19-1070

Sewer Connection Fee Study

Prepared for the

City of La Crosse

by Trilogy Consulting, LLC

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TRILOGY
CONSULTING, LLC
MUNICIPAL & UTILITY ADVISORS

EXHIBIT D

INTRODUCTION

The City of La Crosse owns and operates a wastewater treatment plant, and a system of collector and interceptor sewers and lift stations. In addition to serving the City of La Crosse, the wastewater treatment plant and interceptor sewers convey and treat wastewater from the City of Onalaska, the Town of Campbell, Sanitary Districts No. 1 and No 2 in the Town of Campbell, the Shelby Sanitary District No. 2, and the City of La Crescent, MN.

The sewer utility system has capacity to serve additional customers and no outstanding debt. The cost of constructing the existing wastewater system was contributed by the City and by past and current customers.

The City retained Trilogy Consulting, LLC to analyze and evaluate methods for charging sewer connection fees to new customers that connect to the sewer system. The purpose of the connection fees is to recover the cost of the available capacity in the utility system that has been paid for by past and current customers.

SEWER CONNECTION FEES

Methodology

The basis for the proposed connection fees is the value of the excess capacity in the sanitary sewer facilities serving the entire system. These system-wide facilities include wastewater treatment facilities, interceptor sewers and interceptor lift stations. The intent of the fees is that properties or municipal wholesale customers obtaining new or additional sanitary sewer service will be required to buy into the system in an amount equal to the value of the system-wide reserve capacity required to convey and treat their wastewater. The amount of capacity required is determined based on estimated sewer usage, and equated to a per Residential Equivalent Connection (REC). A REC is defined as the estimated amount of wastewater discharged by one single-family home on a daily basis. For nonresidential uses, the number of RECs would be determined based on the estimated amount of wastewater discharge compared to an average single family household. For the wastewater utility, this study relied on data compiled and used in the calculation of sewer user charges by the Utility's sewer rate consultant, John Mayer & Associates.

Existing Wastewater System Assets

Wastewater system assets include the Isle La Plume Wastewater Treatment Plant (WWTP), 26 wastewater lift stations, interceptor sewers and collector sewers. The WWTP was originally constructed in 1936, with a major expansion in 1972 and numerous other upgrades, expansions and replacements of individual components since then. The facilities currently in service include

portions of the plant that were constructed in 1936, as well portions of the plant that were constructed in each of the decades since then.

The rated capacity of the WWTP, as well as the recent historical influent flows and loadings, are shown in Table 1. As shown, the average day and peak day flows generated by the current service area use only about half of the existing plant capacity. The existing plant is at approximately 56 to 84 percent of loadings capacity, depending on the specific type of loadings.

Table 1 - Wastewater Treatment Plant Capacity and Utilization

	Peak Day Flows (gpd)	Average Day Flows (gpd)	BOD (lbs. per day)	T.S.S. (lbs. per day)	Phosphorus (lbs. per day)	Ammonia (lbs. per day)
System Capacity (per day) [1]	44,000,000	20,000,000	29,793	33,400	977	3,500
Influent Flows and Loadings at WWTP [2]	20,454,288	10,102,244	24,916	25,436	551	1,966
Percentage of Capacity Utilized	46%	51%	84%	76%	56%	56%

1) Source: Facilities Plan Volume 1, p. 164. Ammonia capacity is from an earlier study.
2) Based on last 7 years average, except for peak day flows which represents the peak day influent for 2013-2015.

The original cost of wastewater utility assets in service as of December 31, 2014 was $40,979,075. These costs were adjusted to a current value of $150,430,362 in terms of 2014 dollars using the Engineering News Record (ENR) 20-city construction cost index, as shown in Table 2. For purposes of developing sewer connection fees, only those assets that are considered to be system-wide assets, benefitting both retail and wholesale customers, were included in the fees. Collector sewers, laterals, a portion of the sewer lift stations, equipment and facilities required for customer metering and billing and general plant were excluded. The current value of assets was allocated to each of the utility functions using the same allocation percentages used to establish sewer user charges. The share of asset values allocated to WWTP and interceptor functions totaled $89,925,448, as shown in Table 2.

