



City of Spruce Grove: Sanitary Sewer Utility Rate Review

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Document Information

Revision History

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1 Introduction

The City of Spruce Grove (“the City”) provides sanitary sewer services to City residents including: collection, transmission, lift stations, etc. Treatment is undertaken by the Alberta Capital Region Wastewater Commission. Customers are billed monthly for sanitary sewer services based upon metered water consumed.

The City initiated this review to ensure sanitary sewer rates are current and reflect the full cost of service provision.

2 Scope of Review

This rate review is focused on metered sanitary sewer variable charges. This review did not assess other sanitary sewer charges such as over strength charges, service connection fees, penalties, etc.

3 Methodology

There are two generally accepted methods for determining the revenue requirements (and rates) for sanitary sewer utility systems. These methods are:

- 1) The Utility (Full Cost) Approach, and
- 2) The Cash Needs Approach.

Though each method provides for short and long-term sanitary sewer system program costs, the *utility (full cost) approach* generally results in greater rate stability. Under the *cash needs approach*, revenue requirements can fluctuate dramatically with cash demands that result from large capital expenditures. The *utility approach*, however, develops revenue requirements not based on what is being spent today but rather on the assets that are consumed in service delivery (i.e., depreciation) and through financial returns on system assets that will sustain the service in the future (i.e., return on the asset base). Depreciation and return represent non-cash provisions that, when placed in reserve, may be used to defray the impact of large capital expenditures or, alternatively, may be drawn upon to cover cash needs when decision makers wish to smooth the impact of rate increases over a number of years.

This study uses the *utility approach* to establish sanitary sewer revenue requirements and rates.

4 Assumptions

Assumptions that are utilized throughout this analysis include:

Assumption	Description
Review Period	Though rates are usually approved on an annual basis, this study examines rate requirements over a 10-year review period from 2023 to 2032, thereby providing the City with insight into potential future rate changes.
Inflation	Inflation of 3.0% per annum was applied to current costs to establish future costs.
Depreciation	Depreciation and amortization are calculated on a straight-line base over the economic life of each asset class. Depreciation and amortization are calculated starting in the year of construction completion using the half-year rule.
Return on Acquired Assets that are Debt Supported	All assets are classified as either “acquired assets” or “contributed assets”, depending on the asset’s nature of origin and financing. Acquired assets that are debt supported are provided a rate of return equivalent to the average interest requirements in a given year.
Return on Acquired Assets that are Equity Supported	All assets are classified as either “acquired assets” or “contributed assets”, depending on the asset’s nature of origin and financing. Acquired assets that are equity supported are provided a rate of return of 8.50% which approximates the cost of equity capital for utilities as determined by the Alberta Utility Commission (i.e., the AUC “Generic Rate of Return” or “Generic Cost of Capital”).
Return on Working Capital	Determination of average working capital requirements is based on 1½ months of operation and maintenance costs in a given year (i.e., the “one-eighth” rule). Return on working capital is 8.50% (i.e., the AUC “Generic Rate of Return” or “Generic Cost of Capital”).

5 Analysis of Revenue Requirements

Revenue requirements are the total costs of the sanitary sewer system that sanitary sewer rates must recover for the utility to be self-sustaining. Each element used to determine the City's sanitary sewer revenue requirements is described in the sections below.

5.1 Existing Sanitary Sewer Infrastructure

The cost of existing sanitary sewer assets used in the provision of services (i.e., tangible capital assets) is included in the determination of revenue requirements. The City's sanitary sewer assets are categorized into several categories based on their expected life (i.e., 75-year assets, 50-year assets, 45-year assets, 40-year assets, 30-year assets, 20-year assets, and 10-year assets).¹

Sanitary sewer assets are also classified as either “acquired” assets or “contributed” assets depending on origin and nature of financing. Contributed assets are those that have been provided to the City through grants, local improvements (i.e., developer constructed and financed), third party contributions, and development levies. Acquired and contributed assets earn different rates of return, which is described more fully later in this section. This rate of return is used to make debt payments associated with creation of the infrastructure and to rehabilitate and replace assets when they reach the end of their economic life.

Table 1 summarizes the original and residual book value of assets currently in service. The City's sanitary sewer assets are, on average, at 33% of their economic life with 67% of life remaining. It is important that reserves be accumulated for future asset rehabilitation and reconstruction.

¹ A municipality's assets are usually categorized based on their type, such as: sanitary sewer collection system, sanitary sewer transmission system, lift stations, lagoons, sanitary sewage treatment, equipment, computers, and land. However, in some cases City assets within a given category have been assigned different asset life's, and so data synthesis and analysis using a different approach was required. Moving forward, it is recommended the City establish a singular asset life for each asset type.

Table 1: Net Book Value of Existing Sanitary Sewer Assets ²

Description	Gross Cost	Accumulated Depreciation	Net Book Value	Remaining % of Asset
System Acquired Assets				
75 Year Assets	\$ -	\$ -	\$ -	0%
50 Year Assets	\$ 15,600,329	\$ 6,605,872	\$ 8,994,457	58%
45 Year Assets	\$ -	\$ -	\$ -	0%
40 Year Assets	\$ -	\$ -	\$ -	0%
30 Year Assets	\$ -	\$ -	\$ -	0%
20 Year Assets	\$ 67,342	\$ 8,893	\$ 58,449	87%
10 Year Assets	\$ 379,065	\$ 238,708	\$ 140,357	37%
Total Acquired	\$ 16,046,735	\$ 6,853,474	\$ 9,193,262	57%
Contributed Assets				
75 Year Assets	\$ -	\$ -	\$ -	0%
50 Year Assets	\$ 30,495,295	\$ 8,670,994	\$ 21,824,300	72%
45 Year Assets	\$ -	\$ -	\$ -	0%
40 Year Assets	\$ -	\$ -	\$ -	0%
30 Year Assets	\$ -	\$ -	\$ -	0%
20 Year Assets	\$ -	\$ -	\$ -	0%
10 Year Assets	\$ -	\$ -	\$ -	0%
Total Contributed	\$ 30,495,295	\$ 8,670,994	\$ 21,824,300	72%
Total All Assets	\$ 46,542,030	\$ 15,524,468	\$ 31,017,562	67%

5.2 New Sanitary Sewer Infrastructure (Capital Plan)

Tables 2 and 3 provide details of the capital expenditures that are planned for the City's sanitary sewer system over 10 years.³ The City's capital plan totals \$12.74 million in future dollars, of which \$6.23 million is anticipated to be acquired and \$6.50 million is anticipated to be contributed.

