, where:

A: The area of the property in square metres (m^2), and the proportion of the building lot area attributable to each unit for multiple units sharing a single building of property.

I: The measure of the portion of lot being used for its intended development. The development intensity factor is 1.0 as default, except for properties where owners demonstrate they contribute significantly less stormwater runoff per property area to the City's land drainage system during rainfalls than other similarly-zone properties.

R: Runoff coefficient—the permeability of your lot's surface (i.e., grass versus concrete), based on land zoning.

Rate: The monthly charge of $0.046159 per square metre (m2).

The runoff coefficient has a specific schedule for each land zone. The runoff coefficient ranges from 0.20 (e.g., agricultural zone AG) to 0.95 (e.g., commercial business zone CB2). As point of reference, a single-detached residential home (Zone RF1) has a runoff coefficient of 0.50.

For each parcel, EPCOR calculates a billable stormwater area stated in square metres (m^2). The determination of this billable area is accomplished by reviewing the area of each parcel and then adjusting for development intensity and runoff coefficient. The use of development intensity (**I**) takes into consideration those parcels which have significantly less runoff than similarly zoned parcels. This lowering of runoff is often accomplished via retention/detention ponds or other stormwater best practices.

EPCOR's approach to stormwater rates contains all of the elements and components that would be expected from a contemporary stormwater rate design. Stormwater utilities may administer these elements in a slightly different manner, but their rate design approach considers area, development intensity and any credits for stormwater management (e.g., retention/detention, etc.). One area where EPCOR may differ from other stormwater utilities is their billing of single-family residential parcels. For administrative and cost reasons, many stormwater utilities charge residential customers on a flat, $/month, basis regardless of the parcel size or intensity. While there are certain inequities with this approach, it eliminates a number of administrative issues and concerns with a large majority of the system's parcels. EPCOR has obviously gone one step further and refined their residential rates to be reflective of the specific residential lot size (area) and development intensity. HDR would not recommend EPCOR going backwards on their stormwater rate design, but rather, points this out to highlight the enhanced equity of this approach. Whether EPCOR's residential customers can understand or appreciate this level of refinement in the stormwater drainage rate design

5.4 Future Drainage Rate Structure Considerations

The results of the revenue requirement and cost of service analysis provide the basis for establishing cost-based rates. However, other policy considerations, other than strictly cost of service, may be considered when establishing final proposed sanitary and stormwater drainage rates.

As EPCOR continues forward with the development of alternative sanitary or stormwater drainage rates, a decision will need to be made as to how closely the proposed rates should follow cost of service results, and if so, how best to transition to a cost of service based rate. In this transition process, EPCOR will likely want to attempt to minimize overall rate impacts over time. While the cost of service analyses for both drainage utilities did show some minor cost differences, there does not appear to be any huge cost of service or transition issues on the horizon. If changes are proposed, implementing a smooth transition towards the cost of service results allows for customer outreach, avoids rate shock, and allows the utility to track cost of service results over a number of years and adjust rates accordingly.

5.5 Summary

This section of the report has provided an overview of the rate design process. The results of the sanitary and stormwater drainage revenue requirement and cost of service analysis provide the

basis and guidance for establishing and implementing cost-based utility rates. A key objective of a cost of service analysis is to develop rates that are cost-based while, at the same time, providing equity between customers.

Sanitary Drainage Technical Appendix A

EPCOR
Drainage COSA
Summary of the Revenue Requirement - Sanitary
Exhibit 1

	Budgeted	*Projected*									
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Revenues											
Rate Revenues	$125,131,192	$129,447,867	$134,389,862	$147,314,091	$159,588,513	$172,899,532	$187,350,186	$194,374,288	$198,762,716	$203,542,984	$208,313,894
Miscellaneous Revenues	(8,779,498)	(5,794,213)	(4,402,246)	(4,139,205)	(3,885,783)	(1,546,284)	(405,083)	4,305,460	9,249,880	11,005,523	12,542,737
Total Revenues	**$116,351,694**	**$123,653,654**	**$129,987,615**	**$143,174,886**	**$155,702,730**	**$171,353,248**	**$186,945,103**	**$198,679,748**	**$208,012,597**	**$214,548,507**	**$220,856,631**
Expenses											
Franchise Fees	$9,382,041	$10,019,416	$10,695,294	$11,840,587	$12,871,063	$14,132,030	$15,361,415	$16,329,275	$17,053,661	$17,563,904	$18,085,462
Total Drainage Operations	21,648,842	22,512,000	23,484,650	23,930,858	24,385,544	24,848,870	25,320,998	25,802,097	26,292,337	26,791,891	27,300,937
Total Planning	5,301,847	5,458,850	6,021,064	6,135,464	6,252,038	6,370,827	6,491,873	6,615,218	6,740,907	6,868,984	6,999,495
Total Billing and Meter Reading	6,824,777	7,296,701	7,122,456	7,257,783	7,395,681	7,536,199	7,679,387	7,825,295	7,973,976	8,125,481	8,279,865
Total Project Support Costs	2,158,941	2,149,739	2,336,430	2,380,823	2,426,058	2,472,153	2,519,124	2,566,988	2,615,760	2,665,460	2,716,103
Total Drainage Services Administration	8,640,535	8,706,091	8,726,729	8,892,537	9,061,495	9,233,664	9,409,103	9,587,876	9,770,046	9,955,677	10,144,835
Corporate Allocations	11,130,426	11,812,989	12,419,753	13,049,173	13,297,107	13,549,752	13,807,198	14,069,534	14,336,855	14,609,256	14,886,832
Efficiencies	0	0	0	(5,218,816)	(5,317,974)	(5,419,015)	(5,521,977)	(5,626,894)	(5,733,805)	(5,842,748)	(5,953,760)
O&M Expenses - NRAs	18,201	2,816,809	4,471,419	3,464,149	2,264,207	3,113,527	2,364,759	2,436,191	2,346,161	2,390,738	2,436,162
Total O&M Expenses	**$65,105,609**	**$70,772,596**	**$75,277,796**	**$71,732,557**	**$72,635,220**	**$75,838,006**	**$77,431,879**	**$79,605,579**	**$81,395,899**	**$83,128,644**	**$84,895,932**
Property Taxes	$385,639	$386,238	$405,552	$413,257	$421,109	$429,110	$437,264	$445,572	$454,037	$462,664	$471,455
Depreciation	13,715,467	14,933,363	15,286,699	16,727,560	17,806,132	19,964,858	21,633,526	22,392,008	24,426,333	26,225,138	28,212,760
Financing Costs	12,463,057	11,994,704	14,382,776	20,620,489	23,012,289	24,979,402	29,755,858	35,973,970	39,491,999	42,358,359	46,020,596
Retained Earnings	17,343,838	18,603,012	18,817,537	32,917,445	42,790,503	53,017,103	63,400,885	67,463,967	70,893,148	76,778,802	80,748,993
Total Revenue Requirement	**$109,013,608**	**$116,689,913**	**$124,170,361**	**$142,411,310**	**$156,665,253**	**$174,228,479**	**$192,659,412**	**$205,881,097**	**$216,661,416**	**$228,953,607**	**$240,349,736**
Bal. / (Def.) of Funds	$7,338,086	$6,963,741	$5,817,255	$763,577	($962,523)	($2,875,231)	($5,714,308)	($7,201,349)	($8,648,820)	($14,405,100)	($19,493,105)
Balance a % of Rate Adj. Req'd	-5.9%	-5.4%	-4.3%	-0.5%	0.6%	1.7%	3.1%	3.7%	4.4%	7.1%	9.4%