Table 2 - Determination of Assets to Include in Sewer Connection Fees

Code	Description	Allocation Percents									Total Value	Collection System	Interceptor System	Treatment Plant					Customer		Include in Connection Fees
		Coll	Intr	Q	BOD	TSS	P	NH_3	Cst	Cnn				Flow	B.O.D.	T.S.S.	Phos.	NH_3-N	Billing	Meter/Conn	
		%	%	%	%	%	%	%	%	%	$	$	$	$	$	$	$	$	$	$	$
WASTEWATER TREATMENT FACILITY:																					
1	Preliminary Treatment	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.1	Prelim.- Raw Sewage Pumping	0	0	70	0	30	0	0	0	0	2,180,554	0	0	1,526,388	0	654,166	0	0	0	0	2,180,554
1.2	Prelim.- Bar Screening / Communition	0	0	70	0	30	0	0	0	0	2,542,635	0	0	1,779,845	0	762,791	0	0	0	0	2,542,635
1.3	Prelim.- Grit Removal	0	0	30	10	55	5	0	0	0	52,370	0	0	15,711	5,237	28,804	2,619	0	0	0	52,370
2	Primary Treatment	0	0	50	20	28	3	0	0	0	4,651,603	0	0	2,325,801	930,321	1,279,191	116,290	0	0	0	4,651,603
2.1	Primary Clarifier	0	0	20	45	10	5	20	0	0	2,543,772	0	0	508,754	1,144,697	254,377	127,189	508,754	0	0	2,543,772
3	Secondary Treatment	0	0	20	45	10	5	20	0	0	0	0	0	0	0	0	0	0	0	0	0
3.1	Secondary - Activated Sludge	0	0	0	0	0	100	0	0	0	2,406,792	0	0	0	0	0	2,406,792	0	0	0	2,406,792
3.6	Secondary - Phosphorus	0	0	0	0	0	0	100	0	0	3,081,394	0	0	0	0	0	0	3,081,394	0	0	3,081,394
3.7	Secondary - NH_3-N	0	0	20	32	44	4	0	0	0	26,878	0	0	5,376	8,601	11,826	1,075	0	0	0	26,878
3.8	Secondary - Return Sludge Pumping	0	0	20	32	44	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.9	Secondary - Final Clarifier	0	0	30	30	30	10	0	0	0	1,026,442	0	0	307,933	307,933	307,933	102,644	0	0	0	1,026,442
4	Advanced Treatment	0	0	0	40	55	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Biosolids Trmnt & Disposal	0	0	100	0	0	0	0	0	0	16,653,698	0	0	16,653,698	0	0	0	0	0	0	16,653,698
6	Disinfection	0	0	21	27	40	11	1	0	0	1,489,659	0	0	316,102	395,084	595,041	165,260	18,172	0	0	1,489,659
7	Plant Site Piping & Pumps	0	0	25	35	20	10	10	0	0	1,805,358	0	0	451,339	631,875	361,072	180,536	180,536	0	0	1,805,358
8	Laboratory & Monitoring	0	0	100	0	0	0	0	0	0	41,137	0	0	41,137	0	0	0	0	0	0	41,137
8.1	Flow Monitoring Eqmt.	0	0	21	27	40	11	1	0	0	173,634	0	0	36,845	46,051	69,358	19,263	2,118	0	0	173,634
8.2	Safety Equipment	0	0	45	29	12	3	11	0	0	15,709	0	0	7,023	4,596	1,817	531	1,742	0	0	15,709
9	Electrical	0	0	0	45	29	12	3	11	0	3,705,974	0	0	0	1,656,749	1,084,236	428,598	125,367	411,024	0	3,294,950
10	WWTP Non-Specific	0	0	23	27	38	10	2	0	0	4,604,238	0	0	1,075,008	1,226,991	1,729,139	481,108	91,991	0	0	4,604,238
	Total WWTP	0	0	53	14	15	9	9	1	0	47,001,846	0	0	25,050,959	6,358,135	7,139,749	4,031,904	4,010,075	411,024	0	46,590,823
CONVEYANCE SYSTEM:																					
15	Interceptor Mains	0	100	0	0	0	0	0	0	0	33,265,542	0	33,265,542	0	0	0	0	0	0	0	33,265,542
16	Interceptor Lift Stations	0	100	0	0	0	0	0	0	0	4,956,286	0	4,956,286	0	0	0	0	0	0	0	4,956,286
17	Force Mains	0	100	0	0	0	0	0	0	0	23,499	0	23,499	0	0	0	0	0	0	0	23,499
20	Collection Mains / Other Eqmt.	60	0	0	0	0	0	0	15	25	56,096,997	33,658,198	0	0	0	0	0	0	8,414,550	14,024,249	0
21	Collection Lift Stations (All)	30	70	0	0	0	0	0	0	0	3,758,397	1,127,519	2,630,878	0	0	0	0	0	0	0	2,630,878
25	Service Connections / Laterals	0	0	0	0	0	0	0	0	100	123,165	0	0	0	0	0	0	0	0	123,165	0
26	Other Conveyance System	35	42	0	0	0	0	0	9	14	3,731,168	1,320,426	1,554,058	0	0	0	0	0	319,522	537,162	1,554,058
	Total Conveyance System	35	42	0	0	0	0	0	9	14	101,955,054	36,106,143	42,430,263	0	0	0	0	0	8,734,072	14,684,576	42,430,263
GENERAL PLANT:																					
28.1	Land & Land Rights	23	28	8	9	13	4	1	6	10	0	0	0	0	0	0	0	0	0	0	0
28.2	Struct. & Improv.	23	28	8	9	13	4	1	6	10	0	0	0	0	0	0	0	0	0	0	0
28.3	Office Furn. & Eqmt.	23	28	8	9	13	4	1	6	10	0	0	0	0	0	0	0	0	0	0	0
28.4	Office Furn. & Eqmt.- EDP	23	28	8	9	13	4	1	6	10	61,320	14,364	16,906	4,840	5,524	7,785	2,166	414	3,476	5,844	37,636
28.5	Transport. Eqmt.	23	28	8	9	13	4	1	6	10	988,692	231,603	272,582	78,040	89,073	125,527	34,926	6,678	56,044	94,218	606,826
28.6	Communications Eqmt.	23	28	8	9	13	4	1	6	10	68,645	16,080	18,925	5,418	6,184	8,715	2,425	464	3,891	6,542	42,132
28.7	Tools, Shop & Misc.	23	28	8	9	13	4	1	6	10	116,162	27,211	32,026	9,169	10,465	14,748	4,103	785	6,585	11,070	71,296
28.8	Safety Eqmt.	23	28	8	9	13	4	1	6	10	0	0	0	0	0	0	0	0	0	0	0
28.9	Other Genrl. Eqmt.	23	28	8	9	13	4	1	6	10	238,643	55,903	65,794	18,837	21,500	30,299	8,430	1,612	13,528	22,742	146,471
	Total General Plant	23	28	8	9	13	4	1	6	10	1,473,462	345,162	406,233	116,304	132,747	187,074	52,051	9,952	83,524	140,415	904,362
TOTAL											150,430,362	36,451,305	42,836,497	25,167,263	6,490,882	7,326,823	4,083,955	4,020,027	9,228,619	14,824,991	89,925,448

