

**Town of Ledyard**  
**Water Cost of Service Study and**  
**Financial Projection Report**  
April 2024



Corporate location:  
Utility Financial Solutions, LLC  
185 Sun Meadow Court  
Holland, MI USA 49424  
(616) 393-9722  
Fax (888) 566-4430

Submitted Respectfully by:  
Mark Beauchamp, CPA, CMA, MBA  
President, Utility Financial Solutions, LLC  
mbeauchamp@ufsweb.com  
(616) 393-9722

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April 2024

Town of Ledyard  
741 Colonel Ledyard Highway  
Ledyard, CT 06339

We are pleased to present the Report for the water cost of service study and financial projection for the Town of Ledyard (Ledyard). This report was prepared to provide Ledyard with a comprehensive examination of its existing rate structure by an outside party.

The specific purposes of this rate study are:

- Determine water utility's revenue requirements for fiscal year 2025
- Identify cross-subsidies that may exist between rate classes
- Determine rate adjustments needed to meet targeted revenue requirements
- Identify the appropriate monthly customer charge for each customer class

This report includes results of the water cost of service study and financial projection and considerations on future rate designs.

This report is intended for information and use by the utility and management for the purposes stated above and is not intended to be used by anyone except the specified parties.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark Beauchamp", is written over a horizontal line.

Utility Financial Solutions, LLC  
Mark Beauchamp, CPA, MBA, CMA  
185 Sun Meadow Ct  
Holland, MI 49424

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## 1. Introduction

This report was prepared to provide Town of Ledyard with a water cost of service study and financial projection and a comprehensive examination of its existing rate structure by an outside party. The specific purposes of the study are identified below:

- 1) **Determine water utility's revenue requirements for fiscal year 2025.** Ledyard's revenue requirements were projected for the period from 2025 – 2029 and included adjustments for the following:
  - a. Projected costs
  - b. Projected changes in staffing levels
  - c. Capital improvement plan projected over next five years
- 2) **Identify cross-subsidies that may exist between rate classes.** Cross-subsidies exist when certain customer classes subsidize the water costs of other customers. The rate study identifies if cross-subsidies exist and practical ways to reduce the subsidies. The cost of service study was completed using 2025 projected revenues and expenses. The financial projections are for the period from 2025 – 2029.
- 3) **Identify financial metrics required to meet bond covenant requirements.**
- 4) **Identify rate adjustments needed to meet targeted revenue requirements.** The primary purpose of this study is to identify appropriate revenue requirements and the rate adjustments needed to meet targeted revenue requirements. The report includes a long-term rate track for to help ensure the financial stability of the utility in future years.
- 5) **Unbundled water rates.** The cost of providing water to customers consists of several components, including distribution, customer services, and transfers to the general fund. Water unbundling identifies the cost of each component to assist the utility in preparing for water restructuring and understanding its cost structure.
- 6) **Identify the appropriate monthly customer charge for each customer class.** The monthly customer charge consists of fixed costs to service customers.

## 2. Financial Projection Summary

### Utility Rate Process

Ledyard retained Utility Financial Solutions to review utility rates and cost of service. This study follows the process set forth for best practice through the American Water Works Association. This report includes results of the water cost of service and unbundling study and considerations on future rate designs.

Water consumption can vary significantly due to factors like weather (e.g., a hot, dry summer leading to more irrigation). This variability is a significant challenge for water utility planning since revenues can fluctuate with water usage while many of the utility's costs are fixed. The study assumes little to no growth in water consumption during the projection period. This is a conservative assumption and helps to ensure financial stability.

The assumptions used to develop the expense projection are described in greater detail in the “Significant Assumptions” section of this report.

### Utility Revenue Requirements

To determine revenue requirements, the revenues and expenses for Fiscal Years 2022 and 2023, and 2024 budget were analyzed, with adjustments made to reflect projected operating characteristics. ***The projected financial statements are for cost of service purposes only.***

Table 1 is the projected financial statement for the Water Department from 2025 – 2029. The 2025 rate of return calculation established an operating income target of \$650,133 (See Table 5).

Operating income for 2025 is projected at -\$587,297 and decreases to -\$737,360 in 2029. Operating income is one target that helps to determine if rate adjustments are needed. The following pages review cash flow and debt coverage ratio which are also important indicators.

**Table 1 – Projected Financial Statements**

Description	Projected 2025	Projected 2026	Projected 2027	Projected 2028	Projected 2029
<b>Operating Revenues:</b>					
Water Sales					
Metered Individual Living Units	\$ 765,887	\$ 767,801	\$ 769,721	\$ 771,645	\$ 773,574
Schools, Churches, & Commercial	198,068	198,563	199,060	199,557	200,056
Unmetered	3,103	3,111	3,118	3,126	3,134
Metered Apartments	193,329	193,813	194,297	194,783	195,270
Fire Sprinkler Annual Flat Rate	717	719	721	723	724
Miscellaneous	2,575	2,652	2,732	2,814	2,898
Connection Fees	11,296	11,635	11,984	12,344	12,714
Late Fees	783	807	831	856	882
Assessment Fees	8,740	9,002	9,272	9,550	9,837
Transmission Fee	13,228	13,625	14,033	14,454	14,888
<b>Total Operating Revenues</b>	<b>\$ 1,197,727</b>	<b>\$ 1,201,728</b>	<b>\$ 1,205,770</b>	<b>\$ 1,209,853</b>	<b>\$ 1,213,978</b>
<b>Operating Expenses:</b>					
Contracted and Purchased Services	\$ 1,270,701	\$ 1,308,822	\$ 1,348,087	\$ 1,388,530	\$ 1,430,186
Utilities	14,898	15,344	15,805	16,279	16,767
Depreciation Expense	299,425	300,634	301,884	303,134	304,384
Contributed Capital Depreciation	27,154	27,195	27,195	27,195	27,195
<b>Total Operating Expenses</b>	<b>\$ 1,612,178</b>	<b>\$ 1,651,996</b>	<b>\$ 1,692,971</b>	<b>\$ 1,735,138</b>	<b>\$ 1,778,532</b>
<b>Operating Income</b>	<b>\$ (414,451)</b>	<b>\$ (450,268)</b>	<b>\$ (487,201)</b>	<b>\$ (525,285)</b>	<b>\$ (564,554)</b>
<b>Other Income &amp; Expense</b>					
Interest On Long Term Debt	\$ (91,061)	\$ (74,701)	\$ (58,891)	\$ (44,172)	\$ (29,878)
Transfers					
Transfers Out	(200,000)	(200,000)	(200,000)	(200,000)	(200,000)
Capital Contributions	3,242	-	-	-	-
<b>Non Operating Income/Expense</b>	<b>\$ (287,819)</b>	<b>\$ (274,701)</b>	<b>\$ (258,891)</b>	<b>\$ (244,172)</b>	<b>\$ (229,878)</b>
<b>Net Income</b>	<b>\$ (702,270)</b>	<b>\$ (724,969)</b>	<b>\$ (746,092)</b>	<b>\$ (769,457)</b>	<b>\$ (794,433)</b>
<b>Adjusted Operating Income</b>	<b>\$ (587,297)</b>	<b>\$ (623,073)</b>	<b>\$ (660,007)</b>	<b>\$ (698,090)</b>	<b>\$ (737,360)</b>