These assets are placed into service in the year of construction completion. Similar to existing assets, when capital assets (that are acquired) are placed into service they earn a rate of return to repay any debt obligations that have arisen during their creation, and for the assets eventual rehabilitation and replacement.

² Land values (if any) are shown for information only. Land is not a depreciable asset.

³ The first 10 years of the capital plan are included, consistent with the 10-year outlook of this study.

Table 2: Capital Plan & Financing ⁴

Description	Inflation		3.00%	Allocation of Cost		System Acquired Financing		Contributed Assets		
	Current Cost	Year	Future Cost	System Acquired	Contributed	Debtenture	Reserves	Grants	Developer	Other
Pioneer Trunk Sewer Extension (McLeod to CNR)	\$ 1,800,000	2027	\$ 2,086,693	\$ -	\$ 2,086,693	\$ -	\$ -	\$ -	\$ 2,086,693	\$ -
Pioneer Trunk Extension -875m of 750mm north Hwy 16A to south of Hwy 16A	\$ 3,808,800	2027	\$ 4,415,443	\$ -	\$ 4,415,443	\$ -	\$ -	\$ -	\$ 4,415,443	\$ -
			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Support to City Center ARP - McLeod Avenue and Main Street	\$ 588,570	2022	\$ 588,570	\$ 588,570	\$ -	\$ -	\$ 588,570	\$ -	\$ -	\$ -
Support to City Center ARP - McLeod Avenue and Main Street	\$ 137,739	2023	\$ 141,871	\$ 141,871	\$ -	\$ -	\$ 141,871	\$ -	\$ -	\$ -
Support to City Center ARP - King Street	\$ 1,351,000	2025	\$ 1,476,274	\$ 1,476,274	\$ -	\$ 41,000	\$ 1,435,274	\$ -	\$ -	\$ -
			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Sanitary Sewer Rehabilitation - Grove Meadows Neighbourhood- Phase 2	\$ 375,000	2027	\$ 434,728	\$ 434,728	\$ -	\$ -	\$ 434,728	\$ -	\$ -	\$ -
			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Sanitary Sewer Rehabilitation - Windermere Drive	\$ 324,000	2025	\$ 354,044	\$ 354,044	\$ -	\$ 354,044	\$ -	\$ -	\$ -	\$ -
			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Sanitary Sewer Rehabilitation - Millgrove (Morel & Mathias areas) and Millgrove Dr.	\$ 375,000	2028	\$ 447,770	\$ 447,770	\$ -	\$ -	\$ 447,770	\$ -	\$ -	\$ -
Sanitary Sewer Rehabilitation - Millgrove (Morel & Mathias areas) and Millgrove Dr.	\$ 400,000	2029	\$ 491,950	\$ 491,950	\$ -	\$ -	\$ 491,950	\$ -	\$ -	\$ -
Sanitary Sewer Rehabilitation - Millgrove (Morel & Mathias areas) and Millgrove Dr.	\$ 400,000	2030	\$ 506,708	\$ 506,708	\$ -	\$ -	\$ 506,708	\$ -	\$ -	\$ -
Sanitary Sewer Rehabilitation - Millgrove (Morel & Mathias areas) and Millgrove Dr.	\$ 400,000	2031	\$ 521,909	\$ 521,909	\$ -	\$ -	\$ 521,909	\$ -	\$ -	\$ -
Sanitary Sewer Rehabilitation - Millgrove (Morel & Mathias areas) and Millgrove Dr.	\$ 400,000	2032	\$ 537,567	\$ 537,567	\$ -	\$ -	\$ 537,567	\$ -	\$ -	\$ -
			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Hydro Vac Drying Pad Facility (Water 20%/Sewer 15%/Drainage 65%)	\$ 56,250	2022	\$ 56,250	\$ 56,250	\$ -	\$ -	\$ 56,250	\$ -	\$ -	\$ -
			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Vehicle Lifecycle Replacement Plan - 2012 Ford 1 ton chassis with attached body- Water 50%/Sewer 50%)	\$ 39,665	2022	\$ 39,665	\$ 39,665	\$ -	\$ -	\$ 39,665	\$ -	\$ -	\$ -
Vehicle Lifecycle Replacement Plan - 2015 Ford 3/4 Ton 4x4 with tool boxes (Water 50%/Sewer 50%)	\$ 21,000	2025	\$ 22,947	\$ 22,947	\$ -	\$ -	\$ 22,947	\$ -	\$ -	\$ -
Vehicle Lifecycle Replacement Plan - 2016 Ford 3/4 Ton 4x4 with tool boxes (Water 50%/Sewer 50%)	\$ 21,750	2026	\$ 24,480	\$ 24,480	\$ -	\$ -	\$ 24,480	\$ -	\$ -	\$ -
Vehicle Lifecycle Replacement Plan - F150 with Tool Box (Water 50%/Sewer 50%)	\$ 19,500	2027	\$ 22,606	\$ 22,606	\$ -	\$ -	\$ 22,606	\$ -	\$ -	\$ -
Vehicle Lifecycle Replacement Plan - 1 Ton Truck with Hydraulic Dump Box (Water 50%/Sewer 50%)	\$ 30,500	2027	\$ 35,358	\$ 35,358	\$ -	\$ -	\$ 35,358	\$ -	\$ -	\$ -
Vehicle Lifecycle Replacement Plan - 2015 F350 (Water 50%/Sewer 50%)	\$ 31,750	2025	\$ 34,694	\$ 34,694	\$ -	\$ -	\$ 34,694	\$ -	\$ -	\$ -
Vehicle Lifecycle Replacement Plan - 2020 Ford F150 (Water 50%/Sewer 50%)	\$ 21,250	2030	\$ 26,919	\$ 26,919	\$ -	\$ -	\$ 26,919	\$ -	\$ -	\$ -
Vehicle Lifecycle Replacement Plan - 2020 F450 4x2 Chassis CA (Water 50%/Sewer 50%)	\$ 31,500	2030	\$ 39,903	\$ 39,903	\$ -	\$ -	\$ 39,903	\$ -	\$ -	\$ -
			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Equipment Lifecycle Replacement Plan - 2014 5T Tandem Flusher (Water 10%/Sewer 60%/Drainage 30%)	\$ 363,000	2024	\$ 385,107	\$ 385,107	\$ -	\$ -	\$ 385,107	\$ -	\$ -	\$ -
Equipment Lifecycle Replacement Plan - Unit357Caterpillar450F Backhoe (Water 20%/Sewer 20%/Drainage 60%)	\$ 47,200	2024	\$ 50,074	\$ 50,074	\$ -	\$ -	\$ 50,074	\$ -	\$ -	\$ -
	\$ 11,043,473		\$ 12,741,530	\$ 6,239,394	\$ 6,502,136	\$ 395,044	\$ 5,844,350	\$ -	\$ 6,502,136	\$ -

⁴ The analysis undertaken herein indicates that the sanitary sewer utility reserve will not be sufficient to fund capital projects to the extent identified in the City's current capital plan. As such, debtenture funding has been used to finance additional projects. Note: the City is not bound to the financing plan shown here...its purpose is solely to determine rates. The City may change or move financing methods as desired to reflect changing circumstances. If/when financing methods change, they will be reflected in future rate updates.

