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City of Marine City Retirement System

June 30, 2019

Actuarial Valuation Report

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Actuarial Certification

At the request of the plan sponsor, this report summarizes the Retirement System for the City of Marine City as of June 30, 2019. The purpose of this report is to communicate the following results of the valuation:

- Funded Status
- Actuarially Determined Contribution for the Fiscal Year beginning July 1, 2020

This report has been prepared in accordance with the applicable Federal and State laws. Consequently, it may not be appropriate for other purposes. Please contact Nyhart prior to disclosing this report to any other party or relying on its content for any purpose other than that explained above. Failure to do so may result in misrepresentation or misinterpretation of this report.

The results in this report were prepared using information provided to us by other parties. The census and asset information has been provided to us by the employer. We have reviewed the provided data for reasonableness when compared to prior information provided, but have not audited the data. Where relevant data may be missing, we have made assumptions we believe to be reasonable. We are not aware of any significant issues with and have relied on the data provided. Any errors in the data provided may result in a different result than those provided in this report. A summary of the data used in the valuation is included in this report.

The actuarial assumptions and methods were chosen by the City. In our opinion, all actuarial assumptions and methods are individually reasonable and in combination represent our best estimate of anticipated experience of the plan. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following:

- plan experience differing from that anticipated by the economic or demographic assumptions;
- changes in economic or demographic assumptions;
- increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and
- changes in plan provisions or applicable law.

We did not perform an analysis of the potential range of future measurements due to the limited scope of our engagement. This report has been prepared in accordance with generally accepted actuarial principles and practice.

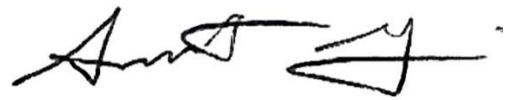
Neither Nyhart nor any of its employees have any relationship with the plan or its sponsor which could impair or appear to impair the objectivity of this report. To the extent that this report or any attachment concerns tax matters, it is not intended to be used and cannot be used by a taxpayer for the purpose of avoiding penalties that may be imposed by law.

Actuarial Certification

The undersigned are compliant with the continuing education requirements of the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States and are available for any questions.

Nyhart

Nick H. Meggos, EA, FCA



Scott Gavin, FSA, EA, MAAA

October 3, 2019
Date

Executive Summary

The actuarial report provides the plan sponsor with several ways to measure the funded status of the pension plan. The following detail is included in the report:

- Recommended Contribution
- Asset Performance
- Plan Demographics

This report is filled with actuarial terminology. However, the ultimate objective of the valuation is to provide a rational method of funding the plan. It is necessary to fund the benefit promised by the employer in a manner that is logical and employer friendly, yet safeguards the participants' interest. The actuarially derived contribution, however, is not the true cost of the pension plan. The true cost is illustrated by the following formula:

Ultimate Pension Cost = Benefits Paid - Investment Income + Plan Expenses

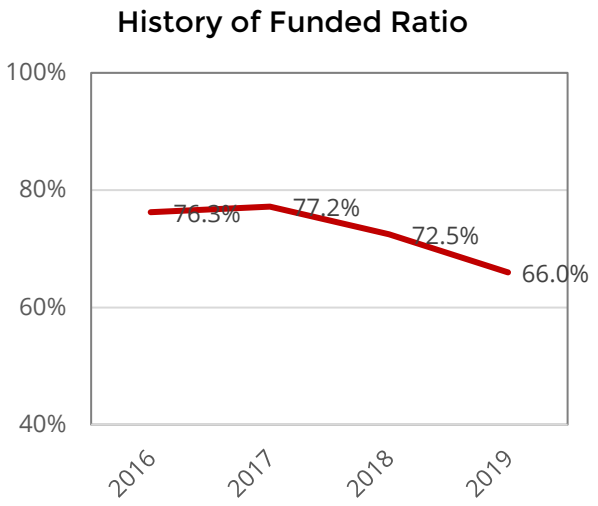
While the plan's liability and normal cost determine the current contribution recommendations, the true cost is controlled only by the "defined" benefit and investment income generated by the underlying assets. The actuarial process only controls the timing of costs.