EPCOR
Drainage COSA
Revenue Requirement - Sanitary
Exhibit 2

	Budgeted	*Projected*										
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	***Notes***
Revenues												
Rate Revenues												
Residential	$77,662,968	$80,685,332	$84,027,701	$92,431,999	$100,479,082	$109,233,500	$118,766,926	$123,637,707	$126,941,597	$130,341,904	$133,841,655	Schedule - R-2
Multi-Residential	19,718,304	20,370,818	21,163,534	23,194,134	25,121,122	27,208,154	29,470,785	30,561,392	31,231,599	31,965,184	32,691,083	Schedule - R-2
Commercial	26,596,593	27,213,225	27,989,588	30,380,149	32,590,302	34,963,452	37,514,864	38,540,040	38,939,026	39,569,912	40,099,538	Schedule - R-2
U of A	1,153,328	1,178,492	1,209,039	1,307,809	1,398,007	1,494,425	1,597,612	1,635,149	1,650,494	1,665,983	1,681,618	Schedule - R-2
Total Rate Revenues	**$125,131,192**	**$129,447,867**	**$134,389,862**	**$147,314,091**	**$159,588,513**	**$172,899,532**	**$187,350,186**	**$194,374,288**	**$198,762,716**	**$203,542,984**	**$208,313,894**	
Other Revenues												
Odour	$0	$3,275,649	$5,963,473	$6,423,463	$6,877,576	$9,421,579	$10,771,169	$15,694,061	$20,854,865	$22,831,002	$24,592,900	Schedule - F-1
Biosolids	(11,130,598)	(11,505,987)	(12,824,672)	(13,068,341)	(13,316,639)	(13,569,655)	(13,827,479)	(14,090,201)	(14,357,915)	(14,630,715)	(14,908,699)	As Allocation (100% sanitary)
Hazardous and Sanitary Waste	710,411	731,939	731,939	745,846	760,017	774,457	789,172	804,166	819,445	835,015	850,880	As Allocation (65.2% sanitary)
Compliance	676,877	709,330	717,159	730,785	744,669	758,818	773,236	787,927	802,898	818,153	833,698	As Allocation (65.2% sanitary)
Pipeline Maintenance	335,962	391,411	391,411	398,848	406,426	414,148	422,017	430,035	438,206	446,532	455,016	As Allocation (65.2% sanitary)
Industrial Monitoring	19,571	19,571	19,571	19,942	20,321	20,707	21,101	21,502	21,910	22,327	22,751	As Allocation (65.2% sanitary)
General Maintenance	14,290	14,290	14,290	14,562	14,839	15,121	15,408	15,701	15,999	16,303	16,613	As Allocation (65.2% sanitary)
Pumping - Maintenance	9,785	9,785	9,785	9,971	10,161	10,354	10,550	10,751	10,955	11,163	11,375	As Allocation (65.2% sanitary)
9K-611 - Late Pmt Chg & UIS Sewer Trouble	340,000	350,000	360,000	366,840	373,810	380,912	388,150	395,525	403,039	410,697	418,500	As Allocation (100% sanitary)
9L-611 - Late Pmt Chg & UIS Sewer Trouble	152,000	155,000	160,000	163,040	166,138	169,294	172,511	175,789	179,129	182,532	186,000	As Allocation (100% sanitary)
Inventory Management (asset sales)	54,798	54,798	54,798	55,839	56,900	57,981	59,082	60,205	61,349	62,514	63,702	As Allocation (65.2% sanitary)
Operations Mgmt and Admin	0	0	0	0	0	0	0	0	0	0	0	As Allocation (65.2% sanitary)
Infrastructure Planning	37,406	0	0	0	0	0	0	0	0	0	0	As Allocation (65.2% sanitary)
Customer Services	0	0	0	0	0	0	0	0	0	0	0	As Allocation (65.2% sanitary)
Project Management	0	0	0	0	0	0	0	0	0	0	0	As Allocation (65.2% sanitary)
Operations Mgmt and Admin	0	0	0	0	0	0	0	0	0	0	0	As Allocation (65.2% sanitary)
Information Services	0	0	0	0	0	0	0	0	0	0	0	As Allocation (65.2% sanitary)
Open Cut Services	0	0	0	0	0	0	0	0	0	0	0	As Allocation (65.2% sanitary)
Total Other Revenues	**(8,779,498)**	**(5,794,213)**	**(4,402,246)**	**(4,139,205)**	**(3,885,783)**	**(1,546,284)**	**(405,083)**	**4,305,460**	**9,249,880**	**11,005,523**	**12,542,737**	
Total Revenues	**$116,351,694**	**$123,653,654**	**$129,987,615**	**$143,174,886**	**$155,702,730**	**$171,353,248**	**$186,945,103**	**$198,679,748**	**$208,012,597**	**$214,548,507**	**$220,856,631**	
Franchise Fees	**$9,382,041**	**$10,019,416**	**$10,695,294**	**$11,840,587**	**$12,871,063**	**$14,132,030**	**$15,361,415**	**$16,329,275**	**$17,053,661**	**$17,563,904**	**$18,085,462**	As Allocation (100% sanitary)
Drainage Operations												
Operations Mgmt and Admin	$950,214	$951,040	$974,816	$993,337	$1,012,211	$1,031,443	$1,051,040	$1,071,010	$1,091,359	$1,112,095	$1,133,225	As Allocation (50% sanitary)
Hazardous and Sanitary Waste	538,214	549,502	562,036	572,714	583,596	594,684	605,983	617,497	629,229	641,185	653,367	As Allocation (100% sanitary)
Industrial Monitoring	2,924,519	3,178,191	3,337,418	3,400,829	3,465,445	3,531,288	3,598,383	3,666,752	3,736,420	3,807,412	3,879,753	As Allocation (100% sanitary)
Compliance	578,845	399,106	451,370	459,946	468,685	477,590	486,664	495,910	505,333	514,934	524,718	As Allocation (50% sanitary)
General Maintenance (2)	1,013,950	1,038,342	1,036,031	1,055,716	1,075,774	1,096,214	1,117,042	1,138,266	1,159,893	1,181,931	1,204,387	As Allocation (50% sanitary)
Pipeline Maintenance	9,876,669	10,094,114	10,550,611	10,751,073	10,955,343	11,163,495	11,375,601	11,591,737	11,811,980	12,036,408	12,265,100	As Allocation (50% sanitary)
Pumping - Maintenance	5,766,430	6,301,705	6,572,368	6,697,243	6,824,491	6,954,156	7,086,285	7,220,924	7,358,122	7,497,926	7,640,387	As Allocation (50% sanitary)
Total Drainage Operations	**$21,648,842**	**$22,512,000**	**$23,484,650**	**$23,930,858**	**$24,385,544**	**$24,848,870**	**$25,320,998**	**$25,802,097**	**$26,292,337**	**$26,791,891**	**$27,300,937**	

EPCOR
Drainage COSA
Revenue Requirement - Sanitary
Exhibit 2

	Budgeted	*Projected*										
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	***Notes***
Planning												
Biosolids	$1,900,469	$1,914,499	$2,023,337	$2,061,781	$2,100,954	$2,140,873	$2,181,549	$2,222,999	$2,265,236	$2,308,275	$2,352,132	As Allocation (100% sanitary)
Engineering	656,836	762,144	1,130,153	1,151,626	1,173,507	1,195,803	1,218,523	1,241,675	1,265,267	1,289,307	1,313,804	As Allocation (50% sanitary)
Infrastructure Planning	736,160	684,183	710,327	723,823	737,576	751,590	765,870	780,422	795,250	810,359	825,756	As Allocation (39.4% sanitary)
System Planning and Analysis	1,105,880	994,552	1,060,744	1,080,898	1,101,435	1,122,362	1,143,687	1,165,417	1,187,560	1,210,124	1,233,116	As Allocation (39.4% sanitary)
Project Management	9,219	9,920	10,040	10,231	10,425	10,624	10,825	11,031	11,241	11,454	11,672	As Allocation (39.4% sanitary)
Customer Services	148,691	50,460	150,518	153,378	156,292	159,262	162,288	165,371	168,513	171,715	174,977	As Allocation (50% sanitary)
Project Management (2)	744,590	1,043,092	935,945	953,728	971,849	990,314	1,009,130	1,028,303	1,047,841	1,067,750	1,088,037	As Allocation (39.4% sanitary)
Total Planning	**$5,301,847**	**$5,458,850**	**$6,021,064**	**$6,135,464**	**$6,252,038**	**$6,370,827**	**$6,491,873**	**$6,615,218**	**$6,740,907**	**$6,868,984**	**$6,999,495**	
Billing and Meter Reading												
Meter Reading	$6,433,366	$6,872,672	$6,665,810	$6,792,460	$6,921,517	$7,053,026	$7,187,033	$7,323,587	$7,462,735	$7,604,527	$7,749,013	As Allocation (100% sanitary)
CUS Charges	391,411	424,029	456,646	465,323	474,164	483,173	492,353	501,708	511,240	520,954	530,852	As Allocation (65.2% sanitary)
Total Billing and Meter Reading	**$6,824,777**	**$7,296,701**	**$7,122,456**	**$7,257,783**	**$7,395,681**	**$7,536,199**	**$7,679,387**	**$7,825,295**	**$7,973,976**	**$8,125,481**	**$8,279,865**	
Project Support Costs												
Operations Mgmt and Admin	$426,518	$666,940	$472,485	$481,463	$490,610	$499,932	$509,431	$519,110	$528,973	$539,023	$549,265	As Allocation (50% sanitary)
Open Cut Services	718,636	681,748	769,473	784,093	798,990	814,171	829,640	845,404	861,466	877,834	894,513	As Allocation (50% sanitary)
In-house Tunnelling	747,164	694,118	790,906	805,933	821,245	836,849	852,749	868,951	885,462	902,285	919,429	As Allocation (50% sanitary)
Survey Operations	266,623	106,933	303,567	309,335	315,212	321,201	327,304	333,523	339,859	346,317	352,897	As Allocation (50% sanitary)
Total Project Support Costs	**$2,158,941**	**$2,149,739**	**$2,336,430**	**$2,380,823**	**$2,426,058**	**$2,472,153**	**$2,519,124**	**$2,566,988**	**$2,615,760**	**$2,665,460**	**$2,716,103**	
Drainage Services Administration												
Security Operations & Investigations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	As Allocation (63.3% sanitary)
Fleet Services	105,487	126,695	131,526	134,025	136,571	139,166	141,810	144,505	147,250	150,048	152,899	As Allocation (63.3% sanitary)
Equipment Dispatch	(1,798,952)	(2,063,004)	(2,267,756)	(2,310,844)	(2,354,750)	(2,399,490)	(2,445,080)	(2,491,537)	(2,538,876)	(2,587,114)	(2,636,270)	As Allocation (63.3% sanitary)
General Maintenance	(646,912)	(765,381)	(836,936)	(852,838)	(869,042)	(885,554)	(902,379)	(919,524)	(936,995)	(954,798)	(972,940)	As Allocation (63.3% sanitary)
None	631,937	837,603	918,100	935,544	953,319	971,432	989,889	1,008,697	1,027,862	1,047,392	1,067,292	As Allocation (63.3% sanitary)
Operations Mgmt and Admin	(885,778)	(862,076)	(834,768)	(850,629)	(866,791)	(883,260)	(900,042)	(917,143)	(934,568)	(952,325)	(970,419)	As Allocation (63.3% sanitary)
Information Services	682,317	699,120	720,371	734,058	748,005	762,217	776,699	791,456	806,494	821,817	837,432	As Allocation (63.3% sanitary)
Security - Operations & Investigations	213,129	120,334	124,293	126,654	129,061	131,513	134,012	136,558	139,152	141,796	144,490	As Allocation (63.3% sanitary)
Facility Operations	1,898,803	2,207,912	2,428,339	2,474,478	2,521,493	2,569,401	2,618,220	2,667,966	2,718,658	2,770,312	2,822,948	As Allocation (63.3% sanitary)
Inventory Management	786,028	772,654	790,285	805,300	820,601	836,192	852,080	868,269	884,766	901,577	918,707	As Allocation (63.3% sanitary)
Contract Management	159,748	169,985	178,385	181,774	185,228	188,747	192,334	195,988	199,712	203,506	207,373	As Allocation (63.3% sanitary)
General Admin (1)	514,380	469,545	483,563	492,751	502,113	511,653	521,374	531,281	541,375	551,661	562,143	As Allocation (63.3% sanitary)
Health Safety and Loss Prevention	967,703	980,445	1,056,355	1,076,426	1,096,878	1,117,718	1,138,955	1,160,595	1,182,647	1,205,117	1,228,014	As Allocation (63.3% sanitary)
Training	1,219,061	1,164,028	1,170,052	1,192,283	1,214,936	1,238,020	1,261,542	1,285,512	1,309,936	1,334,825	1,360,187	As Allocation (63.3% sanitary)
General Admin (2)	897,222	942,280	961,526	979,795	998,411	1,017,381	1,036,711	1,056,409	1,076,480	1,096,933	1,117,775	As Allocation (63.3% sanitary)
None (2)	(560,004)	(560,367)	(659,180)	(671,705)	(684,467)	(697,472)	(710,724)	(724,228)	(737,988)	(752,010)	(766,298)	As Allocation (63.3% sanitary)
General and Tax Accounting	1,639,727	1,727,370	1,616,251	1,646,960	1,678,252	1,710,139	1,742,631	1,775,741	1,809,480	1,843,860	1,878,894	As Allocation (63.3% sanitary)
General Admin (4)	9,518	0	0	0	0	0	0	0	0	0	0	As Allocation (63.3% sanitary)
General Admin (5)	806,041	892,534	937,546	955,360	973,512	992,008	1,010,856	1,030,063	1,049,634	1,069,577	1,089,899	As Allocation (63.3% sanitary)
Internal Communications	2,001,080	1,846,413	1,808,780	1,843,147	1,878,167	1,913,852	1,950,215	1,987,269	2,025,027	2,063,503	2,102,709	As Allocation (63.3% sanitary)
Total Drainage Services Administration	**$8,640,535**	**$8,706,091**	**$8,726,729**	**$8,892,537**	**$9,061,495**	**$9,233,664**	**$9,409,103**	**$9,587,876**	**$9,770,046**	**$9,955,677**	**$10,144,835**	

