

## MEMORANDUM

DATE: October 4, 2022

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

FROM: Donna Heckman, Senior Financial Analyst

SUBJECT: 2023 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 2023 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 14 summarizes the results of budgeted expenses allocated to the various customer classes.

Since components of the Cost of Service tie directly to proposed 2023 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, 2022

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## **INTRODUCTION**

A Cost of Service Study (Study) is used 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. In the water industry, there are two generally accepted approaches to projecting revenue requirements: 1) cash-needs approach and 2) utility approach. With assistance from Raftelis, this study identifies revenue requirements using the utility approach and the 2023 budget as a “test year” (i.e., the annualized period for which costs are analyzed and rates established). 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 2023 budget prepared by DMWW as a test year. **Figure 1** presents a summary of DMWW's FY 2023 budget. The adopted rates, set by DMWW to recover all forecasted expenses, will recover approximately \$79,100,000 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 are not included in this table.

**Figure 1: FY 2023 Budget**

	<u>2023 Budget</u>
<b>Revenues</b>	
Rate Revenues	\$ 79,059,794
Other Revenues	6,507,600
<b>Total: Revenues</b>	<b>\$ 85,567,394</b>
<b>Expenses</b>	
O&M Expense	\$ 55,117,710
DMWW Debt Service	0
DMWW Capital	30,449,684
<b>Total: Expenses</b>	<b>\$ 85,567,394</b>
<b>Surplus/(Deficit)</b>	<b>\$ -</b>

This study follows the *utility basis* to measure revenue requirements. Under the utility basis 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 each 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.	Figures 2, 3
2	Allocate Costs to Functions	Operating and capital budgets are allocated to cost functions.	Figures 4, 5
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 6, 7, 8, 9
4	Determine Unit Cost of Service	Cost by unit of service is calculated.	Figure 10
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 projected rates.	Figures 11, 12, 13, 14

## 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 3** 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 maximum day demand is identified on an annual basis for each individual Purchased Capacity customer. Each Purchased Capacity customer's maximum day is compared to their average day usage to determine a peaking factor; this peaking factor is used to allocate maximum day extra capacity costs. Historical peaking factors and the five-year average are shown in **Figure 2**. The cost of service uses the five-year average to allocate costs.

**Figure 2: Wholesale Peaking Factor**

	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>Average</u>
<u>Wholesale - Purchased Capacity</u>						
City Of Ankeny	1.431	1.553	1.481	1.364	1.378	1.441
City Of Bondurant	1.585	1.545	1.609	1.677	1.590	1.601
City Of Clive	2.155	2.236	2.061	2.025	2.070	2.109
City Of Norwalk	2.046	2.228	2.024	1.932	2.346	2.115
City Of Polk City	2.773	3.317	2.470	2.196	2.204	2.592
Urbandale Water Utility	2.227	2.385	2.123	2.216	2.083	2.207
Warren Rural Water	1.886	1.619	1.506	1.433	1.647	1.618
City Of Waukee	2.208	2.223	2.136	1.888	1.954	2.082
West Dm Water Works	2.725	2.800	2.213	2.685	2.605	2.606
Xenia Rural Water	1.552	1.446	1.458	1.450	1.497	1.481
<u>Wholesale - With Storage</u>						
City of Johnston	2.334	2.622	2.380	2.171	2.111	2.324

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 2023, 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 September 2022 (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 3** 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 2023. This equates to approximately 16,400 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 1.56 times their average day consumption, or around 25,700 kgal. The difference between the maximum day and average day, around 9,300 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 2023, less the maximum day demand (56,757 kgal – 25,673 kgal = 31,084 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 6,281 inch-miles of distribution pipe to allocate pipe units costs.

Figure 3: 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	Inch-Miles
	kgal	kgal		kgal	kgal		kgal	kgal			5/8" Eq.	
<b>Retail</b>												
Des Moines Inside City	5,991,683	16,416	1.56	25,673	9,258	3.46	56,757	31,084	69,199	830,388	107,439	6,281.28
Des Moines Outside City	245,822	673	3.25	2,188	1,514	7.18	4,838	2,651	1,173	14,076	1,513	258
DM Zoo Water Rate	23,790	65	2.40	157	92	5.26	343	186	2	24	2	-
<b>Subtotal: Retail</b>	<b>6,261,295</b>	<b>17,154</b>	<b>1.62</b>	<b>27,861</b>	<b>10,863</b>	<b>3.61</b>	<b>61,938</b>	<b>33,921</b>	<b>70,374</b>	<b>844,488</b>	<b>108,954</b>	<b>6,539</b>
<b>Full Service</b>												
Polk County	632,790	1,734	1.99	3,451	1,717	4.39	7,608	4,157	7,571	90,852	9,923	2,271
Runnells	7,928	22	1.54	33	12	3.40	74	40	211	2,532	228	23
Cumming	11,102	30	2.80	85	55	6.19	188	103	150	1,800	175	53
Alleman	9,516	26	1.61	42	16	3.56	93	51	177	2,124	320	53
Pleasant Hill Inside City	255,131	699	1.82	1,273	574	4.03	2,816	1,543	4,743	56,916	6,723	439
Pleasant Hill Outside City	704	2	2.42	5	3	5.36	10	6	5	60	5	1
PCRWD #1	23,788	65	1.79	117	52	3.96	258	141	468	5,616	488	52
Berwick Water	34,890	96	1.62	155	59	3.57	342	187	226	2,712	316	107
Windsor Heights	114,188	313	1.56	487	174	3.44	1,075	588	2,179	26,148	2,502	155
<b>Subtotal: Full Service</b>	<b>1,090,037</b>	<b>2,986</b>	<b>1.89</b>	<b>5,648</b>	<b>2,661</b>	<b>4.17</b>	<b>12,464</b>	<b>6,816</b>	<b>15,730</b>	<b>188,760</b>	<b>20,680</b>	<b>3,153</b>
<b>Subtotal: Full Service and Retail</b>	<b>7,351,332</b>	<b>20,141</b>	<b>1.66</b>	<b>33,509</b>	<b>13,525</b>	<b>3.69</b>	<b>74,402</b>	<b>40,737</b>	<b>86,104</b>	<b>1,033,248</b>	<b>129,634</b>	<b>9,692</b>
<b>Wholesale</b>												
Altoona	9,516	26	5.84	152	126	20.95	546	394	1	24		
Ankeny	2,034,761	5,575	1.44	8,033	2,458	3.61	20,106	12,073	1	72		
Bondurant	182,382	500	1.60	800	300	3.52	1,760	960	1	36		
Clive	667,681	1,829	2.11	3,858	2,029	4.72	8,633	4,775	1	108		
Norwalk	325,118	891	2.12	1,884	993	4.37	3,896	2,012	1	36		
Waukee	613,758	1,682	2.08	3,501	1,819	4.64	7,803	4,302	1	24		
Urbandale	1,590,698	4,358	2.21	9,618	5,260	4.78	20,848	11,229	1	60		
Warren Rural Water	601,071	1,647	1.62	2,664	1,018	3.46	5,705	3,040	1	36		
West Des Moines	896,056	2,455	2.61	6,398	3,943	5.29	12,982	6,584	1	108		
Xenia	688,299	1,886	1.48	2,793	907	3.52	6,645	3,852	1	48		
Polk City	106,259	291	2.59	755	463	4.91	1,431	676	1	12		
West Des Moines - Storage	9,516	26	9.46	247	221	20.89	545	298	1	24		
Johnston	767,596	2,103	2.32	4,887	2,784	4.81	10,106	5,218	1	36		
Water Development Co	15,861	43	1.77	77	33	3.90	169	93	1	24		
<b>Subtotal: Wholesale</b>	<b>8,508,572</b>	<b>23,311</b>	<b>1.96</b>	<b>45,667</b>	<b>22,356</b>	<b>4.34</b>	<b>101,174</b>	<b>55,507</b>	<b>14</b>	<b>648</b>	<b>-</b>	<b>-</b>
<b>Subtotal: Outside City</b>	<b>9,868,221</b>	<b>26,971</b>	<b>1.98</b>	<b>53,502</b>	<b>26,531</b>	<b>4.39</b>	<b>118,475</b>	<b>64,973</b>	<b>16,917</b>	<b>203,484</b>	<b>22,193</b>	<b>3,411</b>
<b>Total: Utility</b>	<b>15,859,904</b>	<b>43,387</b>	<b>1.82</b>	<b>79,175</b>	<b>35,789</b>	<b>4.04</b>	<b>175,232</b>	<b>96,057</b>	<b>86,116</b>	<b>1,033,872</b>	<b>129,632</b>	<b>9,692</b>

