

MEMORANDUM

DATE: October 5, 2021

TO: Ted Corrigan, CEO & General Manager
Amy Kahler, Chief Financial Officer

FROM: Donna Heckman, Senior Financial Analyst

SUBJECT: 2022 Cost of Service Study Report

In 2017, DMWW engaged Raftelis to review our cost of service study to ensure the principles and methodologies used are consistent with generally accepted industry standards. At that time, Raftelis recommended several changes, including changing from a historical cost model to a forward-looking revenue requirements model.

Attached is the Draft 2022 Cost of Service Study Report. The Report summarizes how revenue requirements are allocated not only to various cost functions, but then also to the various customer classes. The Study assigns costs attributable to peaking based on the demands each customer class places on the system.

Figure 13 summarizes the results of budgeted expenses allocated to the various customer classes.

Since components of the Cost of Service tie directly to proposed 2022 rates and budget, the attached report should be considered a draft, and any changes to rates or budget based upon discussions at the Finance & Audit Committee Meeting will require revisions to the report prior to final acceptance by the Board.

Des Moines Water Works

2022 Water Cost of Service Study

Draft Report / October 4, 2021

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INTRODUCTION

In 2018, Des Moines Water Works (DMWW) engaged Raftelis to conduct a Water Cost of Service Study (Study) to develop a sustainable and solvent financial plan for the water utility and to establish water costs based on allocation methodologies that follow generally accepted industry standards. The approach recommended by Raftelis, and adopted by DMWW in this Study, is a forwarding-looking approach. In the water industry, there are two generally accepted approaches to projecting revenue requirements: 1) cash-needs approach and 2) utility approach. This study identifies revenue requirements using the utility approach and the 2022 budget as a “test year” (i.e., the annualized period for which costs are analyzed and rates established). Using the current budget as a test year is a break from DMWW’s prior approach in which costs were studied on a retroactive basis in order to estimate costs in the rate year. This study allocates costs based on a widely adopted approach described in the American Water Works Association (AWWA) publication, “Manual of Water Supply Practices M1, Principles of Water Rates, Fees and Charges” (AWWA M1).

Cost of Service

REVENUE REQUIREMENTS

Water utilities must receive sufficient total revenue to properly operate, maintain, develop, improve, and replace the water system.

This study uses the FY 2022 budget prepared by DMWW as a test year. Figure 1 presents a summary of DMWW's FY 2022 budget. The adopted rates, set by DMWW to recover all forecasted expenses, will recover approximately \$72,900,000 from ratepaying customers.

Rate revenues include all rate revenue from retail, full service, and wholesale customers, including availability fees and capital improvement fees. Other Revenues include contracted billing fees, late fees, connection fees, other sales and services, and interest income. Capital expenses include projects and debt service funded by DMWW directly. Projects funded by other entities and political subdivision's debt service obligations are not included in this table.

Figure 1: FY 2022 Budget

	<u>2022 Budget</u>
Revenues	
Rate Revenues	\$ 72,976,757
Other Revenues	3,384,082
Total: Revenues	\$ 76,360,839
Expenses	
O&M Expense	\$ 49,802,234
DMWW Debt Service	460,142
DMWW Capital	25,598,463
Total: Expenses	\$ 75,860,839
Surplus/(Deficit)	\$ 500,000

This study follows the *utility basis* to measuring revenue requirements. Under the utility approach, the components of revenue requirements include:

1. *Operations & Maintenance (O&M) expense*

O&M expenses include costs necessary to operate and maintain water-related facilities, including treatment plants, pumping, storage, transmission and distribution mains, customer service, and general and administrative aspects of the utility

2. *Depreciation expense*

Depreciation is the loss in value of capital assets as a result of normal wear and aging. This component allows for cost recovery of capital investments over the useful life of the assets.

3. *Return on rate base*

The term “rate base” is the net book value or undepreciated value of capital assets. A return on the rate base provides a fair rate of return to equity owners providing capital.

The three component revenue requirements are allocated proportionately to each customer class so the proper level of revenues are recovered from each customer class based on the operational demands that class places on the water system. Operational demands placed on the system are generally measured by average and maximum day (also called peak) requirements, and customer related costs associated with meters, services, and accounts.

The fundamental goal of the cost of service process is to determine DMWW’s cost to serve each customer class. This study allocates costs on a widely accepted and practiced method, known as the Base-Extra Capacity method.

The Base-Extra Capacity method generally assigns costs to three primary cost components:

1. Base costs – O&M and capital costs incurred to meet average day demand
2. Extra capacity costs – O&M and capital costs to meet maximum day and hour demand
3. Customer costs – costs attributed to serving customers, regardless of amount of water used (e.g., meter reading, billing, collections, etc.)

Cost of service allocations are performed using the following steps:

Table A - Summary of Cost of Service Steps

Step	Title	Explanation	Figure
1	Determine Units of Service	Units of service are summarized (i.e., base day, max day, max hour, customer, pipe). Maximum day and maximum hour peaking factors are identified or estimates are calculated.	Figure 2
2	Allocate Costs to Functions	Operating and capital budgets are allocated to cost functions.	Figures 3, 4
3	Allocate Functionalized Costs to Cost Components	Functionalized costs, such as number of accounts, equivalent meters, water consumption, peaking factors, and inch-miles of water main, are further allocated to cost components.	Figures 5, 6, 7, 8
4	Determine Unit Cost of Service	Cost by unit of service is calculated.	Figure 9
5	Determine Revenue Requirements by Customer Class	Costs are allocated to customers based on the unit rate and each customer’s units of service. The resulting cost of service is then compared to the amounts actually paid by each customer using published rates.	Figures 10, 11, 12, 13

STEP 1: DETERMINE UNITS OF SERVICE

The first step in the cost allocation process is to determine the units of service, which are the basis for the allocation of the total revenue requirement to each customer class. Units of service are shown in **Figure 2** and include:

Table B - Summary of Units of Service - General

Units of Service	Costs	Examples of Costs Allocated
Base Units	Average day	Power, chemicals
Maximum Day Units	Peak day	Treatment and transmission to serve distribution mains and storage on a peak day.
Maximum Hour Units	Peak Hour	Distribution mains and storage for peak hour
Customer Units	Equivalent meters and monthly bills	Billing, meter reading, customer service, leak detection and field service.
Pipe Units	Inch-mile of distribution mains	Operation and maintenance of distribution system

Base Units

Base units are the total annual consumption for each customer class. These units are used to allocate costs that vary directly with the amount of water produced, such as chemicals and power. This represents the cost of providing water at an average day demand.

Maximum Day Extra Capacity Units

Maximum Day Extra Capacity units represent the water demand in excess of that which is used on an average day. The rate of use on maximum day requires larger pumps, pipes, and other infrastructure to meet the peak demand, in comparison to an equal volume of water taken at a lower but steady rate. Maximum day facilities also sit idle during periods of time when demand is less than maximum day, making them less efficient and more costly to operate per unit relative to assets consistently used to meet average day demand. These maximum day units are used to allocate costs related to operation of the treatment plant at levels above average day demand as well as costs related to transmission mains which supply water to distribution mains and storage.

In general, the guidelines for determining maximum day peaking factors outlined in AWWA M1 were the basis for this component of the analysis.

Maximum Day Extra Capacity Calculation

The Wholesale Master Water Service Agreement requires that peak day demand is identified on an annual basis for each individual Purchased Capacity customer; therefore, each Purchased capacity customer's actual maximum day is used in the cost of service calculation.

Actual maximum day for all other customer classes cannot be easily identified; therefore, the maximum day demand for all other customer classes is estimated as shown below:

- » System Max Day to Average Day in Max Month = $\frac{\text{System Max Day Demand}}{\text{System Max Month} / 30}$

- » Class Maximum Day = $\frac{\text{Class Max Month} / 30}{(\text{Class Annual Total} / 365) * (\text{System Max Day} / \text{Average Day in Max Month})}$

The weighting occurs because the exact maximum day by customer class is not known but is assumed to have the same relationship to the average day in the maximum month as the entire system.

Maximum Hour Extra Capacity Units

Maximum Hour Total Capacity units is the consumption forecast in the highest hour of FY 2022, extrapolated over a day assuming all 24 hours are at that peak hourly demand; and, maximum hour extra capacity units is the maximum hour total capacity less the maximum day demand. These units are used to allocate costs related to distribution mains and storage related to peak hour consumption.

In general, the guidelines for determining maximum hour peaking factors outlined in AWWA M1 were the basis for this component of the analysis.

Maximum Hour

As the exact customer class maximum hour cannot be identified, a similar weighting process occurs to determine the customer class maximum hour demands:

- » System Max Hour to Average Day in Max Month = $\frac{\text{System Max Hour}}{\text{System Max Month} / 30}$

- » Class Maximum Hour = Class Max Day * (System Max Hour / Average Day in Max Month)

Customer Units

Customer Units are equivalent meters and customer monthly bills. The number of bills for each customer class is ascertained through an examination of the billing data. The equivalent meters are

the number of customer meters at each meter size weighted by the potential water demand each meter can place on the water system. For DMWW, a 5/8" meter is the current standard for residential services. The number of equivalent meters for sizes larger than 5/8" is determined by multiplying the nominal number of meters (the number at each connection size) by a meter factor, which represents the ratio of the flow rate of the larger meter, to that of the standard 5/8" meter. Once the number of equivalent meters larger than 5/8" is determined, this total is added to the number of 5/8" meters to arrive at the total number of equivalent meters. Customer units are used to allocate the costs of providing services associated with individual accounts, such as billing, meter reading, customer service, leak detection and field service.