We suggest that a plan sponsor treat the actuarial report as you would treat a scorecard. It is simply a measure of progress toward the ultimate goal of paying all pension benefits when participants retire.

Summary Results

The actuarial valuation's primary purpose is to produce a scorecard measure displaying the funding progress of the plan toward the ultimate goal of paying benefits at retirement. The accrued liability is based on an entry age level percentage of pay.

	June 30, 2018	June 30, 2019
Funded Status Measures		
Accrued Liability	$7,188,213	$7,675,935
Actuarial Value of Assets	5,211,041	$5,063,580
Unfunded Actuarial Accrued Liability (UAAL)	$1,977,172	$2,612,355
Funded Percentage (AVA)	72.49%	65.97%
Funded Percentage (MVA)	69.26%	64.47%
Cost Measures		
Recommended Contribution for Next Fiscal Year	$247,217	$322,237
Recommended Contribution (as a percentage of payroll)	86.4%	143.5%
Asset Performance		
Market Value of Assets (MVA)	$4,978,666	$4,948,426
Actuarial Value of Assets (AVA)	$5,211,041	$5,063,580
Actuarial Value/Market Value	104.7%	102.3%
Market Value Rate of Return	4.26%	6.29%
Actuarial Value Rate of Return	2.76%	3.68%
Participant Information		
Active Participants	5	3
Terminated Vested Participants	4	6
Retirees and Beneficiaries	24	26
Total	33	35
Payroll for Year Ending	$285,980	$224,481



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Changes since Prior Valuation and Key Notes

The healthy mortality table used to measure funding liability has been updated from RP-2006 Total Mortality with generational improvements projected beginning in 2006 based on the SOA Scale MP-17 to RP-2006 Total Mortality with generational improvements projected beginning in 2006 based on the SOA Scale MP-18. This change resulted in a slight decrease in the liabilities and normal cost.

The disabled mortality table used to measure funding liability has been updated from RP-2006 Disabled Retiree Mortality with generational improvements projected beginning in 2006 based on the SOA Scale MP-17 to RP-2006 Disabled Retiree Mortality with generational improvements projected beginning in 2006 based on the SOA Scale MP-18. This change resulted in a slight decrease in the liabilities and normal cost.

The interest rate was changed from 7.25% to 6.50%. This change resulted in an increase in the liabilities and normal cost.

Historical Valuation Summary

	6/30/2016	6/30/2017	6/30/2018	6/30/2019
Funding				
Accrued Liability	$6,950,695	$6,919,054	$7,188,213	$7,675,935
Actuarial Value of Assets	5,299,897	5,340,534	5,211,041	$5,063,580
Unfunded Actuarial Accrued Liability	$1,650,798	$1,578,520	$1,977,172	$2,612,355
Funded Percentage	76.25%	77.19%	72.49%	65.97%
Normal Cost (NC)	$32,617	$38,798	$23,076	$19,468
Actual Contribution	$158,748	$211,847	$209,928	$209,928
Recommended Contribution	$189,645	$209,066	$247,217	$322,237
Interest Rate	7.25%	7.25%	7.25%	6.50%
Rate of Return				
Actuarial Value of Assets	$5,299,897	$5,340,534	$5,211,041	$5,063,580
Market Value of Assets	$4,847,088	$5,042,689	$4,978,666	$4,948,426
Demographic Information				
Active Participants	5	5	5	3
Terminated Vested Participants	4	4	4	6
Retired Participants	22	22	22	24
Beneficiaries	2	2	2	2
Disabled Participants	0	0	0	0
Total Participants	33	33	33	35
Covered Payroll (prior year)	$289,641	$283,870	$285,980	$224,481
Average Covered Pay	$57,928	$56,774	$57,196	$74,827

Identification of Risks

The results presented in this report are shown as single point values. However, these values are derived using assumptions about future markets and demographic behavior. If actual experience deviates from our assumptions, the actual results for the plan will consequently deviate from those presented in this report. Therefore, it is critical to understand the risks facing this pension plan. The following table shows the risks we believe are most relevant to the Retirement System for the City of Marine City. The risks are generally ordered with those we believe to have the most significance at the top. Also shown are possible methods by which a more detailed assessment of the risk can be performed.