Table 3: Summary of Capital Plan by Asset Class ⁵

Year	75 Year Assets	50 Year Assets	45 Year Assets	40 Year Assets	30 Year Assets	20 Year Assets	10 Year Assets	Land	Grand Total
2023	\$ -	\$ 141,871	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,871
2024	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 435,181	\$ 435,181
2025	\$ -	\$ 1,830,318	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,641	\$ 1,887,959
2026	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 24,480	\$ 24,480
2027	\$ -	\$ 6,936,864	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,964	\$ 6,994,828
2028	\$ -	\$ 447,770	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 447,770
2029	\$ -	\$ 491,950	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 491,950
2030	\$ -	\$ 506,708	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 66,822	\$ 573,530
2031	\$ -	\$ 521,909	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 521,909
2032	\$ -	\$ 537,567	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 537,567
Total	\$ -	\$ 11,414,957	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 642,088	\$ 12,057,045
System Acquired Assets	\$ -	\$ 4,912,821	\$ -	\$ -	\$ -	\$ 642,088	\$ -	\$ -	\$ 5,554,909
Contributed Assets	\$ -	\$ 6,502,136	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 6,502,136
Total	\$ -	\$ 11,414,957	\$ -	\$ -	\$ -	\$ 642,088	\$ -	\$ -	\$ 12,057,045

⁵ The capital plan shown in *Table 3* totals \$12.06 million, which is less than the total reflected in *Table 2*. This is because *Table 2* includes 2022 capital items that are not included in the City's TCA balance.

5.3 Existing and Future Debt Payments

Revenue requirements (and rates) must provide for payments on existing and future debts as summarized in *Table 4*.

Table 4: Existing and Future Debts ⁶

Year	Existing Debt			Future Debt			Total Debt		
	Principal	Interest	Total	Principal	Interest	Total	Principal	Interest	Total
2023	\$ 187,588	\$ 22,808	\$ 210,396	\$ -	\$ -	\$ -	\$ 187,588	\$ 22,808	\$ 210,396
2024	\$ 193,047	\$ 17,349	\$ 210,396	\$ -	\$ -	\$ -	\$ 193,047	\$ 17,349	\$ 210,396
2025	\$ 198,665	\$ 11,731	\$ 210,396	\$ -	\$ -	\$ -	\$ 198,665	\$ 11,731	\$ 210,396
2026	\$ 204,446	\$ 5,950	\$ 210,396	\$ 7,576	\$ 16,869	\$ 24,445	\$ 212,022	\$ 22,819	\$ 234,841
2027	\$ 0	\$ (0)	\$ -	\$ 7,943	\$ 16,502	\$ 24,445	\$ 7,943	\$ 16,502	\$ 24,445
2028	\$ 0	\$ (0)	\$ -	\$ 8,328	\$ 16,117	\$ 24,445	\$ 8,328	\$ 16,117	\$ 24,445
2029	\$ 0	\$ (0)	\$ -	\$ 8,731	\$ 15,713	\$ 24,445	\$ 8,731	\$ 15,713	\$ 24,445
2030	\$ 0	\$ (0)	\$ 0	\$ 9,155	\$ 15,713	\$ 24,868	\$ 9,155	\$ 15,713	\$ 24,868
2031	\$ 0	\$ (0)	\$ -	\$ 9,599	\$ 14,846	\$ 24,445	\$ 9,599	\$ 14,846	\$ 24,445
2032	\$ 0	\$ (0)	\$ -	\$ 10,064	\$ 10,064	\$ 20,128	\$ 10,064	\$ 10,064	\$ 20,128
Total	\$ 783,747	\$ 57,837	\$ 841,583	\$ 61,395	\$ 105,824	\$ 167,219	\$ 845,141	\$ 163,661	\$ 1,008,802

5.4 Operating and Maintenance Costs

Table 5 summarizes the operating and maintenance budget for 2023 (i.e., Year 1 of the review period). Total non-utility revenues are forecast at \$33,726, total operating and maintenance expenditures are forecast at \$4.94 million, and net expenditures (expenditures less non-utility revenues) are forecast at \$4.91 million.

⁶ The analysis undertaken herein indicates that the sanitary sewer utility reserve will not be sufficient to fund capital projects to the extent identified in the City's current capital plan. As such, debenture funding has been used to finance additional projects and whose payments are reflected in Future Debt. Note: the City is not bound to the financing plan shown here...its purpose is solely to determine rates. The City may change or move financing methods as desired to reflect changing circumstances. If/when financing methods change, they will be reflected in future rate updates.

Table 5: Operating and Maintenance Revenues and Costs ^{7, 8}

Non Utility Billing Revenues and Recoveries	
4941 - Sale of other Sewer Services	\$ 33,726
	\$ 33,726
O&M Expenditures	
1102 - Full Time Salaries	\$ 208,484
1112 - Full Time Overtime	\$ 6,644
1122 - Shift Premiums	\$ 219
1192 - Full Time Benefits	\$ 52,121
1212 - Part Time Temporary/Casual	\$ 406
3212 - Contracted and General Serv	\$ 10,413
3212 - Contracted and General Serv	\$ 75,000
3212 - Contracted and General Serv	\$ 644
3212 - Contracted and General Serv	\$ 59,551
3212 - Contracted and General Serv	\$ 549
3212 - Contracted and General Serv	\$ 74,500
3522 - Purchase of Wastewater Ser	\$ 4,425,651
5102 - Insurance	\$ 3,500
5312 - Advertising	\$ 5,100
5432 - DO NOT USE - General Expe	\$ 2,000
8122 - Materials Supplies	\$ 11,566
8122 - Materials Supplies	\$ 3,000
8132 - Tools	\$ 266
8132 - Tools	\$ 853
8332 - R&M Equipment	\$ 609
Operator drainage	\$ -
Total Expenditures	\$ 4,941,075
Net Expenditures	\$ 4,907,349

⁷ Amortization and interest on debt are not included in the budget as they are summarized in other sections of the report.