<b>Operating Revenue</b>	Revenue was provided for each customer class and includes revenue associated with commodity (variable), meter charges (fixed), and fire protection. Operating revenue also includes other revenue such as miscellaneous and connection fees.
<b>Contracted and Purchased Services</b>	Includes cost for the operating agreements with Groton Utilities, water purchases, professional services, maintenance, and equipment (non-capital).
<b>Utilities</b>	Cost associated with purchased power.
<b>Depreciation Expense</b>	Represents general ledger account 0505-98-0000-91991-59500 for depreciation expense.
<b>Contributed Capital Depreciation</b>	Depreciation expense on capital contributions is separated for ratemaking purposes. Contributed assets were identified using Ledyard's fixed asset listing.
<b>Interest on Long Term Debt</b>	Ledyard currently has two bonds and is 19% leveraged.
<b>Transfers Out</b>	Transfers out were estimated at \$200,000 each year.
<b>Capital Contributions</b>	Represents assets donated to the water system
<b>Net Income</b>	Revenue less expense plus non-operating income.
<b>Adjusted Operating Income</b>	Revenue less expense and transfers out.



## Projected Cash Flow

The utility’s basic financial statements are kept on an accrual accounting basis. This means they recognize expenses when they are incurred and revenues when they are earned, rather than when cash changes hands. In the accrual basis of accounting, depreciation is recognized as an expense, even though it doesn't involve an actual cash outflow.

Table 2 is the projected cash flow for 2025 – 2029, including projections of capital improvements as provided by Ledyard. To project actual cash flow, several adjustments are made to the accrual basis financial statements:

- Depreciation expense (a non-cash item) is added back since it reduces net income on the income statement but doesn’t involve an actual cash outflow.
- Debt principal payments are subtracted. These are actual cash outflows, but they are not treated as expenses on the income statement under accrual accounting.
- Capital Expenditures are subtracted. Like principal repayments, these are actual cash outflows that are not treated as expenses on the income statement.

The projection starts with the actual cash balances from FY2023, which are adjusted for the anticipated cash expenditures in FY2024. It’s important to note that changes in the capital improvement plan can have a significant impact on projected cash balances, as they involve large expenditures.

- If new projects are added, or if existing projects become more expensive than anticipated, this can significantly reduce projected future cash balances.
- Conversely, delaying or scaling back capital projects can help preserve cash.

Based on these assumptions and projections, the utility expects to have a cash balance of -\$1.00M in 2025 and falling to -\$5.06M in 2029 under the current rates.

The suggested minimum cash reserve level for 2025 is \$993,276 and \$901,810 for 2029.

**Table 2 – Projected Cash Flows**

Description	Projected 2025	Projected 2026	Projected 2027	Projected 2028	Projected 2029
<b>Projected Cash Flows</b>					
Net Income	\$ (702,270)	\$ (724,969)	\$ (746,092)	\$ (769,457)	\$ (794,433)
Depreciation Expense/Amortization	326,579	327,829	329,079	330,329	331,579
Subtract Debt Principal	(578,431)	(585,391)	(529,843)	(521,843)	(503,036)
Add Bond Sale Proceeds	-	-	-	-	-
<b>Cash Available from Operations</b>	<b>\$ (954,122)</b>	<b>\$ (982,531)</b>	<b>\$ (946,856)</b>	<b>\$ (960,970)</b>	<b>\$ (965,889)</b>
Estimated Annual Capital Additions	46,758	50,000	50,000	50,000	50,000
Capital Contributions	3,242	-	-	-	-
<b>Net Cash From Operations</b>	<b>\$ (1,004,122)</b>	<b>\$ (1,032,531)</b>	<b>\$ (996,856)</b>	<b>\$ (1,010,970)</b>	<b>\$ (1,015,889)</b>
Beginning Cash Balance	\$ -	\$ (1,004,122)	\$ (2,036,653)	\$ (3,033,509)	\$ (4,044,479)
Ending Cash Balance	\$ (1,004,122)	\$ (2,036,653)	\$ (3,033,509)	\$ (4,044,479)	\$ (5,060,368)

## Minimum Cash Reserve

Table 3 details the minimum level of cash reserves required to help ensure timely replacement of assets and to provide financial stability of the water utility. The methodology used to establish this target is based on the following assumptions.

Allocator	Risk Factor Assigned
Operation & Maintenance Less Depreciation Expense	45 day working capital lag = 12.3% factor
Historical Rate Base	Less than 50% depreciated = 1.0% factor
Current Portion of Debt Service Payment	Highest annual debt payment = 83%
Five Year Capital Improvements – Net of Bond Proceeds	20% of the five year capital plan

Based on these assumptions, Ledyard should maintain a minimum of \$993,276 in cash reserves for 2025 and \$901,810 in 2029.