Type of Risk	Method to Assess Risk
Investment Return	Scenario Testing; Asset Liability Study
Interest Rates	Scenario Testing; Stochastic Modeling
Participant Longevity	Projections and Contribution Strategy
Salary Growth	Review salary history and future budgets; scenario testing
Early Retirement	Scenario Testing; Review population and retirement rates

Plan Maturity Measures – June 30, 2019

Each pension plan has a distinct life-cycle. New plans promise future benefits to active employees and then accumulate assets to pre-fund those benefits. As the plan matures, benefits are paid and the pre-funded assets begin to decumulate until ultimately, the plan pays out all benefits. A plan's maturity has a dramatic influence on how risks should be viewed. The following maturity measures illustrate where the City of Marine City Police and Firefighter's Retirement System falls in its life-cycle.

Duration of Liabilities: 10.9%
Duration is the most common measure of plan maturity. It is defined as the sensitivity of the liabilities to a change in the interest rate assumption. The metric also approximates the weighted average length of time, in years, until benefits are expected to be paid. A plan with high duration is, by definition, more sensitive to changes in interest rates. A plan with low duration is more susceptible to risk if asset performance deviates from expectations as there would be less time to make up for market losses in adverse market environments while more favorable environments could result in trapped surplus from gains. Conversely, high duration plans can often take on more risk when investing, and low duration plans are less sensitive to interest rate fluctuations.

Demographic Distribution - Ratio of Actively Accruing Participants to All Participants: 8.6%
A plan with a high ratio is more sensitive to fluctuations in salary (if a salary-based plan) and statutory changes. A plan with a low ratio is at higher risk from demographic experience. Such a plan should pay close attention to valuation assumptions as there will be less opportunity to realize future offsetting gains or losses when current experience deviates from assumptions. Plans with a low ratio also have limited opportunities to make alterations to plan design to affect future funded status.

Asset Leverage - Ratio of Payroll for Plan Participants to Market Value of Assets: 4.5%
Younger plans typically have a large payroll base from which to draw in order to fund the plan while mature plans often have a large pool of assets dedicated to providing benefits to a population primarily consisting of members no longer on payroll. Plans with low asset leverage will find it more difficult to address underfunding, as the contributions needed to make up the deficit will represent a higher percentage of payroll than for a plan with high asset leverage.

Benefit Payment Percentage - Ratio of Annual Benefit Payments to Market Value of Assets: 9.8%
As a plan enters its decumulation phase, a larger percentage of the pre-funded assets are paid out each year to retirees. A high percentage is not cause for alarm as long as the plan is nearly fully funded. However, such a plan is more sensitive to negative asset performance, especially if cash contributions are not an option to make up for losses.

Assets and Liabilities

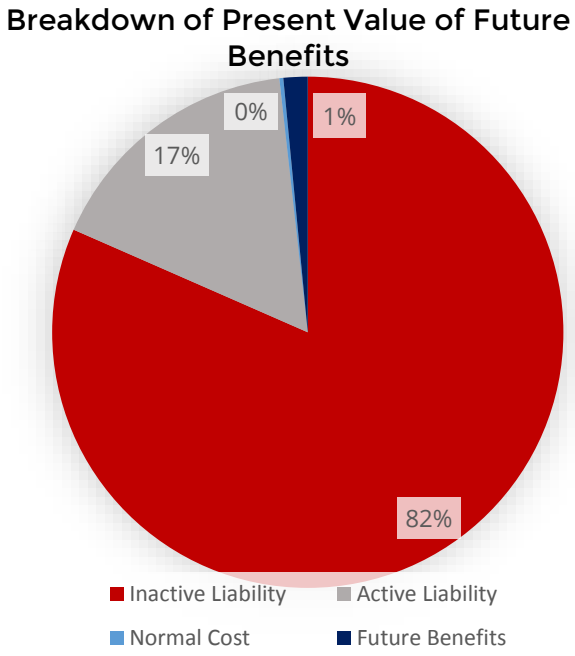
The basic building blocks of the actuarial report are contained in this section. These include:

- Actuarial Accrued Liabilities
- Asset Information
- Summary of Contributions

Present Value of Future Benefits

The Present Value of Future Benefits represents the future benefits payable to the existing participants.

