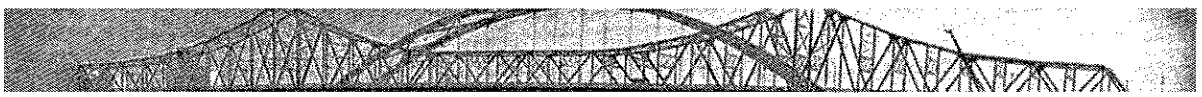
Water Connection Fee Study

Prepared for the

City of La Crosse

by Trilogy Consulting, LLC

February 2016



TRILOGY
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INTRODUCTION

The City owns and operates a water system comprised of wells, storage reservoirs, booster pumping stations and water mains. The water system currently serves mostly City of La Crosse customers, and a small number of customers in the Towns of Campbell and Shelby.

The water utility system has capacity to serve additional customers and almost no outstanding debt. The Water Utility has less than $1.3 million in outstanding advances from the City. The cost of constructing the existing water system was contributed by the City and by past and current customers of the two utilities.

The City retained Trilogy Consulting, LLC to analyze and evaluate methods for charging water connection fees to new customers that connect to the water 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.

WATER CONNECTION FEES

Methodology

The basis for the proposed connection fees is the value of the excess capacity in the water system facilities serving the entire system. These system-wide facilities include wells, storage facilities, booster stations and transmission mains. The intent of the fees is that properties or municipal wholesale customers obtaining new or additional water service will be required to buy into the system in amount equal to the value of the system-wide reserve capacity required to obtain, treat, store, pump and transmit the water. The amount of capacity required is determined based on estimated water usage, and equated to a per Residential Equivalent Connection (REC). A REC is defined as the estimated amount of demand created 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 water demand compared to an average single family household. For the water utility, this study relied on data supplied by the City and filed in the City's annual reports with the Public Service Commission of Wisconsin.

Existing Water System Assets

Water system assets include 13 wells that are currently in service, three booster pump stations, two water storage reservoirs, and approximately 224 miles of water mains. The oldest assets, such as the Granddad Reservoir, have been in service since 1913, and there have been many system expansions, upgrades and replacements over the years since then.

The reliable source capacity of the wells and the storage capacity of the reservoirs is shown in Table 1. Five years of historical data regarding average day sales, average day pumpage, and

maximum day pumpage is shown in Table 2. As shown, the Utility has reliable capacity to supply approximately 36.84 million gallons per day (MGD) of water, while its recent demands have averaged 10.46 MGD on an average day and 19.53 MGD on a maximum day. In addition, the City has enough storage capacity to supply fire flow needs and over six hours of estimated peak hour demand in excess of max day demand, plus a 10 percent reserve (assuming peak hour demands equal to 3.3 times the average day pumpage).

Table 1 - Water System Source Capacity and Storage Capacity

Source Capacity	GPM	MGD
Well 13H	2,050	2.95
Well 14H	1,648	2.37
Well 15H	2,144	3.09
Well 16H	2,675	3.85
Well 17H	2,475	3.56
Well 19H	3,300	4.75
Well 20H	2,457	3.54
Well 21H	2,000	2.88
Well 22H	2,370	3.41
Well 23H	1,800	2.59
Well 24H	1,866	2.69
Well 25H	2,057	2.96
Well 26H	2,050	2.95
Total	28,892	41.59
Less: Largest Supply Unit	(3,300)	(4.75)
Reliable Capacity	25,592	36.84

Storage Capacity	Gallons
Granddad Reservoir	5,000,000
Mormon Coulee Reservoir	150,000
Total Capacity	5,150,000
Less: Fire Protection Needs	630,000
Less: Reserve Storage (10%)	515,000
Storage for Peak Hour Equalizing	4,005,000

Source: Water System Plan, City of La Crosse, and Water Utility Annual Reports.

Table 2 - Water System Pumpage: 2010-2014

Monthly Pumpage (1,000 gallons)	2010	2011	2012	2013	2014	Average
January	237,273	244,931	250,307	230,387	269,266	246,433
February	220,693	228,486	246,503	225,025	262,714	236,684
March	245,930	250,020	285,748	250,102	283,545	263,069
April	311,402	253,435	278,156	265,037	288,278	279,262
May	341,501	344,381	383,787	338,822	339,833	349,665
June	345,445	366,630	428,002	336,000	383,993	372,014
July	389,770	430,146	533,464	495,092	409,603	451,615
August	434,599	433,816	422,175	477,381	478,521	449,298
September	330,910	335,041	349,408	414,302	393,100	364,552
October	294,709	304,747	281,406	310,028	313,056	300,789
November	247,236	270,131	238,541	252,878	275,029	256,763
December	236,531	247,712	223,194	254,907	272,951	247,059
Total	3,635,999	3,709,476	3,920,691	3,849,961	3,969,889	3,817,203
Average Day Pumpage (MGD)	9.96	10.16	10.74	10.55	10.88	10.46
Average Day Sales (MGD)	8.50	8.32	9.26	8.85	8.59	8.70
Ratio of Water Pumped to Water Sold	1.17	1.22	1.16	1.19	1.27	1.20
Maximum Day Pumpage (MGD)	16.59	17.24	21.33	21.97	20.51	19.53
Ratio of Max Day to Ave Day Pumpage	1.66	1.70	1.99	2.08	1.89	1.86

