

Des Moines Water Works

Water Cost of Service Study

Based upon proposed 2024 Budget

Final Report / October 31, 2023

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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 2024 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, known as the Base-Extra Capacity method, 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 2024 budget prepared by DMWW as a test year. **Figure 1** presents a summary of DMWW’s FY 2024 budget. The adopted rates, set by DMWW to recover all forecasted expenses, will recover approximately \$84,800,000 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.

Figure 1: FY 2024 Budget

	<u>2024 Budget</u>
<u>Revenues</u>	
Rate Revenues	\$ 84,813,263
Other Revenues	4,821,000
Total: Revenues	<u>\$ 89,634,263</u>
<u>Expenses</u>	
O&M Expenses	\$ 60,876,241
<i>Less Fee Revenue in O&M Projects</i>	<i>(3,258,216)</i>
O & M Funded thru Rate Revenue	<u>\$ 57,618,025</u>
Capital Expenses	\$ 69,400,145
<i>Less Projects Funded by Others</i>	<i>(1,991,000)</i>
<i>Less Projects Funded by DMWW SRF Debt</i>	<i>(3,344,754)</i>
<i>Less Projects Funded by Carryover</i>	<i>(15,047,830)</i>
<i>Less Projects Funded by Regional Participation</i>	<i>(17,170,323)</i>
Capital Funded Thru Rate Revenue	<u>\$ 31,846,238</u>
DMWW Debt Service	170,000
Total: Expenses	<u>\$ 89,634,263</u>
Surplus/(Deficit)	\$ -

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. 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>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>Average</u>
<u>Wholesale - Purchased Capacity</u>						
City of Altoona	13.38	0	0	0	42.253	11.126
City Of Ankeny	1.553	1.481	1.364	1.378	1.246	1.404
City Of Bondurant	1.545	1.609	1.677	1.590	1.618	1.608
City Of Clive	2.236	2.061	2.025	2.070	2.066	2.092
City Of Norwalk	2.228	2.024	1.932	2.346	2.494	2.205
City Of Polk City	3.317	2.470	2.196	2.204	2.431	2.524
Urbandale Water Utility	2.385	2.123	2.216	2.083	2.236	2.208
Warren Rural Water	1.619	1.506	1.433	1.647	1.868	1.615
City Of Waukee	2.223	2.136	1.888	1.954	1.857	2.012
West Dm Water Works	2.800	2.213	2.685	2.605	3.015	2.664
Xenia Rural Water	1.446	1.458	1.450	1.497	1.425	1.455
<u>Wholesale - With Storage</u>						
City of Johnston	2.622	2.380	2.171	2.111	2.127	2.282

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:

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

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

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 2024, 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 5.9 million kgal (or 5.9 billion gallons) are projected to be used by customers annually in FY 2024. This equates to approximately 16,200 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 1.61 times their average day consumption, or around 26,100 kgal. The difference between the maximum day and average day, around 9,900 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 2024, less the maximum day demand (57,529 kgal – 26,161 kgal = 31,368 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 6,233 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
	<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	5,918,988	16,216	1.61	26,161	9,945	3.55	57,529	31,368	69,199	830,388	107,439	6,233.14
Des Moines Outside City	290,430	796	2.86	2,276	1,480	6.30	5,013	2,737	1,173	14,076	1,513	306
DM Zoo Water Rate	28,419	78	2.07	161	83	4.42	344	183	2	24	2	-
Subtotal: Retail	6,237,837	17,090	1.66	28,437	11,508	3.68	62,886	34,288	70,374	844,488	108,954	6,539
Full Service												
Polk County	634,407	1,738	2.17	3,765	2,027	4.78	8,315	4,550	7,571	90,852	9,923	2,271
Runnells	8,114	22	1.61	36	14	3.53	79	43	211	2,532	228	23
Cumming	12,979	36	2.82	100	65	6.21	221	120	150	1,800	175	53
Alleman	9,735	27	1.63	43	17	3.58	95	52	177	2,124	320	53
Pleasant Hill Inside City	261,024	715	1.88	1,343	628	4.13	2,955	1,612	4,743	56,916	6,723	439
Pleasant Hill Outside City	704	2	2.66	5	3	5.84	11	6	5	60	5	1
PCRWD #1	24,338	67	1.91	127	61	4.21	281	153	468	5,616	488	52
Berwick Water	35,694	98	1.67	163	65	3.67	359	196	226	2,712	316	107
Windsor Heights	113,576	311	1.57	487	176	3.45	1,072	585	2,179	26,148	2,502	155
Subtotal: Full Service	1,100,571	3,015	2.01	6,071	3,055	4.44	13,388	7,317	15,730	188,760	20,680	3,153
Subtotal: Full Service and Retail	7,338,408	20,105	1.72	34,508	14,564	3.79	76,275	41,606	86,104	1,033,248	129,634	9,692
Wholesale												
Altoona	11,356	31	11.13	346	315	25.15	783	436	1	24		
Ankeny	2,156,342	5,908	1.40	8,295	2,387	3.64	21,523	13,229	1	72		
Bondurant	194,703	533	1.61	858	324	3.69	1,966	1,108	1	36		
Clive	684,708	1,876	2.09	3,924	2,048	4.88	9,161	5,236	1	108		
Norwalk	348,844	956	2.21	2,107	1,152	4.51	4,308	2,201	1	36		
Waukee	670,106	1,836	2.01	3,694	1,858	4.73	8,691	4,997	1	24		
Urbandale	1,650,111	4,521	2.21	9,982	5,461	4.83	21,858	11,876	1	60		
Warren Rural Water	613,318	1,680	1.62	2,714	1,033	3.62	6,081	3,368	1	36		
West Des Moines	923,219	2,529	2.66	6,738	4,209	5.52	13,968	7,230	1	108		
Xenia	705,799	1,934	1.46	2,814	880	3.57	6,910	4,097	1	48		
Polk City	113,576	311	2.52	785	474	5.04	1,570	784	1	12		
West Des Moines - Storage	6,490	18	11.22	200	182	24.52	436	236	1	24		
Johnston	790,173	2,165	2.28	4,940	2,775	4.93	10,678	5,738	1	36		
Water Development Co	17,849	49	1.79	87	38	3.93	192	105	1	24		
Subtotal: Wholesale	8,886,594	24,347	1.95	47,484	23,137	4.44	108,126	60,641	14	648	-	-
Subtotal: Outside City	10,306,014	28,158	1.98	55,831	27,673	4.49	126,527	70,696	16,917	203,484	22,193	3,459
Total: Utility	16,225,002	44,374	1.85	81,992	37,618	4.15	184,056	102,064	86,116	1,033,872	129,632	9,692