Pipe Units

Pipe units are measured in "inch-miles" of distribution mains within each service area, based on an inventory of lengths of pipes and their diameters (*diameter of pipe in inches x length of pipe in miles = inch-mile of pipe*) as of the end of FY 2020 (the latest data available). These units are used to allocate operations and maintenance expenses for water distribution functions.

Results

These calculations are illustrated in **Figure 2** for all customer classes.

Using the Inside City Des Moines customer class as an example, approximately 6.0 million kgal (or 6.0 billion gallons) are projected to be used by customers annually in FY 2022. This equates to approximately 16,600 kgal per day on an average day (annual forecast / 365 days). Based on the calculation described above, residential customers, on their highest consumption day of the year, are projected to use 1.55 times their average day consumption, or around 25,700 kgal. The difference between the maximum day and average day, around 9,100 kgal, represents that class's Maximum Day Extra Capacity units.

A similar calculation is used to determine the Maximum Hour Extra Capacity Units, which are simply the consumption forecast in the highest hour of FY 2022, less the maximum day demand (57,502 kgal – 25,653 kgal = 31,850 kgal max hour extra capacity units)

Data from DMWW's billing system shows 830,388 customer bills were generated for Inside City Des Moines customers, and this same class of customers has 107,439 equivalent 5/8" meters.

Inside City Des Moines has over 6,318 inch-miles of distribution pipe to allocate pipe units costs.

Figure 2: Units of Service

	Base		Max Day			Max Hour			Customer		Pipe	
	Water Sales	Average Day	Peaking Factor	Total Capacity	Extra Capacity	Peaking Factor	Total Capacity	Extra Capacity	Count	Bills	Meters	
	<i>kgal</i>	<i>kgal</i>		<i>kgal</i>	<i>kgal</i>		<i>kgal</i>	<i>kgal</i>			<i>5/8" Eq.</i>	
Retail												
Des Moines Inside City	6,043,258	16,557	1.55	25,653	9,096	3.47	57,502	31,850	69,199	830,388	107,439	6,318.02
Des Moines Outside City	197,685	542	2.99	1,622	1,080	6.67	3,614	1,992	1,173	14,076	1,513	207
DM Zoo Water Rate	15,442	42	2.31	98	55	4.98	211	113	2	24	2	-
Subtotal: Retail	6,256,385	17,141	1.59	27,274	10,231	3.58	61,327	33,955	70,374	844,488	108,954	6,525
Full Service												
Polk County	630,116	1,726	1.98	3,426	1,700	4.46	7,700	4,273	7,571	90,852	9,923	2,261
Runnells	9,266	25	1.52	39	13	3.41	87	48	211	2,532	228	23
Cumming	10,810	30	2.79	82	53	6.25	185	103	150	1,800	175	40
Alleman	9,266	25	1.60	41	15	3.59	91	51	177	2,124	320	52
Pleasant Hill Inside City	248,398	681	1.81	1,230	549	4.05	2,756	1,526	4,743	56,916	6,723	424
Pleasant Hill Outside City	869	2	2.44	6	3	5.49	13	7	5	60	5	1
PCRWD #1	23,165	63	1.78	113	49	3.99	253	141	468	5,616	488	50
Berwick Water	33,977	93	1.60	149	56	3.58	334	185	226	2,712	316	105
Windsor Heights	114,284	313	1.54	483	170	3.46	1,085	601	2,179	26,148	2,502	153
Subtotal: Full Service	1,080,151	2,959	1.88	5,569	2,609	4.23	12,503	6,935	15,730	188,760	20,680	3,110
Subtotal: Full Service and Retail	7,336,536	20,100	1.63	32,843	12,840	3.67	73,830	40,890	86,104	1,033,248	129,634	9,635
Wholesale												
Altoona	9,266	25	5.84	148	123	20.95	532	384	1	24		
Ankeny	1,924,329	5,272	1.49	7,871	2,599	3.71	19,577	11,705	1	72		
Bondurant	172,973	474	1.56	741	267	3.50	1,657	916	1	36		
Clive	644,016	1,764	2.14	3,776	2,011	4.77	8,413	4,637	1	108		
Norwalk	296,526	812	2.00	1,621	808	4.40	3,576	1,956	1	36		
Waukee	552,896	1,515	2.16	3,270	1,756	4.73	7,167	3,897	1	24		
Urbandale	1,533,595	4,202	2.26	9,487	5,286	4.88	20,510	11,023	1	60		
Warren Rural Water	589,961	1,616	1.59	2,568	952	3.46	5,586	3,018	1	36		
West Des Moines	854,057	2,340	2.67	6,238	3,898	5.62	13,140	6,902	1	108		
Xenia	671,818	1,841	1.47	2,713	872	3.54	6,519	3,806	1	48		
Polk City	100,386	275	2.62	720	445	5.11	1,404	684	1	12		
West Des Moines - Storage	9,266	25	8.60	218	193	19.22	488	270	1	24		
Johnston	732,049	2,006	2.32	4,652	2,646	4.90	9,834	5,182	1	36		
Water Development Co	15,442	42	1.74	73	31	3.89	165	91	1	24		
Subtotal: Wholesale	8,106,580	22,210	1.99	44,098	21,888	4.44	98,569	54,471	14	648	-	-
Subtotal: Outside City	9,399,858	25,711	1.99	51,288	25,578	4.46	114,686	63,398	16,917	203,484	22,193	3,317
Total: Utility	15,443,116	42,268	1.82	76,941	34,673	4.07	172,188	95,247	86,116	1,033,872	129,632	9,635

STEP 2: ALLOCATE COSTS TO FUNCTIONS

The second step in determining revenue requirements by customer class involves the allocation of water utility operating and maintenance (O&M) costs and capital costs to standard functional categories. These categories relate to various functions performed by the water utility system and staff in order to provide service to DMWW customers. For this study, the standard functions are:

- » Source of Supply
- » Treatment
- » Transmission
- » Storage/Pumping
- » Distribution
- » Meters
- » Customer Service
- » Administration

Allocation of O&M to Functional Categories

Figure 3 summarizes the functional allocation of the water utility's FY 2022 O&M revenue requirements. These allocations relate to the proportion of expenditures in each cost center (i.e., utility department) that is associated with performing each function. The Customer Service department budget, for example, is associated with the cost of billing DMWW's customers, conducting public relations and customer outreach, and maintaining meters. Consequently, all O&M expenses for this cost center, or Customer Service department, have been allocated to the customer service and meters functions based on DMWW's detailed project costing budget data. All allocations are based on a review of activity-based departmental budgets and an understanding of utility processes and are generally consistent with typical and customary allocations seen in the water industry.

Most of DMWW's cost centers (i.e., departments) are fully allocated to a standard function. Exceptions include Engineering expenses, which are allocated in the same proportion as assets in service, and Water Production Administration, which is allocated in proportion to Source, Treatment, and Storage, and Pumping activities. Transmission and Distribution costs are allocated on the basis of inch-miles of transmission and distribution mains DMWW maintains for all customers.

Revenues other than rate revenue are subtracted from the O&M value to provide a net rate revenue requirement. The totals for each function flow through to the following step, Step 3, which is allocation to cost components.

Allocation of Capital Asset Costs to Functional Categories

Figure 4 summarizes the functional allocation of the water utility's FY 2022 capital revenue requirement. Capital costs, including depreciation expense and return on rate base, are allocated using fixed asset records as of the end of FY 2020. Net book value (also called Original Cost Less Depreciation, or OCLD) and annual book depreciation for each category of assets are allocated to the same standard functions used to allocate O&M. In addition to shared assets in **Figure 4**, DMWW also maintains assets that directly serve Full Service customers, such as meters and pipelines. These assets are allocated directly to the customer they serve. Most asset categories are fully allocable to standard functions; however, Pipelines in Des Moines are allocated proportionately between Transmission and Distribution based on inch-miles of pipe in Des Moines.