**Table 3 – Minimum Cash Reserves**

Description	Projected 2025	Projected 2026	Projected 2027	Projected 2028	Projected 2029
<b>Minimum Cash Reserve Allocation</b>					
Operation & Maintenance Less Depreciat	12.3%	12.3%	12.3%	12.3%	12.3%
Historical Rate Base	1%	1%	1%	1%	1%
Current Portion of Debt Service Payment	83%	83%	83%	83%	83%
Five Year Capital Improvements - Net of	20%	20%	20%	20%	20%
% Plant Depreciated	26%	28%	29%	30%	31%
<b>Calculated Minimum Cash Level</b>					
Operation & Maintenance Less Depreciat	\$ 158,498	\$ 163,253	\$ 168,151	\$ 173,196	\$ 178,391
Historical Rate Base	229,100	229,600	230,100	230,600	231,100
Current Portion of Debt Service Reserve	555,678	547,876	488,649	469,792	442,319
Five Year Capital Improvements - Net of	50,000	50,000	50,000	50,000	50,000
<b>Minimum Cash Reserve Levels</b>	<b>\$ 993,276</b>	<b>\$ 990,729</b>	<b>\$ 936,900</b>	<b>\$ 923,587</b>	<b>\$ 901,810</b>
<b>Projected Cash Reserves</b>	<b>\$ (1,004,122)</b>	<b>\$ (2,036,653)</b>	<b>\$ (3,033,509)</b>	<b>\$ (4,044,479)</b>	<b>\$ (5,060,368)</b>

## Debt Coverage Ratio

Table 4 is the projected debt coverage ratios with capital additions as provided by Ledyard. Debt coverage ratio is a measurement of debt affordability and measures the cash flow from operations in that fiscal year. A ratio of 1.00 indicates there was enough cash flow from operations to pay the debt payment one time. The minimum debt coverage ratio for prudent financial planning purposes is 1.40.

Maintaining a 1.40 debt coverage ratio is good business practice and helps to achieve the following:

- Helps to ensure debt coverage ratios are met in years when sales are low due to cold or wet summers or loss of a major customer(s).
- When debt coverage ratios are consistently met, it may help obtain a higher bond rating if revenue bonds are sold in the future, to lower interest cost.

**Table 4 – Projected Debt Coverage Ratios**

Description	Projected 2025	Projected 2026	Projected 2027	Projected 2028	Projected 2029
<b>Debt Coverage Ratio</b>					
Net Income	\$ (702,270)	\$ (724,969)	\$ (746,092)	\$ (769,457)	\$ (794,433)
Add Depreciation/Amortization Expense	326,579	327,829	329,079	330,329	331,579
Add Interest Expense	91,061	74,701	58,891	44,172	29,878
Cash Generated from Operations	\$ (284,630)	\$ (322,439)	\$ (358,122)	\$ (394,956)	\$ (432,975)
Debt Principal and Interest	\$ 669,492	\$ 660,092	\$ 588,734	\$ 566,014	\$ 532,914
<b>Projected Debt Coverage Ratio (Covenants)</b>	<b>(0.43)</b>	<b>(0.49)</b>	<b>(0.61)</b>	<b>(0.70)</b>	<b>(0.81)</b>
<b>Minimum Debt Coverage Ratio</b>	<b>1.40</b>	<b>1.40</b>	<b>1.40</b>	<b>1.40</b>	<b>1.40</b>

Debt coverage falls below the UFS target ratio throughout the projection period at the current rates.

## Optimal Rate Funded Capital (Target Operating Income)

The optimal rate-funded capital target, or target operating income, is an essential concept in utility finance. It ensures the utility can meet its current financial obligations, plan for future capital needs, and operate in a financially sustainable and responsible manner. This concept is central to rate setting and is designed to balance the need for financial sustainability with the goal of fair and equitable rates for customers.

The operating income target aims to address several key financial needs for the utility.

- a. Funding of Interest Expense on Outstanding Debt Principal – Utilities often take on debt to fund major capital projects. The interest on this debt is a recurring expense that must be paid to keep the utility in good financial standing. By setting rates to achieve a target operating income, the utility ensures it has enough revenue to cover these interest payments.
- b. Funding of Inflationary Increase on Assets Invested in the System – As time passes and inflation occurs, the cost to replace or upgrade the utility's assets (e.g., pipes, treatment plants) increases. Target operating income should be sufficient to cover these increased costs, ensuring that the utility can continue to maintain and replace its infrastructure as needed without placing a financial burden on future generations.

Maintaining an ideal operating income helps ensure that current customers are paying for the full cost of the services they are receiving, rather than deferring these costs to future generations. This is a key principle of intergenerational equity and ensures the utility remains financially viable. Table 5 establishes a utility basis target for operating income, starting at \$650,133 in 2025 and ending with \$678,118 in 2029.

**Table 5 – Target Operating Income Calculation**

Description	Projected 2025	Projected 2026	Projected 2027	Projected 2028	Projected 2029
<b>Target Operating Income Determinants</b>					
Net Book Value/Working Capital	\$ 16,865,213	\$ 16,614,579	\$ 16,362,694	\$ 16,109,560	\$ 15,855,175
Outstanding Principal on Debt	3,273,953	2,688,562	2,158,719	1,636,877	1,133,841
Contributed Capital Estimated	1,194,065	1,194,065	1,194,065	1,194,065	1,194,065
System Equity	\$ 12,397,194	\$ 12,731,951	\$ 13,009,910	\$ 13,278,618	\$ 13,527,269
Debt:Equity Ratio	19%	16%	13%	10%	7%
<b>Target Operating Income Allocation</b>					
Interest on Debt	2.78%	2.78%	2.73%	2.70%	2.64%
Contributed Capital Estimated	3.10%	3.10%	3.10%	3.10%	3.10%
System Equity	4.21%	4.28%	4.36%	4.44%	4.52%
<b>Target Operating Income</b>					
Interest on Debt	\$ 91,061	\$ 74,701	\$ 58,891	\$ 44,172	\$ 29,878
Contributed Capital Estimated	37,016	37,016	37,016	37,016	37,016
System Equity	\$ 522,056	\$ 545,429	\$ 567,149	\$ 589,236	\$ 611,223
<b>Target Operating Income</b>	<b>\$ 650,133</b>	<b>\$ 657,146</b>	<b>\$ 663,055</b>	<b>\$ 670,424</b>	<b>\$ 678,118</b>
<b>Projected Operating Income</b>	<b>\$ (587,297)</b>	<b>\$ (623,073)</b>	<b>\$ (660,007)</b>	<b>\$ (698,090)</b>	<b>\$ (737,360)</b>
<b>Rate of Return in %</b>	<b>3.9%</b>	<b>4.0%</b>	<b>4.1%</b>	<b>4.2%</b>	<b>4.3%</b>

Operating income is projected below this target, suggesting that revenue requirements (and thus rates) will likely need to increase over time to ensure the utility's financial health.

## Projected Rate Track

Adjusting system revenue requires balancing the financial health of the utility with the financial impact on customers and cost of service results.

Table 6 is the summary financial projection without any rate changes. Cash balances, operating income and the debt coverage ratio fall to critical levels.