Source: City of La Crosse and Water Utility Annual Reports

The original cost of water utility assets financed by the Utility (for those assests in service as of December 31, 2014) is $32,593,865. These costs were adjusted to a current value of $82,802,911 in terms of 2014 dollars using the Engineering News Record (ENR) 20-city construction cost index, as shown in Table 3. For purposes of developing water connection fees, only those assets that are considered to be system-wide assets, benefitting both retail and wholesale customers, were included in the fees. Distribution mains, meters, services, hydrants, and facilities required for customer metering and billing were excluded. Water mains were allocated between distribution mains and transmission mains using the same allocation method used to establish water user charges. The share of asset values allocated to system wide assets totaled $29,002,070, as shown in Table 3.

Table 3 - Allocation of Water System Assets by Function

	Balance 12/31/2014	Source Capacity Facilities	Storage Facilities	Transmission Facilities	Distribution Facilities	Customer Facilities	Fire Protection Facilities	Include in Connection Fees
Source of Supply Plant								
310 Land and Land Rights	$339,061	$339,061						$339,061
311 Structures and Improvements	$0	$0						$0
312 Collecting and Impounding Reservoirs	$0	$0						$0
313 Lake, River and Other Intakes	$0	$0						$0
314 Wells and Springs	$2,558,896	$2,558,896						$2,558,896
316 Supply Mains	$3,755,861	$3,755,861						$3,755,861
317 Other Water Source Plant	$0	$0						$0
Total Source of Supply Plant	$6,653,817	$6,653,817	$0	$0	$0	$0	$0	$6,653,817
Pumping Plant								
320 Land and Land Rights	$0	$0						$0
321 Structures and Improvements	$6,487,408	$6,487,408						$6,487,408
323 Other Power Production Equipment	$265,794	$265,794						$265,794
325 Electric Pumping Equipment	$2,239,982	$2,239,982						$2,239,982
326 Diesel Pumping Equipment	$0	$0						$0
328 Other Pumping Equipment	$548,814	$548,814						$548,814
Total Pumping Plant	$9,541,998	$9,541,998	$0	$0	$0	$0	$0	$9,541,998
Water Treatment Plant								
330 Land and Land Rights	$0	$0						$0
331 Structures and Improvements	$0	$0						$0
332 Sand or Other Media Filtration Equipment	$258,233	$258,233						$258,233
333 Membraine Filtration Equipment	$0	$0						$0
334 Other Water Treatment Equipment	$0	$0						$0
Total Water Treatment Plant	$258,233	$258,233	$0	$0	$0	$0	$0	$258,233
Transmission and Distribution Plant								
340 Land and Land Rights	$0							$0
341 Structures and Improvements	$0							$0
342 Distribution Reservoirs and Standpipes	$1,774,045		$1,774,045					$1,774,045
343 Transmission Mains	$9,927,535			$9,927,535				$9,927,535
343 Distribution Mains	$31,016,577				$31,016,577			$0
345 Services	$12,286,463					$12,286,463		$0
345 Meters	$5,398,689					$5,398,689		$0
348 Hydrants	$3,528,905						$3,528,905	$0
349 Other Transmission and Distribution Plant	$0							$0
Total Transmission and Distribution Plant	$63,932,214	$0	$1,774,045	$9,927,535	$31,016,577	$17,685,152	$3,528,905	$11,701,580
Subtotal	$80,386,263	$16,454,048	$1,774,045	$9,927,535	$31,016,577	$17,685,152	$3,528,905	$28,155,629
		20.47%	2.21%	12.35%	38.58%	22.00%	4.39%	
General Plant								
389 Land and Land Rights	$0	$0	$0	$0	$0	$0	$0	$0
390 Structures and Improvements	$0	$0	$0	$0	$0	$0	$0	$0
391 Office Furniture and Equipment	$36,485	$7,468	$805	$4,506	$14,077	$8,027	$1,602	$12,779
391.1 Computer Equipment	$32,835	$6,721	$725	$4,055	$12,669	$7,224	$1,441	$11,501
392 Transportation Equipment	$709,433	$145,212	$15,656	$87,614	$273,731	$156,077	$31,144	$248,482
393 Stores Equipment	$16,344	$3,345	$361	$2,018	$6,306	$3,596	$718	$5,725
394 Tools, Shop and Garage Equipment	$298,711	$61,142	$6,592	$36,890	$115,256	$65,717	$13,113	$104,625
395 Laboratory Equipment	$0	$0	$0	$0	$0	$0	$0	$0
396 Power Operated Equipment	$705,228	$144,351	$15,564	$87,094	$272,108	$155,152	$30,959	$247,009
397 Communication Equipment	$168,554	$34,501	$3,720	$20,816	$65,035	$37,082	$7,399	$59,037
397.1 SCADA Equipment	$449,057	$91,916	$9,910	$55,458	$173,266	$98,794	$19,713	$157,284
398 Miscellaneous Equipment	$0	$0	$0	$0	$0	$0	$0	$0
Total General Plant	$2,416,648	$494,657	$53,333	$298,451	$932,450	$531,668	$106,089	$846,441
Total Utility Financed Plant	$82,802,911	$16,948,706	$1,827,378	$10,225,986	$31,949,027	$18,216,820	$3,634,995	$29,002,070