Figure 3: O&M Functionalization

<u>Cost Center</u>	<u>O&M</u>	<u>Source of</u>				<u>Storage/</u>	<u>Fire</u>	<u>Admin</u>
		<u>Supply</u>	<u>Treatment</u>	<u>Transmission</u>	<u>Distribution</u>	<u>Pumping</u>	<u>Protection</u>	
Finance	\$ 4,601,312							100.0%
Customer Service	4,123,393							
IT	3,185,636							100.0%
HR	744,046							100.0%
Engineering	1,658,353	8.0%	18.6%	27.2%	33.8%	7.7%	0.0%	2.3%
Transmission and Distribution	11,142,790			27.9%	72.1%			
OCEO	1,620,702							100.0%
Treatment	13,261,443		100.0%					
Source	513,847	100.0%						
Storage/Pumping	2,135,587					100.0%		
Production Administration	6,815,126	3.2%	83.3%			13.4%		
Subtotal: O&M Expenses	\$ 49,802,234	\$ 867,062	\$ 19,249,755	\$ 3,557,607	\$ 8,596,692	\$ 3,178,519	\$ -	\$ 10,189,209
Other Revenue								
Other Items	Items							
Misc Revenue	(3,384,080)							100.0%
Contribution to Reserves	500,000							100.0%
	-	-	-	-	-	-	-	-
Subtotal: Other Items	\$ (2,884,080)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (2,884,080)
Total: Net O&M	\$ 46,918,154	\$ 867,062	\$ 19,249,755	\$ 3,557,607	\$ 8,596,692	\$ 3,178,519	\$ -	\$ 7,305,129

Figure 4: Capital Asset Functionalization

Category	Rate Base	Annual Depreciation	Source of				Storage/ Pumping	Admin
			Supply	Treatment	Transmission	Distribution		
Structures and Machinery								
Airport Booster Station	\$ 860,135	\$ 13,440					100.00%	
Alleman Tower	5,395	159					100.00%	
Allen Hazen Tower	549,002	29,766					100.00%	
ASR Wells	7,596,961	115,621					100.00%	
Fiber Optics	-	-		100.00%				
FWTP	24,311,832	944,194		100.00%				
General Office Facility	2,881,364	82,952						100.00%
Grounds	2,559,130	75,511						100.00%
JES Booster Station	1,225,550	18,023					100.00%	
Jes Tower	4,155,446	79,012					100.00%	
LP Moon Storage Tank	4,192,488	87,401					100.00%	
MWTP	16,505,338	553,186		100.00%				
Nollen, Wilchinski & Tenny S	1,408,797	36,880					100.00%	
Remote Pumping/Storage	408,499	13,461					100.00%	
Roosevelt Booster Station	31,779	3,294					100.00%	
Service Dept	1,834,964	86,409						100.00%
SW Pump Station	1,957,258	59,311					100.00%	
SW Storage	132,468	2,499					100.00%	
SWTP	20,607,621	1,209,390		100.00%				
SWTP Pumping Station	631,566	21,778					100.00%	
Water Supply System	26,565,080	573,140	100.00%					
Pipelines - Feeder	50,607,487	771,755			100.00%			
Pipelines - DM	108,750,335	2,073,687			36.43%	63.57%		
Total: Rate Base	\$ 278,143,585		\$ 26,565,080	\$ 61,567,033	\$ 90,220,833	\$ 69,136,988	\$ 23,155,344	\$ 7,498,306
Total: Depreciation		7,003,395	573,140	2,740,932	1,527,115	1,318,327	480,645	363,237

STEP 3: ALLOCATE FUNCTIONALIZED COSTS TO COST COMPONENTS

This study utilizes the “Base Extra Capacity” method described in the AWWA M1. The Base Extra Capacity method involves allocating each of the functionalized O&M costs to cost components in accordance with the operational need that function was designed to satisfy. This process ensures that customers are only allocated costs associated with services they receive. For example, wholesale customers do not share in the cost of maintaining Windsor Heights distribution system; those costs are the responsibility of Windsor Heights customers.

Costs are segmented to customers based on the service or benefit received by customers. Customer segments include:

- Common to All - all customer classes benefit from the service
- Full Service & Retail - only Full Service customers under contract and Des Moines customers benefit from the service
- Retail Only - only Des Moines retail customers benefit from the service

Within these segments, costs are further generalized as pertaining to either the volumetric or customer service demands of water utility customers. The volumetric cost components are:

- Base demand (also known as average day demand), which relates to the water demand of DMWW customers on an average day;
- Maximum day extra capacity, or the level of demand in excess of base demand, demonstrated by DMWW customers on the highest consumption day of the year; and
- Maximum hour extra capacity, the theoretical demand, in excess of maximum day demand, demonstrated by DMWW customers in the highest consumption hour.

Treatment, transmission, and storage costs are allocated between the base and maximum day cost components based on historical system peaking data. Over the five-year period, maximum day production is an average of 1.70 times higher than on an average day. Since 100% of average day costs are incurred on the maximum day, 1/1.70, or about 60%, of those costs are allocated to base and the remaining 40% of costs are allocated to maximum day.

Figure 5: System Peaking (MGD)

	<u>Annual</u>		<u>Max Month</u>	<u>Max Day</u>	<u>Max Day /</u>
	<u>Production</u>	<u>Average Day</u>	<u>Production</u>	<u>Production</u>	<u>Annual Avg</u>
					<u>Day</u>
2016	17,042	46.69	1,969	78.64	1.68
2017	18,070	49.51	2,202	81.73	1.65
2018	17,536	48.04	2,043	85.43	1.78
2019	17,350	47.53	2,026	81.04	1.70
2020	18,496	50.68	2,153	85.24	1.68
Average:	17,699	48.49	2,078	82.42	1.70

The customer service-related cost components are 1) customer bills and 2) customer meters. These components relate to—at a minimum—the cost of processing customer bills and maintaining customer meters. Additionally, customer meter costs may also relate to the fixed investment in water utility assets associated with providing water service which is available (virtually at all times) regardless of how much water is consumed by DMWW customers (i.e., “readiness to serve”).

Distribution costs are allocated based on inch-miles of main within each service area.

Administration costs are allocated based on the results of the pro rata allocations of all the other functions to components.

Figure 6 shows the allocation of functionalized “Total: Net O&M” illustrated in Table 3 to more detailed cost components.

Figure 7 shows the allocation of functionalized capital asset costs (rate base) illustrated in Figure 4, as well as construction work in progress expected to come into service in FY 2022, to cost components.

Figure 8 shows the allocation of functionalized capital asset costs (annual depreciation) illustrated in Figure 4, as well as construction work in progress expected to come into service in FY 2022, to cost components.

It should be noted that because Figures 7 & 8 include assets currently held, as well as construction work in progress expected to come into service in FY 2021 and 2022, totals in these Figures are slightly higher than and do not tie to functionalized totals in Figure 4.

Figure 6: Allocation of O&M to Cost Components

Function	O&M	Common to All				Full Service and Retail						Retail Only		
		Base	Max Day	Max Hour	Bills	Base	Max Day	Max Hour	Meters	Fire	Inch Miles	Base	Max Day	Max Hour
Source of Supply	\$ 867,062	\$ 867,062	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Treatment	19,249,755	11,323,100	7,926,655	-	-	-	-	-	-	-	-	-	-	
Transmission	3,557,607	2,092,657	1,464,950	-	-	-	-	-	-	-	-	-	-	
Distribution	8,596,692	-	-	-	-	-	-	-	-	-	8,596,692	-	-	
Storage / Pumping	3,178,519	1,869,670	1,308,849	-	-	-	-	-	-	-	-	-	-	
Meters	1,441,951	-	-	-	-	-	-	1,441,951	-	-	-	-	-	
Customer Service	2,721,439	-	-	-	2,721,439	-	-	-	-	-	-	-	-	
Administration	7,305,129	2,978,695	1,973,306	-	501,870	-	-	265,915	-	1,585,344	-	-	-	
Total:	\$ 46,918,154	\$ 19,131,207	\$12,673,759	\$ -	\$ 3,223,309	\$ -	\$ -	\$ 1,707,866	\$ -	\$10,182,036	\$ -	\$ -	\$ -	

Figure 7: Allocation of Rate Base to Cost Components *

Function	Rate Base	Common to All				Retail Only		
		Base	Max Day	Max Hour	Bills	Base	Max Day	Max Hour
Source of Supply	\$ 45,383,612	\$ 45,383,612	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Treatment	82,985,146	48,813,563	34,171,584	-	-	-	-	-
Transmission	92,058,482	54,150,685	37,907,797	-	-	-	-	-
Distribution	113,392,378	-	-	-	36,624,710	25,638,865	51,128,803	
Storage / Pumping	23,155,344	13,620,448	9,534,896	-	-	-	-	
Meters	5,297,068	-	-	-	-	-	-	
Administration	7,596,664	3,396,395	1,711,411	-	768,002	537,634	1,072,145	
Total:	\$ 369,868,693	\$ 165,364,701	\$83,325,688	\$ -	\$ -	\$37,392,711	\$26,176,499	\$52,200,949

Figure 8: Allocation of Depreciation to Cost Components *

Function	Depreciation	Common to All				Retail Only		
		Base	Max Day	Max Hour	Bills	Base	Max Day	Max Hour
Source of Supply	\$ 973,836	\$ 973,836	\$ -	\$ -	\$ -	\$ -	\$ -	
Treatment	3,218,710	1,893,311	1,325,399	-	-	-	-	
Transmission	1,567,697	922,152	645,546	-	-	-	-	
Distribution	2,327,192	-	-	-	751,662	526,195	1,049,334	
Storage / Pumping	480,645	282,725	197,920	-	-	-	-	
Meters	123,147	-	-	-	-	-	-	
Customer Service	-	-	-	-	-	-	-	
Administration	365,841	171,404	91,294	-	31,640	22,149	44,170	
Total:	\$ 9,057,067	\$ 4,243,428	\$ 2,260,159	\$ -	\$ -	\$ 783,302	\$ 548,345	\$ 1,093,504

*Cost associated with Assets directly assigned to a Full Service or Retail customer are shown under the "Direct" column in Figures 14 thru 24.