⁸ A step increase of \$65,388 is added to the budget in 2024 for a drainage operator.

Table 6 summarizes the projected net operating expenditures that must be recovered from sanitary sewer utility rates over the review period. Projected expenditures over the rate planning period are based on 2023 baseline costs (adjusted for step increases/decreases, if any) plus inflation of 3.0% inflation per year. Net expenditures are forecast to increase from \$4.91 million in 2023 to \$6.49 million in 2032.

Table 6: Forecast Net Operating and Maintenance Costs

Year	Miscellaneous Recoveries	Expenditures	Net Expenditures
2023	\$ 33,726	\$ 4,941,075	\$ 4,907,349
2024	\$ 34,738	\$ 5,154,695	\$ 5,119,958
2025	\$ 35,780	\$ 5,309,336	\$ 5,273,556
2026	\$ 36,853	\$ 5,468,616	\$ 5,431,763
2027	\$ 37,959	\$ 5,632,675	\$ 5,594,716
2028	\$ 39,098	\$ 5,801,655	\$ 5,762,558
2029	\$ 40,271	\$ 5,975,705	\$ 5,935,434
2030	\$ 41,479	\$ 6,154,976	\$ 6,113,497
2031	\$ 42,723	\$ 6,339,625	\$ 6,296,902
2032	\$ 44,005	\$ 6,529,814	\$ 6,485,809

5.5 Depreciation Expense on Acquired Assets

Depreciation represents the value of assets consumed while in service to ratepayers. A depreciation expense establishes part of the provision used for the rehabilitation and replacement of assets. Under the *utility approach* a depreciation expense is calculated only on acquired assets (contributed assets have not been purchased and therefore no expense can emanate from these assets). The depreciation expense established within the sanitary sewer revenue requirement is calculated on a straight-line basis over the economic life of assets in each asset class (50-year assets, 30-year assets, etc). *Table 7* summarizes the depreciation expenses in each year of the rate-planning period.

Table 7: Depreciation Expense ⁹

Description	2023	2024	2025	2026	2027
75 Year Assets	\$ -	\$ -	\$ -	\$ -	\$ -
50 Year Assets	\$ 304,899	\$ 304,984	\$ 319,261	\$ 330,710	\$ 329,836
45 Year Assets	\$ -	\$ -	\$ -	\$ -	\$ -
40 Year Assets	\$ -	\$ -	\$ -	\$ -	\$ -
30 Year Assets	\$ -	\$ -	\$ -	\$ -	\$ -
20 Year Assets	\$ 3,367	\$ 3,367	\$ 3,367	\$ 3,367	\$ 3,367
10 Year Assets	\$ 34,540	\$ 53,578	\$ 77,772	\$ 69,746	\$ 60,166
Total Depreciation	\$ 342,806	\$ 361,929	\$ 400,400	\$ 403,823	\$ 393,369

Description	2028	2029	2030	2031	2032
75 Year Assets	\$ -	\$ -	\$ -	\$ -	\$ -
50 Year Assets	\$ 336,676	\$ 337,873	\$ 338,301	\$ 345,811	\$ 352,341
45 Year Assets	\$ -	\$ -	\$ -	\$ -	\$ -
40 Year Assets	\$ -	\$ -	\$ -	\$ -	\$ -
30 Year Assets	\$ -	\$ -	\$ -	\$ -	\$ -
20 Year Assets	\$ 3,367	\$ 3,090	\$ 2,813	\$ 2,813	\$ 2,813
10 Year Assets	\$ 61,493	\$ 61,493	\$ 64,834	\$ 68,175	\$ 66,192
Total Depreciation	\$ 401,536	\$ 402,456	\$ 405,948	\$ 416,799	\$ 421,346

5.6 Return on Assets in Service

Under the *utility approach*, revenue requirements include returns on sanitary sewer assets that are employed in the provision of service. Determination of returns are based on the capital structure of the utility and are used to meet any borrowing obligations that are incurred in the creation of assets and to rehabilitate and replace the assets when they reach the end of their economic life.

A deemed capital structure of 40% debt and 60% equity is used to calculate returns. The deemed capital structure helps to generate a smooth revenue requirement during periods of abnormally low or high capital construction. Private utilities often utilize a deemed structure comprised of 60% debt; however, the deemed structure used here includes a 40% debt assumption, in alignment with the increased debt constraints placed on municipalities.

There are 4 types of assets in service which earn a rate of return:

1. **Acquired assets that are debt supported:** Acquired assets that are debt supported earn a rate of return that meets average debt interest obligations each

⁹ Depreciation is calculated starting in the year of construction/completion, with the half year rule applied in the first year.

year. For example, in year 1 of the review period the return of 3.83% is based on the average interest of all outstanding debentures.

2. **Acquired assets that are equity supported:** Acquired assets that are equity supported earn a rate of return of 8.50% (the Alberta Utility Commission's ("AUC") Generic Rate of Return) which approximates the cost of equity capital for sanitary sewer utilities as determined by the AUC.
3. **Working capital:** Determination of average working capital requirements is based on 1½ months of operations and maintenance costs (the "one-eighth" rule). Return on working capital is 8.50% (the AUC Generic Rate of Return).
4. **Contributed assets:** Contributed assets do not earn a rate of return.

To illustrate, *Table 8* summarizes returns for each asset in service in year 1 of the rate planning period. The average return on all assets in service is 2.10%. Forecast returns for each year of the rate planning period are summarized in *Appendix B*.

Table 8: Forecast Returns for Year 1

2023							
Description	Actual Capital In Service	% Actual Capital Structure	% Actual System Acquired Asset Structure	Deemed % System Acquired Asset Structure	Deemed Rate Base	Rate of Return	Return on Deemed Rate Base
System Acquired Assets							
Debt Portion	\$ 596,158	1.97%	6.63%	40.00%	\$ 3,596,931	3.83%	\$ 137,610
Equity Portion	\$ 8,396,169	27.79%	93.37%	60.00%	\$ 5,395,396	8.50%	\$ 458,609
Total System Acquired	\$ 8,992,327	29.76%	100.00%	100.00%	\$ 8,992,327		\$ 596,219
Contributed Assets	\$ 21,221,207	70.24%			\$ 21,221,207	0.00%	\$ -
Total Assets	\$ 30,213,534	100.00%			\$ 30,213,534		\$ 596,219
Working Capital	\$ 4,907,349				\$ 613,419	8.50%	\$ 52,141
						Total Return	\$ 648,360
							2.10%

5.7 Revenue Requirements

Table 9 summarizes the forecast revenue requirements under the *utility approach*. These revenue requirements are based on each of the elements described previously in this section. Sanitary sewer revenue requirements are forecast to increase from \$5.90 million in 2023 to \$7.74 million in 2032.