**Table 6 – Summary of Financials without Rate Adjustment**

Fiscal Year	Projected Rate Adjustments	Adjusted Operating Income	Optimal Operating Income	Projected Cash Balances	Recommended Minimum Cash Reserve	Debt Coverage Ratio
2025	0.0%	\$ (587,297)	\$ 650,133	\$ (1,004,122)	\$ 993,276	(0.43)
2026	0.0%	(623,073)	657,146	(2,036,653)	990,729	(0.49)
2027	0.0%	(660,007)	663,055	(3,033,509)	936,900	(0.61)
2028	0.0%	(698,090)	670,424	(4,044,479)	923,587	(0.70)
2029	0.0%	(737,360)	678,118	(5,060,368)	901,810	(0.81)

The study identifies increasing current revenues to maintain debt coverage ratios and minimum cash targets.

Table 7 is a summary of the financial results detailing the total revenue adjustment needed to work toward financial health.

**Table 7 – Summary of Financials with Projected Rate Adjustments (One Year)**

Fiscal Year	Projected Rate Adjustments	Adjusted Operating Income	Optimal Operating Income	Projected Cash Balances	Recommended Minimum Cash Reserve	Debt Coverage Ratio
2025	100.0%	\$ 573,807	\$ 650,133	\$ 156,982	\$ 993,276	1.31
2026	0.0%	540,934	657,146	288,458	990,729	1.27
2027	0.0%	506,910	663,055	458,519	936,900	1.37
2028	0.0%	471,744	670,424	617,383	923,587	1.37
2029	0.0%	435,399	678,118	774,253	901,810	1.39

Rate adjustments may be phased in to work toward the financial metrics over time and balance customer impacts.

Table 8 and Table 9 show this phased in approach.

**Table 8 – Summary of Financials with Projected Rate Adjustments (Two Years)**

Fiscal Year	Projected Rate Adjustments	Adjusted Operating Income	Optimal Operating Income	Projected Cash Balances	Recommended Minimum Cash Reserve	Debt Coverage Ratio
2025	50.0%	\$ (6,745)	\$ 650,133	\$ (423,570)	\$ 993,276	0.44
2026	40.0%	657,334	657,146	(175,693)	990,729	1.45
2027	0.0%	623,602	663,055	111,060	936,900	1.57
2028	0.0%	588,727	670,424	386,907	923,587	1.58
2029	0.0%	552,675	678,118	661,052	901,810	1.61

**Table 9 – Summary of Financials with Projected Rate Adjustments (Three Years)**

Fiscal Year	Projected Rate Adjustments	Adjusted Operating Income	Optimal Operating Income	Projected Cash Balances	Recommended Minimum Cash Reserve	Debt Coverage Ratio
2025	33.0%	\$ (204,133)	\$ 650,133	\$ (620,958)	\$ 993,276	0.15
2026	31.0%	240,969	657,146	(789,446)	990,729	0.82
2027	29.0%	795,801	663,055	(330,495)	936,900	1.86
2028	0.0%	761,356	670,424	117,981	923,587	1.88
2029	0.0%	725,736	678,118	565,187	901,810	1.93

The rate track options above work toward a healthy operating income and positive cash balance through 2029. Depending on the system improvement timetable, additional changes may be needed throughout the projection period.

### 3. Cost of Service Summary

A cost of service study was completed for FY2025 to determine the cost of providing service to each class of customers and to assist in design of water rates for customers. A cost of service study consists of the following general steps:

- 1) Determine utility revenue requirement for test year 2025.
- 2) Classify utility expenses into common cost pools.

Source of Supply	Distribution	Customer
Treatment	Transmission	Administrative
Reservoirs	Fire Protection	Hydrants

- 3) Functionalize within cost pools.

<b>Variable</b>	<b>Fixed</b>
Base Commodity	Capacity
Max Day Commodity	Customer
Max Hour Commodity	Fire Protection

- 4) Allocate costs to customer classes based on the class’s contribution to utility expenses - Class usage patterns were analyzed and compared to system use to develop peaking factors used in allocating the variable components of the rate (Base, Max Day, Max Hour). Number of meters, meter costs, meter size, and meter equivalent ratios were used to allocate the fixed components of the rate (Capacity Fixed, Customer, Fire Protection).
- 5) Compare revenues received from each class to the cost of service. The cost of service provides guidance for the direction of the rate design.

The cost of service summary is included as Table 10 which compares the projected cost to serve each class (fixed and variable) with the revenue received from each class. The “% change” column is the revenue adjustment necessary to meet projected cost of service requirements.

**Table 10 – Cost of Service Summary**

Customer Class	Cost of Service (\$)	Projected Revenues (\$)	% Change
Metered Individual Living Units	\$ 1,895,555	\$ 765,887	147.5%
Schools, Churches, & Commercial	225,969	198,068	14.1%
Unmetered	4,519	3,103	45.6%
Metered Apartments	272,491	193,329	40.9%
Fire Sprinkler Annual Flat Rate	2,355	717	228.3%
<b>Total</b>	<b>\$ 2,400,889</b>	<b>\$ 1,161,104</b>	<b>106.8%</b>

## Cost of Service Components

### Summary of Rate Components

The cost of service study is a critical tool in utility finance and management. It ensures that rates are set based on actual costs, and it helps to distribute those costs fairly among customers, based on how they use the service. It provides guidance for setting rates that support the utility's financial health and its capacity to provide reliable service in the long-term. The purpose of the study is to allocate costs between flow (commodity costs, variable) and customer service costs (customer costs, fixed). The cost of service study was based on recognized procedures from the American Water Works Association.

**Customer Costs (Fixed)** – These are fixed costs, associated with serving customers regardless of how much water they use. They include the costs of operation and maintenance related to meters, services, meter reading, billing, customer service, and a base amount of distribution. Because these costs are largely fixed, they are typically recovered through a fixed ‘customer charge’ that customers pay regardless of their water use. This portion of the rate ensures that the utility can cover its basic operating costs, even if water use fluctuates significantly. Allocating these costs based on the relative cost of meters, services, and the number of customers ensures that each customer is paying their fair share of these basic operating costs.

**Commodity Costs (Variable)** – These are the variable costs associated with the actual production and delivery of water. They can include costs related to water supply, water treatment, pumping (energy costs), and distribution infrastructure. Because these costs tend to vary with the amount of water used, they are typically recovered through a variable ‘commodity charge’ that is based on the volume of water consumed.