## 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 4** summarizes the functional allocation of the water utility's FY 2023 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 5** summarizes the functional allocation of the water utility's FY 2023 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 2021. 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 5**, 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 4: O&M Functionalization

<u>Cost Center</u>	<u>O&amp;M</u>	<u>Source of Supply</u>	<u>Treatment</u>	<u>Transmission</u>	<u>Distribution</u>	<u>Storage/ Pumping</u>	<u>Meters</u>	<u>Customer Service</u>	<u>Fire Protection</u>	<u>Admin</u>
Finance	\$ 5,956,050									100.0%
Customer Service	4,415,288						34.0%	66.0%		
IT	3,393,740									100.0%
HR	914,660									100.0%
Engineering	1,776,484	7.9%	17.5%	27.7%	35.0%	7.7%	2.2%	0.0%	0.0%	2.1%
Transmission and Distribution	10,268,742			27.8%	72.2%					
OCEO	2,391,254									100.0%
Treatment	15,471,370		100.0%							
Source	621,515	100.0%								
Storage/Pumping	2,209,649					100.0%				
Production Administration	7,698,957	3.4%	84.5%			12.1%				
<b>Subtotal: O&amp;M Expenses</b>	<b>\$ 55,117,710</b>	<b>\$ 1,023,112</b>	<b>\$ 22,289,455</b>	<b>\$ 3,349,928</b>	<b>\$ 8,031,472</b>	<b>\$ 3,276,283</b>	<b>\$ 1,540,640</b>	<b>\$ 2,914,090</b>	<b>\$ -</b>	<b>\$ 12,692,730</b>
<b><u>Other Revenue</u></b>										
<b><u>Other Items</u></b>	<b><u>Items</u></b>									
Misc Revenue	(6,507,600)									100.0%
Contribution to Reserves	-									-
<b>Subtotal: Other Items</b>	<b>\$ (6,507,600)</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ (6,507,600)</b>
<b>Total: Net O&amp;M</b>	<b>\$ 48,610,110</b>	<b>\$ 1,023,112</b>	<b>\$ 22,289,455</b>	<b>\$ 3,349,928</b>	<b>\$ 8,031,472</b>	<b>\$ 3,276,283</b>	<b>\$ 1,540,640</b>	<b>\$ 2,914,090</b>	<b>\$ -</b>	<b>\$ 6,185,130</b>

Figure 5: Capital Asset Functionalization

<u>Category</u>	<u>Rate Base</u>	<u>Annual Depreciation</u>	<u>Source of Supply</u>	<u>Treatment</u>	<u>Transmission</u>	<u>Distribution</u>	<u>Storage/ Pumping</u>	<u>Admin</u>
Structures and Machinery								
Airport Booster Station	\$ 846,695	\$ 13,440					100.00%	
Alleman Tower	5,236	159					100.00%	
Allen Hazen Tower	615,040	33,314					100.00%	
ASR Wells	7,482,318	115,658					100.00%	
Fiber Optics	-	-		100.00%				
FWTP	24,284,287	900,250		100.00%				
General Office Facility	2,820,410	83,476						100.00%
Grounds	2,483,908	75,222						100.00%
JES Booster Station	1,207,527	18,023					100.00%	
Jes Tower	4,076,434	79,012					100.00%	
LP Moon Storage Tank	4,105,207	87,408					100.00%	
MWTP	16,010,877	553,190		100.00%				
Nollen, Wilchinski & Tenny S	2,035,318	52,675					100.00%	
Remote Pumping/Storage	790,950	36,144					100.00%	
Roosevelt Booster Station	28,485	3,294					100.00%	
Service Dept	1,750,133	84,831						100.00%
SW Pump Station	1,897,947	59,311					100.00%	
SW Storage	129,969	2,499					100.00%	
SWTP	19,100,987	1,247,021		100.00%				
SWTP Pumping Station	618,369	22,096					100.00%	
Water Supply System	26,860,000	586,075	100.00%					
Pipelines - Feeder	51,729,767	792,344			100.00%			
Pipelines - DM	116,696,958	2,228,415			36.47%	63.53%		
<b>Total: Rate Base</b>	<b>\$ 285,740,494</b>		<b>\$ 26,860,000</b>	<b>\$ 59,508,110</b>	<b>\$ 94,288,128</b>	<b>\$ 74,138,597</b>	<b>\$ 23,839,496</b>	<b>\$ 7,106,163</b>
<b>Total: Depreciation</b>		<b>7,239,103</b>	<b>586,075</b>	<b>2,736,562</b>	<b>1,605,027</b>	<b>1,415,731</b>	<b>523,033</b>	<b>372,675</b>

### 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 6: System Peaking (MGD)**

	<u>Annual</u> <u>Production</u>	<u>Average</u> <u>Day</u>	<u>Max Month</u> <u>Production</u>	<u>Max Day</u> <u>Production</u>	<u>Max Day /</u> <u>Annual Avg</u> <u>Day</u>
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
2021	19,126	52.40	2,125	88.58	1.69
<b>Average:</b>	18,116	49.63	2,110	84.40	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 7** shows the allocation of functionalized “Total: Net O&M” illustrated in Figure 4 to more detailed cost components.

**Figure 8** shows the allocation of functionalized capital asset costs (rate base) illustrated in Figure 5, as well as construction work in progress expected to come into service in FY 2023, to cost components.

**Figure 9** shows the allocation of functionalized capital asset costs (annual depreciation) illustrated in Figure 5, as well as construction work in progress expected to come into service in FY 2023, to cost components.

It should be noted that because Figures 8 & 9 include assets currently held, as well as construction work in progress expected to come into service in FY 2022 and 2023, totals in these Figures are slightly higher than and do not tie to functionalized totals in Figure 5.