STEP 4: DETERMINE UNIT COST OF SERVICE

Once each component of the FY 2022 revenue requirement (i.e., O&M, rate base, depreciation) has been allocated to each of the cost components (i.e., base, max day etc.), the unit cost of service can be determined. The unit cost of service is the basis by which costs are allocated to each customer class. **Figure 9** shows the calculated unit costs.

The total system units are the sum of all units from **Figure 2**.

For distributing O&M costs, *base units represent all retail and wholesale customer use on an annual basis, or Total Water Sales*. Max day units represent the daily use in excess of that which is used on an average day for all customer classes, and similarly, max hour use is that which is used in excess of max day consumption. *Because max day and max hour represent excess usage, O&M costs for these components are allocated over extra capacity units.*

Depreciation and rate base costs for max day are distributed over total capacity units. Max day total capacity units most closely represent customers’ impact on the capacity of the capital assets maintained for their use.

Depreciation and rate base costs for max hour are distributed over extra capacity units. Max hour units represent demand in a day if all 24 hours had usage rates equal to peak hour.

Base, max day and max hour units are summarized in the table below for each revenue requirement:

Revenue Requirement	Base Units	Max Day Units	Max Hour Units
O&M	Total Water Sales	Extra Capacity	Extra Capacity
Depreciation	Total Water Sales	Total Capacity	Extra Capacity
Rate Base	Total Water Sales	Total Capacity	Extra Capacity

Also shown is each of the revenue requirements, as they have been allocated to the cost components, and the unit cost for each component. As an example, the total O&M costs allocated to the “base” cost component is approximately \$19.1 million. Since there are 15.4 million base units, the cost per unit is \$1.24. This calculation is repeated for each of the cost components and revenue requirements to arrive at a total system unit cost for each cost component. These unit rates are the basis by which costs are allocated to customer classes.

Although the total cost of service for each customer is different, it is important to note that all customers--whether retail, full service, or wholesale-- pay the same operating unit rate. For example,

1,000 gallons of water costs the same for Des Moines Inside City retail customers, wholesale, and Full Service customers. The difference is that each customer has different units of service.

While the operating unit cost is the same for all customers, capital unit rates vary. Specifically, purchased capacity customers pay a lower capital unit rate because these customers invested capital to construct two of the utility’s treatment plants. This up-front investment is recognized when allocating depreciation and rate base. Wholesale customers who have purchased capacity receive a credit against the amount of Shared Depreciation and Rate Base. The depreciation credit is equal to the amount of annual depreciation on the original sale price of the purchased capacity, which calculates to approximately \$1.9 million. The rate base credit is equal to the net book value of the sale price of purchased capacity, which is approximately \$39.0 million.

It is important to note that **Figure 9** displays the development of unit costs for each group of customers, but because Purchased Capacity and other outside city customers pay different unit rates, this table does not indicate the total cost recovered. **Figure 10** displays the total revenue recovered by component, developed by multiplying the unit rates by the appropriate units from **Figure 2**.

Example – Figure 10

Des Moines Inside City - Common To All- Base Costs- O&M= \$7,505,625 ¹
Figure 9: \$1.2388 operating cost
Figure 2: DM Inside + DM Zoo = 6,043,258+15,442 = 6,058,700 kgal FY 2022 projected annual consumption
Figure 10: 6,058,700 units * \$1.2388/unit = \$7,505,625 ¹

Figure 10 includes a section for Direct Assets, which are assets in DMWW’s records related to Full Service customers that are allocated directly to the respective Full Service customer rather than allocated among customer classes. These costs are added back to costs at the end of the allocation process and are shown in the two farthest right columns in **Figure 12**.

Figure 11 shows the reconciliation of utility basis costs in **Figure 10** to the cash basis costs shown in **Figure 1**.

¹ Rounding of unit costs in this report may cause immaterial discrepancies between the results shown in Figure 10 and results estimated by manually calculating costs.

Figure 9: Unit Cost of Service

Total	Common to All					Full Service and Retail					Retail Only			
	Base	Max Day	Max Hour	Bills	Base	Max Day	Max Hour	Meters	Fire	Inch Miles	Base	Max Day	Max Hour	
Operating Expenses														
Total Expense	\$ 46,918,154	\$ 19,131,207	\$ 12,673,749	\$ -	\$ 3,223,306	\$ -	\$ -	\$ -	\$ 1,707,864	\$ -	\$ 10,182,028	\$ -	\$ -	\$ -
Units	15,443,116	34,729	95,360	1,033,896	7,336,536	12,840	40,890	129,634	9,924	9,635	6,256,385	10,231	33,955	
Unit Cost	1.2388	364.9373	-	3.1176	-	-	-	13.1745	-	1,056.8133	-	-	-	
Depreciation														
Shared Depreciation														
Total Expense	8,928,737	4,243,428	2,260,159	-	-	-	-	-	-	-	783,302	548,345	1,093,504	
Units	15,443,116	77,038	95,360	1,033,896	7,336,536	32,940	40,890	108,954	9,924	9,635	6,256,385	27,372	33,955	
Unit Cost	0.2748	29.3380	-	-	-	-	-	-	-	-	0.1252	20.0333	32.2044	
PC Depreciation														
PC Depreciation Credit	(1,993,300)	(1,300,579)	(692,722)	-	-	-	-	-	-	-	-	-	-	
Wholesale PC Depreciation	6,935,437	2,942,849	1,567,437	-	-	-	-	-	-	-	783,302	548,345	1,093,504	
Units	15,443,116	77,038	95,360	1,033,896	7,336,536	32,940	40,890	108,954	9,924	9,635	6,256,385	27,372	33,955	
Unit Cost	0.1906	20.3462	-	-	-	-	-	-	-	-	0.1252	20.0333	32.2044	
Rate Base														
Shared Rate Base														
Total Shared Rate Base	369,868,693	165,364,701	83,325,688	-	-	-	-	5,408,145	-	-	37,392,711	26,176,499	52,200,949	
Units	15,443,116	77,038	95,360	1,033,896	7,336,536	32,940	40,890	108,954	9,924	9,635	6,256,385	27,372	33,955	
Unit Cost	10.7080	1,081.6113	-	-	-	-	-	49.6372	-	-	5.9767	956.3347	1,537.3523	
Inside City Rate Base														
Rate Base (1)	209,800,658	64,876,485	27,851,548	-	-	-	-	7,097,714	-	-	36,211,202	24,625,670	49,138,039	
Return on Rate Base	4.00% \$ 8,396,096	2,596,318	1,114,602	-	-	-	-	284,046	-	-	1,449,150	985,504	1,966,475	
Units	6,058,700	25,750	31,963	830,412	6,058,700	25,750	31,963	107,441	7,960	6,318	6,058,700	25,750	31,963	
Unit Cost	0.4285	43.2854	-	-	-	-	-	2.6437	-	-	0.2392	38.2719	61.5239	
Outside City Rate Base														
Rate Base	161,757,604	100,488,216	55,474,140	-	-	-	-	-	-	-	1,181,509	1,550,829	3,062,910	
Return on Rate Base	6.00% 9,705,456	6,029,293	3,328,448	-	-	-	-	-	-	-	70,891	93,050	183,775	
Units	9,384,416	51,288	63,398	203,484	1,277,836	7,190	8,927	1,513	1,964	3,317	197,685	1,622	1,992	
Unit Cost	0.6425	64.8967	-	-	-	-	-	-	-	-	0.3586	57.3801	92.2411	
PC Rate Base														
PC Rate Base Credit	(39,013,875)	(25,941,966)	(13,071,908)	-	-	-	-	-	-	-	-	-	-	
PC Rate Base	122,743,730	74,546,249	42,402,232	-	-	-	-	-	-	-	1,181,509	1,550,829	3,062,910	
PC Return on Rate Base	6.00% 7,364,624	4,472,775	2,544,134	-	-	-	-	-	-	-	70,891	93,050	183,775	
Units	9,384,416	51,288	63,398	203,484	1,277,836	7,190	8,927	1,513	1,964	3,317	197,685	1,622	1,992	
Unit Cost	0.4766	49.6044	-	-	-	-	-	-	-	-	0.3586	57.3801	92.2411	

(1) Includes addition of \$5.3 million Direct Asset - Des Moines Inside City Meters.