EPCOR
Drainage COSA
Revenue Requirement - Sanitary
Exhibit 2

	Budgeted	*Projected*										
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	***Notes***
Corporate Allocations	**$11,130,426**	**$11,812,989**	**$12,419,753**	**$13,049,173**	**$13,297,107**	**$13,549,752**	**$13,807,198**	**$14,069,534**	**$14,336,855**	**$14,609,256**	**$14,886,832**	As Allocation (63.3% sanitary)
Efficiencies	**$0**	**$0**	**$0**	**($5,218,816)**	**($5,317,974)**	**($5,419,015)**	**($5,521,977)**	**($5,626,894)**	**($5,733,805)**	**($5,842,748)**	**($5,953,760)**	As Allocation (65.2% sanitary)
O&M Expenses - NRAs												
Planning and Estimation (LRT Relocates)	$18,201	$18,547	$18,899	$19,258	$19,624	$19,997	$20,377	$20,764	$21,159	$21,561	$21,970	As Allocation (50% sanitary)
Engineering (SIRP)	0	0	0	0	0	0	0	0	0	0	0	As Allocation (0% sanitary)
Odour and Corrosion Mitigation	0	2,798,262	4,452,520	3,444,891	2,244,583	3,093,530	2,344,382	2,415,427	2,325,003	2,369,178	2,414,192	As Allocation (100% sanitary)
Total Corporate Allocations	**$18,201**	**$2,816,809**	**$4,471,419**	**$3,464,149**	**$2,264,207**	**$3,113,527**	**$2,364,759**	**$2,436,191**	**$2,346,161**	**$2,390,738**	**$2,436,162**	
Total O&M Expenses	**$65,105,609**	**$70,772,596**	**$75,277,796**	**$71,732,557**	**$72,635,220**	**$75,838,006**	**$77,431,879**	**$79,605,579**	**$81,395,899**	**$83,128,644**	**$84,895,932**	
Property Taxes	**$385,639**	**$386,238**	**$405,552**	**$413,257**	**$421,109**	**$429,110**	**$437,264**	**$445,572**	**$454,037**	**$462,664**	**$471,455**	As Allocation (50% sanitary)
Depreciation	$29,098,240	$31,129,361	$32,465,373	$34,929,835	$37,152,403	$40,411,096	$43,042,122	$44,755,834	$47,730,680	$50,395,694	$53,210,283	As Allocation (39.4% sanitary)
Less: Contributions Amortization	(15,382,774)	(16,195,998)	(17,178,674)	(18,202,275)	(19,346,271)	(20,446,238)	(21,408,596)	(22,363,826)	(23,304,346)	(24,170,556)	(24,997,523)	As Allocation (39.4% sanitary)
Total Depreciation	**$13,715,467**	**$14,933,363**	**$15,286,699**	**$16,727,560**	**$17,806,132**	**$19,964,858**	**$21,633,526**	**$22,392,008**	**$24,426,333**	**$26,225,138**	**$28,212,760**	
Financing Costs												
Interest on LTD	$12,877,794	$13,641,241	$17,385,115	$25,526,953	$28,116,090	$30,576,977	$34,543,645	$38,900,688	$42,255,936	$45,382,580	$48,663,063	As Allocation (65.2% sanitary)
Interest on STD	1,247,850	1,597,390	753,962	850,830	970,553	1,110,181	1,132,166	990,017	953,476	985,094	1,030,424	As Allocation (65.2% sanitary)
AFUDC	(1,662,587)	(3,243,926)	(3,756,301)	(5,757,295)	(6,074,355)	(6,707,756)	(5,919,953)	(3,916,734)	(3,717,413)	(4,009,315)	(3,672,891)	As Allocation (65.2% sanitary)
Total Financing Costs	**$12,463,057**	**$11,994,704**	**$14,382,776**	**$20,620,489**	**$23,012,289**	**$24,979,402**	**$29,755,858**	**$35,973,970**	**$39,491,999**	**$42,358,359**	**$46,020,596**	
Return on Investment												
Retained Earnings	$17,343,838	$18,603,012	$18,817,537	$32,917,445	$42,790,503	$53,017,103	$63,400,885	$67,463,967	$70,893,148	$76,778,802	$80,748,993	As Allocation (65.2% sanitary)
Dividends / Equity Issue	0	0	0	0	0	0	0	0	0	0	0	As Allocation (65.2% sanitary)
Total Return on Investment	**$17,343,838**	**$18,603,012**	**$18,817,537**	**$32,917,445**	**$42,790,503**	**$53,017,103**	**$63,400,885**	**$67,463,967**	**$70,893,148**	**$76,778,802**	**$80,748,993**	
Total Revenue Requirement	**$109,013,608**	**$116,689,913**	**$124,170,361**	**$142,411,310**	**$156,665,253**	**$174,228,479**	**$192,659,412**	**$205,881,097**	**$216,661,416**	**$228,953,607**	**$240,349,736**	
Bal. / (Def.) of Funds	$7,338,086	$6,963,741	$5,817,255	$763,577	($962,523)	($2,875,231)	($5,714,308)	($7,201,349)	($8,648,820)	($14,405,100)	($19,493,105)	
Balance a % of Rate Adj. Req'd	-5.9%	-5.4%	-4.3%	-0.5%	0.6%	1.7%	3.1%	3.7%	4.4%	7.1%	9.4%	

EPCOR
Drainage COSA
Exhibit 3
Volume Distribution Factor - Sanitary

	2021 Annual Flow (ML)	15.5% Inflow and Infiltration [1]	Total Annual Flow at Plant (ML)	Avg. Daily Flow At Plant (ML)	% of Total	% of Total
Residential	45,062	6,985	52,046	52,046	53.9%	52.6%
Multi-Residential	17,570	2,723	20,294	20,294	21.0%	20.5%
Commercial	20,912	3,241	24,154	24,154	25.0%	24.4%
U of A	2,080	322	2,403	2,403	0.0%	2.4%
Total	**85,624**	**13,272**	**98,896**	**98,896**	**100.0%**	**100.0%**
		Actual Flows [2]	**0**			
					(VOL w/o)	***(VOL)***

Notes

[1] - Estimated
[2] -

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Drainage COSA
Exhibit 5
Customer Distribution Factors - Sanitary

	Actual Customer		*Cust. Serv. & Acntg*		
	Number of Account [1]	**% of Total**	**Weight Factor [2]**	**Wt. Acct.**	**% of Total**
Residential	266,841	92.8%	1.00	266,841	92.8%
Multi-Residential	3,753	1.3%	1.00	3,753	1.3%
Commercial	16,886	5.9%	1.00	16,886	5.9%
U of A	1	0.0%	1.00	1	0.0%
Total	**287,482**	**100.0%**		**287,482**	**100.0%**
		(AC)			***(WCA)***

Notes

[1] - Based on 2018 Billing Data
[2] - No Cost Difference Identified

EPCOR
Drainage COSA
Exhibit 6
Revenue Distribution Factor - Sanitary

	Projected 2021	% of Total
Residential	$84,027,701	62.5%
Multi-Residential	21,163,534	15.7%
Commercial	27,989,588	20.8%
U of A	1,209,039	0.9%
Total	**$134,389,862**	**100.0%**

(RR)

EPCOR
Drainage COSA
Exhibit 7
Net Plant in Service - Sanitary

	As of 12/31/18	Volume (VOL)	Weighted for Actual Customer (AC)	Customer Acct/Svcs (ESU)	Capacity Demand (CD)	Revenue (RR)	Direct (DA)	Basis of Classification
Collection	$1,390,309,155	$1,112,247,324	$0	$0	$278,061,831	$0	$0	80.0% VOL 20.0% CD
Collection - Common	11,254,229	9,003,383	0	0	2,250,846	0	0	80.0% VOL 20.0% CD
Pumping Stations	68,280,578	68,280,578	0	0	0	0	0	100.0% VOL 0.0% CD
Storage	39,249,760	31,399,808	0	0	7,849,952	0	0	80.0% VOL 20.0% CD
Storage - Common	166,983	133,586	0	0	33,397	0	0	80.0% VOL 20.0% CD
Biosolids	10,386,741	0	0	0	10,386,741	0	0	100.0% AC
Plant Before General Plant	**$1,519,647,445**	**$1,221,064,679**	**$0**	**$0**	**$298,582,766**	**$0**	**$0**	
% Plant Before General Plant	***100.0%***	***80.4%***	***0.0%***	***0.0%***	***19.6%***	***0.0%***	***0.0%***	*Factor PBGP*
General Plant								
General Plant	$4,219,597	$3,390,524	$0	$0	$829,073	$0	$0	*As Factor PBGP*
General Plant - Common	34,073,653	27,378,807	0	0	6,694,846	0	0	*As Factor PBGP*
Total General Plant	**$38,293,250**	**$30,769,331**	**$0**	**$0**	**$7,523,919**	**$0**	**$0**	
Net Plant in Service	**$1,557,940,695**	**$1,251,834,010**	**$0**	**$0**	**$306,106,685**	**$0**	**$0**	