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 2024 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 2024 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 2022. 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&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	\$ 6,271,299									100.0%
Customer Service	4,980,103						34.0%	66.0%		
IT	3,573,052									100.0%
HR	991,836									100.0%
Engineering	1,819,110	7.7%	17.7%	26.7%	36.1%	7.6%	2.2%	0.0%	0.0%	2.0%
Transmission and Distribution	10,459,804			27.8%	72.2%					
OCEO	2,364,274									100.0%
Treatment	16,002,082		100.0%							
Source	666,641	100.0%								
Storage/Pumping	2,576,811					100.0%				
Production Administration	7,913,013	3.5%	83.1%			13.4%				
Subtotal: O&M Expenses	\$ 57,618,026	\$ 1,080,708	\$ 22,904,232	\$ 3,398,357	\$ 8,203,762	\$ 3,774,970	\$ 1,733,121	\$ 3,286,868	\$ -	\$ 13,236,029
Other Revenue										
Other Items	Items									
Misc Revenue	(4,821,000)									100.0%
Contribution to Reserves	-									1
Subtotal: Other Items	\$ (4,821,000)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (4,821,000)
Total: Net O&M	\$ 52,797,026	\$ 1,080,708	\$ 22,904,232	\$ 3,398,357	\$ 8,203,762	\$ 3,774,970	\$ 1,733,121	\$ 3,286,868	\$ -	\$ 8,415,029

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	\$ 833,256	\$ 13,440					100.00%	
Alleman Tower	5,077	159					100.00%	
Allen Hazen Tower	603,016	33,314					100.00%	
ASR Wells	7,366,878	115,658					100.00%	
Fiber Optics	-	-		100.00%				
FWTP	29,110,502	1,098,674		100.00%				
General Office Facility	2,740,076	83,476						100.00%
Grounds	2,408,686	75,222						100.00%
JES Booster Station	1,189,504	18,023					100.00%	
Jes Tower	4,304,765	88,325					100.00%	
LP Moon Storage Tank	4,017,841	87,408					100.00%	
MWTP	15,665,681	562,640		100.00%				
Nollen, Wilchinski & Tenny S	3,118,034	74,355					100.00%	
Remote Pumping/Storage	928,256	37,276					100.00%	
Roosevelt Booster Station	25,191	3,294					100.00%	
Service Dept	1,666,966	83,168						100.00%
SW Pump Station	1,838,636	59,311					100.00%	
SW Storage	127,470	2,499					100.00%	
SWTP	18,874,454	1,242,029		100.00%				
SWTP Pumping Station	598,180	22,096					100.00%	
Water Supply System	27,613,821	603,325	100.00%					
Pipelines - Feeder	51,124,009	793,166			100.00%			
Pipelines - DM	123,388,404	2,343,586			36.47%	63.53%		
Total: Rate Base	\$ 297,870,591		\$ 27,613,821	\$ 63,761,021	\$ 96,122,682	\$ 78,389,731	\$ 24,956,103	\$ 7,027,232
Total: Depreciation		7,593,898	603,325	2,932,021	1,647,851	1,488,901	555,158	366,641

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 1.72 times higher than on an average day. Since 100% of average day costs are incurred on the maximum day, 1/1.72, or about 58%, of those costs are allocated to base and the remaining 42% of costs are allocated to maximum day.

Figure 6: 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>AD in MM</u>	<u>Production</u>	<u>Annual Avg</u>
						<u>Day</u>
2018	17,536	48.04	2,043	65.89	85.43	1.78
2019	17,350	47.53	2,026	65.34	81.04	1.70
2020	18,496	50.68	2,153	69.45	85.24	1.68
2021	19,126	52.40	2,125	68.56	88.58	1.69
2022	19,547	53.55	2,235	72.09	93.47	1.75
Average:	18,411	50.44	2,116	68.27	86.75	1.72

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 2024, 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 2024, 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 2023 and 2024, 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	Fire	Inch Miles	Base	Max Day	Max Hour
Source of Supply	\$ 1,080,686	\$ 1,080,686	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Treatment	22,904,232	13,314,884	9,589,348	-	-	-	-	-	-	-	-	-	-	-
Transmission	3,398,357	1,975,562	1,422,795	-	-	-	-	-	-	-	-	-	-	-
Distribution	8,203,762	-	-	-	-	-	-	-	-	-	8,203,762	-	-	-
Storage / Pumping	3,774,970	2,194,498	1,580,472	-	-	-	-	-	-	-	-	-	-	-
Meters	1,733,121	-	-	-	-	-	-	1,733,121	-	-	-	-	-	-
Customer Service	3,286,868	-	-	-	3,286,868	-	-	-	-	-	-	-	-	-
Administration	8,415,029	3,520,128	2,387,617	-	623,205	-	-	-	328,608	-	1,555,471	-	-	-
Total:	\$ 52,797,026	\$ 22,085,759	\$ 14,980,233	\$ -	\$ 3,910,073	\$ -	\$ -	\$ -	\$ 2,061,728	\$ -	\$ 9,759,233	\$ -	\$ -	\$ -