Figure 10: Cost of Service by Component

	Total	Common to All				Full Service and Retail					Retail Only			
		Base	Max Day	Max Hour	Bills	Base	Max Day	Max Hour	Meters	Fire	Inch Miles	Base	Max Day	Max Hour
Des Moines Inside City														
O&M	\$ 21,526,489	\$ 7,505,625	\$ 3,339,495	\$ -	\$ 2,588,918	\$ -	\$ -	\$ -	\$ 1,415,482	\$ -	\$ 6,676,968	\$ -	\$ -	\$ -
Depreciation	4,720,362	1,664,797	755,456	-	-	-	-	-	-	-	758,551	515,858	1,025,699	
Return on Rate Base	8,396,096	2,596,318	1,114,602	-	-	-	-	284,046	-	-	1,449,150	985,504	1,966,475	
Subtotal: DMIC	\$ 34,642,947	\$ 11,766,740	\$ 5,209,553	\$ -	\$ 2,588,918	\$ -	\$ -	\$ -	\$ 1,699,529	\$ -	\$ 6,676,968	\$ 2,207,702	\$ 1,501,362	\$ 2,992,174
Outside City Customers														
O&M	\$ 25,391,665	\$ 11,625,582	\$ 9,334,254	\$ -	\$ 634,388	\$ -	\$ -	\$ -	\$ 292,382	\$ -	\$ 3,505,059	\$ -	\$ -	\$ -
PC Depreciation	2,197,232	1,400,587	796,645	-	-	-	-	-	-	-	-	-	-	-
PC Return on Rate Base	5,445,294	3,503,053	1,942,242	-	-	-	-	-	-	-	-	-	-	-
Other Outside Depreciation	1,036,443	559,061	355,983	-	-	-	-	-	-	-	24,750	32,487	64,162	
Other Outside Return on Rate Base	2,442,345	1,307,184	787,446	-	-	-	-	-	-	-	70,891	93,050	183,775	
Subtotal: Outside City	\$ 36,512,979	\$ 18,395,466	\$ 13,216,570	\$ -	\$ 634,388	\$ -	\$ -	\$ -	\$ 292,382	\$ -	\$ 3,505,059	\$ 95,641	\$ 125,536	\$ 247,936
Direct Assets														
Depreciation	\$ 1,820,833													
Subtotal: Direct Assets	\$ 1,820,833													
Total: Revenue Recovered	\$ 72,976,759													

Figure 11: Reconciliation to Cash Basis

	<u>Operating</u>	<u>Capital</u>	<u>Total</u>
<u>Cash Basis Revenue Requirements</u>			
Operation and Maintenance Expense	\$ 49,802,234		\$ 49,802,234
Debt Service		460,142	460,142
Cash Financed Capital		25,598,463	25,598,463
Contribution to Operating Reserve	500,000		500,000
Subtotal: Revenue Requirement	\$ 50,302,234	\$ 26,058,605	\$ 76,360,839
<u>Requirements Met from Other Sources</u>			
Misc Revenues	3,384,080		3,384,080
Subtotal: Other Revenues	\$ 3,384,080	\$ -	\$ 3,384,080
Total: Revenue Required	\$ 46,918,154	\$ 26,058,605	\$ 72,976,759
<u>Utility Basis Revenue Requirements</u>			
Operation and Maintenance Expense	\$ 46,918,154		\$ 46,918,154
Depreciation		9,774,870	9,774,870
Return on Rate Base		16,283,735	16,283,735
Total: Revenue Requirement	\$ 46,918,154	\$ 26,058,605	\$ 72,976,759

STEP 5: DETERMINATION OF REVENUE REQUIREMENTS BY CUSTOMER CLASS

To determine the allocation of the FY 2022 revenue requirements to each of the customer classes, the total unit cost of service (as illustrated in Figure 9) is multiplied by the units of service for that class (as illustrated in Figure 2)². **Figure 12** indicates the cost of service by customer class.

Example – Figure 12

Des Moines Inside City- Common To All- Base Costs (DM Inside City + DM Zoo)

$$\$11,736,750 + \$29,990 = \$11,766,740^2$$

Figure 9: \$1.2388 operating cost + \$0.2748 shared depreciation + \$0.4285 Inside City rate base = \$1.9421/unit

Figure 2: DM Inside + DM Zoo =

$$6,043,258 + 15,442 = 6,058,700 \text{ kgal FY 2022 projected annual consumption}$$

Figure 12: 6,058,700 units * \$1.9421/unit = \$11,766,740²

Each customer class utilizes varying levels of service. For example, wholesale customers are primarily responsible only for base and maximum day costs, in addition to costs related to issuing bills. Full service and retail customers receive a higher level of service and hence pay additional costs related to maintaining meters, providing customer service, and operating and maintaining distribution systems.

Figure 12 further details costs for each customer within the purchased capacity wholesale class.

COST OF SERVICE RESULTS

Figure 13 presents a summary of each customers Cost of Service compared to projected FY 2022 revenues under approved rates. A few observations in reviewing these results:

- The Des Moines Inside City customer class is slightly under-recovering costs, by approximately 1%. The Des Moines Outside City customer class is significantly under-recovering costs, although the customer class is relatively small which minimizes the overall impact to the retail customer class.
- Full Service customers are recovering costs at varying percentages, some below costs and others above costs. In situations where the results show costs are over-recovered, it should be understood that this has occurred intentionally to build up a capital fund for small communities who face significant needed capital improvements in their system. We have added future capital costs to the Cost of Service numbers for areas where we either 1) have future CIP projects or 2) where we already collect a capital improvement fee. This number is then subtracted as it is not a current year expense.

² Rounding of unit costs in this report may cause immaterial discrepancies between the results shown in Figure and results estimated by manually calculating costs.

- Overall, the Wholesale – Purchased capacity class pays approximately 93% of their cost of service. It should be noted the findings in **Figure 13** illustrate the wholesale customers are not homogenous as a class. The purchased capacity wholesale customers have varying attributes, such as max day consumption, that results in widely varying cost of service recovery for each specific customer.
- The Wholesale – With Storage class is over-recovering by about 10%. For the 2022 Budget year, revenue collected from this class is forecasted to remain flat.

Appendix A provides more calculation detail for the cost of service for each retail customer class, wholesale customer and Full Service customer.

Figure 12: Class Cost of Service

	Common to All					Full Service and Retail					Retail Only			Direct
	Total	Base	Max Day	Max Hour	Bills	Base	Max Day	Max Hour	Meters	Inch Miles	Base	Max Day	Max Hour	Depreciation
Retail														
Des Moines Inside City	\$ 35,497,153	\$ 11,736,750	\$ 5,128,443	\$ -	\$ 2,588,843	\$ -	\$ -	\$ -	\$ 1,699,497	\$ 6,676,968	\$ 2,202,075	\$ 1,495,675	\$ 2,985,214	\$ 983,688
Des Moines, Outside City	1,738,378	426,224	546,960	-	43,884	-	-	-	19,931	218,415	95,641	125,536	247,936	13,851
DM Zoo Water Rate	79,255	29,990	27,241	-	75	-	-	-	32	-	5,627	5,687	10,603	-
Subtotal: Retail	\$ 37,314,786	\$ 12,192,964	\$ 5,702,679	\$ -	\$ 2,632,802	\$ -	\$ -	\$ -	\$ 1,719,460	\$ 6,895,383	\$ 2,303,343	\$ 1,626,899	\$ 3,243,753	\$ 997,539
Full Service														
Polk County	6,509,481	1,358,577	943,265	-	283,243	-	-	-	130,737	2,389,478	-	-	-	1,404,180
Runnells	169,020	70,415	8,482	-	7,894	-	-	-	3,006	24,240	-	-	-	54,983
Cumming Water	106,828	23,307	27,072	-	5,612	-	-	-	2,303	41,951	-	-	-	6,583
Alleman	102,506	19,978	9,387	-	6,622	-	-	-	4,214	55,204	-	-	-	7,102
Pleasant Hill Inside City	2,723,483	535,565	316,200	-	177,443	-	-	-	88,570	448,300	-	-	-	1,157,406
Pleasant Hill Outside City	6,053	1,874	1,800	-	187	-	-	-	72	1,569	-	-	-	551
PCRWD #1	166,599	49,945	28,685	-	17,509	-	-	-	6,423	52,850	-	-	-	11,187
Berwick Water	239,165	73,257	34,434	-	8,455	-	-	-	4,159	111,368	-	-	-	7,491
Windsor Heights	882,836	246,405	107,677	-	81,520	-	-	-	32,966	161,685	-	-	-	252,583
Less: Future FS Capital Costs	(2,078,771)	-	-	-	-	-	-	-	-	-	-	-	-	(2,078,771)
Subtotal: Full Service	8,827,201	2,379,324	1,477,003	-	588,484	-	-	-	272,451	3,286,645	-	-	-	823,294
Wholesale														
Altoona	72,946	17,661	55,210	-	75	-	-	-	-	-	-	-	-	-
Ankeny	5,167,120	3,667,763	1,499,133	-	224	-	-	-	-	-	-	-	-	-
Bondurant	479,184	329,686	149,386	-	112	-	-	-	-	-	-	-	-	-
Clive	2,226,005	1,227,492	998,177	-	337	-	-	-	-	-	-	-	-	-
Norwalk	973,654	565,177	408,364	-	112	-	-	-	-	-	-	-	-	-
Waukee	1,923,356	1,053,817	869,464	-	75	-	-	-	-	-	-	-	-	-
Urbandale	5,515,784	2,923,025	2,592,572	-	187	-	-	-	-	-	-	-	-	-
Warren Rural Water	1,651,660	1,124,463	527,085	-	112	-	-	-	-	-	-	-	-	-
West Des Moines	3,487,141	1,627,829	1,858,975	-	337	-	-	-	-	-	-	-	-	-
Xenia	1,788,798	1,280,482	508,166	-	150	-	-	-	-	-	-	-	-	-
Polk City	404,136	191,335	212,763	-	37	-	-	-	-	-	-	-	-	-
Subtotal: Wholesale PC	23,689,784	14,008,730	9,679,295	-	1,758	-	-	-	-	-	-	-	-	-
Wholesale with Storage														
West Des Moines - Storage	111,052	19,978	90,999	-	75	-	-	-	-	-	-	-	-	-
Johnston	2,982,490	1,578,353	1,404,025	-	112	-	-	-	-	-	-	-	-	-
Water Development Co	51,657	33,294	18,288	-	75	-	-	-	-	-	-	-	-	-
Subtotal: Wholesale - Storage	3,145,199	1,631,625	1,513,312	-	262	-	-	-	-	-	-	-	-	-
Total: Utility	\$ 72,976,970	\$ 30,158,774	\$ 18,426,123	\$ -	\$ 3,223,306	\$ -	\$ -	\$ -	\$ 1,991,911	\$ 10,182,028	\$ 2,303,343	\$ 1,626,899	\$ 3,243,753	\$ 1,820,833