EPCOR
Drainage COSA
Exhibit 8
Allocation of the Revenue Requirement - Sanitary

	Test Year 2021	Volume (VOL)	Weighted Actual Customer (AC)	Weighted Customer Acct/Svcs (ESU)	Weighted Equivalent SW Unit (CD)	Revenue (RR)	Direct (DA)	Basis of Classification
Franchise Fees	**$10,695,294**	$0	$0	$0	0	$10,695,294	$0	100.0% RR
Drainage Operations								
Operations Mgmt and Admin	$974,816	$783,282	$0	$0	$191,533	$0	$0	As Net Plant
General Maintenance	0	0	0	0	0	0	0	As Net Plant
Operations Mgmt and Admin (2)	0	0	0	0	0	0	0	As Net Plant
Hazardous and Sanitary Waste	562,036	451,606	0	0	110,430	0	0	As Net Plant
Industrial Monitoring	3,337,418	2,681,677	0	0	655,741	0	0	As Net Plant
Compliance	451,370	362,684	0	0	88,686	0	0	As Net Plant
General Maintenance (2)	1,036,031	832,470	0	0	203,561	0	0	As Net Plant
Pipeline Maintenance	10,550,611	10,550,611	0	0	0	0	0	100.0% VOL
Pumping - Maintenance	6,572,368	6,572,368	0	0	0	0	0	100.0% VOL
Total Drainage Operations	**$23,484,650**	**$22,234,698**	**$0**	**$0**	**$1,249,951**	**$0**	**$0**	
Planning								
Biosolids	$2,023,337	$1,625,789	$0	$0	$397,549	$0	$0	As Net Plant
Engineering	1,130,153	908,099	0	0	222,054	0	0	As Net Plant
Infrastructure Planning	710,327	570,761	0	0	139,566	0	0	As Net Plant
System Planning and Analysis	1,060,744	852,327	0	0	208,417	0	0	As Net Plant
Stormwater Strategies	0	0	0	0	0	0	0	As Net Plant
Project Management	10,040	8,068	0	0	1,973	0	0	As Net Plant
Customer Services	150,518	120,944	0	0	29,574	0	0	As Net Plant
Engineering (pre-SIRP)	0	0	0	0	0	0	0	As Net Plant
Planning and Estimation (LRT Relocates)	0	0	0	0	0	0	0	As Net Plant
Project Management (2)	935,945	752,049	0	0	183,896	0	0	As Net Plant
Total Planning	**$6,021,064**	**$4,838,036**	**$0**	**$0**	**$1,183,028**	**$0**	**$0**	
Billing and Meter Reading								
Meter Reading	$6,665,810	$0	$6,665,810	$0	$0	$0	$0	100.0% AC
CUS Charges	456,646	0	456,646	0	0	0	0	100.0% AC
Total Billing and Meter Reading	**$7,122,456**	**$0**	**$7,122,456**	**$0**	**$0**	**$0**	**$0**	
Project Support Costs								
Operations Mgmt and Admin	$472,485	$379,651	$0	$0	$92,835	$0	$0	As Net Plant
Open Cut Services	769,473	618,285	0	0	151,187	0	0	As Net Plant
In-house Tunnelling	790,906	635,507	0	0	155,398	0	0	As Net Plant
Survey Operations	303,567	243,922	0	0	59,645	0	0	As Net Plant
Total Project Support Costs	**$2,336,430**	**$1,877,365**	**$0**	**$0**	**$459,066**	**$0**	**$0**	

EPCOR
Drainage COSA
Exhibit 8
Allocation of the Revenue Requirement - Sanitary

	Test Year 2021	Volume (VOL)	Weighted Actual Customer (AC)	Weighted Customer Acct/Svcs (ESU)	Weighted Equivalent SW Unit (CD)	Revenue (RR)	Direct (DA)	Basis of Classification
Drainage Services Administration								
Security Operations & Investigations	$0	$0	$0	$0	$0	$0	$0	As Net Plant
Fleet Services	131,526	105,683	0	0	25,842	0	0	As Net Plant
Equipment Dispatch	(2,267,756)	(1,822,184)	0	0	(445,572)	0	0	As Net Plant
General Maintenance	(836,936)	(672,494)	0	0	(164,443)	0	0	As Net Plant
None	918,100	737,710	0	0	180,390	0	0	As Net Plant
Operations Mgmt and Admin	(834,768)	(670,752)	0	0	(164,017)	0	0	As Net Plant
Inspection Services	0	0	0	0	0	0	0	As Net Plant
Capital OH Clearing	0	0	0	0	0	0	0	As Net Plant
Information Services	720,371	578,831	0	0	141,540	0	0	As Net Plant
Security - Operations & Investigations	124,293	99,871	0	0	24,421	0	0	As Net Plant
Facility Operations	2,428,339	1,951,215	0	0	477,124	0	0	As Net Plant
Security Operations & Investigations (2)	0	0	0	0	0	0	0	As Net Plant
Inventory Management	790,285	635,008	0	0	155,276	0	0	As Net Plant
Contract Management	178,385	143,336	0	0	35,049	0	0	As Net Plant
General Admin (1)	483,563	388,552	0	0	95,011	0	0	As Net Plant
Health Safety and Loss Prevention	1,056,355	848,801	0	0	207,554	0	0	As Net Plant
Training	1,170,052	940,158	0	0	229,894	0	0	As Net Plant
General Admin (2)	961,526	772,604	0	0	188,922	0	0	As Net Plant
None (2)	(659,180)	(529,664)	0	0	(129,517)	0	0	As Net Plant
General and Tax Accounting	1,616,251	1,298,687	0	0	317,564	0	0	As Net Plant
General Admin (3)	0	0	0	0	0	0	0	As Net Plant
General Admin (4)	0	0	0	0	0	0	0	As Net Plant
General Admin (5)	937,546	753,336	0	0	184,211	0	0	As Net Plant
General Admin (6)	0	0	0	0	0	0	0	As Net Plant
Internal Communications	1,808,780	1,453,388	0	0	355,392	0	0	As Net Plant
Comm Relations & Public Consultation	0	0	0	0	0	0	0	As Net Plant
Total Drainage Services Administration	**$8,726,729**	**$7,012,088**	**$0**	**$0**	**$1,714,642**	**$0**	**$0**	
Corporate Allocations	**$12,419,753**	**$9,979,500**	**$0**	**$0**	**$2,440,253**	**$0**	**$0**	As Net Plant
Efficiencies	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	As Net Plant
O&M Expenses - NRAs								
Planning and Estimation (LRT Relocates)	$18,899	$15,186	$0	$0	$3,713	$0	$0	As Net Plant
Engineering (SIRP)	0	0	0	0	0	0	0	As Net Plant
Odour and Corrosion Mitigation	4,452,520	3,577,682	0	0	874,838	0	0	As Net Plant
Total Corporate Allocations	**$4,471,419**	**$3,592,867**	**$0**	**$0**	**$878,552**	**$0**	**$0**	
Total O&M Expenses	**$75,277,796**	**$49,534,554**	**$7,122,456**	**$0**	**$7,925,491**	**$10,695,294**	**$0**	

EPCOR
Drainage COSA
Exhibit 8
Allocation of the Revenue Requirement - Sanitary

	Test Year 2021	Volume (VOL)	Weighted Actual Customer (AC)	Weighted Customer Acct/Svcs (ESU)	Weighted Equivalent SW Unit (CD)	Revenue (RR)	Direct (DA)	Basis of Classification
Property Taxes	**$405,552**	**$0**	**$0**	**$0**	**0**	**$405,552**	**$0**	100.0% RR
Depreciation	$32,465,373	$21,362,977	$3,071,732	$0	$3,418,060	$4,612,605	$0	As O&M Expenses
Less: Contributions Amortization	(17,178,674)	(11,303,970)	(1,625,371)	0	(1,808,627)	(2,440,706)	0	As O&M Expenses
Total Depreciation	**$15,286,699**	**$10,059,006**	**$1,446,361**	**$0**	**$1,609,433**	**$2,171,899**	**$0**	
Financing Costs								
Interest on LTD	$17,385,115	$11,439,813	$1,644,904	$0	$1,830,362	$2,470,037	$0	As O&M Expenses
Interest on STD	753,962	496,125	71,337	0	79,380	107,121	0	As O&M Expenses
AFUDC	(3,756,301)	(2,471,734)	(355,405)	0	(395,476)	(533,687)	0	As O&M Expenses
Total Financing Costs	**$14,382,776**	**$9,464,204**	**$1,360,836**	**$0**	**$1,514,266**	**$2,043,471**	**$0**	
Return on Investment								
Retained Earnings	$18,817,537	$12,382,381	$1,780,433	$0	$1,981,172	$2,673,552	$0	As O&M Expenses
Dividends / Equity Issue	0	0	0	0	0	0	0	As O&M Expenses
Total Return on Investment	**$18,817,537**	**$12,382,381**	**$1,780,433**	**$0**	**$1,981,172**	**$2,673,552**	**$0**	
Total Revenue Requirement	**$124,170,361**	**$81,440,145**	**$11,710,086**	**$0**	**$13,030,362**	**$17,989,768**	**$0**	
Less: Non-Operating Revenue								
Odour	$5,963,473	$3,911,289	$562,395	$0	$625,803	$863,986	$0	As Revenue Requirement
Biosolids	(12,824,672)	(8,411,372)	(1,209,451)	0	(1,345,813)	(1,858,035)	0	As Revenue Requirement
Hazardous and Sanitary Waste	731,939	480,060	69,027	0	76,809	106,043	0	As Revenue Requirement
Compliance	717,159	470,366	67,633	0	75,258	103,902	0	As Revenue Requirement
Pipeline Maintenance	391,411	256,717	36,913	0	41,074	56,708	0	As Revenue Requirement
Industrial Monitoring	19,571	12,836	1,846	0	2,054	2,835	0	As Revenue Requirement
General Maintenance	14,290	9,373	1,348	0	1,500	2,070	0	As Revenue Requirement
Pumping - Maintenance	9,785	6,418	923	0	1,027	1,418	0	As Revenue Requirement
9K-611 - Late Pmt Chg & UIS Sewer Trouble	360,000	236,115	33,950	0	37,778	52,157	0	As Revenue Requirement
9L-611 - Late Pmt Chg & UIS Sewer Trouble	160,000	104,940	15,089	0	16,790	23,181	0	As Revenue Requirement
Inventory Management (asset sales)	54,798	35,940	5,168	0	5,750	7,939	0	As Revenue Requirement
Operations Mgmt and Admin	0	0	0	0	0	0	0	As Revenue Requirement
Infrastructure Planning	0	0	0	0	0	0	0	As Revenue Requirement
Customer Services	0	0	0	0	0	0	0	As Revenue Requirement
Project Management	0	0	0	0	0	0	0	As Revenue Requirement
Operations Mgmt and Admin	0	0	0	0	0	0	0	As Revenue Requirement
Information Services	0	0	0	0	0	0	0	As Revenue Requirement
Open Cut Services	0	0	0	0	0	0	0	As Revenue Requirement
Total Other Revenues	**($4,402,246)**	**($2,887,320)**	**($415,161)**	**$0**	**($461,969)**	**($637,796)**	**$0**	
Net Revenue Requirement	**$128,572,607**	**$84,327,465**	**$12,125,247**	**$0**	**$13,492,331**	**$18,627,564**	**$0**	