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	Fire	Inch Miles	Base	Max Day	Max Hour
Source of Supply	\$ 53,107,714	\$ 53,107,714	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Treatment	103,411,891	60,116,286	43,295,605	-	-	-	-	-	-	-	-	-	-	-
Transmission	111,730,708	64,952,252	46,778,457	-	-	-	-	-	-	-	-	-	-	-
Distribution	143,080,178	-	-	-	-	-	-	-	-	-	-	48,009,168	34,576,088	60,494,923
Storage / Pumping	25,344,001	14,733,192	10,610,810	-	-	-	-	-	-	-	-	-	-	-
Meters	7,317,234	-	-	-	-	-	-	7,317,234	-	-	-	-	-	-
Customer Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Administration	11,569,393	5,026,772	2,623,614	-	-	-	-	190,670	-	-	1,251,007	900,973	1,576,357	
Total:	\$ 455,561,120	\$ 197,936,215	\$ 103,308,485	\$ -	\$ -	\$ -	\$ -	\$ 7,507,904	\$ -	\$ -	\$ 49,260,175	\$ 35,477,060	\$ 62,071,280	

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	Fire	Inch Miles	Base	Max Day	Max Hour
Source of Supply	\$ 1,193,427	\$ 1,193,427	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Treatment	3,866,779	2,247,869	1,618,910	-	-	-	-	-	-	-	-	-	-	-
Transmission	1,980,338	1,151,227	829,111	-	-	-	-	-	-	-	-	-	-	-
Distribution	3,081,519	-	-	-	-	-	-	-	-	-	-	1,033,974	744,665	1,302,879
Storage / Pumping	564,179	327,973	236,206	-	-	-	-	-	-	-	-	-	-	-
Meters	185,806	-	-	-	-	-	-	185,806	-	-	-	-	-	-
Customer Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Administration	960,483	434,698	237,136	-	-	-	-	16,415	-	-	91,346	65,787	115,102	
Total:	\$ 11,832,532	\$ 5,355,194	\$ 2,921,363	\$ -	\$ -	\$ -	\$ -	\$ 202,221	\$ -	\$ -	\$ 1,125,319	\$ 810,452	\$ 1,417,981	

*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 2024 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 in **Figure 10** 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 \$22.08 million. Since there are 16.2 million base units, the cost per unit is \$1.36. 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= \$8,095,715¹

Figure 10: \$1.3612 operating cost

Figure 3: DM Inside + DM Zoo =

$$5,918,988 + 28,419 = 5,947,407 \text{ kgal FY 2024 projected annual consumption}$$

Figure 11: $5,947,407 \text{ units} * \$1.3612/\text{unit} = \$8,095,715^1$

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**.

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 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	
Operating Expenses														
Total Expense	\$ 52,797,026	\$ 22,085,759	\$ 14,980,233	\$ -	\$ 3,910,073	\$ -	\$ -	\$ -	\$ 2,061,728	\$ -	\$ 9,759,233	\$ -	\$ -	\$ -
Units	16,225,002	37,701	102,247	1,033,896	7,338,408	14,564	41,606	129,634	9,924	9,692	6,237,837	11,508	34,288	
Unit Cost	1.3612	397.3425	-	3.7819	-	-	-	15.9043	-	1,006.8978	-	-	-	
Depreciation														
Shared Depreciation														
Total Expense	11,630,310	5,355,194	2,921,363	-	-	-	-	-	-	-	1,125,319	810,452	1,417,981	
Units	16,225,002	82,153	102,247	1,033,896	7,338,408	34,669	41,606	108,954	9,924	9,692	6,237,837	28,598	34,288	
Unit Cost	0.3301	35.5600	-	-	-	-	-	-	-	-	0.1804	28.3391	41.3549	
PC Depreciation														
PC Depreciation Credit	(1,993,300)	(1,289,728)	(703,572)	-	-	-	-	-	-	-	-	-	-	
Wholesale PC Depreciation	9,637,010	4,065,466	2,217,791	-	-	-	-	-	-	-	1,125,319	810,452	1,417,981	
Units	16,225,002	82,153	102,247	1,033,896	7,338,408	34,669	41,606	108,954	9,924	9,692	6,237,837	28,598	34,288	
Unit Cost	0.2506	26.9958	-	-	-	-	-	-	-	-	0.1804	28.3391	41.3549	
Rate Base														
Shared Rate Base														
Total Shared Rate Base	455,561,120	197,936,215	103,308,485	-	-	-	-	7,507,904	-	-	49,260,175	35,477,060	62,071,280	
Units	16,225,002	82,153	102,247	1,033,896	7,338,408	34,669	41,606	108,954	9,924	9,692	6,237,837	28,598	34,288	
Unit Cost	12.1995	1,257.5114	-	-	-	-	-	68.9092	-	-	7.8970	1,240.5263	1,810.2878	
Inside City Rate Base														
Rate Base (1)	249,253,375	72,555,137	33,100,657	-	-	-	-	6,861,322	-	-	46,966,650	32,653,567	57,116,042	
Return on Rate Base	3.69% \$ 9,191,215	2,675,470	1,220,586	-	-	-	-	253,011	-	-	1,731,895	1,204,100	2,106,153	
Units	5,947,407	26,322	31,551	830,412	5,947,407	26,322	31,551	107,441	7,960	6,233	5,947,407	26,322	31,551	
Unit Cost	0.4499	46.3707	-	-	-	-	-	2.3549	-	-	0.2912	45.7444	66.7543	
Outside City Rate Base														
Rate Base	205,661,163	125,381,078	70,207,829	-	-	-	-	-	-	-	2,293,525	2,823,493	4,955,238	
Return on Rate Base	6.00% 12,339,670	7,522,865	4,212,470	-	-	-	-	-	-	-	137,611	169,410	297,314	
Units	10,277,595	55,831	70,696	203,484	1,391,001	8,347	10,055	1,513	1,964	3,459	290,430	2,276	2,737	
Unit Cost	0.7320	75.4507	-	-	-	-	-	-	-	-	0.4738	74.4316	108.6173	
PC Rate Base														
PC Rate Base Credit	(41,859,305)	(27,504,127)	(14,355,178)	-	-	-	-	-	-	-	-	-	-	
PC Rate Base	163,801,857	97,876,951	55,852,650	-	-	-	-	-	-	-	2,293,525	2,823,493	4,955,238	
PC Return on Rate Base	6.00% 9,828,111	5,872,617	3,351,159	-	-	-	-	-	-	-	137,611	169,410	297,314	
Units	10,277,595	55,831	70,696	203,484	1,391,001	8,347	10,055	1,513	1,964	3,459	290,430	2,276	2,737	
Unit Cost	0.5714	60.0235	-	-	-	-	-	-	-	-	0.4738	74.4316	108.6173	