Table 9: Sanitary Sewer Revenue Requirements ¹⁰

Description	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
O&M costs (Net)	4,907,349	5,119,958	5,273,556	5,431,763	5,594,716	5,762,558	5,935,434	6,113,497	6,296,902	6,485,809
Depreciation	342,806	361,929	400,400	403,823	393,369	401,536	402,456	405,948	416,799	421,346
Return										
System Assets - Debt	137,610	156,062	88,666	268,021	200,310	201,474	203,512	207,117	209,545	212,242
System Assets - Equity	458,609	462,345	538,210	518,864	523,929	526,287	530,851	539,398	544,758	550,686
Contributed Assets	-	-	-	-	-	-	-	-	-	-
Working Capital	52,141	54,400	56,032	57,712	59,444	61,227	63,064	64,956	66,905	68,912
Principal Shortfall	-	-	-	-	-	-	-	-	-	-
Total	5,898,515	6,154,693	6,356,864	6,680,183	6,771,768	6,953,081	7,135,317	7,330,916	7,534,909	7,738,994

¹⁰ A principal shortfall is the difference between depreciation and principal debt payment in a given year. If the number is negative, there is a shortfall, and this amount is added to the revenue requirement in that year.

5.8 Comparison of Revenue Requirement: Utility (Full Cost) Approach Versus Cash Needs Approach

As described in *Section 4*, the *utility approach* provides revenue targets for rates that ensure the utility is self-sustaining. Full cost rates not only ensure current costs are covered, but they allow the utility to generate reserves that will be necessary to rehabilitate and replace assets in the future.

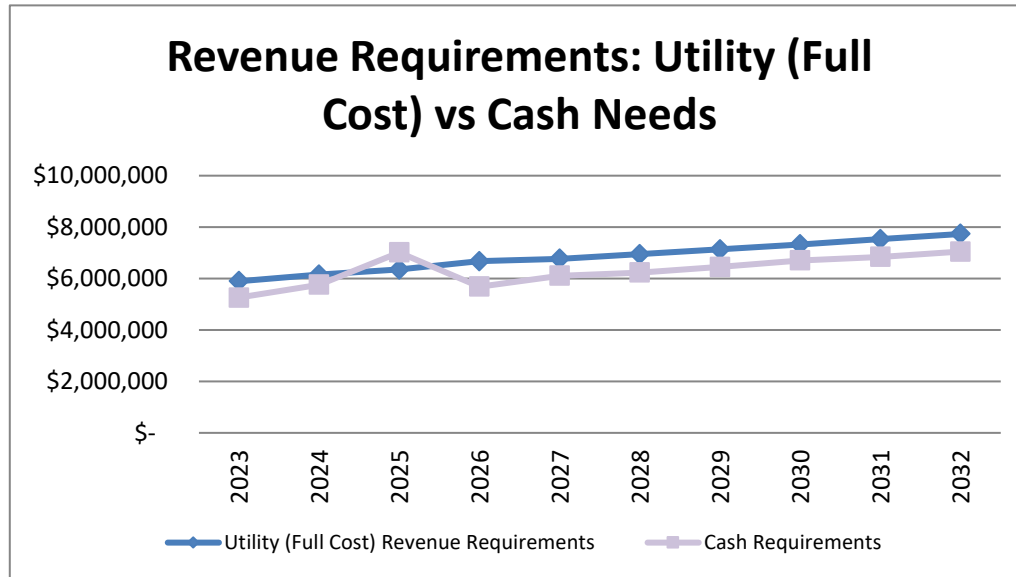
A *cash approach*, on the other hand, only describes the minimum amount of cash the utility must generate to satisfy current costs. Rates which generate revenue less than this minimum will create a utility loss which must be subsidized via other sources such as taxes.

Based on all revenue requirements described in this section, *Table 10* and the accompanying graph compare the City's revenue requirements under both the *utility approach* (i.e., the ideal/maximum) and the *cash approach*.¹¹

Table 10: Comparison of Full Cost and Cash Revenue Requirements

Year	Revenue Requirement - Utility (Full Cost)					Revenue Requirement - Cash				
	Operating & Maintenance Expenses	Depreciation	Return on Assets	Principal Short Fall	Total Revenue Requirement	Operating & Maintenance Expenses	Debt Charges	Revenue Requirement Before Capital Drawn From Reserve	Capital Drawn From Reserves	Total Revenue Requirement
2023	\$ 4,907,349	\$ 342,806	\$ 648,360	\$ -	\$ 5,898,515	\$ 4,907,349	\$ 210,396	\$ 5,117,745	\$ 141,871	\$ 5,259,616
2024	\$ 5,119,958	\$ 361,929	\$ 672,806	\$ -	\$ 6,154,693	\$ 5,119,958	\$ 210,396	\$ 5,330,354	\$ 435,181	\$ 5,765,535
2025	\$ 5,273,556	\$ 400,400	\$ 682,907	\$ -	\$ 6,356,864	\$ 5,273,556	\$ 210,396	\$ 5,483,952	\$ 1,533,915	\$ 7,017,867
2026	\$ 5,431,763	\$ 403,823	\$ 844,597	\$ -	\$ 6,680,183	\$ 5,431,763	\$ 234,841	\$ 5,666,604	\$ 24,480	\$ 5,691,084
2027	\$ 5,594,716	\$ 393,369	\$ 783,683	\$ -	\$ 6,771,768	\$ 5,594,716	\$ 24,445	\$ 5,619,161	\$ 492,692	\$ 6,111,853
2028	\$ 5,762,558	\$ 401,536	\$ 788,988	\$ -	\$ 6,953,081	\$ 5,762,558	\$ 24,445	\$ 5,787,002	\$ 447,770	\$ 6,234,772
2029	\$ 5,935,434	\$ 402,456	\$ 797,427	\$ -	\$ 7,135,317	\$ 5,935,434	\$ 24,445	\$ 5,959,879	\$ 491,950	\$ 6,451,829
2030	\$ 6,113,497	\$ 405,948	\$ 811,471	\$ -	\$ 7,330,916	\$ 6,113,497	\$ 24,445	\$ 6,137,942	\$ 573,530	\$ 6,711,472
2031	\$ 6,296,902	\$ 416,799	\$ 821,208	\$ -	\$ 7,534,909	\$ 6,296,902	\$ 24,445	\$ 6,321,347	\$ 521,909	\$ 6,843,256
2032	\$ 6,485,809	\$ 421,346	\$ 831,839	\$ -	\$ 7,738,994	\$ 6,485,809	\$ 24,445	\$ 6,510,254	\$ 537,567	\$ 7,047,821

¹¹ There may be years when significant capital costs result in cash requirements exceeding utility (full cost) requirements.