	June 30, 2019
Present Value of Future Benefits	
Active participants	
Retirement	$1,297,946
Disability	69,991
Death	30,454
Termination	41,611
Refund of contributions	0
Total active	$1,440,002
Inactive participants	
Retired participants	$5,092,228
Beneficiaries	87,288
Disabled participants	0
Terminated vested participants	1,1995,261
Total inactive	$6,374,777
Total	$7,814,779
Present value of future payrolls	$1,571,608



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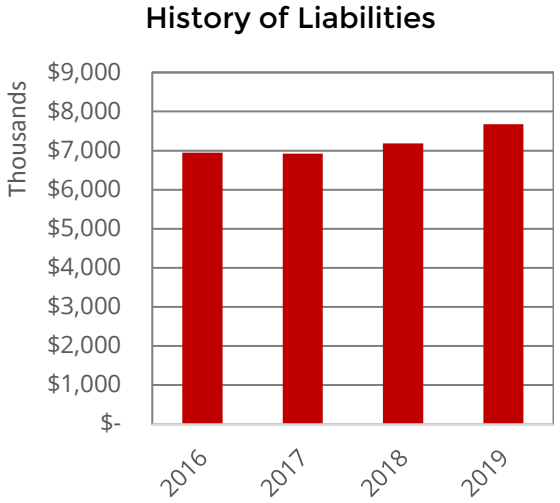
Actuarial Accrued Liability

The Actuarial Accrued Liability measures the present value of benefits earned as of the valuation date, using a specified set of actuarial assumptions.

	June 30, 2019
Funding Liabilities – Entry Age Normal as Percent of Pay	
Active participants	
Retirement	$1,187,838
Disability	58,292
Death	25,289
Termination	29,739
Refund of contributions	0
Total Active	$1,301,158
Inactive participants	
Retired participants	$5,092,228
Beneficiaries	87,288
Disabled participants	0
Terminated vested participants	1,195,261
Total Inactive	$6,374,777
Total	$7,675,935
Normal Cost	$19,468
Interest Rate	6.50%



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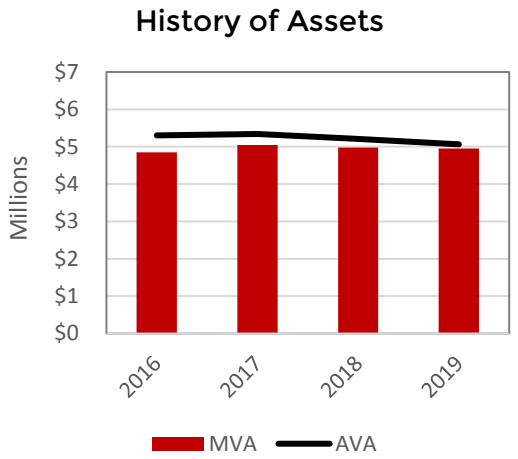
Asset Information

The amount of assets backing the pension promise is the most significant driver of volatility and future costs within a pension plan. The investment performance of the assets directly offsets the ultimate cost.

	June 30, 2019
Market Value Reconciliation	
Market value of assets, beginning of prior year	$4,978,666
Contributions	
Employer contributions	209,928
Employee contributions	13,274
Total	$223,202
Investment income	$302,671
Administrative Expenses	($50,363)
Benefit payments	($505,750)
Market value of assets, beginning of current year	$4,948,426
Return on Market Value	6.29%
Market value of assets available for pension benefits	$4,948,426
Actuarial Value of Assets	
Value at beginning of current year	$5,063,580



Monitoring the pension plan's investment performance is crucial to eliminating surprises.

Asset Information (continued)

Plan Assets are used to develop funded percentages and contribution requirements.