(1) Includes addition of \$6.8 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	
Des Moines Inside City														
O&M	\$ 23,205,717	\$ 8,095,715	\$ 3,984,584	\$ -	\$ 3,140,520	\$ -	\$ -	\$ -	\$ 1,708,766	-	\$ 6,276,132	\$ -	\$ -	\$ -
Depreciation	6,015,110	1,962,990	936,022	-	-	-	-	-	-	-	1,072,925	745,951	1,297,221	
Return on Rate Base	9,191,215	2,675,470	1,220,586	-	-	-	-	253,011	-	-	1,731,895	1,204,100	2,106,153	
Subtotal: DMIC	\$ 38,412,042	\$ 12,734,175	\$ 6,141,193	\$ -	\$ 3,140,520	\$ -	\$ -	\$ -	\$ 1,961,777	\$ -	\$ 6,276,132	\$ 2,804,820	\$ 1,950,051	\$ 3,403,374
Outside City Customers														
O&M	\$ 29,591,308	\$ 13,990,043	\$ 10,995,648	\$ -	\$ 769,553	\$ -	\$ -	\$ -	\$ 352,963	\$ -	\$ 3,483,101	\$ -	\$ -	\$ -
PC Depreciation	3,163,369	2,022,605	1,140,764	-	-	-	-	-	-	-	-	-	-	
PC Return on Rate Base	7,148,804	4,612,387	2,536,416	-	-	-	-	-	-	-	-	-	-	
Other Outside Depreciation	1,440,723	727,948	482,681	-	-	-	-	-	-	-	52,394	64,501	113,199	
Other Outside Return on Rate Base	3,242,846	1,614,364	1,024,147	-	-	-	-	-	-	-	137,611	169,410	297,314	
Subtotal: Outside City	\$ 44,587,050	\$ 22,967,347	\$ 16,179,656	\$ -	\$ 769,553	\$ -	\$ -	\$ -	\$ 352,963	\$ -	\$ 3,483,101	\$ 190,006	\$ 233,911	\$ 410,514
Direct Assets														
Depreciation	\$ 1,814,170													
Subtotal: Direct Assets	\$ 1,814,170													
Total: Revenue Recovered	\$ 84,813,263													

Figure 12: Reconciliation to Cash Basis

	<u>Operating</u>	<u>Capital</u>	<u>Total</u>
<u>Cash Basis Revenue Requirements</u>			
Operation and Maintenance Expense	57,618,026		57,618,026
Debt Service		170,000	170,000
Cash Financed Capital		31,846,237	31,846,237
Contribution to Operating Reserve			0
Subtotal: Revenue Requirement	57,618,026	32,016,237	89,634,263
<u>Requirements Met from Other Sources</u>			
Misc Revenues	4,821,000		4,821,000
Subtotal: Other Revenues	4,821,000	0	4,821,000
Total: Revenue Required	52,797,026	32,016,237	84,813,263
<u>Utility Basis Revenue Requirements</u>			
Operation and Maintenance Expense	52,797,026		52,797,026
Depreciation		12,433,373	12,433,373
Return on Rate Base		19,582,864	19,582,864
Total: Revenue Requirement	52,797,026	32,016,237	84,813,263

STEP 5: DETERMINE REVENUE REQUIREMENTS BY CUSTOMER CLASS

To determine the allocation of the FY 2024 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)². **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)

$$\$12,673,327 + \$60,849 = \$12,734,176^2$$

Figure 10: \$1.3612 operating cost + \$0.3301 shared depreciation + \$0.4499 Inside City rate base
= \$2.1411/unit

Figure 3: DM Inside + DM Zoo projected annual consumption

DM Inside – 5,918,988

DM Zoo – 28,419

Figure 13: DM Inside + DM Zoo

$$\text{DM Inside} - 5,918,988 * \$2.1411/\text{unit} = \$12,673,327^2$$

$$\text{DM Zoo} - 28,419 * \$2.1411/\text{unit} = \$60,849$$

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 Cost of Service results for each customer class compared to projected FY 2024 revenues under proposed rates. A few observations in reviewing these results:

- The Des Moines Inside City, Wholesale Purchased Capacity and With Storage classes are significantly close to 100% recovery.
- The Des Moines Outside City customer class is significantly under-recovering costs, although this 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 costs are under-recovered, higher rate increases are proposed. In situations where the results show costs are over-recovered, this has occurred intentionally to

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

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.