Figure 13: Cost of Service Results

<u>Customer</u>	<u>Cost of Service</u>	<u>2022 Projected</u>	
		<u>Revenue</u>	<u>COS Recovery</u>
Retail			
Des Moines Inside City	\$ 35,576,327	\$ 35,242,463	99%
Des Moines Outside City	1,738,376	904,982	52%
Total: Retail	\$ 37,314,703	\$ 36,147,445	97%
Full Service			
Polk County	\$ 6,509,474	\$ 6,759,117	104%
Runnells	169,020	183,951	109%
Cumming	106,828	113,613	106%
Alleman	102,506	111,867	109%
Pleasant Hill Inside City	2,723,480	2,845,853	104%
Pleasant Hill Outside City	6,053	5,372	89%
PCRWD	166,599	137,779	83%
Berwick	239,165	151,737	63%
Windsor Heights	882,835	1,006,179	114%
Less: Future FS Capital Costs	(2,078,771)		
Total: Full Service	\$ 8,827,188	\$ 11,315,467	128%
Wholesale - PC			
Altoona	\$ 72,946	\$ 37,444	51%
Ankeny	5,167,092	5,541,846	107%
Bondurant	479,181	501,423	105%
Clive	2,225,996	1,965,996	88%
Norwalk	973,649	893,723	92%
Waukee	1,923,348	1,690,639	88%
Urbandale	5,515,762	4,729,966	86%
Warren Rural Water	1,651,652	1,714,149	104%
West Des Moines	3,487,129	2,727,192	78%
Xenia	1,788,788	1,931,349	108%
Polk City	404,134	319,268	79%
Total: Wholesale - PC	\$ 23,689,677	\$ 22,052,997	93%
Wholesale with Storage			
West Des Moines - Storage	\$ 111,052	\$ 60,920	55%
Johnston	2,982,480	3,332,530	112%
Water Development Co	51,657	67,398	130%
Total: Wholesale with Storage	\$ 3,145,188	\$ 3,460,848	110%
Total: Utility	\$ 72,976,756	\$ 72,976,757	100%

Appendix A: Individual Cost of Service

The following tables show a detailed calculation of the cost of service for each wholesale customer. The units of service can be traced to **Figure 2** and the unit costs can be found on **Figure 9**.

⁽¹⁾ Capital unit costs consist of depreciation and return on rate base.

Figure 14: Des Moines Inside City

	Common to All			Full Service and Retail			Retail Only			Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles	Base	Max Day	Max Hour			
Operating Expense											
Units of Service	6,058,700	9,151	830,412	107,441	6,318	6,058,700	9,151	31,963	-	-	
Unit Cost	1.2388	364.9376	3.1176	13.1746	1,056.8142	-	-	-	-	-	
	\$ 7,505,533	\$ 3,285,629	\$ 2,588,920	\$ 1,415,484	\$ 6,676,974	\$ -	\$ -	\$ -	\$ -	\$ 21,472,539	
Capital Expense											
Units of Service	6,058,700	25,750	830,412	107,441	6,318	6,058,700	25,750	31,963			
Unit Cost (1)	0.7033	72.6235	-	2.6437	-	0.3644	58.3052	93.7283			
	\$ 4,261,115	\$ 1,870,058	\$ -	\$ 284,046	\$ -	\$ 2,207,702	\$ 1,501,362	\$ 2,995,817	\$ 983,688	\$ 14,103,788	
Total: Cost of Service	\$ 11,766,647	\$ 5,155,687	\$ 2,588,920	\$ 1,699,530	\$ 6,676,974	\$ 2,207,702	\$ 1,501,362	\$ 2,995,817	\$ 983,688	\$ 35,576,327	

Figure 15: Des Moines Outside City

	Common to All			Full Service and Retail			Retail Only			Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles	Base	Max Day	Max Hour			
Operating Expense											
Units of Service	197,685	1,080	14,076	1,513	207	197,685	1,080	1,992			
Unit Cost	1.2388	364.9376	3.1176	13.1746	1,056.8142	-	-	-			
	\$ 244,893	\$ 394,146	\$ 43,884	\$ 19,931	\$ 218,415	\$ -	\$ -	\$ -	\$ -	\$ 921,268	
Capital Expense											
Units of Service	197,685	1,622	14,076	1,513	207	197,685	1,622	1,992			
Unit Cost (1)	0.9173	94.2347	0.0000	-	-	0.4838	77.4134	124.4456			
	\$ 181,328	\$ 152,815	\$ -	\$ -	\$ -	\$ 95,641	\$ 125,536	\$ 247,936	\$ 13,851	\$ 817,108	
Total: Cost of Service	\$ 426,221	\$ 546,960	\$ 43,884	\$ 19,931	\$ 218,415	\$ 95,641	\$ 125,536	\$ 247,936	\$ 13,851	\$ 1,738,376	

Figure 16: Polk County

<u>Operating Expense</u>	<u>Common to All</u>			<u>Full Service and Retail</u>		<u>Direct</u>	<u>Total</u>
	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Meters</u>	<u>Inch Miles</u>		
Units of Service	630,116	1,700	90,852	9,923	2,261		
Unit Cost	1.2388	364.9376	3.1176	13.1746	1,056.8142		
	\$ 780,589	\$ 620,387	\$ 283,243	\$ 130,737	\$ 2,389,480	\$ -	\$ 4,204,437
Capital Expense							
Units of Service	630,116	3,426	90,852	9,923	2,261		
Unit Cost (1)	0.9173	94.2347	0.0000				
	\$ 577,978	\$ 322,879	\$ -	\$ -	\$ -	\$ 1,404,180	\$ 2,305,037
Total: Cost of Service	\$ 1,358,568	\$ 943,266	\$ 283,243	\$ 130,737	\$ 2,389,480	\$ 1,404,180	\$ 6,509,474

Figure 17: Runnells

<u>Operating Expense</u>	<u>Common to All</u>			<u>Full Service and Retail</u>		<u>Direct</u>	<u>Total</u>
	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Meters</u>	<u>Inch Miles</u>		
Units of Service	9,266	13	2,532	228	23		
Unit Cost	1.2388	364.9376	3.1176	13.1746	1,056.8142		
	\$ 11,479	\$ 4,840	\$ 7,894	\$ 3,006	\$ 24,240	\$ 50,437	\$ 101,896
Capital Expense							
Units of Service	9,266	39	2,532	228	23		
Unit Cost (1)	0.9173	94.2347	0.0000				
	\$ 8,499	\$ 3,642	\$ -	\$ -	\$ -	\$ 54,983	\$ 67,124
Total: Cost of Service	\$ 19,978	\$ 8,482	\$ 7,894	\$ 3,006	\$ 24,240	\$ 105,419	\$ 169,020

Figure 18: Cumming

<u>Operating Expense</u>	<u>Common to All</u>			<u>Full Service and Retail</u>		<u>Direct</u>	<u>Total</u>
	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Meters</u>	<u>Inch Miles</u>		
Units of Service	10,810	53	1,800	175	40		
Unit Cost	1.2388	364.9376	3.1176	13.1746	1,056.8142		
	\$ 13,391	\$ 19,298	\$ 5,612	\$ 2,303	\$ 41,951	\$ -	\$ 82,555
Capital Expense							
Units of Service	10,810	82	1,800	175	40		
Unit Cost (1)	0.9173	94.2347	0.0000				
	\$ 9,916	\$ 7,774	\$ -	\$ -	\$ -	\$ 6,583	\$ 24,272
Total: Cost of Service	\$ 23,307	\$ 27,072	\$ 5,612	\$ 2,303	\$ 41,951	\$ 6,583	\$ 106,828