**Figure 7: 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	Inch Miles	Base	Max Day	Max Hour
Source of Supply	\$ 1,023,112	\$ 1,023,112	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Treatment	22,289,455	13,101,526	9,187,929	-	-	-	-	-	-	-	-	-	-
Transmission	3,349,928	1,969,056	1,380,873	-	-	-	-	-	-	-	-	-	-
Distribution	8,031,472	-	-	-	-	-	-	-	-	8,031,472	-	-	-
Storage / Pumping	3,276,283	1,925,767	1,350,516	-	-	-	-	-	-	-	-	-	-
Meters	1,540,640	-	-	-	-	-	-	1,540,640	-	-	-	-	-
Customer Service	2,914,090	-	-	-	2,914,090	-	-	-	-	-	-	-	-
Administration	6,185,130	2,627,054	1,737,715	-	424,845	-	-	-	224,610	1,170,907	-	-	-
<b>Total:</b>	<b>\$ 48,610,110</b>	<b>\$ 20,646,516</b>	<b>\$13,657,032</b>	<b>\$ -</b>	<b>\$ 3,338,935</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 1,765,249</b>	<b>\$ 9,202,378</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>

**Figure 8: Allocation of Rate Base to Cost Components \***

Function	Rate Base	Common to All				Full Service and Retail					Retail Only		
		Base	Max Day	Max Hour	Bills	Base	Max Day	Max Hour	Meters	Inch Miles	Base	Max Day	Max Hour
Source of Supply	\$ 56,958,150	\$ 56,958,150	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Treatment	100,461,305	59,050,184	41,411,121	-	-	-	-	-	-	-	-	-	-
Transmission	100,768,212	59,230,581	41,537,631	-	-	-	-	-	-	-	-	-	-
Distribution	128,247,542	-	-	-	-	-	-	-	-	-	42,381,115	29,721,321	56,145,107
Storage / Pumping	25,097,305	14,751,954	10,345,352	-	-	-	-	-	-	-	-	-	-
Meters	6,187,964	-	-	-	-	-	-	6,187,964	-	-	-	-	-
Customer Service	-	-	-	-	-	-	-	-	-	-	-	-	-
Administration	7,135,223	3,245,298	1,593,588	-	-	-	-	105,699	-	723,926	507,680	959,033	
<b>Total:</b>	<b>\$ 424,855,702</b>	<b>\$ 193,236,167</b>	<b>\$94,887,691</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 6,293,663</b>	<b>\$ -</b>	<b>\$43,105,041</b>	<b>\$30,229,001</b>	<b>\$57,104,140</b>	

**Figure 9: Allocation of Depreciation to Cost Components \***

Function	Depreciation	Common to All				Full Service and Retail					Retail Only		
		Base	Max Day	Max Hour	Bills	Base	Max Day	Max Hour	Meters	Inch Miles	Base	Max Day	Max Hour
Source of Supply	\$ 1,236,474	\$ 1,236,474	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Treatment	3,643,789	2,141,784	1,502,005	-	-	-	-	-	-	-	-	-	-
Transmission	1,745,403	1,025,931	719,472	-	-	-	-	-	-	-	-	-	-
Distribution	2,699,125	-	-	-	-	-	-	-	-	-	891,962	625,521	1,181,642
Storage / Pumping	567,544	333,597	233,947	-	-	-	-	-	-	-	-	-	-
Meters	151,681	-	-	-	-	-	-	151,681	-	-	-	-	-
Customer Service	-	-	-	-	-	-	-	-	-	-	-	-	-
Administration	404,697	190,896	98,935	-	-	-	-	6,112	-	35,939	25,204	47,611	
<b>Total:</b>	<b>\$ 10,448,713</b>	<b>\$ 4,928,683</b>	<b>\$ 2,554,359</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 157,792</b>	<b>\$ -</b>	<b>\$ 927,901</b>	<b>\$ 650,725</b>	<b>\$ 1,229,253</b>	

\*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 2023 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 10** shows the calculated unit costs.

The total system units are the sum of all units from **Figure 3**.

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 \$20.6 million. Since there are 15.9 million base units, the cost per unit is \$1.30. 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 \$43.9 million.

It is important to note that **Figure 10** 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 11** displays the total revenue recovered by component, developed by multiplying the unit rates by the appropriate units from **Figure 3**.

**Example – Figure 11**

Des Moines Inside City - Common To All- Base Costs- O&M= \$7,830,978<sup>1</sup>

Figure 10: \$1.3018 operating cost

Figure 3: DM Inside + DM Zoo =

$$5,991,683 + 23,790 = 6,015,473 \text{ kgal FY 2023 projected annual consumption}$$

Figure 11: 6,015,473 units \* \$1.3018/unit = \$7,830,978<sup>1</sup>

**Figure 11** 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 13**.

**Figure 12** shows the reconciliation of utility basis costs in **Figure 11** to the cash basis costs shown in **Figure 1**.

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<sup>1</sup> 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 10: 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
<b>Operating Expenses</b>														
Total Expense	\$ 48,610,110	\$ 20,646,516	\$ 13,657,032	\$ -	\$ 3,338,935	\$ -	\$ -	\$ -	\$ 1,765,249	\$ -	\$ 9,202,378	\$ -	\$ -	\$ -
Units		15,859,904	35,880	96,243	1,033,896	7,351,332	13,525	40,737	129,634	9,924	9,692	6,261,295	10,863	33,921
<b>Unit Cost</b>		1.3018	380.6287	-	3.2295	-	-	-	13.6172	-	949.4449	-	-	-
<b>Depreciation</b>														
<b>Shared Depreciation</b>														
Total Expense	10,290,921	4,928,683	2,554,359	-	-	-	-	-	-	-	-	927,901	650,725	1,229,253
Units		15,859,904	79,332	96,243	1,033,896	7,351,332	33,665	40,737	108,954	9,924	9,692	6,261,295	28,018	33,921
<b>Unit Cost</b>		0.3108	32.1984	-	-	-	-	-	-	-	-	0.1482	23.2256	36.2389
<b>PC Depreciation</b>														
PC Depreciation Credit	(1,993,300)	(1,312,881)	(680,419)	-	-	-	-	-	-	-	-	-	-	-
Wholesale PC Depreciation	8,297,621	3,615,802	1,873,940	-	-	-	-	-	-	-	-	927,901	650,725	1,229,253
Units		15,859,904	79,332	96,243	1,033,896	7,351,332	33,665	40,737	108,954	9,924	9,692	6,261,295	28,018	33,921
<b>Unit Cost</b>		0.2280	23.6215	-	-	-	-	-	-	-	-	0.1482	23.2256	36.2389
<b>Rate Base</b>														
<b>Shared Rate Base</b>														
Total Shared Rate Base	424,855,702	193,236,167	94,887,691	-	-	-	-	-	6,293,663	-	-	43,105,041	30,229,001	57,104,140
Units		15,859,904	79,332	96,243	1,033,896	7,351,332	33,665	40,737	108,954	9,924	9,692	6,261,295	28,018	33,921
<b>Unit Cost</b>		12.1839	1,196.0836	-	-	-	-	-	57.7646	-	-	6.8844	1,078.9320	1,683.4550
<b>Inside City Rate Base</b>														
Rate Base (1)	232,707,869	73,292,181	30,894,735	-	-	-	-	-	6,597,694	-	-	41,412,713	27,868,718	52,641,829
Return on Rate Base	4.21% \$ 9,802,353	3,087,286	1,301,379	-	-	-	-	-	277,915	-	-	1,744,428	1,173,914	2,217,432
Units		6,015,473	25,830	31,270	830,412	6,015,473	25,830	31,270	107,441	7,960	6,281	6,015,473	25,830	31,270
<b>Unit Cost</b>		0.5132	50.3826	-	-	-	-	-	2.5867	-	-	0.2900	45.4478	70.9122
<b>Outside City Rate Base</b>														
Rate Base	192,451,864	119,943,985	63,992,956	-	-	-	-	-	-	-	-	1,692,328	2,360,282	4,462,311
Return on Rate Base	6.00% 11,547,112	7,196,639	3,839,577	-	-	-	-	-	-	-	-	101,540	141,617	267,739
Units		9,844,431	53,502	64,973	203,484	1,335,859	7,835	9,466	1,513	1,964	3,411	245,822	2,188	2,651
<b>Unit Cost</b>		0.7310	71.7650	-	-	-	-	-	-	-	-	0.4131	64.7359	101.0073
<b>PC Rate Base</b>														
PC Rate Base Credit	(43,852,606)	(29,410,648)	(14,441,957)	-	-	-	-	-	-	-	-	-	-	-
PC Rate Base	148,599,258	90,533,337	49,550,999	-	-	-	-	-	-	-	-	1,692,328	2,360,282	4,462,311
PC Return on Rate Base	6.00% 8,915,955	5,432,000	2,973,060	-	-	-	-	-	-	-	-	101,540	141,617	267,739
Units		9,844,431	53,502	64,973	203,484	1,335,859	7,835	9,466	1,513	1,964	3,411	245,822	2,188	2,651
<b>Unit Cost</b>		0.5518	55.5691	-	-	-	-	-	-	-	-	0.4131	64.7359	101.0073