Residential Equivalent Connections

Based on recent historical data, a typical residential customer in the City of La Crosse ("La Crosse REC") has water demand with the characteristics described in Table 4.

Table 4 - Capacity Requirements per REC

Year	Residential Consumption	No. of Residential Customers	Average Day Consumption per Customer
2010	888,501,000	13,352	182.31
2011	842,951,000	13,402	172.32
2012	946,039,000	13,450	192.71
2013	873,327,000	13,352	179.20
2014	767,957,000	13,449	156.44
Average	863,755,000	13,401	176.59

Use for Connection Fee:	
Average Day Demand per Customer (gpd)	177
Average Day Pumpage per Customer (gpd) [1]	212
Max Day Pumpage per Customer (gpd) [2]	395
Peak Hour Demand per Customer (gpd) [3]	700
Extra Peak Hour Capacity per Customer (gallons) [4]	64

Notes:
1) Based on average day demand times a ratio of 1.20 gallons of water pumped per gallon of water sold.
2) Based on average day pumpage times a ratio of 1.86 for max day to average day pumpage.
3) Based on average day pumpage times a ratio of 3.3 (per the Water System Plan).
4) Based on peak hour demand in excess of max day demand for five hours.

Alternatives

Two alternative methods for computing water 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 water system assets per unit of capacity for each of the components of capacity, as shown in Table 5. 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 water demand for each component for a typical La Crosse REC to calculate the cost of facilities needed to serve one REC.

Table 5 - Water Connection Fee Alternative 1

	Source Capacity (Max Day Pumpage)	Storage Capacity (gallons)	Transmission Capacity (Max Day Pumpage)	Total
Asset Value by Function [1]	$16,948,706	$1,827,378	$10,225,986	$29,002,070
System Capacity (gallons or gallons per day) [2]	36,840,000	4,005,000	36,840,000	
Asset Value per Unit of Capacity	$0.46	$0.46	$0.28	
Est. Capacity Requirements per REC (gallons or gallons per day) [3]	395	64	395	
Asset Value per REC	$182	$29	$110	$321

Notes:
1) Allocated costs from Table 3.
2) From Table 1.
3) From Table 4.

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

Fee per REC:

Source capacity	$182
Storage capacity	$ 29
Transmission	$110
Total	$321

The proposed fee would be $321 per single-family residential connection. The fees for nonresidential customers or service areas would be calculated based on the estimated amount and peaking characteristics of the user's water demand. If, for example, a new customer or service area with high peak day or peak hour demands was connecting to the water system, the City could adjust the components of the fee to reflect the higher peak demands generated by the user.

The advantages of this method include that it is based on the varying costs to provide different types of water service, similar to the City's water user charge rate structure. It can also be adapted to account for users whose water demand characteristics are different than normal residential customers.

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 water demand 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 maximum day demand only

The second alternative calculated a fee based on the total current value of water system assets divided by the maximum day capacity of the entire system. The cost per gallon per day was then multiplied by the maximum day demand per day per REC, resulting in a fee of $311 per REC, as shown in Table 6.

Table 6 - Water Connection Fee Alternative 2

	Total
Total Asset Value [1]	$29,002,070
System Capacity (gallons per day) [2]	36,840,000
Asset Value per Unit of Capacity	$0.79
Est. Capacity Requirements per REC (gallons per day) [3]	395
Asset Value per REC	$311

Notes:
1) Allocated costs from Table 3.
2) From Table 1.
3) From Table 4.

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 differences in peaking factors into account, so it cannot be adapted to require higher charges for customers with higher peaking ratios (or lower charges for customers with lower peaking ratios). However, in many cases, the information needed to reliably estimate 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 each customer class for ongoing operation and maintenance costs in proportion to peaking factors through its system of water user charges.

Recommended Alternative

The recommended alternative is to charge water connection fees according to Alternative 2, based on maximum day water demand, 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 water infrastructure and the current demand patterns of customers.