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
Retail															
Des Moines Inside City	\$ 39,040,868	\$ 12,673,327	\$ 6,037,002	\$ -	\$ 3,140,430	\$ -	\$ -	\$ -	\$ 1,961,740	\$ 6,276,132	\$ 2,791,417	\$ 1,938,129	\$ 3,391,170		\$ 831,522
Des Moines, Outside City	2,776,039	703,783	840,870	-	53,234	-	-	-	24,061	307,954	190,006	233,911	410,514		11,709
DM Zoo Water Rate	152,260	60,849	46,193	-	91	-	-	-	37	-	13,403	11,922	19,765		
Subtotal: Retail	\$ 41,969,167	\$ 13,437,958	\$ 6,924,064	\$ -	\$ 3,193,754	\$ -	\$ -	\$ -	\$ 1,985,837	\$ 6,584,086	\$ 2,994,825	\$ 2,183,962	\$ 3,821,449	\$ -	\$ 843,231
Full Service															
Polk County	6,226,879	1,537,322	1,223,356	-	343,592	-	-	-	157,826	2,286,648					678,135
Runnells	120,884	19,662	59,773	-	9,576	-	-	-	3,629	23,095					5,150
Cumming Water	149,091	31,451	36,925	-	6,807	-	-	-	2,781	53,100					18,026
Alleman	108,515	23,590	11,447	-	8,033	-	-	-	5,087	53,213					7,145
Pleasant Hill Inside City	2,004,447	632,525	398,558	-	215,250	-	-	-	106,921	442,114					209,079
Pleasant Hill Outside City	5,614	1,705	1,839	-	227	-	-	-	87	1,192					564
PCRWD #1	189,598	58,977	38,308	-	21,239	-	-	-	7,754	52,133					11,187
Berwick Water	262,243	86,495	43,983	-	10,256	-	-	-	5,021	107,991					8,495
Windsor Heights	726,896	275,222	124,169	-	98,889	-	-	-	39,796	155,661					33,159
Subtotal: Full Service	9,794,166	2,666,951	1,938,358	-	713,868	-	-	-	328,902	3,175,147	-	-	-	-	970,940
Wholesale															
Altoona	180,200	24,792	155,317	-	91										
Ankeny	6,378,107	4,707,695	1,670,140	-	272										
Bondurant	628,720	425,073	203,511	-	136										
Clive	2,650,707	1,494,845	1,155,454	-	408										
Norwalk	1,402,717	761,591	640,989	-	136										
Waukee	2,522,730	1,462,966	1,059,674	-	91										
Urbandale	6,641,319	3,602,499	3,038,593	-	227										
Warren Rural Water	1,985,883	1,338,987	646,760	-	136										
West Des Moines	4,274,685	2,015,558	2,258,718	-	408										
Xenia	2,135,498	1,540,890	594,426	-	182										
Polk City	504,774	247,957	256,771	-	45										
Subtotal: Wholesale PC	29,305,339	17,622,853	11,680,353	-	2,133										
Wholesale with Storage															
West Des Moines - Storage	110,175	15,727	94,358	-	91										
Johnston	3,566,096	1,914,781	1,651,179	-	136										
Water Development Co	68,319	43,252	24,976	-	91										
Subtotal: Wholesale - Storage	3,744,591	1,973,761	1,770,513	-	318										
Total: Utility	\$ 84,813,263	\$ 35,701,522	\$ 22,313,288	\$ -	\$ 3,910,073	\$ -	\$ -	\$ -	\$ 2,314,739	\$ 9,759,233	\$ 2,994,825	\$ 2,183,962	\$ 3,821,449	\$ -	\$ 1,814,170

Figure 14: Cost of Service Results

<u>Customer</u>	<u>Cost of Service</u>	<u>4/1 Proposed Rate Increase</u>	<u>2024 Projected Revenue</u>	<u>COS Recovery</u>
Retail				
Des Moines Inside City	\$ 39,193,127	6%	\$ 38,096,872	97%
Des Moines Outside City	2,776,039	10%	1,402,777	51%
Total: Retail	\$ 41,969,167		\$ 39,499,649	94%
Full Service				
Polk County	\$ 7,040,886	6%	\$ 7,840,259	111%
Runnells	170,884	6%	180,601	106%
Cumming	149,091	6%	151,030	101%
Alleman	108,515	6%	136,741	126%
Pleasant Hill Inside City	3,004,447	6%	3,130,036	104%
Pleasant Hill Outside City	5,614	10%	3,882	69%
PCRWD	189,598	10%/\$1 Avail Inc	170,876	90%
Berwick	262,243	10%/\$1 Avail Inc	188,513	72%
Windsor Heights	954,049	6%	1,067,435	112%
Less: Future FS Capital Costs	(2,091,160)			
Total: Full Service	\$ 9,794,166		\$ 12,869,373	131%
Wholesale - PC				
Altoona	\$ 180,200	6%	\$ 40,280	22%
Ankeny	6,378,107	6%	7,648,726	120%
Bondurant	628,720	6%	690,627	110%
Clive	2,650,707	6%	2,428,718	92%
Norwalk	1,402,717	6%	1,237,379	88%
Waukee	2,522,730	6%	2,376,923	94%
Urbandale	6,641,319	6%	5,853,085	88%
Warren Rural Water	1,985,883	6%	2,175,492	110%
West Des Moines	4,274,685	6%	3,274,735	77%
Xenia	2,135,498	6%	2,503,528	117%
Polk City	504,774	6%	402,865	80%
Total: Wholesale - PC	\$ 29,305,339		\$ 28,632,358	98%
Wholesale with Storage				
West Des Moines - Storage	\$ 110,175	3%	\$ 30,372	28%
Johnston	3,566,096	3%	3,697,979	104%
Water Development Co	68,319	3%	83,532	122%
Total: Wholesale with Storage	\$ 3,744,591		\$ 3,811,883	102%
Total: Utility	\$ 84,813,263		\$ 84,813,263	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 3** and the unit costs can be found on **Figure 10**.