5.9 Customers/Sanitary Sewer Demand

The City currently has approximately 12,960 sanitary sewer customers, the vast majority (98%) of which have a 5/8" water meter, as summarized in *Table 11*. Customers currently utilize approximately 2,840,500 m³ of water. The City estimates that sanitary sewer customers/demand will increase an average of approximately 2.29% per year over the review period.

Table 11: Sanitary Sewer Customers

	5/8" (15mm)	3/4" (19mm)	3/4" (20mm)	1" (25mm)	1.5" (37mm)	1.5" (38mm)	2" (50mm)	3" (75mm)	4" (100mm)	6" (150mm)	Total
Jan	12,777	166	-	64	-	35	40	13	3	1	13,099
Feb	12,784	166	-	64	-	35	40	13	3	1	13,106
Mar	12,807	166	-	64	-	35	40	13	3	1	13,129
Apr	12,488	165	-	64	-	35	39	13	3	1	12,808
May	12,522	165	-	63	-	35	39	13	3	1	12,841
Jun	12,511	165	-	64	-	35	39	13	3	1	12,831
Jul	12,552	165	-	64	-	35	39	13	3	1	12,872
Aug	12,564	165	-	64	-	35	39	13	3	1	12,884
Sep	12,616	166	-	64	-	35	39	13	3	1	12,937
Oct	12,666	166	-	64	-	35	39	13	3	1	12,987
Nov	12,671	166	-	64	-	35	39	13	3	1	12,992
Dec	12,708	163	-	64	-	35	40	13	3	1	13,027
Average	12,639	165	-	64	-	35	39	13	3	1	12,959
%	97.53%	1.28%	0.00%	0.49%	0.00%	0.27%	0.30%	0.10%	0.02%	0.01%	100.00%

6 Recommended Rates & Forecast Recoveries

6.1 Recommended Sanitary Sewer Rates

The City's current charge is \$2.02 per cubic meter for sanitary sewer services.¹² This rate is sufficient to achieve full costs. Accordingly, it is recommended the City's sanitary sewer charge remain constant at \$2.02 until 2025, and then gradually increase to \$2.12 per cubic meter in 2032, as summarized in *Table 12*.

Table 12 Recommended Sanitary Sewer Rates

Year	Sanitary Sewer Charge Per m3
2023	\$ 2.02
2024	\$ 2.02
2025	\$ 2.02
2026	\$ 2.07
2027	\$ 2.06
2028	\$ 2.06
2029	\$ 2.07
2030	\$ 2.09
2031	\$ 2.10
2032	\$ 2.12

The impact of the recommended rate strategy on customers is summarized in *Appendix A*.

6.2 Forecast Sanitary Sewer Recoveries

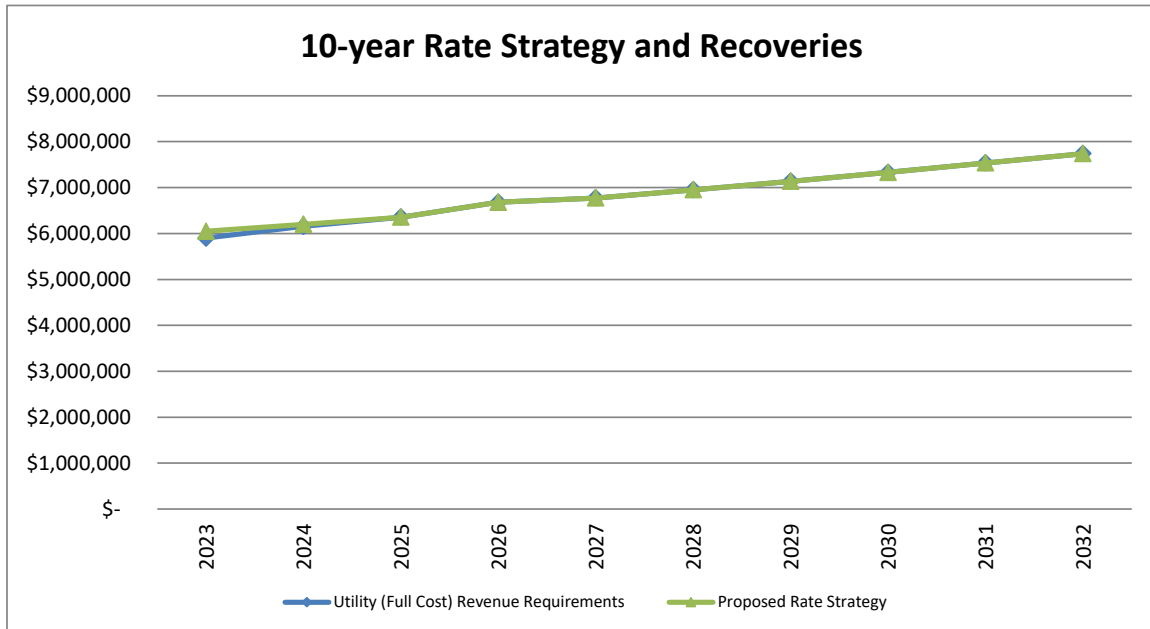
The sanitary sewer rates recommended and summarized in the previous section will ensure the City achieves full cost revenue requirements immediately thereby ensuring the sustainability of the sanitary sewer utility and reducing the risk of future tax subsidization.

The forecast revenue generated from the recommended rate structure is summarized in *Table 13* and the accompanying graph ('green' line).

¹² The City's current charge is approximately \$6.33 per cubic meter for both water and sewer services. Of this charge, the City estimates that \$2.02 is dedicated to the sanitary sewer utility.

Table 13: Forecast Sanitary Sewer Recoveries

Year	Utility (Full Cost) Revenue Requirement	Actual Revenue Under the Proposed Rate Strategy
2023	\$ 5,898,515	\$ 6,047,358
2024	\$ 6,154,693	\$ 6,201,077
2025	\$ 6,356,864	\$ 6,354,656
2026	\$ 6,680,183	\$ 6,680,183
2027	\$ 6,771,768	\$ 6,771,768
2028	\$ 6,953,081	\$ 6,953,081
2029	\$ 7,135,317	\$ 7,135,317
2030	\$ 7,330,916	\$ 7,330,916
2031	\$ 7,534,909	\$ 7,534,909
2032	\$ 7,738,994	\$ 7,738,994
Total	\$ 68,555,240	\$ 68,748,260



The impact of the recommended rate strategy on the forecast sanitary sewer reserve balance over the 10-year planning period is shown in *Table 14*. In addition to financing several capital projects over the review period, the sanitary sewer reserve is forecast to amass approximately \$5.03 million by 2032.