EPCOR
Drainage COSA
Exhibit 9
Distribution of Total Revenue Requirement - Sanitary

		Residential	Multi-Residential	Commercial	U of A	*Basis*
Volume Related	$84,327,465	$44,379,248	$17,304,166	$20,595,460	$2,048,591	*(VOL)*
*Less: Collection Discount**	0	486,183	189,570	225,627	(901,380)	*(VOL w/o)*
Net Volume Related Costs	**$84,327,465**	**$44,865,431**	**$17,493,736**	**$20,821,087**	**$1,147,211**	
Customer Related						
Actual Customer	$12,125,247	$11,254,679	$158,303	$712,223	$42	*(AC)*
Weighted Customer	0	0	0	0	0	*(ESU)*
Capacity Demand	13,492,331	10,936,134	727,741	1,819,876	8,580	*(CD)*
Total Customer Related	**$25,617,578**	**$22,190,813**	**$886,044**	**$2,532,099**	**$8,622**	
Revenue Related	$18,627,564	$11,646,946	$2,933,444	$3,879,592	$167,583	*(RR)*
Direct Assignment	$0	$0	$0	$0	$0	*(DA)*
Total Revenue Requirements	**$128,572,607**	**$78,703,189**	**$21,313,223**	**$27,232,778**	**$1,323,416**	

EPCOR
Drainage COSA
Exhibit 10
Cost of Service Analysis Summary - Sanitary

	2021	Residential	Multi-Residential	Commercial	U of A
Revenues at Present Rates	**$134,389,862**	$84,027,701	$21,163,534	$27,989,588	$1,209,039
Allocated Revenue Requirement	**$128,572,607**	$78,703,189	$21,313,223	$27,232,778	$1,323,416
Balance / (Deficiency) of Funds	**$5,817,255**	**$5,324,511**	**($149,689)**	**$756,810**	**($114,377)**
Required % Change in Rates	**-4.3%**	**-6.3%**	**0.7%**	**-2.7%**	**9.5%**

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Drainage COSA
Exhibit 11
Unit Costs Summary - Sanitary

	System Average	Residential	Multi-Residential	Commercial	U of A
Variable					
Volume Related	$0.85	$0.86	$0.86	$0.86	$0.48
Fixed					
Actual Customer	$3.02	$3.45	$0.73	$1.31	$0.02
Weighted Customer	0.00	0.00	0.00	0.00	0.00
Capacity Demand	3.36	3.36	3.36	3.36	3.36
RR / DA	4.63	3.58	13.53	7.16	65.56
Total	**$11.01**	**$10.39**	**$17.62**	**$11.83**	**$68.94**
Basic Data					
Volume / Flow (m^3)	98,895,906	52,046,222	20,293,639	24,153,539	2,402,506
Customers	287,482	266,841	3,753	16,886	1
Wt. Customers	287,482	266,841	3,753	16,886	1
Equiv. Meters	334,944	271,487	18,066	45,178	213

Stormwater Drainage Technical Appendix B

EPCOR
Drainage COSA
Summary of the Revenue Requirement - Stormwater
Exhibit 1

	Budgeted	*Projected*									
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Revenues											
Rate Revenues	$66,684,244	$70,625,215	$75,564,007	$85,753,292	$93,850,487	$102,713,644	$112,423,901	$117,727,669	$121,557,096	$125,512,770	$129,598,904
Miscellaneous Revenues	990,741	4,159,107	5,137,859	11,530,157	14,183,899	17,894,469	22,528,992	26,236,952	31,578,394	41,719,693	50,772,875
Total Revenues	**$67,674,985**	**$74,784,321**	**$80,701,866**	**$97,283,449**	**$108,034,386**	**$120,608,112**	**$134,952,893**	**$143,964,621**	**$153,135,490**	**$167,232,463**	**$180,371,779**
Expenses											
Franchise Fees	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Drainage Operations	$18,186,109	$18,784,307	$19,585,196	$19,957,314	$20,336,503	$20,722,897	$21,116,632	$21,517,848	$21,926,687	$22,343,294	$22,767,817
Total Planning	5,670,337	5,943,791	6,423,058	6,545,096	6,669,453	6,796,172	6,925,299	7,056,880	7,190,961	7,327,589	7,466,813
Total Billing and Meter Reading	208,589	225,971	243,354	247,977	252,689	257,490	262,382	267,368	272,447	277,624	282,899
Total Project Support Costs	2,158,941	2,149,739	2,336,430	2,380,823	2,426,058	2,472,153	2,519,124	2,566,988	2,615,760	2,665,460	2,716,103
Total Drainage Services Administration	5,001,615	5,039,562	5,051,509	5,147,487	5,245,290	5,344,950	5,446,504	5,549,988	5,655,437	5,762,891	5,872,386
Corporate Allocations	6,442,900	6,838,005	7,189,233	7,553,576	7,697,094	7,843,338	7,992,362	8,144,217	8,298,957	8,456,637	8,617,313
Efficiencies	0	0	0	(2,781,184)	(2,834,026)	(2,887,873)	(2,942,742)	(2,998,654)	(3,055,629)	(3,113,686)	(3,172,846)
Total O&M Expenses - NRAs	18,201	3,148,529	4,123,462	4,371,102	4,454,153	4,538,782	4,625,018	4,712,894	4,802,439	4,893,685	4,986,665
Total O&M Expenses	**$37,686,691**	**$42,129,906**	**$44,952,241**	**$43,422,191**	**$44,247,213**	**$45,087,910**	**$45,944,580**	**$46,817,527**	**$47,707,060**	**$48,613,494**	**$49,537,151**
Property Taxes	$385,639	$386,238	$405,552	$413,257	$421,109	$429,110	$437,264	$445,572	$454,037	$462,664	$471,455
Depreciation	21,056,212	22,925,948	23,468,395	25,680,428	27,336,270	30,650,382	33,212,149	34,376,583	37,499,713	40,261,268	43,312,698
Financing Costs	6,641,745	6,392,153	7,664,792	10,988,961	12,263,586	13,311,889	15,857,332	19,171,055	21,045,864	22,573,389	24,525,049
Retained Earnings	9,242,785	9,913,817	10,028,141	17,542,189	22,803,685	28,253,590	33,787,260	35,952,536	37,779,996	40,916,548	43,032,320
Total Revenue Requirement	**$75,013,071**	**$81,748,062**	**$86,519,121**	**$98,047,026**	**$107,071,863**	**$117,732,881**	**$129,238,584**	**$136,763,272**	**$144,486,671**	**$152,827,363**	**$160,878,673**
Bal. / (Def.) of Funds	($7,338,086)	($6,963,741)	($5,817,255)	($763,577)	$962,523	$2,875,231	$5,714,308	$7,201,349	$8,648,820	$14,405,100	$19,493,105
Balance a % of Rate Adj. Req'd	11.0%	9.9%	7.7%	0.9%	-1.0%	-2.8%	-5.1%	-6.1%	-7.1%	-11.5%	-15.0%
Proposed Rate Adjustment	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Add'l Revenue with Rate Adj.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Bal. / (Def.) After Rate Adj.	($7,338,086)	($6,963,741)	($5,817,255)	($763,577)	$962,523	$2,875,231	$5,714,308	$7,201,349	$8,648,820	$14,405,100	$19,493,105
Additional Rate Adjustment Required	**11.0%**	**9.9%**	**7.7%**	**0.9%**	**-1.0%**	**-2.8%**	**-5.1%**	**-6.1%**	**-7.1%**	**-11.5%**	**-15.0%**