	June 30 , 2019
1. Expected Investment Income	
(a) Actuarial value of assets, beginning of prior year	$5,211,041
(b) Employee Contributions	13,274
(c) Employer Contributions	209,928
(d) Refund of Member Contributions	0
(e) Benefit payments	505,750
(f) Administrative Expenses	50,363
(g) Expected Investment Income – end of year [7.25% x (a) + 7.25% x (1/2) x {(b)+(c)-(d)-(e)-(f)}]	$365,732
2. Market value of Investment Income, beginning of current year	$302,671
3. Gain/Loss on market value (2)-(1g)	($63,061)
4. Phased-In Recognition of Investment Income	
(a) Current Year Phase in of gain/(loss) (($63,061) x .75)	$(47,296)
(b) First Prior Year (($168,309) x .50)	(84,155)
(c) Second Prior Year ($65,189 x .25)	16,297
(e) Total	$(115,154)
5. Final market value of assets	$4,948,426
6. Final actuarial value of assets 5-(4e)	$5,063,580

Funding Results

The basic building blocks of the actuarial report are contained in this section. These include:

- Reconciliation of Gain/Loss
- Recommended Contribution

Reconciliation of Gain/Loss

	June 30, 2019
Liability (Gain)/Loss	
1. Actuarial liability, beginning of prior year	$7,188,213
2. Normal cost for prior year	23,076
3. Benefit payments	(505,750)
4. Expected Interest	504,485
5. Change in Assumptions (Mortality Update & Interest Rate)	525,749
6. Change in Plan Provisions	0
7. Expected actuarial liability, beginning of current year	$7,735,773
8. Actual actuarial liability	7,675,935
9. Liability (Gain)/Loss, (8) – (7)	($59,838)
Asset Gain/(Loss)	
10. Actuarial value of assets, beginning of prior year	$5,211,041
11. Contributions	223,202
12. Benefit payments	(505,750)
13. Expected Investment return	367,558
14. Expected actuarial value of assets, beginning of current year	$5,296,051
15. Actual actuarial value of assets, beginning of current year	5,063,580
16. Asset (Gain)/Loss, (14) – (15)	$232,471
Total (Gain)/ Loss, (9) + (16)	$172,633

Reconciliation of Unfunded Actuarial Accrued Liability (UAAL)

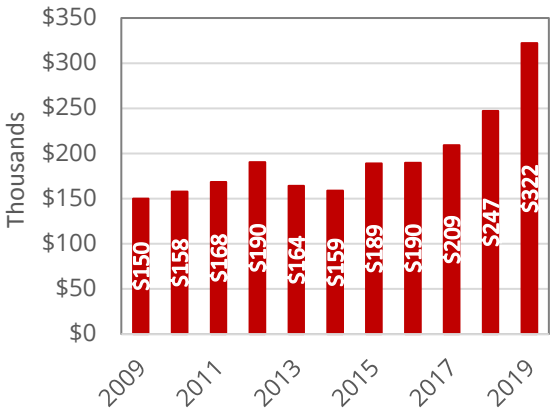
	June 30, 2019
1. UAAL beginning of prior year	$1,977,172
2. Normal Cost for prior year	23,076
3. Expenses	0
4. Employer Contributions	(209,928)
5. Non-Employer Contributions	(13,274)
6. Interest	136,927
7. Expected UAAL, beginning of current year	$1,913,973
8. Changes due to:	
(a) Amendments	0
(b) Assumptions	
(1) Mortality Update	(15,917)
(2) Interest Rate	541,666
(c) Funding Methods	0
(d) (Gain)/Loss	172,633
(e) Total	$698,382
9. UAAL beginning of current year	$2,612,355

Development of Recommended Contribution

The recommended contribution is the annual amount necessary to fund the plan according to funding policies and/or applicable laws.

Funded Position	
1. Entry age accrued liability	$7,675,935
2. Actuarial value of assets	$5,063,580
3. Unfunded actuarial accrued liability (UAAL)	$2,612,355
Employer Contributions for Fiscal Year 2021	
1. Normal Cost	
(a) Total normal cost	$19,467
(b) Interest-adjusted Expected participant contributions	11,088
(c) Net normal cost	$8,379
2. Amortization of UAAL (13 years)	285,231
3. Interest	28,627
4. Total contribution for Fiscal 2021	$322,237
As a percentage of most recent payroll	143.5%

History of Recommended Contributions



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Michigan PA 202 Reporting Requirements