⁽¹⁾ 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		
Operating Expense										
Units of Service	5,947,407	10,028	830,412	107,441	6,233	5,947,407	10,028	31,551		
Unit Cost	1.3612	397.3425	3.7819	15.9043	1,006.8978	-	-	-		
	\$ 8,095,715	\$ 3,926,586	\$ 3,140,520	\$ 1,708,766	\$ 6,276,132	\$ -	\$ -	\$ -		\$ 23,147,719
Capital Expense										
Units of Service	5,947,407	26,322	830,412	107,441	6,233	5,947,407	26,322	31,551		
Unit Cost (1)	0.7799	81.9307	-	2.3549	-	0.4716	74.0835	108.1093		
	\$ 4,638,460	\$ 2,156,608	\$ -	\$ 253,011	\$ -	\$ 2,804,820	\$ 1,950,051	\$ 3,410,935	\$ 831,522	\$ 16,045,408
Total: Cost of Service	\$ 12,734,175	\$ 6,083,195	\$ 3,140,520	\$ 1,961,777	\$ 6,276,132	\$ 2,804,820	\$ 1,950,051	\$ 3,410,935	\$ 831,522	\$ 39,193,127

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		
Operating Expense										
Units of Service	290,430	1,480	14,076	1,513	306	290,430	1,480	2,737		
Unit Cost	1.3612	397.3425	3.7819	15.9043	1,006.8978	-	-	-		
	\$ 395,338	\$ 588,204	\$ 53,234	\$ 24,061	\$ 307,954	\$ -	\$ -	\$ -	\$ -	\$ 1,368,791
Capital Expense										
Units of Service	290,430	2,276	14,076	1,513	306	290,430	2,276	2,737		
Unit Cost (1)	1.0620	111.0107	-	-	-	0.6542	102.7707	149.9722		
	\$ 308,444	\$ 252,665	\$ -	\$ -	\$ -	\$ 190,006	\$ 233,911	\$ 410,514	\$ 11,709	\$ 1,407,248
Total: Cost of Service	\$ 703,783	\$ 840,870	\$ 53,234	\$ 24,061	\$ 307,954	\$ 190,006	\$ 233,911	\$ 410,514	\$ 11,709	\$ 2,776,039

Figure 17: Polk County

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
Operating Expense							
Units of Service	634,407	2,027	90,852	9,923	2,271		
Unit Cost	1.3612	397.3425	3.7819	15.9043	1,006.8978		
	\$ 863,566	\$ 805,395	\$ 343,592	\$ 157,826	\$ 2,286,648	\$ -	\$ 4,457,026
Capital Expense							
Units of Service	634,407	3,765	90,852	9,923	2,271		
Unit Cost (1)	1.0620	111.0107	-	-	-		
	\$ 673,756	\$ 417,961	\$ -	\$ -	\$ -	\$ 1,492,142	\$ 2,583,860
Total: Cost of Service	\$ 1,537,322	\$ 1,223,356	\$ 343,592	\$ 157,826	\$ 2,286,648	\$ 1,492,142	\$ 7,040,886

Figure 18: Runnells

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
Operating Expense							
Units of Service	8,114	14	2,532	228	23		
Unit Cost	1.3612	397.3425	3.7819	15.9043	1,006.8978		
	\$ 11,045	\$ 5,368	\$ 9,576	\$ 3,629	\$ 23,095	\$ 50,437	\$ 103,150
Capital Expense							
Units of Service	8,114	36	2,532	228	23		
Unit Cost (1)	1.0620	111.0107	-	-	-		
	\$ 8,617	\$ 3,968	\$ -	\$ -	\$ -	\$ 55,150	\$ 67,734
Total: Cost of Service	\$ 19,662	\$ 9,336	\$ 9,576	\$ 3,629	\$ 23,095	\$ 105,586	\$ 170,884

Figure 19: Cumming

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
Operating Expense							
Units of Service	12,979	65	1,800	175	53		
Unit Cost	1.3612	397.3425	3.7819	15.9043	1,006.8978		
	\$ 17,667	\$ 25,776	\$ 6,807	\$ 2,781	\$ 53,100	\$ -	\$ 106,132
Capital Expense							
Units of Service	12,979	100	1,800	175	53		
Unit Cost (1)	1.0620	111.0107	-	-	-		
	\$ 13,784	\$ 11,149	\$ -	\$ -	\$ -	\$ 18,026	\$ 42,959
Total: Cost of Service	\$ 31,451	\$ 36,925	\$ 6,807	\$ 2,781	\$ 53,100	\$ 18,026	\$ 149,091

Figure 20: Alleman

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
Operating Expense							
Units of Service	9,735	17	2,124	320	53		
Unit Cost	1.3612	397.3425	3.7819	15.9043	1,006.8978		
	\$ 13,251	\$ 6,633	\$ 8,033	\$ 5,087	\$ 53,213	\$ -	\$ 86,217
Capital Expense							
Units of Service	9,735	43	2,124	320	53		
Unit Cost (1)	1.0620	111.0107	-				
	\$ 10,339	\$ 4,814	\$ -	\$ -	\$ -	\$ 7,145	\$ 22,298
Total: Cost of Service	\$ 23,590	\$ 11,447	\$ 8,033	\$ 5,087	\$ 53,213	\$ 7,145	\$ 108,515

Figure 21: Pleasant Hill Inside City

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
Operating Expense							
Units of Service	261,024	628	56,916	6,723	439		
Unit Cost	1.3612	397.3425	3.7819	15.9043	1,006.8978		
	\$ 355,310	\$ 249,472	\$ 215,250	\$ 106,921	\$ 442,114	\$ -	\$ 1,369,067
Capital Expense							
Units of Service	261,024	1,343	56,916	6,723	439		
Unit Cost (1)	1.0620	111.0107	-	-	-		
	\$ 277,214	\$ 149,086	\$ -	\$ -	\$ -	\$ 1,209,079	\$ 1,635,379
Total: Cost of Service	\$ 632,525	\$ 398,558	\$ 215,250	\$ 106,921	\$ 442,114	\$ 1,209,079	\$ 3,004,447