Residential Equivalent Connections

Based on recent historical data, a typical residential customer in the City of La Crosse ("La Crosse REC") discharges wastewater with the amounts and characteristics described in Table 3.

Table 3 - Capacity Requirements per Residential Equivalent Connection

Component:	Basis:	Factor:	Total Daily Discharge
Average Day Flows	Average daily billable flows per residential retail customer, 2013: (1)		162 gpd
Peak Day Flows	Averge daily flows x ratio of peak day to average day influent flows: (2)	2.02	329 gpd
BOD	Ave Daily Flows x Estimated domestic strength (mg/l) (3)	278	0.377 pounds per day
TSS	Ave Daily Flows x Estimated domestic strength (mg/l) (3)	303	0.411 pounds per day
Phosphorus	Ave Daily Flows x Estimated domestic strength (mg/l) (3)	8	0.011 pounds per day
Ammonia	Ave Daily Flows x Estimated domestic strength (mg/l) (3)	29	0.039 pounds per day

Notes:
1) Average day capacity is based on average flows per customer for retail residential customers for 2013. Source: User Charge Rate Study for Test Year 2015, prepared by John Mayer & Associates.
2) The ratio of peak day to average day flows influent to the WWTP is based on the historical data presented in Table 1.
3) Domestic strength is estimated based on analysis of influent loadings to the WWTP, less estimated loadings from high-strength and wholesale customers. Source: User Charge Rate Study for Test Year 2015, prepared by John Mayer & Associates.

Alternatives

Two alternative methods for computing sewer connection fees were considered and evaluated as part of this study.

Alternative 1 - Multiple component fee

The first alternative calculated a fee based on the current value of WWTP and interceptor assets per unit of capacity for each of the components of flows and loading, as shown in Table 4. First the total asset value for each category of utility function was divided by the capacity of each utility function in order to determine the asset value per unit of capacity. The values per unit of capacity were then multiplied by the amount of flows and loadings for a typical La Crosse REC to calculate the cost of facilities needed to serve one REC.