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

Figure 11: 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	
<b>Des Moines Inside City</b>														
O&M	\$ 21,498,098	\$ 7,830,978	\$ 3,558,560	\$ -	\$ 2,681,790	\$ -	\$ -	\$ -	\$ 1,463,043	-	\$ 5,963,728	\$ -	\$ -	\$ -
Depreciation	5,318,906	1,869,391	831,681	-	-	-	-	-	-	-	891,471	599,916	1,126,447	
Return on Rate Base	9,802,353	3,087,286	1,301,379	-	-	-	-	277,915	-	-	1,744,428	1,173,914	2,217,432	
<b>Subtotal: DMIC</b>	<b>\$ 36,619,357</b>	<b>\$ 12,787,655</b>	<b>\$ 5,691,620</b>	<b>\$ -</b>	<b>\$ 2,681,790</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 1,740,958</b>	<b>\$ -</b>	<b>\$ 5,963,728</b>	<b>\$ 2,635,899</b>	<b>\$ 1,773,830</b>	<b>\$ 3,343,878</b>
<b>Outside City Customers</b>														
O&M	\$ 27,112,012	\$ 12,815,538	\$ 10,098,472	\$ -	\$ 657,145	\$ -	\$ -	\$ -	\$ 302,206	\$ -	\$ 3,238,651	\$ -	\$ -	\$ -
PC Depreciation	2,714,659	1,759,032	955,628	-	-	-	-	-	-	-	-	-	-	
PC Return on Rate Base	6,505,438	4,257,345	2,248,093	-	-	-	-	-	-	-	-	-	-	
Other Outside Depreciation	1,264,927	661,564	420,067	-	-	-	-	-	-	-	36,430	50,809	96,058	
Other Outside Return on Rate Base	3,003,412	1,556,254	936,263	-	-	-	-	-	-	-	101,540	141,617	267,739	
<b>Subtotal: Outside City</b>	<b>\$ 40,600,449</b>	<b>\$ 21,049,732</b>	<b>\$ 14,658,523</b>	<b>\$ -</b>	<b>\$ 657,145</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 302,206</b>	<b>\$ -</b>	<b>\$ 3,238,651</b>	<b>\$ 137,970</b>	<b>\$ 192,426</b>	<b>\$ 363,797</b>
<b>Direct Assets</b>														
Depreciation	\$ 1,839,989													
<b>Subtotal: Direct Assets</b>	<b>\$ 1,839,989</b>													
<b>Total: Revenue Recovered</b>	<b>\$ 79,059,795</b>													

**Figure 12: Reconciliation to Cash Basis**

	<u>Operating</u>	<u>Capital</u>	<u>Total</u>
<b><u>Cash Basis Revenue Requirements</u></b>			
Operation and Maintenance Expense	\$ 55,117,710		\$ 55,117,710
Debt Service		-	-
Cash Financed Capital		30,449,684	30,449,684
Contribution to Operating Reserve	-		-
<b>Subtotal: Revenue Requirement</b>	<u>\$ 55,117,710</u>	<u>\$ 30,449,684</u>	<u>\$ 85,567,394</u>
<b><u>Requirements Met from Other Sources</u></b>			
Misc Revenues	6,507,600		6,507,600
<b>Subtotal: Other Revenues</b>	<u>\$ 6,507,600</u>	<u>\$ -</u>	<u>\$ 6,507,600</u>
<b>Total: Revenue Required</b>	<u>\$ 48,610,110</u>	<u>\$ 30,449,684</u>	<u>\$ 79,059,794</u>
<b><u>Utility Basis Revenue Requirements</u></b>			
Operation and Maintenance Expense	\$ 48,610,110		\$ 48,610,110
Depreciation		11,138,481	11,138,481
Return on Rate Base		19,311,203	19,311,203
<b>Total: Revenue Requirement</b>	<u>\$ 48,610,110</u>	<u>\$ 30,449,684</u>	<u>\$ 79,059,794</u>

## STEP 5: DETERMINE REVENUE REQUIREMENTS BY CUSTOMER CLASS

To determine the allocation of the FY 2023 revenue requirements to each of the customer classes, the total unit cost of service (as illustrated in Figure 10) is multiplied by the units of service for that class (as illustrated in Figure 2)<sup>2</sup>. **Figure 13** indicates the cost of service by customer class.

### *Example – Figure 13*

Des Moines Inside City- Common To All- Base Costs (DM Inside City + DM Zoo)  
 $\$12,737,082 + \$50,573 = \$12,787,655^2$

Figure 10:  $\$1.3018$  operating cost +  $\$0.3108$  shared depreciation +  $\$0.5132$  Inside City rate base  
=  $\$2.1258/\text{unit}$

Figure 3: DM Inside + DM Zoo projected annual consumption  
DM Inside – 5,991,683  
DM Zoo – 23,790

Figure 13: DM Inside + DM Zoo  
DM Inside –  $5,991,683 * \$2.1258/\text{unit} = \$12,737,082^2$   
DM Zoo –  $23,790 * \$2.1258/\text{unit} = \$50,573$

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 13** further details costs for each customer within the purchased capacity wholesale class.

## COST OF SERVICE RESULTS

**Figure 14** presents a summary of each customers Cost of Service compared to projected FY 2023 revenues under proposed rates. A few observations in reviewing these results:

- The Des Moines Inside City customer class is slightly under-recovering costs, by approximately 2%. 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, 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

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



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.