Figure 22: Pleasant Hill Outside City

	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
Operating Expense							
Units of Service	704	3	60	5	1		
Unit Cost	1.3612	397.3425	3.7819	15.9043	1,006.8978		
	\$ 958	\$ 1,270	\$ 227	\$ 87	\$ 1,192	\$ -	\$ 3,734
Capital Expense							
Units of Service	704	5	60	5	1		
Unit Cost (1)	1.0620	111.0107	-	-	-		
	\$ 747	\$ 569	\$ -	\$ -	\$ -	\$ 564	\$ 1,880
Total: Cost of Service	\$ 1,705	\$ 1,839	\$ 227	\$ 87	\$ 1,192	\$ 564	\$ 5,614

Figure 23: PCRWD#1

Operating Expense	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
Units of Service	24,338	61	5,616	488	52		
Unit Cost	1.3612	397.3425	3.7819	15.9043	1,006.8978		
	\$ 33,129	\$ 24,157	\$ 21,239	\$ 7,754	\$ 52,133	\$ -	\$ 138,412
Capital Expense							
Units of Service	24,338	127	5,616	488	52		
Unit Cost (1)	1.0620	111.0107	-	-	-		
	\$ 25,848	\$ 14,151	\$ -	\$ -	\$ -	\$ 11,187	\$ 51,185
Total: Cost of Service	\$ 58,977	\$ 38,308	\$ 21,239	\$ 7,754	\$ 52,133	\$ 11,187	\$ 189,598

Figure 24: Berwick

Operating Expense	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
Units of Service	35,694	65	2,712	316	107		
Unit Cost	1.3612	397.3425	3.7819	15.9043	1,006.8978		
	\$ 48,587	\$ 25,893	\$ 10,256	\$ 5,021	\$ 107,991	\$ -	\$ 197,749
Capital Expense							
Units of Service	35,694	163	2,712	316	107		
Unit Cost (1)	1.0620	111.0107	-	-	-		
	\$ 37,908	\$ 18,090	\$ -	\$ -	\$ -	\$ 8,495	\$ 64,493
Total: Cost of Service	\$ 86,495	\$ 43,983	\$ 10,256	\$ 5,021	\$ 107,991	\$ 8,495	\$ 262,243

Figure 25: Windsor Heights

Operating Expense	Common to All			Full Service and Retail		Direct	Total
	Base	Max Day	Bills	Meters	Inch Miles		
Units of Service	113,576	176	26,148	2,502	155		
Unit Cost	1.3612	397.3425	3.7819	15.9043	1,006.8978		
	\$ 154,602	\$ 70,054	\$ 98,889	\$ 39,796	\$ 155,661	\$ -	\$ 519,001
Capital Expense							
Units of Service	113,576	487	26,148	2,502	155		
Unit Cost (1)	1.0620	111.0107	-	-	-		
	\$ 120,621	\$ 54,115	\$ -	\$ -	\$ -	\$ 260,312	\$ 435,048
Total: Cost of Service	\$ 275,222	\$ 124,169	\$ 98,889	\$ 39,796	\$ 155,661	\$ 260,312	\$ 954,049

Figure 26: Altoona

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	11,356	315	24	
Unit Cost	1.3612	397.3425	3.7819	
	<u>\$ 15,458</u>	<u>\$ 125,193</u>	<u>\$ 91</u>	<u>\$ 140,741</u>
<u>Capital Expense</u>				
Units of Service	11,356	346	24	
Unit Cost (1)	0.8220	87.0193	-	
	<u>\$ 9,334</u>	<u>\$ 30,125</u>	<u>\$ -</u>	<u>\$ 39,459</u>
Total: Cost of Service	\$ 24,792	\$ 155,317	\$ 91	\$ 180,200

Figure 27: Ankeny

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	2,156,342	2,387	72	
Unit Cost	1.3612	397.3425	3.7819	
	<u>\$ 2,935,251</u>	<u>\$ 948,355</u>	<u>\$ 272</u>	<u>\$ 3,883,879</u>
<u>Capital Expense</u>				
Units of Service	2,156,342	8,295	72	
Unit Cost (1)	0.8220	87.0193	-	
	<u>\$ 1,772,444</u>	<u>\$ 721,785</u>	<u>\$ -</u>	<u>\$ 2,494,229</u>
Total: Cost of Service	\$ 4,707,695	\$ 1,670,140	\$ 272	\$ 6,378,107

Figure 28: Bondurant

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	194,703	324	36	
Unit Cost	1.3612	397.3425	3.7819	
	<u>\$ 265,033</u>	<u>\$ 128,869</u>	<u>\$ 136</u>	<u>\$ 394,038</u>
<u>Capital Expense</u>				
Units of Service	194,703	858	36	
Unit Cost (1)	0.8220	87.0193	-	
	<u>\$ 160,040</u>	<u>\$ 74,642</u>	<u>\$ -</u>	<u>\$ 234,681</u>
Total: Cost of Service	\$ 425,073	\$ 203,511	\$ 136	\$ 628,720

Figure 29: Clive

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	684,708	2,048	108	
Unit Cost	1.3612	397.3425	3.7819	
	<u>\$ 932,037</u>	<u>\$ 813,955</u>	<u>\$ 408</u>	<u>\$ 1,746,400</u>
<u>Capital Expense</u>				
Units of Service	684,708	3,924	108	
Unit Cost (1)	0.8220	87.0193	-	
	<u>\$ 562,808</u>	<u>\$ 341,499</u>	<u>\$ -</u>	<u>\$ 904,307</u>
Total: Cost of Service	\$ 1,494,845	\$ 1,155,454	\$ 408	\$ 2,650,707

Figure 30: Norwalk

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	348,844	1,152	36	
Unit Cost	1.3612	397.3425	3.7819	
	<u>\$ 474,853</u>	<u>\$ 457,605</u>	<u>\$ 136</u>	<u>\$ 932,593</u>
<u>Capital Expense</u>				
Units of Service	348,844	2,107	36	
Unit Cost (1)	0.8220	87.0193	-	
	<u>\$ 286,739</u>	<u>\$ 183,385</u>	<u>\$ -</u>	<u>\$ 470,123</u>
Total: Cost of Service	\$ 761,591	\$ 640,989	\$ 136	\$ 1,402,717