Table 14: Forecast Sanitary Sewer Reserve

Year	Reserve Receipts	Reserve Applied	Reserve Balance
2023	929,613	141,871	187,289
2024	870,723	435,181	622,831
2025	870,703	1,492,915	619
2026	1,003,496	24,480	979,635
2027	1,149,777	492,692	1,636,720
2028	1,163,248	447,770	2,352,198
2029	1,172,608	491,950	3,032,856
2030	1,190,144	573,530	3,649,469
2031	1,210,731	521,909	4,338,291
2032	1,225,910	537,567	5,026,634

7 Acknowledgements

CORVUS Business Advisors would like to thank all the City of Spruce Grove staff from Engineering, Planning, and Finance who supported the work of this review.

8 Disclaimer

CORVUS Business Advisor has relied upon City of Spruce Grove to provide all the data and information used to construct the utility rate model and create the rates, such as TCA's, capital plans and costs estimates, debenture details, and operating budgets etc. As such, CORVUS Business Advisors makes no guarantee as to the accuracy of the input data and information provided by these groups or the results that stem from this data and information.

Appendix A – Customer Impacts

Average Residential Consumption		
Consumption Level m3	20	20
Service Type - 15mm/5/8"	Existing	2023
Consumption Charge	\$ 2.02	\$ 2.02
Total Monthly Billing	\$ 40.40	\$ 40.40
Change from Existing Billing	\$ -	\$ -
Low Residential Consumption (e.g., Senior Citizen)		
Consumption Level m3	10	10
Service Type - 15mm/5/8"	Existing	2023
Consumption Charge	\$ 2.02	\$ 2.02
Total Monthly Billing	\$ 20.20	\$ 20.20
Change from Existing Billing	\$ -	\$ -
High Residential / Small Business Consumption		
Consumption Level m3	35	35
Service Type - 15mm/5/8"	Existing	2023
Consumption Charge	\$ 2.02	\$ 2.02
Total Monthly Billing	\$ 70.70	\$ 70.70
Change from Existing Billing	\$ -	\$ -

Small Business (1 1/2" Service)		
Consumption Level m3	50	50
Service Type - 38mm/1 1/2"	Existing	2023
Consumption Charge	\$ 2.02	\$ 2.02
Total Monthly Billing	\$ 101.00	\$ 101.00
Change from Existing Billing	\$ -	\$ -
Medium Business (2" Service)		
Consumption Level m3	200	200
Service Type - 50mm/2"	Existing	2023
Consumption Charge	\$ 2.02	\$ 2.02
Total Monthly Billing	\$ 404.00	\$ 404.00
Change from Existing Billing	\$ -	\$ -
Large Business (4" Service)		
Consumption Level m3	2500	2500
Service Type - 100mm/4"	Existing	2023
Consumption Charge	\$ 2.02	\$ 2.02
Total Monthly Billing	\$ 5,050.00	\$ 5,050.00
Change from Existing Billing	\$ -	\$ -

Appendix B – Return on Assets

2023							
Description	Actual Capital In Service	% Actual Capital Structure	% Actual System Acquired Asset Structure	Deemed % System Acquired Asset Structure	Deemed Rate Base	Rate of Return	Return on Deemed Rate Base
System Acquired Assets							
Debt Portion	\$ 596,158	1.97%	6.63%	40.00%	\$ 3,596,931	3.83%	\$ 137,610
Equity Portion	\$ 8,396,169	27.79%	93.37%	60.00%	\$ 5,395,396	8.50%	\$ 458,609
Total System Acquired	\$ 8,992,327	29.76%	100.00%	100.00%	\$ 8,992,327		\$ 596,219
Contributed Assets	\$ 21,221,207	70.24%			\$ 21,221,207	0.00%	\$ -
Total Assets	\$ 30,213,534	100.00%			\$ 30,213,534		\$ 596,219
Working Capital	\$ 4,907,349				\$ 613,419	8.50%	\$ 52,141
						Total Return	\$ 648,360
							2.10%
2024							
Description	Actual Capital In Service	% Actual Capital Structure	% Actual System Acquired Asset Structure	Deemed % System Acquired Asset Structure	Deemed Rate Base	Rate of Return	Return on Deemed Rate Base
System Acquired Assets							
Debt Portion	\$ 403,111	1.36%	4.45%	40.00%	\$ 3,626,232	4.30%	\$ 156,062
Equity Portion	\$ 8,662,468	29.18%	95.55%	60.00%	\$ 5,439,348	8.50%	\$ 462,345
Total System Acquired	\$ 9,065,580	30.54%	100.00%	100.00%	\$ 9,065,580		\$ 618,407
Contributed Assets	\$ 20,619,178	69.46%			\$ 20,619,178	0.00%	\$ -
Total Assets	\$ 29,684,758	100.00%			\$ 29,684,758		\$ 618,407
Working Capital	\$ 5,119,958				\$ 639,995	8.50%	\$ 54,400
						Total Return	\$ 672,806
							2.22%
2025							
Description	Actual Capital In Service	% Actual Capital Structure	% Actual System Acquired Asset Structure	Deemed % System Acquired Asset Structure	Deemed Rate Base	Rate of Return	Return on Deemed Rate Base
System Acquired Assets							
Debt Portion	\$ 558,490	1.83%	5.29%	40.00%	\$ 4,221,256	2.10%	\$ 88,666
Equity Portion	\$ 9,994,649	32.69%	94.71%	60.00%	\$ 6,331,883	8.50%	\$ 538,210
Total System Acquired	\$ 10,553,139	34.52%	100.00%	100.00%	\$ 10,553,139		\$ 626,876
Contributed Assets	\$ 20,020,367	65.48%			\$ 20,020,367	0.00%	\$ -
Total Assets	\$ 30,573,506	100.00%			\$ 30,573,506		\$ 626,876
Working Capital	\$ 5,273,556				\$ 659,195	8.50%	\$ 56,032
						Total Return	\$ 682,907
							2.19%