EPCOR
Drainage COSA
Revenue Requirement - Stormwater
Exhibit 2

	Budgeted	*Projected*										
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	***Notes***
Revenues												
Rate Revenues												
Residential	$35,066,775	$37,434,513	$40,403,032	$46,118,298	$50,636,346	$55,597,011	$61,048,300	$64,132,658	$66,429,493	$68,808,587	$71,272,885	Schedule - R-3
Multi-Residential	3,416,114	3,582,936	3,792,285	4,384,240	4,756,989	5,161,429	5,600,680	5,814,270	5,951,488	6,091,945	6,235,717	Schedule - R-3
Commercial	28,201,355	29,607,766	31,368,691	35,250,754	38,457,152	41,955,204	45,774,920	47,780,741	49,176,115	50,612,238	52,090,301	Schedule - R-3
Total Rate Revenues	**$66,684,244**	**$70,625,215**	**$75,564,007**	**$85,753,292**	**$93,850,487**	**$102,713,644**	**$112,423,901**	**$117,727,669**	**$121,557,096**	**$125,512,770**	**$129,598,904**	
Other Revenues												
Storm - Revenue Leakage	$0	$0	$0	$6,125,384	$8,641,858	$9,311,548	$10,033,899	$10,344,299	$10,514,980	$10,688,477	$10,864,837	Schedule - F-1
SIRP	0	3,129,982	4,104,563	4,351,844	4,469,107	7,489,600	11,381,000	14,757,392	19,906,583	29,852,405	38,706,830	Schedule - F-2
Biosolids	0	0	0	0	0	0	0	0	0	0	0	As Allocation (0% storm)
Hazardous and Sanitary Waste	378,589	390,061	390,061	397,472	405,024	412,720	420,561	428,552	436,694	444,992	453,446	As Allocation (34.8% storm)
Compliance	360,718	378,012	382,184	389,446	396,845	404,385	412,069	419,898	427,876	436,006	444,290	As Allocation (34.8% storm)
Pipeline Maintenance	179,039	208,589	208,589	212,552	216,590	220,706	224,899	229,172	233,526	237,963	242,485	As Allocation (34.8% storm)
Industrial Monitoring	10,429	10,429	10,429	10,628	10,830	11,035	11,245	11,459	11,676	11,898	12,124	As Allocation (34.8% storm)
General Maintenance	7,616	7,616	7,616	7,760	7,908	8,058	8,211	8,367	8,526	8,688	8,853	As Allocation (34.8% storm)
Pumping - Maintenance	5,215	5,215	5,215	5,314	5,415	5,518	5,622	5,729	5,838	5,949	6,062	As Allocation (34.8% storm)
9K-611 - Late Pmt Chg & UIS Sewer Trouble	0	0	0	0	0	0	0	0	0	0	0	As Allocation (0% storm)
9L-611 - Late Pmt Chg & UIS Sewer Trouble	0	0	0	0	0	0	0	0	0	0	0	As Allocation (0% storm)
Inventory Management (asset sales)	29,202	29,202	29,202	29,757	30,323	30,899	31,486	32,084	32,694	33,315	33,948	As Allocation (34.8% storm)
Operations Mgmt and Admin	0	0	0	0	0	0	0	0	0	0	0	As Allocation (34.8% storm)
Infrastructure Planning	19,934	0	0	0	0	0	0	0	0	0	0	As Allocation (34.8% storm)
Customer Services	0	0	0	0	0	0	0	0	0	0	0	As Allocation (34.8% storm)
Project Management	0	0	0	0	0	0	0	0	0	0	0	As Allocation (34.8% storm)
Operations Mgmt and Admin	0	0	0	0	0	0	0	0	0	0	0	As Allocation (34.8% storm)
Information Services	0	0	0	0	0	0	0	0	0	0	0	As Allocation (34.8% storm)
Open Cut Services	0	0	0	0	0	0	0	0	0	0	0	As Allocation (34.8% storm)
Total Other Revenues	**990,741**	**4,159,107**	**5,137,859**	**11,530,157**	**14,183,899**	**17,894,469**	**22,528,992**	**26,236,952**	**31,578,394**	**41,719,693**	**50,772,875**	
Total Revenues	**$67,674,985**	**$74,784,321**	**$80,701,866**	**$97,283,449**	**$108,034,386**	**$120,608,112**	**$134,952,893**	**$143,964,621**	**$153,135,490**	**$167,232,463**	**$180,371,779**	
Franchise Fees	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	As Allocation (0% storm)
Drainage Operations												
Operations Mgmt and Admin	$950,214	$951,040	$974,816	$993,337	$1,012,211	$1,031,443	$1,051,040	$1,071,010	$1,091,359	$1,112,095	$1,133,225	As Allocation (50% storm)
Compliance	578,845	399,106	451,370	459,946	468,685	477,590	486,664	495,910	505,333	514,934	524,718	As Allocation (50% storm)
General Maintenance (2)	1,013,950	1,038,342	1,036,031	1,055,716	1,075,774	1,096,214	1,117,042	1,138,266	1,159,893	1,181,931	1,204,387	As Allocation (50% storm)
Pipeline Maintenance	9,876,669	10,094,114	10,550,611	10,751,073	10,955,343	11,163,495	11,375,601	11,591,737	11,811,980	12,036,408	12,265,100	As Allocation (50% storm)
Pumping - Maintenance	5,766,430	6,301,705	6,572,368	6,697,243	6,824,491	6,954,156	7,086,285	7,220,924	7,358,122	7,497,926	7,640,387	As Allocation (50% storm)
Total Drainage Operations	**$18,186,109**	**$18,784,307**	**$19,585,196**	**$19,957,314**	**$20,336,503**	**$20,722,897**	**$21,116,632**	**$21,517,848**	**$21,926,687**	**$22,343,294**	**$22,767,817**	

EPCOR
Drainage COSA
Revenue Requirement - Stormwater
Exhibit 2

	Budgeted	*Projected*										
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	***Notes***
Planning												
Biosolids	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	As Allocation (0% storm)
Engineering	656,836	762,144	1,130,153	1,151,626	1,173,507	1,195,803	1,218,523	1,241,675	1,265,267	1,289,307	1,313,804	As Allocation (50% storm)
Infrastructure Planning	1,130,165	1,050,370	1,090,506	1,111,225	1,132,339	1,153,853	1,175,776	1,198,116	1,220,880	1,244,077	1,267,714	As Allocation (60.6% storm)
System Planning and Analysis	1,697,766	1,526,853	1,628,472	1,659,413	1,690,941	1,723,069	1,755,808	1,789,168	1,823,162	1,857,802	1,893,101	As Allocation (60.6% storm)
Stormwater Strategies	879,617	937,364	971,117	989,569	1,008,370	1,027,529	1,047,052	1,066,946	1,087,218	1,107,876	1,128,925	As Allocation (100% storm)
Project Management	14,153	15,229	15,414	15,707	16,005	16,309	16,619	16,935	17,257	17,585	17,919	As Allocation (60.6% storm)
Customer Services	148,691	50,460	150,518	153,378	156,292	159,262	162,288	165,371	168,513	171,715	174,977	As Allocation (50% storm)
Engineering (pre-SIRP)	0	0	0	0	0	0	0	0	0	0	0	As Allocation (100% storm)
Planning and Estimation (LRT Relocates)	0	0	0	0	0	0	0	0	0	0	0	As Allocation (60.6% storm)
Project Management (2)	1,143,108	1,601,372	1,436,878	1,464,179	1,491,998	1,520,346	1,549,233	1,578,668	1,608,663	1,639,227	1,670,373	As Allocation (60.6% storm)
Total Planning	**$5,670,337**	**$5,943,791**	**$6,423,058**	**$6,545,096**	**$6,669,453**	**$6,796,172**	**$6,925,299**	**$7,056,880**	**$7,190,961**	**$7,327,589**	**$7,466,813**	
Billing and Meter Reading												
Meter Reading	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	As Allocation (0% storm)
CUS Charges	208,589	225,971	243,354	247,977	252,689	257,490	262,382	267,368	272,447	277,624	282,899	As Allocation (34.8% storm)
Total Billing and Meter Reading	**$208,589**	**$225,971**	**$243,354**	**$247,977**	**$252,689**	**$257,490**	**$262,382**	**$267,368**	**$272,447**	**$277,624**	**$282,899**	
Project Support Costs												
Operations Mgmt and Admin	$426,518	$666,940	$472,485	$481,463	$490,610	$499,932	$509,431	$519,110	$528,973	$539,023	$549,265	As Allocation (50% storm)
Open Cut Services	718,636	681,748	769,473	784,093	798,990	814,171	829,640	845,404	861,466	877,834	894,513	As Allocation (50% storm)
In-house Tunnelling	747,164	694,118	790,906	805,933	821,245	836,849	852,749	868,951	885,462	902,285	919,429	As Allocation (50% storm)
Survey Operations	266,623	106,933	303,567	309,335	315,212	321,201	327,304	333,523	339,859	346,317	352,897	As Allocation (50% storm)
Total Project Support Costs	**$2,158,941**	**$2,149,739**	**$2,336,430**	**$2,380,823**	**$2,426,058**	**$2,472,153**	**$2,519,124**	**$2,566,988**	**$2,615,760**	**$2,665,460**	**$2,716,103**	
Drainage Services Administration												
Security Operations & Investigations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	As Allocation (36.7% storm)
Fleet Services	61,061	73,338	76,134	77,581	79,055	80,557	82,087	83,647	85,236	86,856	88,506	As Allocation (36.7% storm)
Equipment Dispatch	(1,041,332)	(1,194,179)	(1,312,701)	(1,337,643)	(1,363,058)	(1,388,956)	(1,415,346)	(1,442,238)	(1,469,640)	(1,497,563)	(1,526,017)	As Allocation (36.7% storm)
General Maintenance	(374,468)	(443,044)	(484,465)	(493,669)	(503,049)	(512,607)	(522,347)	(532,271)	(542,384)	(552,690)	(563,191)	As Allocation (36.7% storm)
None	365,800	484,851	531,446	541,544	551,833	562,318	573,002	583,889	594,983	606,288	617,807	As Allocation (36.7% storm)
Operations Mgmt and Admin	(512,737)	(499,017)	(483,210)	(492,391)	(501,746)	(511,279)	(520,994)	(530,892)	(540,979)	(551,258)	(561,732)	As Allocation (36.7% storm)
Information Services	394,962	404,689	416,990	424,913	432,986	441,213	449,596	458,138	466,843	475,713	484,751	As Allocation (36.7% storm)
Security - Operations & Investigations	123,371	69,656	71,947	73,314	74,707	76,127	77,573	79,047	80,549	82,079	83,639	As Allocation (36.7% storm)
Facility Operations	1,099,131	1,278,060	1,405,656	1,432,363	1,459,578	1,487,310	1,515,569	1,544,365	1,573,708	1,603,608	1,634,077	As Allocation (36.7% storm)
Inventory Management	454,996	447,254	457,460	466,152	475,009	484,034	493,230	502,602	512,151	521,882	531,798	As Allocation (36.7% storm)
Contract Management	92,471	98,397	103,259	105,221	107,220	109,257	111,333	113,449	115,604	117,801	120,039	As Allocation (36.7% storm)
General Admin (1)	297,751	271,798	279,913	285,231	290,650	296,173	301,800	307,534	313,377	319,332	325,399	As Allocation (36.7% storm)
Health Safety and Loss Prevention	560,160	567,535	611,476	623,094	634,933	646,997	659,290	671,816	684,581	697,588	710,842	As Allocation (36.7% storm)
Training	705,659	673,803	677,290	690,159	703,272	716,634	730,250	744,125	758,263	772,670	787,351	As Allocation (36.7% storm)
General Admin (2)	519,361	545,444	556,584	567,159	577,935	588,916	600,105	611,507	623,126	634,965	647,029	As Allocation (36.7% storm)
None (2)	(324,161)	(324,371)	(381,570)	(388,819)	(396,207)	(403,735)	(411,406)	(419,223)	(427,188)	(435,304)	(443,575)	As Allocation (36.7% storm)
General and Tax Accounting	949,164	999,896	935,574	953,350	971,464	989,922	1,008,730	1,027,896	1,047,426	1,067,327	1,087,607	As Allocation (36.7% storm)
General Admin (4)	5,510	0	0	0	0	0	0	0	0	0	0	As Allocation (36.7% storm)
General Admin (5)	466,581	516,648	542,703	553,014	563,522	574,229	585,139	596,257	607,586	619,130	630,893	As Allocation (36.7% storm)
Internal Communications	1,158,334	1,068,805	1,047,021	1,066,914	1,087,186	1,107,842	1,128,891	1,150,340	1,172,197	1,194,468	1,217,163	As Allocation (36.7% storm)
Total Drainage Services Administration	**$5,001,615**	**$5,039,562**	**$5,051,509**	**$5,147,487**	**$5,245,290**	**$5,344,950**	**$5,446,504**	**$5,549,988**	**$5,655,437**	**$5,762,891**	**$5,872,386**	