- Overall, the Wholesale – Purchased capacity class pays approximately 96% of their cost of service. It should be noted the findings in **Figure 14** 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 varying cost of service recovery for each specific customer.
- The Wholesale – With Storage class is slightly over-recovering by about 2%. For the 2023 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 13: Class Cost of Service

	Total	Common to All				Full Service and Retail					Retail Only			Direct	
		Base	Max Day	Max Hour	Bills	Base	Max Day	Max Hour	Meters	Inch Miles	Base	Max Day	Max Hour	Return	Depreciation
<b>Retail</b>															
Total: Des Moines Inside City	\$ 37,375,936	\$ 12,737,082	\$ 5,586,639	\$ -	\$ 2,681,712	\$ -	\$ -	\$ -	\$ 1,740,925	\$ 5,963,728	\$ 2,625,474	\$ 1,763,066	\$ 3,330,674	\$ -	\$ 946,636
Total: Des Moines, Outside City	2,398,116	576,110	803,751	-	45,458	-	-	-	20,601	244,675	137,970	192,426	363,797	-	13,330
DM Zoo Water Rate	139,620	50,573	47,796	-	78	-	-	-	32	-	10,424	10,764	19,953	-	-
<b>Subtotal: Retail</b>	<b>\$ 39,913,672</b>	<b>\$ 13,363,765</b>	<b>\$ 6,438,186</b>	<b>\$ -</b>	<b>\$ 2,727,248</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 1,761,558</b>	<b>\$ 6,208,403</b>	<b>\$ 2,773,868</b>	<b>\$ 1,966,256</b>	<b>\$ 3,714,423</b>	<b>\$ -</b>	<b>\$ 959,965</b>
<b>Full Service</b>															
Polk County	5,704,275	1,483,011	1,012,476	-	293,404	-	-	-	135,130	2,156,173	-	-	-	-	624,082
Runnells	114,993	69,017	7,923	-	8,177	-	-	-	3,107	21,777	-	-	-	-	4,992
Cumming Water	127,141	26,019	29,756	-	5,813	-	-	-	2,381	50,071	-	-	-	-	13,102
Alleman	102,580	22,302	10,476	-	6,859	-	-	-	4,355	50,177	-	-	-	-	8,411
Pleasant Hill Inside City	1,818,471	597,927	350,825	-	183,808	-	-	-	91,546	416,862	-	-	-	-	177,505
Pleasant Hill Outside City	5,084	1,649	1,528	-	194	-	-	-	74	1,150	-	-	-	-	490
PCRWD #1	172,691	55,750	31,820	-	18,137	-	-	-	6,639	49,158	-	-	-	-	11,187
Berwick Water	242,944	81,768	38,549	-	8,758	-	-	-	4,299	101,830	-	-	-	-	7,739
Windsor Heights	682,246	267,612	116,821	-	84,444	-	-	-	34,074	146,779	-	-	-	-	32,516
<b>Subtotal: Full Service</b>	<b>8,970,425</b>	<b>2,605,054</b>	<b>1,600,172</b>	<b>-</b>	<b>609,595</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>281,606</b>	<b>2,993,976</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>880,024</b>
<b>Wholesale</b>															
Altoona	79,973	19,808	60,087	-	78	-	-	-	-	-	-	-	-	-	-
Ankeny	5,807,637	4,235,505	1,571,899	-	233	-	-	-	-	-	-	-	-	-	-
Bondurant	557,414	379,642	177,656	-	116	-	-	-	-	-	-	-	-	-	-
Clive	2,467,850	1,389,827	1,077,674	-	349	-	-	-	-	-	-	-	-	-	-
Norwalk	1,204,089	676,757	527,216	-	116	-	-	-	-	-	-	-	-	-	-
Waukee	2,247,423	1,277,583	969,763	-	78	-	-	-	-	-	-	-	-	-	-
Urbandale	6,075,208	3,311,155	2,763,859	-	194	-	-	-	-	-	-	-	-	-	-
Warren Rural Water	1,849,658	1,251,174	598,368	-	116	-	-	-	-	-	-	-	-	-	-
West Des Moines	3,872,869	1,865,207	2,007,313	-	349	-	-	-	-	-	-	-	-	-	-
Xenia	1,999,311	1,432,745	566,411	-	155	-	-	-	-	-	-	-	-	-	-
Polk City	457,388	221,186	236,164	-	39	-	-	-	-	-	-	-	-	-	-
<b>Subtotal: Wholesale PC</b>	<b>26,618,820</b>	<b>16,060,589</b>	<b>10,556,410</b>	<b>-</b>	<b>1,821</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Wholesale with Storage</b>															
West Des Moines - Storage	131,984	22,302	109,605	-	78	-	-	-	-	-	-	-	-	-	-
Johnston	3,366,981	1,798,943	1,567,922	-	116	-	-	-	-	-	-	-	-	-	-
Water Development Co	57,913	37,172	20,664	-	78	-	-	-	-	-	-	-	-	-	-
<b>Subtotal: Wholesale - Storage</b>	<b>3,556,878</b>	<b>1,858,416</b>	<b>1,698,191</b>	<b>-</b>	<b>271</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total: Utility</b>	<b>\$ 79,059,795</b>	<b>\$ 33,837,387</b>	<b>\$ 20,343,394</b>	<b>\$ -</b>	<b>\$ 3,338,935</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 2,043,164</b>	<b>\$ 9,202,378</b>	<b>\$ 2,773,868</b>	<b>\$ 1,966,256</b>	<b>\$ 3,714,423</b>	<b>\$ -</b>	<b>\$ 1,839,989</b>

**Figure 14: Cost of Service Results**

<u>Customer</u>	<u>Cost of Service</u>	<u>4/1 Proposed Rate Increase</u>	<u>2023 Projected Revenue</u>	<u>COS Recovery</u>
<b>Retail</b>				
Des Moines Inside City	\$ 37,515,556	5.50%	\$ 36,647,682	98%
Des Moines Outside City	2,398,116	10.00%	1,182,233	49%
<b>Total: Retail</b>	<b>\$ 39,913,672</b>		<b>\$ 37,829,915</b>	<b>95%</b>
<b>Full Service</b>				
Polk County	\$ 6,513,209	5.50%	\$ 7,151,909	110%
Runnells	164,993	5.50%	167,950	102%
Cumming	127,141	5.50%	122,016	96%
Alleman	102,580	5.50%	120,461	117%
Pleasant Hill Inside City	2,818,471	5.50%	3,045,282	108%
Pleasant Hill Outside City	5,084	5.50%	4,768	94%
PCRWD	172,691	5.50%	149,947	87%
Berwick	242,944	8.00%	169,461	70%
Windsor Heights	910,672	5.50%	1,038,304	114%
Less: Future FS Capital Costs	(2,087,360.00)			
<b>Total: Full Service</b>	<b>\$ 8,970,425</b>		<b>\$ 11,970,098</b>	<b>133%</b>
<b>Wholesale - PC</b>				
Altoona	\$ 79,973	10.00%	\$ 31,618	40%
Ankeny	5,807,637	10.00%	6,760,709	116%
Bondurant	557,414	10.00%	605,983	109%
Clive	2,467,850	10.00%	2,218,441	90%
Norwalk	1,204,089	10.00%	1,080,239	90%
Waukee	2,247,423	10.00%	2,039,276	91%
Urbandale	6,075,208	10.00%	5,285,263	87%
Warren Rural Water	1,849,658	10.00%	1,997,122	108%
West Des Moines	3,872,869	10.00%	2,977,241	77%
Xenia	1,999,311	10.00%	2,286,946	114%
Polk City	457,388	10.00%	353,057	77%
<b>Total: Wholesale - PC</b>	<b>\$ 26,618,820</b>		<b>\$ 25,635,895</b>	<b>96%</b>
<b>Wholesale with Storage</b>				
West Des Moines - Storage	\$ 131,984	0.00%	\$ 43,488	33%
Johnston	3,366,981	0.00%	3,507,914	104%
Water Development Co	57,913	0.00%	72,485	125%
<b>Total: Wholesale with Storage</b>	<b>\$ 3,556,878</b>		<b>\$ 3,623,887</b>	<b>102%</b>
<b>Total: Utility</b>	<b>\$ 79,059,795</b>		<b>\$ 79,059,795</b>	<b>100%</b>