For water utilities, the cost of service study is based on Long Term Marginal Costs (LTMC). LTMC is considered a best practice as it sends accurate price signals to consumers based on the full cost of providing additional units of service, including the cost of infrastructure investments that will be needed in the future. This promotes efficient use of water and ensures that the utility collects sufficient revenue to sustain its operations over the long term. This differs from Short-Term Marginal Cost (STMC) which refers to the cost associated with producing one additional unit of output (e.g., one more cubic meter of water treated and delivered) in the short-term.



The rates outlined in Table 11 and Table 12 are not the suggested rates. They are used as a guide to move toward cost of service slowly over time. Classes that charge at or above cost of service may still see an increase due to meeting revenue requirements, but that increase may be lower than the average.

Table 11 details the current monthly charges and provides a comparison with cost of service. The utility’s rate schedule currently utilizes a minimum bill in place of a customer charge. The minimum bill assumes 3,333 units per month and any units above 3,333 are billed at the current commodity rate outlined in Table 12.

The cost of service monthly charge identified in the study unbundles the fixed cost components from the commodity components, and therefore no units are associated with this charge. If using a monthly customer charge in the rate schedule, the utility would charge the monthly customer charge and charge all units of water (including units 1-3,333) at the published commodity rate.

**Table 11 – Comparison of Current Customer Costs (Fixed) with Cost of Service**

Customer Class	Cost of Service Meter \$/Month	Current - Meter \$/Month	Current - Minimum Bill		Number of Customers/Meters (Monthly)
Metered Individual Living Units	\$ 25.79	\$ -	\$ 30.78	<i>per customer</i>	1,474
Schools, Churches, & Commercial	124.90	-	123.13	<i>per customer</i>	78
Metered Apartments	6.89	-	30.78	<i>per apt unit</i>	330
Fire Sprinkler - 2"	9.53	4.63	-	<i>per customer</i>	4
Fire Sprinkler - 4"	52.70	13.75	-	<i>per customer</i>	3

*\*Cost of service meter \$/month shows a monthly charge with no units of water included*

Table 12 outlines the cost of service commodity rates compared to the current commodity charge. Ledyard currently uses an inclining block rate structure for the Metered Individual Living Units and Metered Apartments customer classes and a flat rate for the Schools, Churches & Commercial class. The current commodity charge column represents the average charge, with higher averages implying more usage in higher blocks for classes utilizing the block rate structure.

The rates below are not the suggested rates. They are used as a guide to move toward cost of service slowly over time.

**Table 12 – Comparison of Current Commodity Costs (Variable) with Cost of Service**

Customer Class	Cost of Service Commodity by Class	Current Commodity Charge		Annual Commodity Units
Metered Individual Living Units	\$ 1.58	\$ 0.93	<i>Blocked Rate</i>	910,264
Schools, Churches, & Commercial	1.61	1.68	<i>Flat Rate</i>	68,209
Metered Apartments	1.50	0.93	<i>Blocked Rate</i>	163,248

## Customer Costs (Fixed) Breakdown

The customer charge consists of expenses related to, 1) providing a minimum amount of water to the residential customer, and 2) servicing a meter on the customer's premises; together they reflect the cost for availability of service. The methodology used in this study is consistent with methodologies and practices used by AWWA.

The customer charge includes two types of costs called minimum system and direct charges. A further discussion of the two is below:

**Minimum System Costs:** The cost to provide the minimum level of service based on the potential capacity of the customer's meter. Utilities provide water lines to connect to the water transmission system, pumping stations, reservoirs, and subsequently the water treatment facilities. These water lines are required to provide even the minimal amount of service to a customer.

For cost of service purposes, the total cost of the water distribution infrastructure is broken into two components:

1. The minimum system costs, in effect provide a customer with the minimum capacity and should be recovered through the customer charge.
2. Demand-related costs are additional infrastructure costs of providing customers with capacity in the water system for usage greater than the minimum amounts and should be recovered through the usage component.

The distribution system is sized to handle the customers' peak usage and the cost above the minimum sizing is recovered through the usage component (commodity costs, variable).

### Determination of Meter Equivalents

A meter equivalent is the maximum capacity of the utility’s smallest meter size compared with the maximum capacity of other meters. The meter equivalent ratios are standard factors used by AWWA.

**Table 13 – Meter Capacity Factors**

Meter Size	Meter Capacity Ratios 3/4"
0.75	1.00
1.00	1.67
1.50	3.33
2.00	5.33
3.00	23.33
4.00	43.33
6.00	93.33
8.00	160.00
10.00	233.33
12.00	293.33

The table of capacity factors was calculated using the theoretical volume capacity of each meter size. The table can be interpreted as a 2-inch meter has 8 times more potential capacity than a 5/8-inch meter.

Ledyard uses a customer class designation instead of charging based on actual meter size. For purposes of the cost of service study, the following assumptions were made.

<b>Customer Class</b>	<b>Meter Size</b>
Metered Individual Living Units	5/8" – 3/4"
Schools, Churches, & Commercial	2" and up
Unmetered	5/8" – 3/4"
Metered Apartments	2"
Fire Sprinkler	2"

The customer charge, cost-based rate, breakdown for customers is listed in Table 14. The costs are generated by classifying the trial balance accounts from the general ledger for the test year into common cost pools. The costs are then functionalized into fixed components and allocated to each meter. The minimum system costs for distribution are included under distribution facilities, and direct costs include meters, services, customer service, and billing.

No units are associated with the cost of service monthly customer charge. If using a monthly customer charge in the rate schedule, the utility would charge the monthly customer charge and charge all units of water (including units 1-3,333) at the published commodity rate. Ledyard is currently using a minimum bill mechanism.

**Table 14 – Customer Charge Breakdown**

Customer Class	Meters	Cust. Serv.	Fire Prot.	Distribution Facilities	Billing	Meters:			
						Cost of Service Customer Charge	Meters: Current Customer Charge	Meters: Current Minimum Bill	Percent Change
Metered Individual Living Units	\$ 2.66	\$ 0.76	\$ 9.44	\$ 9.97	\$ 2.96	\$ 25.79	\$ -	\$ 30.78	-16%
Schools, Churches, & Commercial	17.71	0.76	50.34	53.13	2.96	124.90	-	123.13	1%
Metered Apartments	0.98	0.76	1.07	1.13	2.96	6.89	-	30.78	-78%

**Customer Charge Allocations**

<b>Meters</b>	Installation, operation, and maintenance costs of meter based on number of meters and meter cost.
<b>Fire Protection</b>	Cost of water flow for fire protection based on number of customers, equivalent services, and demand factor.
<b>Distribution Facilities</b>	Installation and maintenance cost of distribution system based on capacity ratio.
<b>Billing and Customer Service</b>	Personnel cost, billing, and collection cost to service accounts based on number of meters and meter size.