Figure 19: Alleman

<u>Operating Expense</u>	<u>Common to All</u>			<u>Full Service and Retail</u>		<u>Direct</u>	<u>Total</u>
	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Meters</u>	<u>Inch Miles</u>		
Units of Service	9,266	15	2,124	320	52		
Unit Cost	1.2388	364.9376	3.1176	13.1746	1,056.8142		
	\$ 11,479	\$ 5,560	\$ 6,622	\$ 4,214	\$ 55,204	\$ -	\$ 83,077
Capital Expense							
Units of Service	9,266	41	2,124	320	52		
Unit Cost (1)	0.9173	94.2347	0.0000				
	\$ 8,499	\$ 3,828	\$ -	\$ -	\$ -	\$ 7,102	\$ 19,429
Total: Cost of Service	\$ 19,978	\$ 9,387	\$ 6,622	\$ 4,214	\$ 55,204	\$ 7,102	\$ 102,506

Figure 20: Pleasant Hill Inside City

<u>Operating Expense</u>	<u>Common to All</u>			<u>Full Service and Retail</u>		<u>Direct</u>	<u>Total</u>
	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Meters</u>	<u>Inch Miles</u>		
Units of Service	248,398	549	56,916	6,723	424		
Unit Cost	1.2388	364.9376	3.1176	13.1746	1,056.8142		
	\$ 307,716	\$ 200,338	\$ 177,443	\$ 88,570	\$ 448,301	\$ -	\$ 1,222,367
Capital Expense							
Units of Service	248,398	1,230	56,916	6,723	424		
Unit Cost (1)	0.9173	94.2347	0.0000				
	\$ 227,845	\$ 115,862	\$ -	\$ -	\$ -	\$ 1,157,406	\$ 1,501,113
Total: Cost of Service	\$ 535,561	\$ 316,200	\$ 177,443	\$ 88,570	\$ 448,301	\$ 1,157,406	\$ 2,723,480

Figure 21: Pleasant Hill Outside City

	<u>Common to All</u>			<u>Full Service and Retail</u>		<u>Direct</u>	<u>Total</u>
	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Meters</u>	<u>Inch Miles</u>		
<u>Operating Expense</u>							
Units of Service	869	3	60	5	1		
Unit Cost	1.2388	364.9376	3.1176	13.1746	1,056.8142		
	\$ 1,077	\$ 1,252	\$ 187	\$ 72	\$ 1,569	\$ -	\$ 4,157
<u>Capital Expense</u>							
Units of Service	869	6	60	5	1		
Unit Cost (1)	0.9173	94.2347	0.0000				
	\$ 797	\$ 548	\$ -	\$ -	\$ -	\$ 551	\$ 1,896
Total: Cost of Service	\$ 1,874	\$ 1,800	\$ 187	\$ 72	\$ 1,569	\$ 551	\$ 6,053

Figure 22: PCRWD #1

	<u>Common to All</u>			<u>Full Service and Retail</u>		<u>Direct</u>	<u>Total</u>
	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Meters</u>	<u>Inch Miles</u>		
<u>Operating Expense</u>							
Units of Service	23,165	49	5,616	488	50		
Unit Cost	1.2388	364.9376	3.1176	13.1746	1,056.8142		
	\$ 28,697	\$ 18,045	\$ 17,509	\$ 6,423	\$ 52,850	\$ -	\$ 123,523
<u>Capital Expense</u>							
Units of Service	23,165	113	5,616	488	50		
Unit Cost (1)	0.9173	94.2347	0.0000				
	\$ 21,248	\$ 10,640	\$ -	\$ -	\$ -	\$ 11,187	\$ 43,075
Total: Cost of Service	\$ 49,945	\$ 28,685	\$ 17,509	\$ 6,423	\$ 52,850	\$ 11,187	\$ 166,599

Figure 23: Berwick

Operating Expense	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
Units of Service	33,977	56	2,712	316	105		
Unit Cost	1.2388	364.9376	3.1176	13.1746	1,056.8142		
	\$ 42,091	\$ 20,395	\$ 8,455	\$ 4,159	\$ 111,369	\$ -	\$ 186,469
Capital Expense							
Units of Service	33,977	149	2,712	316	105		
Unit Cost (1)	0.9173	94.2347	0.0000				
	\$ 31,166	\$ 14,039	\$ -	\$ -	\$ -	\$ 7,491	\$ 52,696
Total: Cost of Service	\$ 73,256	\$ 34,434	\$ 8,455	\$ 4,159	\$ 111,369	\$ 7,491	\$ 239,165

Figure 24: Windsor Heights

Operating Expense	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
Units of Service	114,284	170	26,148	2,502	153		
Unit Cost	1.2388	364.9376	3.1176	13.1746	1,056.8142		
	\$ 141,575	\$ 62,128	\$ 81,520	\$ 32,966	\$ 161,685	\$ -	\$ 479,875
Capital Expense							
Units of Service	114,284	483	26,148	2,502	153		
Unit Cost (1)	0.9173	94.2347	0.0000				
	\$ 104,828	\$ 45,548	\$ -	\$ -	\$ -	\$ 252,583	\$ 402,960
Total: Cost of Service	\$ 246,403	\$ 107,677	\$ 81,520	\$ 32,966	\$ 161,685	\$ 252,583	\$ 882,835

Figure 25: Altoona

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	9,266	123	24	
Unit Cost	1.2388	364.9376	3.1176	
	<u>\$ 11,479</u>	<u>\$ 44,840</u>	<u>\$ 75</u>	<u>\$ 56,393</u>
<u>Capital Expense</u>				
Units of Service	9,266	148	24	
Unit Cost (1)	0.6672	69.9506	0.0000	
	<u>\$ 6,182</u>	<u>\$ 10,371</u>	<u>\$ -</u>	<u>\$ 16,553</u>
Total: Cost of Service	\$ 17,661	\$ 55,210	\$ 75	\$ 72,946

Figure 26: Ankeny

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	1,924,329	2,599	72	
Unit Cost	1.2388	364.9376	3.1176	
	<u>\$ 2,383,864</u>	<u>\$ 948,532</u>	<u>\$ 224</u>	<u>\$ 3,332,620</u>
<u>Capital Expense</u>				
Units of Service	1,924,329	7,871	72	
Unit Cost (1)	0.6672	69.9506	0.0000	
	<u>\$ 1,283,870</u>	<u>\$ 550,602</u>	<u>\$ -</u>	<u>\$ 1,834,472</u>
Total: Cost of Service	\$ 3,667,733	\$ 1,499,134	\$ 224	\$ 5,167,092

Figure 27: Bondurant

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	172,973	267	36	
Unit Cost	1.2388	364.9376	3.1176	
	<u>\$ 214,279</u>	<u>\$ 97,540</u>	<u>\$ 112</u>	<u>\$ 311,932</u>
Capital Expense				
Units of Service	172,973	741	36	
Unit Cost (1)	0.6672	69.9506	0.0000	
	<u>\$ 115,404</u>	<u>\$ 51,846</u>	<u>\$ -</u>	<u>\$ 167,250</u>
Total: Cost of Service	\$ 329,683	\$ 149,386	\$ 112	\$ 479,181

Figure 28: Clive

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	644,016	2,011	108	
Unit Cost	1.2388	364.9376	3.1176	
	<u>\$ 797,809</u>	<u>\$ 734,053</u>	<u>\$ 337</u>	<u>\$ 1,532,198</u>
Capital Expense				
Units of Service	644,016	3,776	108	
Unit Cost (1)	0.6672	69.9506	0.0000	
	<u>\$ 429,673</u>	<u>\$ 264,125</u>	<u>\$ -</u>	<u>\$ 693,798</u>
Total: Cost of Service	\$ 1,227,482	\$ 998,177	\$ 337	\$ 2,225,996

Figure 29: Norwalk

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	296,526	808	36	
Unit Cost	1.2388	364.9376	3.1176	
	<u>\$ 367,337</u>	<u>\$ 294,993</u>	<u>\$ 112</u>	<u>\$ 662,442</u>
Capital Expense				
Units of Service	296,526	1,621	36	
Unit Cost (1)	0.6672	69.9506	0.0000	
	<u>\$ 197,836</u>	<u>\$ 113,372</u>	<u>\$ -</u>	<u>\$ 311,207</u>
Total: Cost of Service	\$ 565,173	\$ 408,365	\$ 112	\$ 973,649

Figure 30: Waukee

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	552,896	1,756	24	
Unit Cost	1.2388	364.9376	3.1176	
	<u>\$ 684,929</u>	<u>\$ 640,697</u>	<u>\$ 75</u>	<u>\$ 1,325,701</u>
Capital Expense				
Units of Service	552,896	3,270	24	
Unit Cost (1)	0.6672	69.9506	0.0000	
	<u>\$ 368,880</u>	<u>\$ 228,768</u>	<u>\$ -</u>	<u>\$ 597,648</u>
Total: Cost of Service	\$ 1,053,809	\$ 869,465	\$ 75	\$ 1,923,348