## 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 3** and the unit costs can be found on **Figure 10**.

<sup>(1)</sup> Capital unit costs consist of depreciation and return on rate base.

### Figure 15: 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		
<b>Operating Expense</b>										
Units of Service	6,015,473	9,349	830,412	107,441	6,281	6,015,473	9,349	31,270		
Unit Cost	1.3018	380.6287	3.2295	13.6172	949.4449	-	-	-		
	\$ 7,830,978	\$ 3,501,375	\$ 2,681,790	\$ 1,463,043	\$ 5,963,728	\$ -	\$ -	\$ -		\$ 21,440,914
<b>Capital Expense</b>										
Units of Service	6,015,473	25,830	830,412	107,441	6,281	6,015,473	25,830	31,270		
Unit Cost (1)	0.8240	82.5810	-	2.5867	-	0.4382	68.6735	107.1511		
	\$ 4,956,677	\$ 2,133,059	\$ -	\$ 277,915	\$ -	\$ 2,635,899	\$ 1,773,830	\$ 3,350,626	\$ 946,636	\$ 16,074,642
<b>Total: Cost of Service</b>	\$ 12,787,655	\$ 5,634,435	\$ 2,681,790	\$ 1,740,958	\$ 5,963,728	\$ 2,635,899	\$ 1,773,830	\$ 3,350,626	\$ 946,636	\$ 37,515,556

### Figure 16: 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		
<b>Operating Expense</b>										
Units of Service	245,822	1,514	14,076	1,513	258	245,822	1,514	2,651		
Unit Cost	1.3018	380.6287	3.2295	13.6172	949.4449	-	-	-		
	\$ 320,013	\$ 576,319	\$ 45,458	\$ 20,601	\$ 244,675	\$ -	\$ -	\$ -	\$ -	\$ 1,207,066
<b>Capital Expense</b>										
Units of Service	245,822	2,188	14,076	1,513	258	245,822	2,188	2,651		
Unit Cost (1)	1.0418	103.9634	0.0000	-	-	0.5613	87.9616	137.2462		
	\$ 256,097	\$ 227,431	\$ -	\$ -	\$ -	\$ 137,970	\$ 192,426	\$ 363,797	\$ 13,330	\$ 1,191,050
<b>Total: Cost of Service</b>	\$ 576,110	\$ 803,751	\$ 45,458	\$ 20,601	\$ 244,675	\$ 137,970	\$ 192,426	\$ 363,797	\$ 13,330	\$ 2,398,116

**Figure 17: Polk County**

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
<b>Operating Expense</b>							
Units of Service	632,790	1,717	90,852	9,923	2,271		
Unit Cost	1.3018	380.6287	3.2295	13.6172	949.4449		
	\$ 823,770	\$ 653,691	\$ 293,404	\$ 135,130	\$ 2,156,173	\$ -	\$ 4,062,168
<b>Capital Expense</b>							
Units of Service	632,790	3,451	90,852	9,923	2,271		
Unit Cost (1)	1.0418	103.9634	0.0000				
	\$ 659,241	\$ 358,785	\$ -	\$ -	\$ -	\$ 1,433,016	\$ 2,451,041
<b>Total: Cost of Service</b>	\$ 1,483,011	\$ 1,012,476	\$ 293,404	\$ 135,130	\$ 2,156,173	\$ 1,433,016	\$ 6,513,209

**Figure 18: Runnells**

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
<b>Operating Expense</b>							
Units of Service	7,928	12	2,532	228	23		
Unit Cost	1.3018	380.6287	3.2295	13.6172	949.4449		
	\$ 10,321	\$ 4,449	\$ 8,177	\$ 3,107	\$ 21,777	\$ 50,437	\$ 98,268
<b>Capital Expense</b>							
Units of Service	7,928	33	2,532	228	23		
Unit Cost (1)	1.0418	103.9634	0.0000				
	\$ 8,259	\$ 3,473	\$ -	\$ -	\$ -	\$ 54,992	\$ 66,725
<b>Total: Cost of Service</b>	\$ 18,580	\$ 7,923	\$ 8,177	\$ 3,107	\$ 21,777	\$ 105,429	\$ 164,993

**Figure 19: Cumming**

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
<b>Operating Expense</b>							
Units of Service	11,102	55	1,800	175	53		
Unit Cost	1.3018	380.6287	3.2295	13.6172	949.4449		
	\$ 14,453	\$ 20,888	\$ 5,813	\$ 2,381	\$ 50,071	\$ -	\$ 93,605
<b>Capital Expense</b>							
Units of Service	11,102	85	1,800	175	53		
Unit Cost (1)	1.0418	103.9634	0.0000				
	\$ 11,566	\$ 8,867	\$ -	\$ -	\$ -	\$ 13,102	\$ 33,535
<b>Total: Cost of Service</b>	\$ 26,019	\$ 29,756	\$ 5,813	\$ 2,381	\$ 50,071	\$ 13,102	\$ 127,141

**Figure 20: Alleman**

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
<b>Operating Expense</b>							
Units of Service	9,516	16	2,124	320	53		
Unit Cost	1.3018	380.6287	3.2295	13.6172	949.4449		
	\$ 12,388	\$ 6,099	\$ 6,859	\$ 4,355	\$ 50,177	\$ -	\$ 79,879
<b>Capital Expense</b>							
Units of Service	9,516	42	2,124	320	53		
Unit Cost (1)	1.0418	103.9634	0.0000				
	\$ 9,914	\$ 4,376	\$ -	\$ -	\$ -	\$ 8,411	\$ 22,702
<b>Total: Cost of Service</b>	\$ 22,302	\$ 10,476	\$ 6,859	\$ 4,355	\$ 50,177	\$ 8,411	\$ 102,580

**Figure 21: Pleasant Hill Inside City**

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
<b>Operating Expense</b>							
Units of Service	255,131	574	56,916	6,723	439		
Unit Cost	1.3018	380.6287	3.2295	13.6172	949.4449		
	\$ 332,131	\$ 218,480	\$ 183,808	\$ 91,546	\$ 416,862	\$ -	\$ 1,242,827
<b>Capital Expense</b>							
Units of Service	255,131	1,273	56,916	6,723	439		
Unit Cost (1)	1.0418	103.9634	0.0000				
	\$ 265,796	\$ 132,344	\$ -	\$ -	\$ -	\$ 1,177,505	\$ 1,575,644
<b>Total: Cost of Service</b>	\$ 597,927	\$ 350,825	\$ 183,808	\$ 91,546	\$ 416,862	\$ 1,177,505	\$ 2,818,471