Often, larger meters require additional time in processing and vetting the bills and answering customer service questions. Because of this, a weighting factor is assigned based on the size of the meter.

## Commodity Costs (Variable) Breakdown

The commodity charges are generated by classifying the trial balance accounts from the general ledger for the test year into common cost pools. The costs are then functionalized into variable components and allocated to each meter based on allocation factors. The cost based commodity rates are broken down by meter size and listed in Table 15 below. The rate provided shows the average use by meter size across the three tiers.

**Table 15 – Commodity Charge Breakdown**

Rate Class - Unit Costs	Extra Capacity - Treatment	Extra Capacity - Distribution		Extra Capacity - Transmission		Usage:		
	Treatment Base	Distribution Base	Distribution MD	Transmission Base	Transmission MH	Usage: Unit Cost	Usage: Current Rates	Usage: Percent Change
Metered Individual Living Units	0.72	0.20	0.20	0.17	0.29	\$ 1.58	\$ 0.93	70%
Schools, Churches, & Commercial	0.72	0.20	0.22	0.17	0.30	1.61	1.68	-4%
Metered Apartments	0.72	0.20	0.15	0.17	0.26	1.50	0.93	62%

## Commodity Allocation Factors

<b>Treatment Base</b>	Cost related to the average day production and treatment of water.
<b>Distribution Base</b>	The cost associated with the average day use of the distribution facilities.
<b>Distribution MD</b>	Cost above the average day consumption, determined by the ratio of maximum month to the annual average-day consumption.
<b>Transmission Base</b>	Average-day cost to transport between the treatment plant and local distribution lines.
<b>Transmission MH</b>	Cost associated with the maximum hour of consumption, determined by the ratio of the max hour factor to annual average day consumption.

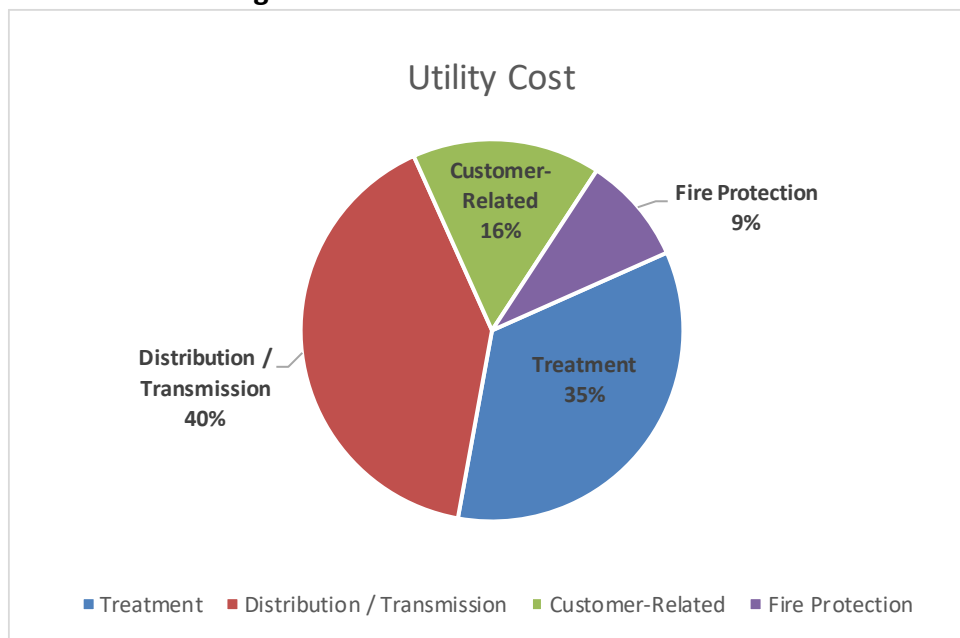
**Unbundling Process**

The cost of treatment, distribution, customer-related, and fire protection are identified as part of the unbundling process and are the first step in determining unbundled charges to customers. The total fiscal year 2025 revenue requirements of \$2.40M are separated into four categories identified in Figure 1.

Utility Cost	Amount	Percentage
Treatment	\$ 828,135	35%
Distribution / Transmission	\$ 969,739	40%
Customer-Related	\$ 382,161	16%
Fire Protection	\$ 220,752	9%
<b>Total</b>	<b>\$ 2,400,787</b>	<b>100%</b>

The expenses consist of treatment costs 35%, distribution costs 40%, customer-related costs 16%, and fire protection costs 9%. These components are broken down into subcomponents and are identified in the following sections.

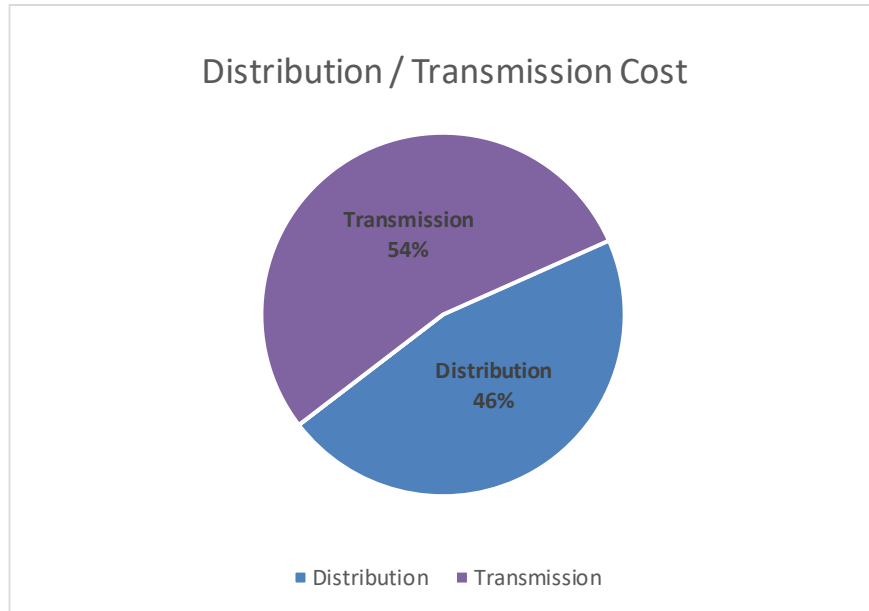
**Figure 1 – Breakdown of Cost Structure**



**Distribution Cost Breakdown**

Total distribution costs of \$969,739 for fiscal year 2025 are broken down into the main component shown in Figure 2 below: Distribution, Pumping, Storage, and Transmission.