Figure 31: Urbandale

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	1,533,595	5,286	60	
Unit Cost	1.2388	364.9376	3.1176	
	<u>\$ 1,899,821</u>	<u>\$ 1,928,933</u>	<u>\$ 187</u>	<u>\$ 3,828,941</u>
Capital Expense				
Units of Service	1,533,595	9,487	60	
Unit Cost (1)	0.6672	69.9506	0.0000	
	<u>\$ 1,023,181</u>	<u>\$ 663,641</u>	<u>\$ -</u>	<u>\$ 1,686,822</u>
Total: Cost of Service	\$ 2,923,002	\$ 2,592,574	\$ 187	\$ 5,515,762

Figure 32: Warren Rural Water

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	589,961	952	36	
Unit Cost	1.2388	364.9376	3.1176	
	<u>\$ 730,845</u>	<u>\$ 347,428</u>	<u>\$ 112</u>	<u>\$ 1,078,385</u>
Capital Expense				
Units of Service	589,961	2,568	36	
Unit Cost (1)	0.6672	69.9506	0.0000	
	<u>\$ 393,609</u>	<u>\$ 179,658</u>	<u>\$ -</u>	<u>\$ 573,267</u>
Total: Cost of Service	\$ 1,124,454	\$ 527,085	\$ 112	\$ 1,651,652

Figure 33: West Des Moines

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	854,057	3,898	108	
Unit Cost	1.2388	364.9376	3.1176	
	<u>\$ 1,058,008</u>	<u>\$ 1,422,616</u>	<u>\$ 337</u>	<u>\$ 2,480,960</u>
Capital Expense				
Units of Service	854,057	6,238	108	
Unit Cost (1)	0.6672	69.9506	0.0000	
	<u>\$ 569,808</u>	<u>\$ 436,361</u>	<u>\$ -</u>	<u>\$ 1,006,169</u>
Total: Cost of Service	\$ 1,627,816	\$ 1,858,976	\$ 337	\$ 3,487,129

Figure 34: Xenia

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	671,818	872	48	
Unit Cost	1.2388	364.9376	3.1176	
	<u>\$ 832,250</u>	<u>\$ 318,387</u>	<u>\$ 150</u>	<u>\$ 1,150,787</u>
Capital Expense				
Units of Service	671,818	2,713	48	
Unit Cost (1)	0.6672	69.9506	0.0000	
	<u>\$ 448,222</u>	<u>\$ 189,779</u>	<u>\$ -</u>	<u>\$ 638,001</u>
Total: Cost of Service	\$ 1,280,472	\$ 508,166	\$ 150	\$ 1,788,788

Figure 35: Polk City

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	100,386	445	12	
Unit Cost	1.2388	364.9376	3.1176	
	<u>\$ 124,358</u>	<u>\$ 162,397</u>	<u>\$ 37</u>	<u>\$ 286,793</u>
Capital Expense				
Units of Service	100,386	720	12	
Unit Cost (1)	0.6672	69.9506	0.0000	
	<u>\$ 66,975</u>	<u>\$ 50,366</u>	<u>\$ -</u>	<u>\$ 117,342</u>
Total: Cost of Service	\$ 191,334	\$ 212,763	\$ 37	\$ 404,134

Figure 36: West Des Moines - Storage

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	9,266	193	24	
Unit Cost	1.2388	364.9376	3.1176	
	\$ 11,479	\$ 70,422	\$ 75	\$ 81,976
Capital Expense				
Units of Service	9,266	218	24	
Unit Cost (1)	0.9173	94.2347	0.0000	
	\$ 8,499	\$ 20,577	\$ -	\$ 29,076
Total: Cost of Service	\$ 19,978	\$ 90,999	\$ 75	\$ 111,052

Figure 37: Johnston

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	732,049	2,646	36	
Unit Cost	1.2388	364.9376	3.1176	
	\$ 906,864	\$ 965,671	\$ 112	\$ 1,872,647
Capital Expense				
Units of Service	732,049	4,652	36	
Unit Cost (1)	0.9173	94.2347	0.0000	
	\$ 671,477	\$ 438,355	\$ -	\$ 1,109,833
Total: Cost of Service	\$ 1,578,341	\$ 1,404,026	\$ 112	\$ 2,982,480

Figure 38: Water Development Co.

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	15,442	31	24	
Unit Cost	1.2388	364.9376	3.1176	
	\$ 19,130	\$ 11,366	\$ 75	\$ 30,571
Capital Expense				
Units of Service	15,442	73	24	
Unit Cost (1)	0.9173	94.2347	0.0000	
	\$ 14,164	\$ 6,922	\$ -	\$ 21,086
Total: Cost of Service	\$ 33,294	\$ 18,288	\$ 75	\$ 51,657

GLOSSARY

Availability Charge - A flat monthly charge designed to recover part or all of customer related costs in lieu of recovering them through volume rates since these costs do not vary with the amount of water use. Availability charges can be established as progressive based on meter size or capped to meet specific needs.

Base Costs - Costs that tend to vary with the total quantity of water used and operation under average load conditions. Costs included are operation, maintenance, and replacement expenses of supply, treatment, pumping facilities and capital costs related to plant investment associated with serving customers at a constant, or average demand.

Base-Extra Capacity - The method of cost allocation in which the costs of service are classified to the functional cost components of base, extra-capacity (maximum day, maximum hour), customer related, and fire protection costs.

Cash-Needs Approach – One of two commonly used methods that projects revenue requirements with the objective of ensuring utility revenues are sufficient to recover total cash needs for a given projection period. Components of the cash-needs approach include O&M expenses, debt service payments, contributions to reserves, and cost of capital expenditures that are not debt-financed or contributed (primarily recovered through rates). Also called “**Cash Basis Approach.**”

Customer Classification - The grouping of customers into homogeneous classes. Typically, water utility customers may be classified as residential, commercial, industrial or wholesale for rate-making and other purposes.

Customer Related Costs - Costs directly associated with serving customers, regardless of the amount of water use. Such costs generally include meter reading, billing, accounting, and collecting expense, and maintenance and capital costs related to meters and associated services.

Debt Service - The amounts of money necessary to pay interest and principal requirements resulting from the borrowing of money for capital expenditures.

Demand Costs - Costs associated with providing facilities to meet peak day and peak hour demands placed on the system by customers. They include capital-related costs and operation and maintenance expenses associated with those facilities.

Depreciation - The periodic cost incurred based on replacement cost of fixed assets and plant facilities. The funds resulting from depreciation are used for replacement of these assets.

Equivalent Meter Ratio - The ratio of the capacity in larger meters to that of a 5/8” meter used for most residential customers.

Extra Capacity Costs - Capital and operation and maintenance costs related to providing water at levels above average demand. These costs are divided between maximum-day and maximum-hour components.

Fire Protection Costs - Cost of providing fire protection service to the areas served by the utility.

Full Service Customers – Customers outside the City of Des Moines who are served by Des Moines Water Works under contract. Des Moines Water Works provides full service to these communities, including operations and maintenance of the water system, customer service, billing, planning for capital improvements, etc. Also called “**Total Service**” customers.

Maximum-Day - Extra capacity costs associated with system capacity designed to meet the one-day maximum demand placed on the system.

Maximum-Hour - Extra capacity costs associated with system capacity designed to meet the one-hour maximum demand placed on the system.

Operational Areas - Specific areas of the utility operations under which related operating and maintenance expenses are grouped.

Peak-Day - Demand costs related to treatment, pumping and transmission facilities designed to meet peak one day usage.

Peak-Hour - Demand costs, in excess of peak-day, related to treatment, pumping and transmission facilities designed to meet peak one hour usage.

Purchased Capacity - Direct purchase of capacity in the treatment, pumping and transmission facilities of the utility in order to eliminate the return on investment cost component related to those facilities.

Rate Base – Rate base is the net book value of capital assets (original cost less depreciation) and usually also includes the costs for construction in progress.

Rate-Making Process - The process of developing and establishing rates and charges. The process is comprised of four phases: (1) determination of revenue requirements; (2) allocation of costs to the functional components of the cost of service; (3) distribution of the functional costs of service to customer classes; and (4) development and design of a schedule of rates and charges to recover the revenue requirements.

Return on Investment - The cost computed as a percentage of the value of plant investments dedicated to serving outside city and wholesale customers.

Revenue Requirement - The total revenues needed to meet all expenses and capital replacement costs of the utility.

Test Year - The annualized period for which costs are analyzed and rates established.

Utility Approach – One of two commonly used approaches to projecting revenue requirements. Components of the utility basis include O&M expenses, depreciation expense, and return on rate base. This approach is particularly appropriate when the government owned utility serves customers

outside its geographical limits, based on the premise that the owner investors are entitled to a reasonable return from nonowner customers based on the value of assets required to serve those customers.

Wholesale Customers - Service in which water is sold to a customer at one or more major points of delivery for resale within the wholesale customer's service area.