**Figure 22: Pleasant Hill Outside City**

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
<b>Operating Expense</b>							
Units of Service	704	3	60	5	1		
Unit Cost	1.3018	380.6287	3.2295	13.6172	949.4449		
	\$ 916	\$ 1,042	\$ 194	\$ 74	\$ 1,150	\$ -	\$ 3,376
<b>Capital Expense</b>							
Units of Service	704	5	60	5	1		
Unit Cost (1)	1.0418	103.9634	0.0000				
	\$ 733	\$ 485	\$ -	\$ -	\$ -	\$ 490	\$ 1,708
<b>Total: Cost of Service</b>	\$ 1,649	\$ 1,528	\$ 194	\$ 74	\$ 1,150	\$ 490	\$ 5,084

**Figure 23: PCRWD#1**

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
<b>Operating Expense</b>							
Units of Service	23,788	52	5,616	488	52		
Unit Cost	1.3018	380.6287	3.2295	13.6172	949.4449		
	\$ 30,967	\$ 19,672	\$ 18,137	\$ 6,639	\$ 49,158	\$ -	\$ 124,573
<b>Capital Expense</b>							
Units of Service	23,788	117	5,616	488	52		
Unit Cost (1)	1.0418	103.9634	0.0000				
	\$ 24,782	\$ 12,149	\$ -	\$ -	\$ -	\$ 11,187	\$ 48,118
<b>Total: Cost of Service</b>	\$ 55,750	\$ 31,820	\$ 18,137	\$ 6,639	\$ 49,158	\$ 11,187	\$ 172,691

**Figure 24: Berwick**

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
<b>Operating Expense</b>							
Units of Service	34,890	59	2,712	316	107		
Unit Cost	1.3018	380.6287	3.2295	13.6172	949.4449		
	\$ 45,420	\$ 22,473	\$ 8,758	\$ 4,299	\$ 101,830	\$ -	\$ 182,780
<b>Capital Expense</b>							
Units of Service	34,890	155	2,712	316	107		
Unit Cost (1)	1.0418	103.9634	0.0000				
	\$ 36,348	\$ 16,076	\$ -	\$ -	\$ -	\$ 7,739	\$ 60,164
<b>Total: Cost of Service</b>	\$ 81,768	\$ 38,549	\$ 8,758	\$ 4,299	\$ 101,830	\$ 7,739	\$ 242,944

**Figure 25: Windsor Heights**

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
<b>Operating Expense</b>							
Units of Service	114,188	174	26,148	2,502	155		
Unit Cost	1.3018	380.6287	3.2295	13.6172	949.4449		
	\$ 148,651	\$ 66,212	\$ 84,444	\$ 34,074	\$ 146,779	\$ -	\$ 480,159
<b>Capital Expense</b>							
Units of Service	114,188	487	26,148	2,502	155		
Unit Cost (1)	1.0418	103.9634	0.0000				
	\$ 118,961	\$ 50,609	\$ -	\$ -	\$ -	\$ 260,942	\$ 430,513
<b>Total: Cost of Service</b>	\$ 267,612	\$ 116,821	\$ 84,444	\$ 34,074	\$ 146,779	\$ 260,942	\$ 910,672

**Figure 26: Altoona**

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	9,516	126	24	
Unit Cost	1.3018	380.6287	3.2295	
	<u>\$ 12,388</u>	<u>\$ 48,030</u>	<u>\$ 78</u>	<u>\$ 60,495</u>
<u>Capital Expense</u>				
Units of Service	9,516	152	24	
Unit Cost (1)	0.7798	79.1906	0.0000	
	<u>\$ 7,420</u>	<u>\$ 12,057</u>	<u>\$ -</u>	<u>\$ 19,478</u>
 <b>Total: Cost of Service</b>	 <b>\$ 19,808</b>	 <b>\$ 60,087</b>	 <b>\$ 78</b>	 <b>\$ 79,973</b>

**Figure 27: Ankeny**

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	2,034,761	2,458	72	
Unit Cost	1.3018	380.6287	3.2295	
	<u>\$ 2,648,864</u>	<u>\$ 935,752</u>	<u>\$ 233</u>	<u>\$ 3,584,848</u>
<u>Capital Expense</u>				
Units of Service	2,034,761	8,033	72	
Unit Cost (1)	0.7798	79.1906	0.0000	
	<u>\$ 1,586,641</u>	<u>\$ 636,148</u>	<u>\$ -</u>	<u>\$ 2,222,789</u>
 <b>Total: Cost of Service</b>	 <b>\$ 4,235,505</b>	 <b>\$ 1,571,899</b>	 <b>\$ 233</b>	 <b>\$ 5,807,637</b>



### Figure 28: Bondurant

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	182,382	300	36	
Unit Cost	1.3018	380.6287	3.2295	
	<u>\$ 237,426</u>	<u>\$ 114,305</u>	<u>\$ 116</u>	<u>\$ 351,847</u>
<u>Capital Expense</u>				
Units of Service	182,382	800	36	
Unit Cost (1)	0.7798	79.1906	0.0000	
	<u>\$ 142,216</u>	<u>\$ 63,351</u>	<u>\$ -</u>	<u>\$ 205,567</u>
<b>Total: Cost of Service</b>	<b>\$ 379,642</b>	<b>\$ 177,656</b>	<b>\$ 116</b>	<b>\$ 557,414</b>

### Figure 29: Clive

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	667,681	2,029	108	
Unit Cost	1.3018	380.6287	3.2295	
	<u>\$ 869,191</u>	<u>\$ 772,163</u>	<u>\$ 349</u>	<u>\$ 1,641,703</u>
<u>Capital Expense</u>				
Units of Service	667,681	3,858	108	
Unit Cost (1)	0.7798	79.1906	0.0000	
	<u>\$ 520,636</u>	<u>\$ 305,510</u>	<u>\$ -</u>	<u>\$ 826,147</u>
<b>Total: Cost of Service</b>	<b>\$ 1,389,827</b>	<b>\$ 1,077,674</b>	<b>\$ 349</b>	<b>\$ 2,467,850</b>

### Figure 30: Norwalk

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	325,118	993	36	
Unit Cost	1.3018	380.6287	3.2295	
	<u>\$ 423,241</u>	<u>\$ 378,028</u>	<u>\$ 116</u>	<u>\$ 801,385</u>
<u>Capital Expense</u>				
Units of Service	325,118	1,884	36	
Unit Cost (1)	0.7798	79.1906	0.0000	
	<u>\$ 253,517</u>	<u>\$ 149,187</u>	<u>\$ -</u>	<u>\$ 402,704</u>
<b>Total: Cost of Service</b>	<b>\$ 676,757</b>	<b>\$ 527,216</b>	<b>\$ 116</b>	<b>\$ 1,204,089</b>