**Figure 2 – Breakdown of Distribution Costs**

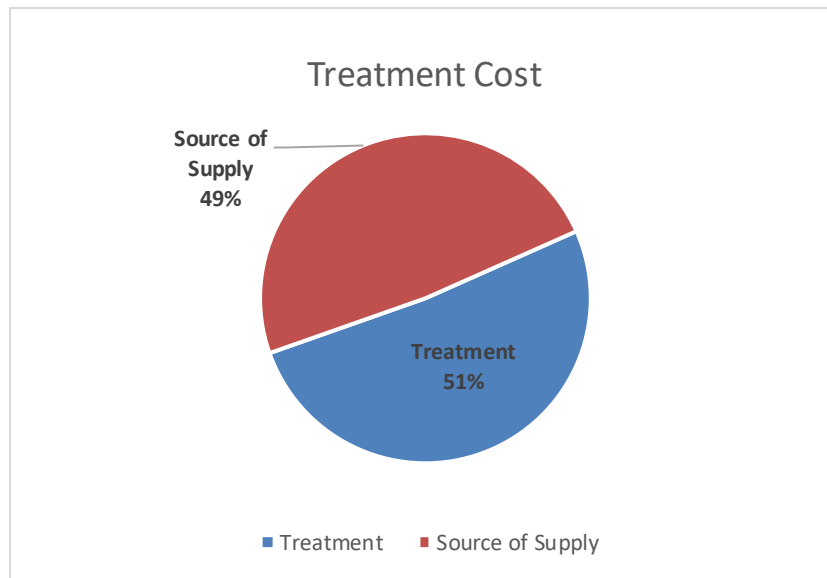


Each of these components are allocated to customer groups based on certain factors established in the study, such as the length of line extensions to reach certain customer classes. The distribution-related costs are separated into the customer charge based on the cost to provide a minimum amount of water to the customer, and the usage component expressed as a rate per gallons. Pumping and transmission costs are allocated into the usage component of the rates.

### Treatment Cost Breakdown

Total treatment costs of \$828,135 for fiscal year 2025 are broken down into the main components in Figure 3 below: Treatment and Source of Supply.

**Figure 3 – Breakdown of Treatment Costs**



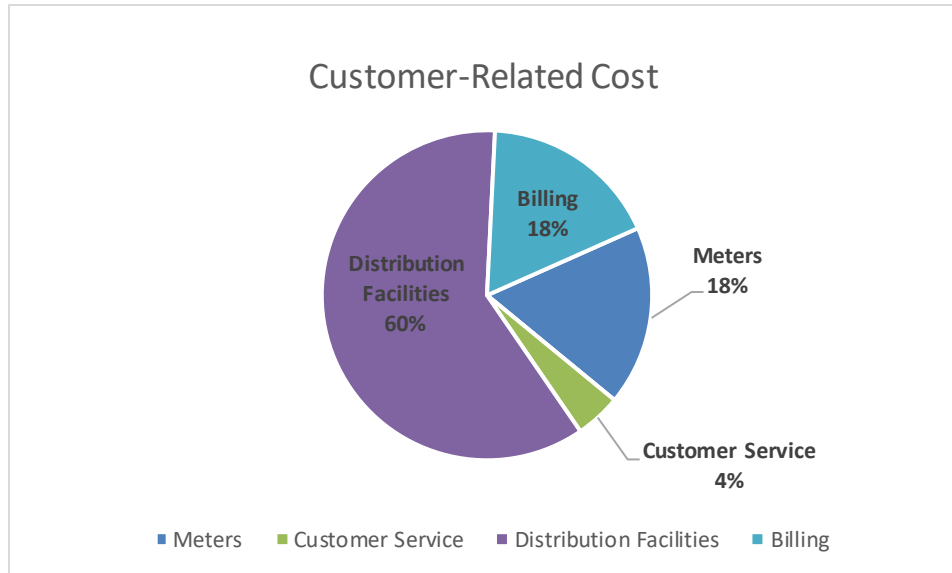
Each of these components are allocated to customer groups based on certain factors established in the study, such as the amount of water used and the peaking requirements of customer class.



**Customer-Related Cost Breakdown**

Ledyard’s total expenses for direct customer-related costs are \$382,161 for fiscal year 2025. The cost is broken down into the following components in Figure 4.

**Figure 4 – Breakdown of Customer Costs**

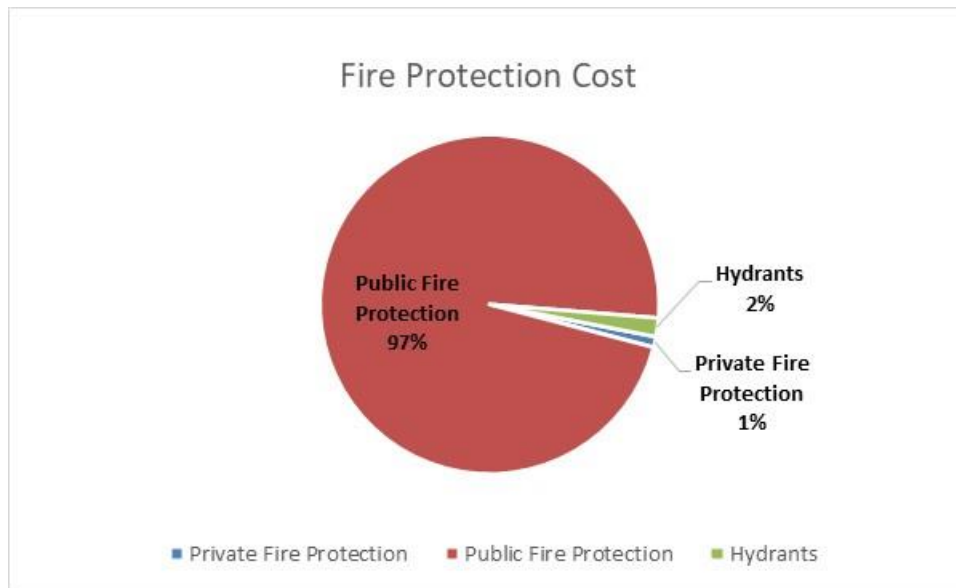


Direct customer-related costs are allocated to rate classes based on cost of meters, minimum sizing requirements, customer service and billing costs for each customer class and meter size.