Figure 31: Waukee

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	670,106	1,858	24	
Unit Cost	1.3612	397.3425	3.7819	
	<u>\$ 912,160</u>	<u>\$ 738,238</u>	<u>\$ 91</u>	<u>\$ 1,650,488</u>
Capital Expense				
Units of Service	670,106	3,694	24	
Unit Cost (1)	0.8220	87.0193	-	
	<u>\$ 550,806</u>	<u>\$ 321,436</u>	<u>\$ -</u>	<u>\$ 872,242</u>
Total: Cost of Service	\$ 1,462,966	\$ 1,059,674	\$ 91	\$ 2,522,730

Figure 32: Urbandale

<u>Operating Expense</u>	<u>Base</u>	<u>Max Day</u>	<u>Bills</u>	<u>Total</u>
Units of Service	1,650,111	5,461	60	
Unit Cost	1.3612	397.3425	3.7819	
	<u>\$ 2,246,160</u>	<u>\$ 2,169,963</u>	<u>\$ 227</u>	<u>\$ 4,416,350</u>
Capital Expense				
Units of Service	1,650,111	9,982	60	
Unit Cost (1)	0.8220	87.0193	-	
	<u>\$ 1,356,338</u>	<u>\$ 868,631</u>	<u>\$ -</u>	<u>\$ 2,224,969</u>
Total: Cost of Service	\$ 3,602,499	\$ 3,038,593	\$ 227	\$ 6,641,319

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	613,318	1,033	36	
Unit Cost	1.3612	397.3425	3.7819	
	<u>\$ 834,859</u>	<u>\$ 410,613</u>	<u>\$ 136</u>	<u>\$ 1,245,609</u>
Capital Expense				
Units of Service	613,318	2,714	36	
Unit Cost (1)	0.8220	87.0193	-	
	<u>\$ 504,128</u>	<u>\$ 236,146</u>	<u>\$ -</u>	<u>\$ 740,274</u>
Total: Cost of Service	\$ 1,338,987	\$ 646,760	\$ 136	\$ 1,985,883

Figure 34: West Des Moines Water Works

Operating Expense	Base	Max Day	Bills	Total
Units of Service	923,219	4,209	108	
Unit Cost	1.3612	397.3425	3.7819	
	<u>\$ 1,256,702</u>	<u>\$ 1,672,362</u>	<u>\$ 408</u>	<u>\$ 2,929,472</u>
Capital Expense				
Units of Service	923,219	6,738	108	
Unit Cost (1)	0.8220	87.0193	-	
	<u>\$ 758,856</u>	<u>\$ 586,357</u>	<u>\$ -</u>	<u>\$ 1,345,213</u>
Total: Cost of Service	\$ 2,015,558	\$ 2,258,718	\$ 408	\$ 4,274,685

Figure 35: Xenia Rural Water District

Operating Expense	Base	Max Day	Bills	Total
Units of Service	705,799	880	48	
Unit Cost	1.3612	397.3425	3.7819	
	<u>\$ 960,746</u>	<u>\$ 349,594</u>	<u>\$ 182</u>	<u>\$ 1,310,522</u>
Capital Expense				
Units of Service	705,799	2,814	48	
Unit Cost (1)	0.8220	87.0193	-	
	<u>\$ 580,144</u>	<u>\$ 244,831</u>	<u>\$ -</u>	<u>\$ 824,975</u>
Total: Cost of Service	\$ 1,540,890	\$ 594,426	\$ 182	\$ 2,135,498

Figure 36: Polk City

Operating Expense	Base	Max Day	Bills	Total
Units of Service	113,576	474	12	
Unit Cost	1.3612	397.3425	3.7819	
	<u>\$ 154,602</u>	<u>\$ 188,427</u>	<u>\$ 45</u>	<u>\$ 343,074</u>
Capital Expense				
Units of Service	113,576	785	12	
Unit Cost (1)	0.8220	87.0193	-	
	<u>\$ 93,356</u>	<u>\$ 68,344</u>	<u>\$ -</u>	<u>\$ 161,700</u>
Total: Cost of Service	\$ 247,957	\$ 256,771	\$ 45	\$ 504,774

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

Operating Expense	Base	Max Day	Bills	Total
Units of Service	6,490	182	24	
Unit Cost	1.3612	397.3425	3.7819	
	\$ 8,834	\$ 72,210	\$ 91	\$ 81,135
Capital Expense				
Units of Service	6,490	200	24	
Unit Cost (1)	1.0620	111.0107	-	
	\$ 6,893	\$ 22,148	\$ -	\$ 29,041
Total: Cost of Service	\$ 15,727	\$ 94,358	\$ 91	\$ 110,175

Figure 38: Johnston

Operating Expense	Base	Max Day	Bills	Total
Units of Service	790,173	2,775	36	
Unit Cost	1.3612	397.3425	3.7819	
	\$ 1,075,597	\$ 1,102,763	\$ 136	\$ 2,178,497
Capital Expense				
Units of Service	790,173	4,940	36	
Unit Cost (1)	1.0620	111.0107	-	
	\$ 839,184	\$ 548,415	\$ -	\$ 1,387,599
Total: Cost of Service	\$ 1,914,781	\$ 1,651,179	\$ 136	\$ 3,566,096

Figure 39: Water Development Co.

Operating Expense	Base	Max Day	Bills	Total
Units of Service	17,849	38	24	
Unit Cost	1.3612	397.3425	3.7819	
	\$ 24,296	\$ 15,279	\$ 91	\$ 39,666
Capital Expense				
Units of Service	17,849	87	24	
Unit Cost (1)	1.0620	111.0107	-	
	\$ 18,956	\$ 9,697	\$ -	\$ 28,653
Total: Cost of Service	\$ 43,252	\$ 24,976	\$ 91	\$ 68,319

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.