Table 4 - Sewer Connection Fee Alternative 1

	Interceptor System:	Wastewater Treatment Plant					
	Peak Day Capacity (gpd)	Ave Day Capacity (gpd)	BOD Capacity (lbs. per day)	T.S.S. Capacity (lbs. per day)	Phos. Capacity (lbs. per day)	NH_3-N Capacity (lbs. per day)	Total
Asset Value by Function [1]	$42,836,497	$25,167,263	$6,490,882	$7,326,823	$4,083,955	$4,020,027	$89,925,448
System Capacity (gallons or pounds per day) [2]	44,000,000	20,000,000	29,793	33,400	977	3,500	
Asset Value per Unit of Capacity (gallons or lbs. per day)	$0.97	$1.26	$217.87	$219.37	$4,180.10	$1,148.58	
Est. Capacity Requirements per REC [3]	329	162	0.377	0.411	0.011	0.039	
Asset Value per REC	$320	$204	$82	$90	$44	$45	$786

Notes:
1) Allocated costs from Table 2.
2) From Table 1.
3) From Table 3.

Under this alternative, the components of the fee and the total fee per REC would be as follows:

Fee per REC:

Peak day flow	$320
Average day flow	$204
BOD	$ 82
SS	$ 90
Phosphorus	$ 44
Ammonia	$ 45
Total	$786

The proposed fee would be $786 per single-family residential connection. The fees for flows from nonresidential sources would be calculated based on the estimated amount and wastestrength characteristics of the flows. If, for example, a new high-strength customer was connecting to the sewer system, the City could adjust the wastestrength components of the fee to reflect the higher amounts of BOD, TSS, Phosphorus, or Ammonia generated by the user.

The advantages of this method include that it is based on the varying costs to provide different types of treatment, similar to the City's wastewater user charge rate structure. It can also be adapted to account for high-strength connections (industry) or other users whose wastewater characteristics are different than normal domestic strength.

The disadvantage of this method is that it is more complicated and requires more information to calculate the fees as compared to other methods. It is also based on detailed analysis of residential customers in the City of La Crosse, while users in other communities may have

different wastewater characteristics than typical La Crosse customers. If this method were applied to other municipalities or individual customers in other municipalities, the definition of a REC may need to be adjusted.

Alternative 2 - Fee based on average day flow only

The second alternative calculated a fee based on the total current value of WWTP and interceptor assets divided by the average day flow capacity of the entire system. The cost per gallon per day was then multiplied by the average flow per day per REC, resulting in a fee of $730 per REC, as shown in Table 5. This alternative did not calculate costs per unit to handle other components of wastewater.

Table 5 - Sewer Connection Fee Alternative 2

System Capacity	Total
Asset Value by Function (1)	$89,925,448
System Capacity (Average Day Flow in gpd) (2)	20,000,000
Asset Value per Unit of Capacity (gallons per day)	$4.50
Est. Capacity Requirements per REC (3)	162
Asset Value per REC	$730

Notes:
1) Allocated costs from Table 2.
2) From Table 1.
3) From Table 3.

The advantages of this method are that it is simpler to explain and requires less information to calculate the fees.

The primary disadvantage of this approach is that it doesn't take wastewater strength or differences in peaking factors into account, so it cannot be adapted to require higher charges for customers with higher wastestrength or peaking ratios (or lower charges for customers with lower peaking ratios). However, in many cases, the information needed to reliably estimate wastestrength or peaking factors may not be available at the time of connection, or the characteristics of a particular property or service area may change over time. The City will still have the opportunity to charge for ongoing operation and maintenance costs in proportion to wastestrength through its system of sewer user charges.

Recommended Alternative

The recommended alternative is to charge sewer connection fees according to Alternative 2, based on average daily wastewater flow, as the more feasible of the two methods.

IMPLEMENTATION

The method of implementation will depend on the specific service area from which the City proposes to collect the fees. In general, fees imposed on areas outside of City boundaries will require an intermunicipal agreement in order to implement the fees. For areas that will be served as retail customers of the City, the fees may be collected from individual customers as they connect. For areas that will be served on a wholesale basis, the City may choose to collect the fees in one of two general ways:

- Initial lump sum payment for RECs associated with existing development connecting to the City's system and payment for new development as it occurs
- Initial lump sum payment for RECs associated with both existing and anticipated future development (purchase of total anticipated future capacity needs upfront)

It is recommended that the fees be reviewed and updated from time to time to ensure that the fees reflect the amounts that the City has invested in its sewer infrastructure and the current demand patterns of customers.