**Fire Protection Cost Breakdown**

Ledyard’s total expenses for fire protection costs are \$220,752 for fiscal year 2025. Fire protection costs are allocated to fire protection classes based on the potential fire flow requirements determined by the number and size of the fire lines.

**Figure 5 – Breakdown of Fire Protection Costs**



Item	Number of Services	Demand Factor	Equivalent Connections	Allocation	Total Fire Protection Costs
Total Public Fire Protection	350	38.32	13,412	\$ 216,247	\$ 216,247
Private Fire Protection					
2.0	4	6.19	25		
4.0	3	38.32	115		
Total Private Fire Protection			140	\$ 2,253	\$ 2,253
Direct Hydrants					\$ 3,904
<b>Total</b>			<b>13,551</b>		<b>\$ 222,404</b>

## Combined Cost Summary

Table 16 compares the cost of service rates for each customer class with the current rates. Charging these rates would directly match the cost of providing service to each customer class shown below.

**Table 16 – Total Costs by Customer Class**

Customer Class	Cost of Service Meter \$/Month	Current - Minimum Bill	Cost of Service Commodity by Class	Current Commodity Charge
Metered Individual Living Units	\$ 25.79	\$ 30.78	\$ 1.58	\$ 0.93
Schools, Churches, & Commercial	124.90	123.13	1.61	1.68
Unmetered	16.73	-	1.54	-
Metered Apartments	6.89	30.78	1.50	0.93
Fire Sprinkler - 2"	9.53	-	-	-
Fire Sprinkler - 4"	52.70	-	-	-

The table above compares the current customer charges with the cost-based customer charges and identifies the cost-based commodity rates for each class.

## 4. Significant Assumptions

### General Assumptions

This section outlines the procedures used to develop the cost of service for Ledyard and the related significant assumptions.

Fiscal Year	Inflation	Cost Increase (Units)	Customer Growth	Investment Income	Capital Improvements Plan
2025	3.0%	5.0%	0.25%	0.5%	\$ 50,000
2026	3.0%	4.0%	0.25%	0.5%	50,000
2027	3.0%	3.0%	0.25%	0.5%	50,000
2028	3.0%	3.0%	0.25%	0.5%	50,000
2029	3.0%	3.0%	0.25%	0.5%	50,000

### Rate Implementation

Anticipated rate adjustments are modeled to take place in July of each calendar year.

## Forecasted Operating Expenses

Forecasted expenses were based on 2022 and 2023, and 2024 budget and adjusted for inflation. Table 17 is a summary of the expenses used in the analysis.

**Table 17 – Projected Operating Expenses**

Description	Projected 2025	Projected 2026	Projected 2027	Projected 2028	Projected 2029
<b>Operating Expenses:</b>					
Contracted and Purchased Services	\$ 1,270,701	\$ 1,308,822	\$ 1,348,087	\$ 1,388,530	\$ 1,430,186
Utilities	14,898	15,344	15,805	16,279	16,767
Depreciation Expense	299,425	300,634	301,884	303,134	304,384
Contributed Capital Depreciation	27,154	27,195	27,195	27,195	27,195
<b>Total Operating Expenses</b>	<b>\$ 1,612,178</b>	<b>\$ 1,651,996</b>	<b>\$ 1,692,971</b>	<b>\$ 1,735,138</b>	<b>\$ 1,778,532</b>

## Beginning 2025 Cash Balance

Beginning 2025 cash balance was based on the 2023 available cash balance at year end, adjusted for the projected 2024 cash flow from operations.

## Depreciation Expense

Depreciation expense was projected based on historical capital additions and discussions with management on future capital additions.

## Interest Income

Interest income was forecasted based on projected cash balances and an interest rate of 0.5%.

## Capital Improvements

A capital improvement plan was not available for use in the study. Projected capital investment was estimated at \$50,000 per year based on historic capital spending.

## 5. Considerations and Additional Information

1. The Utility is projected to require increases in rates charged to customers. Projected rate track options are outlined in the projected rate track section of this report.
2. Unknown events can occur that affect a utility’s financial plan. It is recommended that Ledyard have the financial projection study updated annually to ensure the utility can meet revenue requirements with the current rate plan. Cost of service studies are separate from the financial projection and can be refreshed every 3-5 years.
3. Cash balances are decreasing without changes in rates. Projected cash balances are below the suggested minimums during the projection period.
4. Debt Coverage Ratio falls below suggested minimum levels without changes in rates.
5. Current rate related revenues are projected to result in operating income below the target operating income for each year. Meeting the operating income target indicates current rates are fully funding system revenue requirements and future replacement cost of current infrastructure.
6. Infrastructure of the Utility is newer than the national average. The infrastructure in total is approximately 26% depreciated compared with the national average between 50% - 55%. This indicates the Utility has newer infrastructure.
7. The Utility has a debt to equity ratio of 19% which is lower than the national average of between 40% - 60% for water utilities.
8. Ledyard may consider movements toward cost of service. The cost of service study indicates a variance exists between revenues and costs for certain rate classes. The study results are listed below:

Customer Class	Cost of Service (\$)	Projected Revenues (\$)	% Change
Metered Individual Living Units	\$ 1,895,555	\$ 765,887	147.5%
Schools, Churches, & Commercial	225,969	198,068	14.1%
Unmetered	4,519	3,103	45.6%
Metered Apartments	272,491	193,329	40.9%
Fire Sprinkler Annual Flat Rate	2,355	717	228.3%
Total	\$ 2,400,889	\$ 1,161,104	106.8%

9. Currently, Ledyard uses a minimum bill mechanism which includes the first block of water use. Ledyard may consider charging a monthly customer charge in place of a minimum bill. No units of water are associated with a monthly customer charge and all units of water are charged at the commodity rate.
10. Ledyard may consider revising the rate schedule to charge by meter size. Charging by meter size is more cost reflective.
11. Revisions to the rate structure (considerations 9 and 10), may be considered once the financial health of the utility is restored.