EPCOR
Drainage COSA
Revenue Requirement - Stormwater
Exhibit 2

	Budgeted	*Projected*										
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	***Notes***
Corporate Allocations	**$6,442,900**	**$6,838,005**	**$7,189,233**	**$7,553,576**	**$7,697,094**	**$7,843,338**	**$7,992,362**	**$8,144,217**	**$8,298,957**	**$8,456,637**	**$8,617,313**	As Allocation (36.7% storm)
Efficiencies	**$0**	**$0**	**$0**	**($2,781,184)**	**($2,834,026)**	**($2,887,873)**	**($2,942,742)**	**($2,998,654)**	**($3,055,629)**	**($3,113,686)**	**($3,172,846)**	As Allocation (34.8% storm)
O&M Expenses - NRAs												
Planning and Estimation (LRT Relocates)	$18,201	$18,547	$18,899	$19,258	$19,624	$19,997	$20,377	$20,764	$21,159	$21,561	$21,970	As Allocation (50% storm)
Engineering (SIRP)	0	3,129,982	4,104,563	4,351,844	4,434,529	4,518,785	4,604,642	4,692,130	4,781,280	4,872,125	4,964,695	As Allocation (100% storm)
Odour and Corrosion Mitigation	0	0	0	0	0	0	0	0	0	0	0	As Allocation (0% storm)
Total O&M Expenses - NRAs	**$18,201**	**$3,148,529**	**$4,123,462**	**$4,371,102**	**$4,454,153**	**$4,538,782**	**$4,625,018**	**$4,712,894**	**$4,802,439**	**$4,893,685**	**$4,986,665**	
Total O&M Expenses	**$37,686,691**	**$42,129,906**	**$44,952,241**	**$43,422,191**	**$44,247,213**	**$45,087,910**	**$45,944,580**	**$46,817,527**	**$47,707,060**	**$48,613,494**	**$49,537,151**	
Property Taxes	**$385,639**	**$386,238**	**$405,552**	**$413,257**	**$421,109**	**$429,110**	**$437,264**	**$445,572**	**$454,037**	**$462,664**	**$471,455**	As Allocation (50% storm)
Depreciation	$44,672,102	$47,790,312	$49,841,381	$53,624,863	$57,036,986	$62,039,786	$66,078,981	$68,709,900	$73,276,932	$77,368,307	$81,689,311	As Allocation (60.6% storm)
Less: Contributions Amortization	(23,615,890)	(24,864,365)	(26,372,986)	(27,944,435)	(29,700,716)	(31,389,404)	(32,866,832)	(34,333,318)	(35,777,220)	(37,107,040)	(38,376,613)	As Allocation (60.6% storm)
Total Depreciation	**$21,056,212**	**$22,925,948**	**$23,468,395**	**$25,680,428**	**$27,336,270**	**$30,650,382**	**$33,212,149**	**$34,376,583**	**$37,499,713**	**$40,261,268**	**$43,312,698**	
Financing Costs												
Interest on LTD	$6,862,765	$7,269,617	$9,264,782	$13,603,687	$14,983,476	$16,294,919	$18,408,814	$20,730,746	$22,518,807	$24,185,041	$25,933,259	As Allocation (34.8% storm)
Interest on STD	664,998	851,272	401,798	453,420	517,222	591,631	603,348	527,594	508,121	524,971	549,128	As Allocation (34.8% storm)
AFUDC	(886,017)	(1,728,736)	(2,001,788)	(3,068,147)	(3,237,112)	(3,574,661)	(3,154,830)	(2,087,285)	(1,981,064)	(2,136,623)	(1,957,337)	As Allocation (34.8% storm)
Total Financing Costs	**$6,641,745**	**$6,392,153**	**$7,664,792**	**$10,988,961**	**$12,263,586**	**$13,311,889**	**$15,857,332**	**$19,171,055**	**$21,045,864**	**$22,573,389**	**$24,525,049**	
Return on Investment												
Retained Earnings	$9,242,785	$9,913,817	$10,028,141	$17,542,189	$22,803,685	$28,253,590	$33,787,260	$35,952,536	$37,779,996	$40,916,548	$43,032,320	As Allocation (34.8% storm)
Dividends / Equity Issue	0	0	0	0	0	0	0	0	0	0	0	As Allocation (34.8% storm)
Total Return on Investment	**$9,242,785**	**$9,913,817**	**$10,028,141**	**$17,542,189**	**$22,803,685**	**$28,253,590**	**$33,787,260**	**$35,952,536**	**$37,779,996**	**$40,916,548**	**$43,032,320**	
Total Revenue Requirement	**$75,013,071**	**$81,748,062**	**$86,519,121**	**$98,047,026**	**$107,071,863**	**$117,732,881**	**$129,238,584**	**$136,763,272**	**$144,486,671**	**$152,827,363**	**$160,878,673**	
Bal. / (Def.) of Funds	($7,338,086)	($6,963,741)	($5,817,255)	($763,577)	$962,523	$2,875,231	$5,714,308	$7,201,349	$8,648,820	$14,405,100	$19,493,105	
Balance a % of Rate Adj. Req'd	11.0%	9.9%	7.7%	0.9%	-1.0%	-2.8%	-5.1%	-6.1%	-7.1%	-11.5%	-15.0%	
Proposed Rate Adjustment	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

EPCOR
Drainage COSA
Exhibit 3
Equivalent Unit Distribution Factor - Stormwater

	# of Storm Equivalents [1]	% of Total
Residential	824,984,120	52.6%
Multi-Residential	80,367,807	5.1%
Commercial	663,467,628	42.3%
Total	**1,568,819,555**	**100.0%**
		(ESU)

Notes

[1] - Based on Historical data and 2019 projection

EPCOR
Drainage COSA
Exhibit 4
Customer Distribution Factors - Stormwater

	Acutal Customer		*Cust. Serv. & Acntg*		
	Number of Account [1]	**% of Total**	**Weight Factor [2]**	**Wt. Acct.**	**% of Total**
Residential	266,841	92.8%	1.00	266,841	92.8%
Multi-Residential	3,753	1.3%	1.00	3,753	1.3%
Commercial	16,886	5.9%	1.00	16,886	5.9%
Total	**287,481**	**100.0%**		**287,481**	**100.0%**
		(AC)			***(WCA)***

Notes

[1] - Based on Historical data and 2019 projection
[2] - No Cost Difference Identified

EPCOR
Drainage COSA
Exhibit 5
Revenue Distribution Factor - Stormwater

	Projected 2021	% of Total
Residential	$40,403,032	53.5%
Multi-Residential	3,792,285	5.0%
Commercial	31,368,691	41.5%
Total	**$75,564,007**	**100.0%**

(RR)

EPCOR
Drainage COSA
Exhibit 6.1
Net Plant in Service - Storm

	As of 12/31/18	Volume (VOL)	Actual Customer (AC)	Customer Acct/Svcs (WCA)	Equivalent SW Unit (ESU)	Revenue (RR)	Direct (DA)	Basis of Classification
			Weighted for					
Collection	$1,596,871,139	$0	$0	$0	$1,596,871,139	$0	$0	100.0% ESU
Collection - Common	12,926,300	0	0	0	12,926,300	0	0	100.0% ESU
Pumping Stations	9,773,971	0	0	0	9,773,971	0	0	100.0% ESU
Storage	507,772,869	0	0	0	507,772,869	0	0	100.0% ESU
Storage - Common	2,160,248	0	0	0	2,160,248	0	0	100.0% ESU
Plant Before General Plant	**$2,129,504,527**	**$0**	**$0**	**$0**	**$2,129,504,527**	**$0**	**$0**	
% Plant Before General Plant	***100.0%***	***0.0%***	***0.0%***	***0.0%***	***100.0%***	***0.0%***	***0.0%***	*Factor PBGP*
General Plant								
General Plant	$2,599,942	$0	$0	$0	$2,599,942	$0	$0	*As Factor PBGP*
General Plant - Common	20,994,785	0	0	0	20,994,785	0	0	*As Factor PBGP*
Total General Plant	**$23,594,727**	**$0**	**$0**	**$0**	**$23,594,727**	**$0**	**$0**	
Net Plant in Service	**$2,153,099,254**	**$0**	**$0**	**$0**	**$2,153,099,254**	**$0**	**$0**	

EPCOR
Drainage COSA
Exhibit 7
Allocation of the Revenue Requirement - Stormwater

	Test Year 2021	Volume (VOL)	Weighted Actual Customer (AC)	Weighted Customer Acct/Svcs (WCA)	Weighted Equivalent SW Unit (ESU)	Revenue (RR)	Direct (DA)	Basis of Classification
Franchise Fees	**$0**	$0	$0	$0	$0	$0	$0	100.0% RR
Drainage Operations								
Operations Mgmt and Admin	$974,816	$0	$0	$0	$974,816	$0	$0	As Net Plant
General Maintenance	0	0	0	0	0	0	0	As Net Plant
Operations Mgmt and Admin (2)	0	0	0	0	0	0	0	As Net Plant
Hazardous and Sanitary Waste	0	0	0	0	0	0	0	As Net Plant
Industrial Monitoring	0	0	0	0	0	0	0	As Net Plant
Compliance	451,370	0	0	0	451,370	0	0	As Net Plant
General Maintenance (2)	1,036,031	0	0	0	1,036,031	0	0	As Net Plant
Pipeline Maintenance	10,550,611	0	0	0	10,550,611	0	0	As Net Plant
Pumping - Maintenance	6,572,368	0	0	0	6,572,368	0	0	As Net Plant
Total Drainage Operations	**$19,585,196**	**$0**	**$0**	**$0**	**$19,585,196**	**$0**	**$0**	
Planning								
Biosolids	$0	$0	$0	$0	$0	$0	$0	As Net Plant
Engineering	1,130,153	0	0	0	1,130,153	0	0	As Net Plant
Infrastructure Planning	1,090,506	0	0	0	1,090,506	0	0	As Net Plant
System Planning and Analysis	1,628,472	0	0	0	1,628,472	0	0	As Net Plant
Stormwater Strategies	971,117	0	0	0	971,117	0	0	As Net Plant
Project Management	15,414	0	0	0	15,414	0	0	As Net Plant
Customer Services	150,518	0	0	0	150,518	0	0	As Net Plant
Engineering (pre-SIRP)	0	0	0	0	0	0	0	As Net Plant
Planning and Estimation (LRT Relocates)	0	0	0	0	0	0	0	As Net Plant
Project Management (2)	1,436,878	0	0	0	1,436,878	0	0	As Net Plant
Total Planning	**$6,423,058**	**$0**	**$0**	**$0**	**$6,423,058**	**$0**	**$0**	
Billing and Meter Reading								
Meter Reading	$0	$0	$0	$0	$0	$0	$0	As Net Plant
CUS Charges	243,354	0	0	0	243,354	0	0	As Net Plant
Total Billing and Meter Reading	**$243,354**	**$0**	**$0**	**$0**	**$243,354**	**$0**	**$0**	
Project Support Costs								
Operations Mgmt and Admin	$472,485	$0	$0	$0	$472,485	$0	$0	As Net Plant
Open Cut Services	769,473	0	0	0	769,473	0	0	As Net Plant
In-house Tunnelling	790,906	0	0	0	790,906	0	0	As Net Plant
Survey Operations	303,567	0	0	0	303,567	0	0	As Net Plant
Total Project Support Costs	**$2,336,430**	**$0**	**$0**	**$0**	**$2,336,430**	**$0**	**$0**	