		January 1, 2019
Funding Assumptions	**Plan Assumptions**	**State Treasury Uniform Assumptions**
Funded Ratio		
Interest Rate	6.50%	6.50%
Mortality	RP-2006 Total Mortality with SOA Scale MP-18	No change
Accrued Liability	$7,675,935	$7,675,935
Market Value of Assets	$4,948,426	$4,948,426
Unfunded Accrued Liability, MVA Basis	$2,727,509	$2,727,509
Funded Percentage (MVA)	**64.47%**	**64.47%**
Underfunded Status	Not underfunded	Not underfunded
Actuarially Determined Contribution	$322,237	$322,237

Data, Assumptions, and Plan Provisions

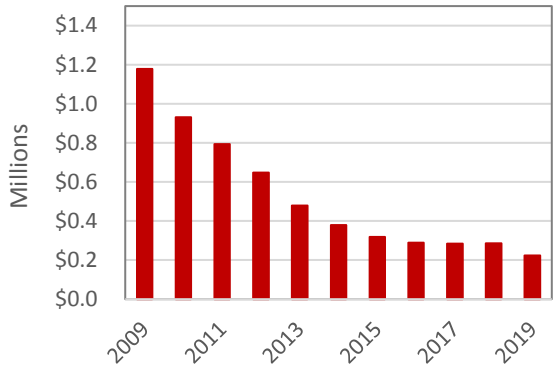
- Demographic Information
- Plan Provisions
- Assumptions and Methods

Demographic Information

The foundation of a reliable actuarial report is the participant information provided by the plan sponsor. Monitoring trends in demographic information is crucial for long-term pension planning.

	January 1, 2018	January 1, 2019
Participant Counts		
Active Participants	5	3
Retired Participants	22	24
Beneficiaries	2	2
Disabled Participants	0	0
Terminated Vested Participants	4	6
Total Participants	33	35
Active Participant Demographics (Ongoing)		
Average Age	52.2	50.0
Average Service	23.0	26.1
Average Compensation	$57,196	$74,827
Covered Payroll for Year Ending	$285,980	$224,481
Total Payroll for Year Ending	$285,980	$224,481

History of Covered Payroll



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Demographic Information (continued)

	January 1, 2018	January 1, 2019
Retiree Statistics		
Average Age	68.0	68.2
Average Monthly Benefit	$1,672	$1,585
Beneficiary Statistics		
Average Age	83.5	84.5
Average Monthly Benefit	$705	$705
Disabled Participant Statistics		
Average Age	N/A	N/A
Average Monthly Benefit	N/A	N/A
Terminated Vested Participant Statistics		
Average Age	54.7	54.4
Average Monthly Benefit	$2,275	$1,726

Monitoring the average age of the population is important due to the relationship of actuarial cost to age. Generally speaking, an older population generates a higher actuarial cost.

Changes in the ratio of active to retired participants can be a significant driver of costs in a volatile asset market.

Participant Reconciliation

	Active	Terminated Vested	Disabled	Retired	Beneficiaries	Totals
Prior Year	5	4	0	22	2	33
Active						
To Retired	(1)	0	0	1	0	0
To Terminated Vested	(1)	1	0	0	0	0
Terminated Vested						
To Retired	0	0	0	0	0	0
Retired						
To Survivor	0	0	0	0	0	0
To Death	0	0	0	0	0	0
Survivor						
To Death	0	0	0	0	0	0
Additions	0	1	0	1	0	2
Departures	0	0	0	0	0	0
Current Year	3	6	0	24	2	35

Active Participant Schedule

Active participant information grouped based on age and service.

Age Group	Years of Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25										0
25 to 29										0
30 to 34										0
35 to 39										0
40 to 44										0
45 to 49				1	1					2
50 to 54										0
55 to 59								1		1
60 to 64										0
65 to 69										0
70 & up										0
Total	0	0	0	1	1	0	0	1	0	3

Plan Effective Date

The effective date of the Plan is July 1, 1980. The most recent amendment was effective January 1, 2009.

Fiscal Year

The period beginning July 1, and ending on the next June 30.

Eligibility for Participation

The Plan is closed to new participants.

Accrual of Benefits

An eligible participant's monthly benefit shall be equal to the product of 2.25% of the participant's final average compensation, and the number of years of credited service at retirement or termination.