**Figure 31: Waukee**

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	613,758	1,819	24	
Unit Cost	1.3018	380.6287	3.2295	
	<u>\$ 798,994</u>	<u>\$ 692,521</u>	<u>\$ 78</u>	<u>\$ 1,491,592</u>
<u>Capital Expense</u>				
Units of Service	613,758	3,501	24	
Unit Cost (1)	0.7798	79.1906	0.0000	
	<u>\$ 478,589</u>	<u>\$ 277,242</u>	<u>\$ -</u>	<u>\$ 755,830</u>
<b>Total: Cost of Service</b>	<b>\$ 1,277,583</b>	<b>\$ 969,763</b>	<b>\$ 78</b>	<b>\$ 2,247,423</b>

**Figure 32: Urbandale**

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	1,590,698	5,260	60	
Unit Cost	1.3018	380.6287	3.2295	
	<u>\$ 2,070,780</u>	<u>\$ 2,002,182</u>	<u>\$ 194</u>	<u>\$ 4,073,156</u>
<u>Capital Expense</u>				
Units of Service	1,590,698	9,618	60	
Unit Cost (1)	0.7798	79.1906	0.0000	
	<u>\$ 1,240,375</u>	<u>\$ 761,677</u>	<u>\$ -</u>	<u>\$ 2,002,052</u>
<b>Total: Cost of Service</b>	<b>\$ 3,311,155</b>	<b>\$ 2,763,859</b>	<b>\$ 194</b>	<b>\$ 6,075,208</b>

**Figure 33: Warren Rural Water**

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	601,071	1,018	36	
Unit Cost	1.3018	380.6287	3.2295	
	<u>\$ 782,478</u>	<u>\$ 387,367</u>	<u>\$ 116</u>	<u>\$ 1,169,961</u>
<u>Capital Expense</u>				
Units of Service	601,071	2,664	36	
Unit Cost (1)	0.7798	79.1906	0.0000	
	<u>\$ 468,696</u>	<u>\$ 211,001</u>	<u>\$ -</u>	<u>\$ 679,697</u>
<b>Total: Cost of Service</b>	<b>\$ 1,251,174</b>	<b>\$ 598,368</b>	<b>\$ 116</b>	<b>\$ 1,849,658</b>

**Figure 34: West Des Moines Water Works**

<b><u>Operating Expense</u></b>	<b><u>Base</u></b>	<b><u>Max Day</u></b>	<b><u>Bills</u></b>	<b><u>Total</u></b>
Units of Service	896,056	3,943	108	
Unit Cost	1.3018	380.6287	3.2295	
	<u>\$ 1,166,491</u>	<u>\$ 1,500,684</u>	<u>\$ 349</u>	<u>\$ 2,667,524</u>
<b><u>Capital Expense</u></b>				
Units of Service	896,056	6,398	108	
Unit Cost (1)	0.7798	79.1906	0.0000	
	<u>\$ 698,716</u>	<u>\$ 506,629</u>	<u>\$ -</u>	<u>\$ 1,205,345</u>
<b>Total: Cost of Service</b>	<b>\$ 1,865,207</b>	<b>\$ 2,007,313</b>	<b>\$ 349</b>	<b>\$ 3,872,869</b>

**Figure 35: Xenia Rural Water District**

<b><u>Operating Expense</u></b>	<b><u>Base</u></b>	<b><u>Max Day</u></b>	<b><u>Bills</u></b>	<b><u>Total</u></b>
Units of Service	688,299	907	48	
Unit Cost	1.3018	380.6287	3.2295	
	<u>\$ 896,032</u>	<u>\$ 345,248</u>	<u>\$ 155</u>	<u>\$ 1,241,434</u>
<b><u>Capital Expense</u></b>				
Units of Service	688,299	2,793	48	
Unit Cost (1)	0.7798	79.1906	0.0000	
	<u>\$ 536,713</u>	<u>\$ 221,163</u>	<u>\$ -</u>	<u>\$ 757,877</u>
<b>Total: Cost of Service</b>	<b>\$ 1,432,745</b>	<b>\$ 566,411</b>	<b>\$ 155</b>	<b>\$ 1,999,311</b>

**Figure 36: Polk City**

<b><u>Operating Expense</u></b>	<b><u>Base</u></b>	<b><u>Max Day</u></b>	<b><u>Bills</u></b>	<b><u>Total</u></b>
Units of Service	106,259	463	12	
Unit Cost	1.3018	380.6287	3.2295	
	<u>\$ 138,329</u>	<u>\$ 176,408</u>	<u>\$ 39</u>	<u>\$ 314,775</u>
<b><u>Capital Expense</u></b>				
Units of Service	106,259	755	12	
Unit Cost (1)	0.7798	79.1906	0.0000	
	<u>\$ 82,857</u>	<u>\$ 59,756</u>	<u>\$ -</u>	<u>\$ 142,613</u>
<b>Total: Cost of Service</b>	<b>\$ 221,186</b>	<b>\$ 236,164</b>	<b>\$ 39</b>	<b>\$ 457,388</b>

**Figure 37: West Des Moines Water Works – w/ Storage**

<b><u>Operating Expense</u></b>	<b><u>Base</u></b>	<b><u>Max Day</u></b>	<b><u>Bills</u></b>	<b><u>Total</u></b>
Units of Service	9,516	221	24	
Unit Cost	1.3018	380.6287	3.2295	
	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
	\$ 12,388	\$ 83,962	\$ 78	\$ 96,427
<b><u>Capital Expense</u></b>				
Units of Service	9,516	247	24	
Unit Cost (1)	1.0418	103.9634	0.0000	
	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
	\$ 9,914	\$ 25,643	\$ -	\$ 35,557
<b>Total: Cost of Service</b>	\$ 22,302	\$ 109,605	\$ 78	\$ 131,984

**Figure 38: Johnston**

<b><u>Operating Expense</u></b>	<b><u>Base</u></b>	<b><u>Max Day</u></b>	<b><u>Bills</u></b>	<b><u>Total</u></b>
Units of Service	767,596	2,784	36	
Unit Cost	1.3018	380.6287	3.2295	
	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
	\$ 999,261	\$ 1,059,813	\$ 116	\$ 2,059,190
<b><u>Capital Expense</u></b>				
Units of Service	767,596	4,887	36	
Unit Cost (1)	1.0418	103.9634	0.0000	
	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
	\$ 799,682	\$ 508,108	\$ -	\$ 1,307,790
<b>Total: Cost of Service</b>	\$ 1,798,943	\$ 1,567,922	\$ 116	\$ 3,366,981

**Figure 39: Water Development Co.**

<b><u>Operating Expense</u></b>	<b><u>Base</u></b>	<b><u>Max Day</u></b>	<b><u>Bills</u></b>	<b><u>Total</u></b>
Units of Service	15,861	33	24	
Unit Cost	1.3018	380.6287	3.2295	
	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
	\$ 20,648	\$ 12,682	\$ 78	\$ 33,408
<b><u>Capital Expense</u></b>				
Units of Service	15,861	77	24	
Unit Cost (1)	1.0418	103.9634	0.0000	
	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
	\$ 16,524	\$ 7,982	\$ -	\$ 24,506
<b>Total: Cost of Service</b>	\$ 37,172	\$ 20,664	\$ 78	\$ 57,913

## 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.