EPCOR
Drainage COSA
Exhibit 7
Allocation of the Revenue Requirement - Stormwater

	Test Year 2021	Volume (VOL)	Weighted Actual Customer (AC)	Weighted Customer Acct/Svcs (WCA)	Weighted Equivalent SW Unit (ESU)	Revenue (RR)	Direct (DA)	Basis of Classification
Drainage Services Administration								
Security Operations & Investigations	$0	$0	$0	$0	$0	$0	$0	As Net Plant
Fleet Services	76,134	0	0	0	76,134	0	0	As Net Plant
Equipment Dispatch	(1,312,701)	0	0	0	(1,312,701)	0	0	As Net Plant
General Maintenance	(484,465)	0	0	0	(484,465)	0	0	As Net Plant
None	531,446	0	0	0	531,446	0	0	As Net Plant
Operations Mgmt and Admin	(483,210)	0	0	0	(483,210)	0	0	As Net Plant
Inspection Services	0	0	0	0	0	0	0	As Net Plant
Capital OH Clearing	0	0	0	0	0	0	0	As Net Plant
Information Services	416,990	0	0	0	416,990	0	0	As Net Plant
Security - Operations & Investigations	71,947	0	0	0	71,947	0	0	As Net Plant
Facility Operations	1,405,656	0	0	0	1,405,656	0	0	As Net Plant
Security Operations & Investigations (2)	0	0	0	0	0	0	0	As Net Plant
Inventory Management	457,460	0	0	0	457,460	0	0	As Net Plant
Contract Management	103,259	0	0	0	103,259	0	0	As Net Plant
General Admin (1)	279,913	0	0	0	279,913	0	0	As Net Plant
Health Safety and Loss Prevention	611,476	0	0	0	611,476	0	0	As Net Plant
Training	677,290	0	0	0	677,290	0	0	As Net Plant
General Admin (2)	556,584	0	0	0	556,584	0	0	As Net Plant
None (2)	(381,570)	0	0	0	(381,570)	0	0	As Net Plant
General and Tax Accounting	935,574	0	0	0	935,574	0	0	As Net Plant
General Admin (3)	0	0	0	0	0	0	0	As Net Plant
General Admin (4)	0	0	0	0	0	0	0	As Net Plant
General Admin (5)	542,703	0	0	0	542,703	0	0	As Net Plant
General Admin (6)	0	0	0	0	0	0	0	As Net Plant
Internal Communications	1,047,021	0	0	0	1,047,021	0	0	As Net Plant
Comm Relations & Public Consultation	0	0	0	0	0	0	0	As Net Plant
Total Drainage Services Administration	**$5,051,509**	**$0**	**$0**	**$0**	**$5,051,509**	**$0**	**$0**	
Corporate Allocations	**$7,189,233**	**$0**	**$0**	**$0**	**$7,189,233**	**$0**	**$0**	As Net Plant
Efficiencies	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	As Net Plant
O&M Expenses - NRAs								
Planning and Estimation (LRT Relocates)	$18,899	$0	$0	$0	$18,899	$0	$0	As Net Plant
Engineering (SIRP)	4,104,563	0	0	0	4,104,563	0	0	As Net Plant
Odour and Corrosion Mitigation	0	0	0	0	0	0	0	As Net Plant
Total O&M Expenses - NRAs	**$4,123,462**	**$0**	**$0**	**$0**	**$4,123,462**	**$0**	**$0**	
Total O&M Expenses	**$44,952,241**	**$0**	**$0**	**$0**	**$44,952,241**	**$0**	**$0**	

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Drainage COSA
Exhibit 7
Allocation of the Revenue Requirement - Stormwater

	Test Year 2021	Volume (VOL)	Weighted Actual Customer (AC)	Weighted Customer Acct/Svcs (WCA)	Equivalent SW Unit (ESU)	Revenue (RR)	Direct (DA)	Basis of Classification
Property Taxes	**$405,552**	**$0**	**$0**	**$0**	**$405,552**	**$0**	**$0**	As O&M Expenses
Depreciation	$49,841,381	$0	$0	$0	$49,841,381	$0	$0	As O&M Expenses
Less: Contributions Amortization	(26,372,986)	0	0	0	(26,372,986)	0	0	As O&M Expenses
Total Depreciation	**$23,468,395**	**$0**	**$0**	**$0**	**$23,468,395**	**$0**	**$0**	
Financing Costs								
Interest on LTD	**$9,264,782**	$0	$0	$0	$9,264,782	$0	$0	As O&M Expenses
Interest on STD	**401,798**	0	0	0	401,798	0	0	As O&M Expenses
AFUDC	**(2,001,788)**	0	0	0	(2,001,788)	0	0	As O&M Expenses
Total Financing Costs	**$7,664,792**	**$0**	**$0**	**$0**	**$7,664,792**	**$0**	**$0**	
Return on Investment								
Retained Earnings	**$10,028,141**	$0	$0	$0	$10,028,141	$0	$0	As O&M Expenses
Dividends / Equity Issue	**0**	0	0	0	0	0	0	As O&M Expenses
Total Return on Investment	**$10,028,141**	**$0**	**$0**	**$0**	**$10,028,141**	**$0**	**$0**	
Total Revenue Requirement	**$86,519,121**	**$0**	**$0**	**$0**	**$86,519,121**	**$0**	**$0**	
Less: Non-Operating Revenue								
Storm - Revenue Leakage	$0	$0	$0	$0	$0	$0	$0	As Revenue Requirement
SIRP	4,104,563	0	0	0	4,104,563	0	0	As Revenue Requirement
Biosolids	0	0	0	0	0	0	0	As Revenue Requirement
Hazardous and Sanitary Waste	390,061	0	0	0	390,061	0	0	As Revenue Requirement
Compliance	382,184	0	0	0	382,184	0	0	As Revenue Requirement
Pipeline Maintenance	208,589	0	0	0	208,589	0	0	As Revenue Requirement
Industrial Monitoring	10,429	0	0	0	10,429	0	0	As Revenue Requirement
General Maintenance	7,616	0	0	0	7,616	0	0	As Revenue Requirement
Pumping - Maintenance	5,215	0	0	0	5,215	0	0	As Revenue Requirement
9K-611 - Late Pmt Chg & UIS Sewer Trouble	0	0	0	0	0	0	0	As Revenue Requirement
9L-611 - Late Pmt Chg & UIS Sewer Trouble	0	0	0	0	0	0	0	As Revenue Requirement
Inventory Management (asset sales)	29,202	0	0	0	29,202	0	0	As Revenue Requirement
Operations Mgmt and Admin	0	0	0	0	0	0	0	As Revenue Requirement
Infrastructure Planning	0	0	0	0	0	0	0	As Revenue Requirement
Customer Services	0	0	0	0	0	0	0	As Revenue Requirement
Project Management	0	0	0	0	0	0	0	As Revenue Requirement
Operations Mgmt and Admin	0	0	0	0	0	0	0	As Revenue Requirement
Information Services	0	0	0	0	0	0	0	As Revenue Requirement
Open Cut Services	0	0	0	0	0	0	0	As Revenue Requirement
Total Other Revenues	**$5,137,859**	**$0**	**$0**	**$0**	**$5,137,859**	**$0**	**$0**	
Net Revenue Requirement	**$81,381,262**	**$0**	**$0**	**$0**	**$81,381,262**	**$0**	**$0**	

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Exhibit 8
Distribution of Total Revenue Requirement - Stormwater

		Residential	Multi-Residential	Commercial	*Basis*
Volume Related	$0	$0	$0	$0	*(VOL)*
Customer Related					
Actual Customer	$0	$0	$0	$0	*(AC)*
Weighted Customer	0	0	0	0	*(WCA)*
Capacity Demand	81,381,262	42,795,393	4,169,016	34,416,853	*(ESU)*
Total Customer Related	**$81,381,262**	**$42,795,393**	**$4,169,016**	**$34,416,854**	
Revenue Related	$0	$0	$0	$0	*(RR)*
Direct Assignment	$0	$0	$0	$0	*(DA)*
Total Revenue Requirements	**$81,381,262**	**$42,795,393**	**$4,169,016**	**$34,416,854**	

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Exhibit 9
Cost of Service Analysis Summary - Stormwater

	2021	Residential	Multi-Residential	Commercial
Revenues at Present Rates	**$75,564,007**	$40,403,032	$3,792,285	$31,368,691
Allocated Revenue Requirement	**$81,381,262**	$42,795,393	$4,169,016	$34,416,854
Balance / (Deficiency) of Funds	**($5,817,255)**	**($2,392,361)**	**($376,731)**	**($3,048,162)**
Required % Change in Rates	**7.7%**	**5.9%**	**9.9%**	**9.7%**

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Exhibit 10
Unit Costs Summary - Stormwater

	System Average	Residential	Multi-Residential	Commercial
Unit Cost - $ / Storm Equiv.				
Volume Related	$0.0000	$0.0000	$0.0000	$0.0000
Actual Customer	0.0000	0.0000	0.0000	0.0000
Weighted Customer	0.0000	0.0000	0.0000	0.0000
Capacity Demand	0.0519	0.0519	0.0519	0.0519
RR / DA	0.0000	0.0000	0.0000	0.0000
Total	**$0.0519**	**$0.0519**	**$0.0519**	**$0.0519**
	Current Rates			
Basic Data				
Equivalent Stormwater Units	1,568,819,555	824,984,120	80,367,807	663,467,628