Benefits

Normal Retirement

Eligibility	Attainment of age 55 with 25 or more years of credited service or age 60 and 10 or more years of credited service.
Benefit	Unreduced Accrued Benefit payable immediately.

Early Retirement

Eligibility	Attainment of age 55 with 15 or more years of credited service.
Benefit	The early retirement benefit shall be equal to the participant's Accrued Benefit, reduced by 0.5% for each month by which the date of benefit commencement precedes the attainment of age 60.

Termination

Eligibility	10 years of credited service.
Benefit	The participant's Accrued Benefit payable at age 60.

Death Before Retirement

Eligibility	10 years of credited service.
Benefit	If a participant dies after becoming vested but prior to commencement of benefit, the spouse or beneficiary will receive a benefit as if the participant had retired under the joint and 100% survivor option. The beneficiary may elect to receive a lump sum payment in lieu of monthly benefits.

Disability

Eligibility	Totally and permanently disabled at a time prior to normal retirement date after completion of 10 years of credited service.
Benefit	Accrued Benefit payable immediately, reduced for any earning from gainful employment, worker's compensation or unemployment payments.

Final Average Compensation

Defined as the average of the five consecutive years of compensation out of the previous 10 years that produces the highest average. Compensation includes base salary or wages, overtime salary or wages, longevity pay, vacation, holiday or illness pay, and worker's compensation benefits.

Credited Service

The number of calendar years worked by a participant. If the participant works less than 1,000 hours in a calendar year, the credited service granted for that calendar year will be the number of hours worked divided by 1,000.

Employee Contributions

5% of compensation.

Payment Forms

Normal Form	Single Life Annuity
Optional Forms	50% or 100% Joint and Survivor Annuity
	Social Security Adjustment Annuity

Actuarial Equivalence

1971 Group Annuity Mortality Table, set back no years for males and five years for females, and the interest rate published monthly by the Pension Benefit Guaranty Corporation for use in converting a series of monthly annuity payments into a lump sum value.

Cost-of-Living Allowance (COLA)

None

Plan Provisions Not Included

We are not aware of any plan provisions not included in the valuation.

Adjustments Made for Subsequent Events

We are not aware of any event following the measurement date and prior to the date of this report that would materially impact the results of this report.

Valuation Date	June 30, 2019
Participant and Asset Information Collected as of	June 30, 2019
Cost Method	Individual Entry Age Cost Method % of pay
Amortization Method	13 year closed level dollar amortization of Unfunded Actuarial Accrued Liability
Asset Valuation Method	4 year smoothing of asset gains and losses
Interest Rates	6.50% net of expenses The interest rate is the long-term rate of return on assets. This assumption is supported by the investment mix of the plan assets and long-term capital market return assumptions.
Annual Pay Increases	2.00% The annual pay increase assumption is based on recent experience and future expectations.
Mortality Rates	
Healthy & Disabled	RP-2014 Combined Mortality with generational improvements projected beginning in 2006 with Scale MP-2018 As the plan is not large enough to have credible experience, mortality assumptions are set to reflect general population trends.
Marital Status and Ages	100% of Participants assumed to be married with wives assumed to be 3 years younger than husbands.

Retirement Rates

Rates based on age shown below.

Age	Rate
55	30%
56	25%
57	20%
58	15%
59	20%
60	20%
61	40%
62	70%
63	50%
64	50%
65	80%
66	70%
67	60%
68	60%
69	70%
70	100%

Disability Rates

Rates based on age. Sample rates below.

Age	Rate
20	0.05%
25	0.07%
30	0.08%
35	0.10%
40	0.16%
45	0.24%
50	0.39%
55	0.69%
60	1.15%

Withdrawal Rates

Rates based on age and service. Sample rates below.

Age	Service	Rate
ALL	0	30.00%
ALL	1	20.00%
ALL	2	15.00%
ALL	3	10.00%
ALL	4	7.00%
25	5+	6.00%
30	5+	5.50%
35	5+	4.40%
40	5+	1.85%
45	5+	1.25%
50	5+	1.25%
55	5+	1.25%
60	5+	1.25%