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2026							
Description	Actual Capital In Service	% Actual Capital Structure	% Actual System Acquired Asset Structure	Deemed % System Acquired Asset Structure	Deemed Rate Base	Rate of Return	Return on Deemed Rate Base
System Acquired Assets							
Debt Portion	\$ 346,468	1.17%	3.41%	40.00%	\$ 4,069,518	6.59%	\$ 268,021
Equity Portion	\$ 9,827,327	33.20%	96.59%	60.00%	\$ 6,104,277	8.50%	\$ 518,864
Total System Acquired	\$ 10,173,796	34.37%	100.00%	100.00%	\$ 10,173,796		\$ 786,884
Contributed Assets	\$ 19,427,031	65.63%			\$ 19,427,031	0.00%	\$ -
Total Assets	\$ 29,600,827	100.00%			\$ 29,600,827		\$ 786,884
Working Capital	\$ 5,431,763				\$ 678,970	8.50%	\$ 57,712
						Total Return	\$ 844,597
							2.79%
2027							
Description	Actual Capital In Service	% Actual Capital Structure	% Actual System Acquired Asset Structure	Deemed % System Acquired Asset Structure	Deemed Rate Base	Rate of Return	Return on Deemed Rate Base
System Acquired Assets							
Debt Portion	\$ 338,526	0.95%	3.30%	40.00%	\$ 4,109,248	4.87%	\$ 200,310
Equity Portion	\$ 9,934,593	27.95%	96.70%	60.00%	\$ 6,163,871	8.50%	\$ 523,929
Total System Acquired	\$ 10,273,119	28.90%	100.00%	100.00%	\$ 10,273,119		\$ 724,239
Contributed Assets	\$ 25,274,982	71.10%			\$ 25,274,982	0.00%	\$ -
Total Assets	\$ 35,548,101	100.00%			\$ 35,548,101		\$ 724,239
Working Capital	\$ 5,594,716				\$ 699,340	8.50%	\$ 59,444
						Total Return	\$ 783,683
							2.16%
2028							
Description	Actual Capital In Service	% Actual Capital Structure	% Actual System Acquired Asset Structure	Deemed % System Acquired Asset Structure	Deemed Rate Base	Rate of Return	Return on Deemed Rate Base
System Acquired Assets							
Debt Portion	\$ 330,198	0.95%	3.20%	40.00%	\$ 4,127,741	4.88%	\$ 201,474
Equity Portion	\$ 9,989,155	28.64%	96.80%	60.00%	\$ 6,191,612	8.50%	\$ 526,287
Total System Acquired	\$ 10,319,353	29.59%	100.00%	100.00%	\$ 10,319,353		\$ 727,761
Contributed Assets	\$ 24,557,362	70.41%			\$ 24,557,362	0.00%	\$ -
Total Assets	\$ 34,876,714	100.00%			\$ 34,876,714		\$ 727,761
Working Capital	\$ 5,762,558				\$ 720,320	8.50%	\$ 61,227
						Total Return	\$ 788,988
							2.22%

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2029							
Description	Actual Capital In Service	% Actual Capital Structure	% Actual System Acquired Asset Structure	Deemed % System Acquired Asset Structure	Deemed Rate Base	Rate of Return	Return on Deemed Rate Base
System Acquired Assets							
Debt Portion	\$ 321,466	0.94%	3.09%	40.00%	\$ 4,163,539	4.89%	\$ 203,512
Equity Portion	\$ 10,087,381	29.45%	96.91%	60.00%	\$ 6,245,308	8.50%	\$ 530,851
Total System Acquired	\$ 10,408,847	30.39%	100.00%	100.00%	\$ 10,408,847		\$ 734,363
Contributed Assets	\$ 23,846,292	69.61%			\$ 23,846,292	0.00%	\$ -
Total Assets	\$ 34,255,140	100.00%			\$ 34,255,140		\$ 734,363
Working Capital	\$ 5,935,434				\$ 741,929	8.50%	\$ 63,064
						Total Return	\$ 797,427
							2.28%
2030							
Description	Actual Capital In Service	% Actual Capital Structure	% Actual System Acquired Asset Structure	Deemed % System Acquired Asset Structure	Deemed Rate Base	Rate of Return	Return on Deemed Rate Base
System Acquired Assets							
Debt Portion	\$ 312,312	0.93%	2.95%	40.00%	\$ 4,230,572	4.90%	\$ 207,117
Equity Portion	\$ 10,264,117	30.44%	97.05%	60.00%	\$ 6,345,857	8.50%	\$ 539,398
Total System Acquired	\$ 10,576,429	31.37%	100.00%	100.00%	\$ 10,576,429		\$ 746,515
Contributed Assets	\$ 23,142,859	68.63%			\$ 23,142,859	0.00%	\$ -
Total Assets	\$ 33,719,288	100.00%			\$ 33,719,288		\$ 746,515
Working Capital	\$ 6,113,497				\$ 764,187	8.50%	\$ 64,956
						Total Return	\$ 811,471
							2.35%
2031							
Description	Actual Capital In Service	% Actual Capital Structure	% Actual System Acquired Asset Structure	Deemed % System Acquired Asset Structure	Deemed Rate Base	Rate of Return	Return on Deemed Rate Base
System Acquired Assets							
Debt Portion	\$ 302,713	0.91%	2.83%	40.00%	\$ 4,272,616	4.90%	\$ 209,545
Equity Portion	\$ 10,378,826	31.33%	97.17%	60.00%	\$ 6,408,923	8.50%	\$ 544,758
Total System Acquired	\$ 10,681,539	32.25%	100.00%	100.00%	\$ 10,681,539		\$ 754,303
Contributed Assets	\$ 22,441,645	67.75%			\$ 22,441,645	0.00%	\$ -
Total Assets	\$ 33,123,184	100.00%			\$ 33,123,184		\$ 754,303
Working Capital	\$ 6,296,902				\$ 787,113	8.50%	\$ 66,905
						Total Return	\$ 821,208
							2.42%

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2032							
Description	Actual Capital In Service	% Actual Capital Structure	% Actual System Acquired Asset Structure	Deemed % System Acquired Asset Structure	Deemed Rate Base	Rate of Return	Return on Deemed Rate Base
System Acquired Assets							
Debt Portion	\$ 292,649	0.90%	2.71%	40.00%	\$ 4,319,104	4.91%	\$ 212,242
Equity Portion	\$ 10,505,111	32.28%	97.29%	60.00%	\$ 6,478,656	8.50%	\$ 550,686
Total System Acquired	\$ 10,797,760	33.18%	100.00%	100.00%	\$ 10,797,760		\$ 762,928
Contributed Assets	\$ 21,743,677	66.82%			\$ 21,743,677	0.00%	\$ -
Total Assets	\$ 32,541,438	100.00%			\$ 32,541,438		\$ 762,928
Working Capital	\$ 6,485,809				\$ 810,726	8.50%	\$ 68,912
						Total Return	\$ 831,839
							2.49%